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Earth Resources	(NASA SP-7041(04))
Earth Resources	(NASA SP-7041(05))
Earth Resources	(NASA SP-7041(06))
Earth Resources	(NASA SP-7041(07))
Earth Resources	(NASA SP-7041(08))
Earth Resources	(NASA SP-7041(09))
Earth Resources	(NASA SP-7041(10))
Earth Resources	(NASA SP-7041(11))
Earth Resources	(NASA SP-7041(12))
Earth Resources	(NASA SP-7041(13))
Earth Resources	(NASA SP-7041(14))
Earth Resources	(NASA SP-7041(15))
Earth Resources	(NASA SP-7041(16))
Earth Resources	(NASA SP-7041(17))
Earth Resources	(NASA SP-7041(18))
Earth Resources	(NASA SP-7041(19))
Earth Resources	(NASA SP-7041(20))
Earth Resources	(NASA SP-7041(21))
Earth Resources	(NASA SP-7041(22))
Earth Resources	(NASA SP-7041(23))
Earth Resources	(NASA SP-7041(24))
Earth Resources	(NASA SP-7041(25))
Earth Resources	(NASA SP-7041(26))
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NASA SP-7041 (28)

EARTH RESOURCES

A Continuing Bibliography With Indexes

Issue 28

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced between October 1 and December 31, 1980 in

- Scientific and Technical Aerospace Reports (STAR)
- International Aerospace Abstracts (IAA).

NASA Scientific and Technical Information Branch 1981 National Aeronautics and Space Administration Washington, DC

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INTRODUCTION

The technical literature described in this continuing bibliography may be helpful to researchers in numerous disciplines such as agriculture and forestry, geography and cartography, geology and mining, oceanography and fishing, environmental control, and many others. Until recently it was impossible for anyone to examine more than a minute fraction of the earth's surface continuously. Now vast areas can be observed synoptically, and changes noted in both the earth's lands and waters, by sensing instrumention on orbiting spacecraft or on aircraft.

This literature survey lists 436 reports, articles, and other documents announced between October 1 and December 31, 1980 in *Scientific and Technical Aerospace Reports (STAR)*, and *International Aerospace Abstracts (IAA)*.

The coverage includes documents related to the identification and evaluation by means of sensors in spacecraft and aircraft of vegetation, minerals, and other natural resources, and the techniques and potentialities of surveying and keeping up-to-date inventories of such riches. It encompasses studies of such natural phenomena as earthquakes, volcanoes, ocean currents, and magnetic fields; and such cultural phenomena as cities, transportation networks, and irrigation systems. Descriptions of the components and use of remote sensing and geophysical instrumentation, their subsystems, observational procedures, signature and analyses and interpretive techniques for gathering data are also included. All reports generated under NASA's Earth Resources Survey Program for the time period covered in this bibliography will also be included. The bibliography does not contain citations to documents dealing mainly with satellites or satellite equipment used in navigation or communication systems, nor with instrumentation not used aboard aerospace vehicles.

The selected items are grouped in nine categories. These are listed in the Table of Contents with notes regarding the scope of each category. These categories were especially chosen for this publication, and differ from those found in STAR and IAA.

Each entry consists of a standard bibliographic citation accompanied by an abstract. The citations and abstracts are reproduced exactly as they appeared originally in STAR, or IAA, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the variation in citation appearance.

Under each of the nine categories, the entries are presented in one of two groups that appear in the following order:

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vii

TABLE OF CONTENTS

Subject Categories

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Abs	stracts in this Bibliography are grouped under the following categories:	page:
01	AGRICULTURE AND FORESTRY Includes crop forecasts, crop signature analysis, soil identification, disease detection, harvest estimates, range resources, timber inventory, forest fire detection, and wildlife migration patterns.	173
02	ENVIRONMENTAL CHANGES AND CULTURAL RESOURCES Includes land use analysis, urban and metropolitan studies, environmental impact, air and water pollution, geographic information systems, and geographic analysis.	181
03	GEODESY AND CARTOGRAPHY Includes mapping and topography.	185
04	GEOLOGY AND MINERAL RESOURCES Includes mineral deposits, petroleum deposits, spectral properties of rocks, geological exploration, and lithology.	189
05	OCEANOGRAPHY AND MARINE RESOURCES Includes sea-surface temperature, ocean bottom surveying imagery, drift rates, sea ice and icebergs, sea state, fish location.	195
06	HYDROLOGY AND WATER MANAGEMENT Includes snow cover and water runoff in rivers and glaciers, saline intrusion, drainage analysis, geomorphology of river basins, land uses, and estuarine studies.	201
07	DATA PROCESSING AND DISTRIBUTION SYSTEMS Includes film processing, computer technology, satellite and aircraft hard- ware, and imagery.	209
08	INSTRUMENTATION AND SENSORS Includes data acquisition and camera systems and remote sensors.	223
09	GENERAL Includes economic analysis.	227
PE CO CO	UBJECT INDEX RSONAL AUTHOR INDEX ORPORATE SOURCE INDEX ONTRACT NUMBER INDEX PORT/ACCESSION NUMBER INDEX	B-1 C-1

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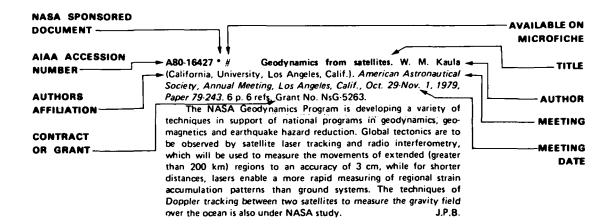
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TYPICAL CITATION AND ABSTRACT FROM STAR

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NASA ACCESSION	→ N80-15526*# Geological Survey, Reston, Va. CENTRAL ATLANTIC REGIONAL ECOLOGICAL TEST SITE: A PROTOTYPE REGIONAL ENVIRONMENTAL INFORMA- TION SYSTEM, VOLUME 1 Final Report SOURCE
	Robert H. Alexander, Prinicipal Investigator 26 Sep. <u>1979</u> 384 p. Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls,
AUTHOR	
CONTRACT	HC A17/MF A01 CSCL 08F
OR GRANT-	The author has identified the following significant results.
REPORT	LANDSAT data showed the test region in 1972 to be 9% urban and built-up land. 38% agriculture. 50% forest. 3% nonforested wetlands, and less than 1% barren land, exclusive of water-covered areas. A comprehensive user evaluation revealed greatest demand for high-altitude aerial photography and the detailed maps and data products that can be derived from the metropolitan areas agencies, found relatively little use for LANDSAT imagery at 1:250.000 scale and corresponding manually interpreted land use maps.

TYPICAL CITATION AND ABSTRACT FROM IAA



EARTH RESOURCES

A Continuing Bibliography (Issue 28)

JANUARY 1981

01

AGRICULTURE AND FORESTRY

Include crop forecasts, crop signature analysis, soil identification, disease detection, harvest estimates, range resources, timber inventory, forest fire detection, and wildlife migration patterns.

A80-44262 * Vegetation clutter model. F. T. Ulaby (Kansas University Center for Research, Inc., Lawrence, Kan.). *IEEE Transactions on Antennas and Propagation*, vol. AP-28, July 1980, p. 538-545. 14 refs. Contract No. NAS9-15421.

The statistical behavior of the radar backscattering coefficient of agricultural crops is examined. The data used were obtained by the microwave active spectrometer (MAS) systems in 1975 and 1976. Based on an evaluation of the angular and spectral variation of the mean, median, and 90-percent dynamic range of the coefficient (dB) histograms, empirical expressions describing the joint angular and frequency dependence of the mean and median were generated for each linear polarization configuration. The clutter model thus generated covers the angular range between 0 deg (nadir) and 80 deg and the frequency range between 1 GHz and 18 GHz. Decorrelation of the coefficient with frequency spacing was also evaluated and modeled. (Author)

A80-46451 * Simulation of solar radiation absorption in vegetation canopies. D. S. Kimes (NASA, Goddard Space Flight Center, Earth Resources Branch, Greenbelt, Md.) and J. A. Smith (Colorado State University, Fort Collins, Colo.). *Applied Optics*, vol. 19, Aug. 15, 1980, p. 2801-2811. 26 refs. Grant No. DAAG29-78-G 0045.

A solar radiation canopy absorption model, including multiple scattering effects, was developed and tested for a lodgepole pine (Pinus contorta) canopy. Reflectance above the canopy, spectral transmittance to the ground layer, and geometric and spectral measurements of canopy elements were made. Relatively large differentials occurred in spectral absorption by canopy layers, especially in the photosynthetically active region, as a function of solar zenith angle. In addition, the proportion of total global irradiance absorbed by individual layers varied greatly as a function of solar zenith angle. However, absorption by the entire canopy system remained relatively constant. (Author)

A80-47744 * Unsupervised classification of MSS Landsat data for mapping spatially complex vegetation. J. R. G. Townshend and C. O. Justice (NASA, Goddard Space Flight Center, Greenbelt, Md.). (Remote Sensing Society, Annual Conference, 5th, Durham, England, Dec. 18-20, 1978.) International Journal of Remote Sensing, vol. 1, Apr.-June 1980, p. 105-120. 15 refs. The various stages in carrying out a monocluster block unsupervised classification using Landsat MSS data are described. Procedures for carrying out these various stages were found to be far from well-established for the type of terrain being investigated, which is rugged and contains many small land cover units. Two particular difficulties were encountered: first, that of precise ground location of pixels; and, secondly, that of objectively evaluating the results. Ways in which these can be surmounted are suggested. (Author)

A80-47748 Soil water and plant canopy effects on remotely measured surface temperatures. J. Cihlar (Canada Centre for Remote Sensing, Ottawa, Canada). *International Journal of Remote Sensing*, vol. 1, Apr.-June 1980, p. 167-173. 7 refs.

A study was performed to assess the effects of soil water and crop canopy on apparent temperatures observed by means of remote sensors, and to determine the impact of these effects on remote soil water monitoring. Airborne thermal scanner and apparent reflectance data (one date) and ground PRT-5 data (three dates) were collected primarily over barley and other small grain canopies. Plant heights, cover, and available soil water for four layers in the top 20 cm were determined. Analysis of the data showed a close inverse linear relationship between the available water and the day minus night temperature difference for thick barley canopies (plant cover above 90%) only. The use of apparent reflectance values in the visible region did not improve available soil water regression equations substantially. These results suggest that the available water or plant stress could only be accurately determined for thick canopies, and that the reflectance data could probably be used to identify such canopies but would not improve regression estimates of soil water from remote sensing data. (Author)

A80-49100 * Separability of agricultural cover types in spectral channels and wavelength regions. R. Kumar (General Electric Co., Space Div., Lanham, Md.). *IEEE Transactions on Geoscience and Remote Sensing*, vol. GE-18, July 1980, p. 263-267. 7 refs. Research supported by the Conselho Nacional de Desenvolvimento Científico e Technológico; Grant No. NGL-15-005-112.

This study was a continuation of a more complete evaluation of the spectral channels as well as wavelength regions - visible, near infrared, middle infrared, and thermal infrared - with respect to their estimated probability of correct classification Pc in discriminating agricultural cover types reported previously by Kumar and Silva (1977). Multispectral scanner data in twelve spectral channels in the wavelength range of 0.4-11.7 microns acquired in the middle of July for three flightlines were analyzed by applying automatic pattern recognition techniques. The same analysis was performed for the data acquired in the middle of August 1971, over the same three flightlines, to investigate the effect of time on the results. The effect of deletion of each spectral channel as well as each wavelength regions on Pc is given. Values of Pc for all possible combinations of are also given. The overall values of Pc were found to be greater for the data of the middle of August than the data of the middle of July. (Author)

A80-49136 Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979. Symposium sponsored by the Missouri River Basin Commission and U.S. Geological Survey. Ornaha, Neb., Missouri River Basin Commission, 1980. 85 p.

Papers are presented reviewing the status of irrigated land identification by means of remote sensing techniques, with particular emphasis on applications in the Missouri River Basin. Specific topics include the Landsat series of remote sensing satellites, processing techniques for remotely sensed data, the identification and location of land irrigated by center-pivot irrigation systems using satellite imagery, irrigation mapping in western Kansas, the Klamath River Basin of Oregon and in California using Landsat imagery, and the application of Landsat-derived irrigated cropland maps for water use determination in the high plains. A.L.W.

A80-49137 # Overview of the Landsat system. W. H. Anderson (U.S. Geological Survey, EROS Data Center, Sioux Falls, S. Dak.). In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979. Omaha, Neb., Missouri River Basin Commission, 1980, p. 1-4.8 refs.

Information available from the Landsat series of earth observation satellites is reviewed. It is pointed out that an individual Landsat scene records an area of 185×178 km and that continual coverage of most of the world is available at 18-day intervals. The Landsat Multispectral Scanner (MSS) and the processing of MSS data into false-color images are discussed, and the return beam vidicon camera, data collection system and computer-compatible tape capabilities of the Landsat satellites are indicated. Documented applications of Landsat data are noted to include the production of general agricultural resource maps, the selection of areas for more detailed investigation, the determination of optimal dates for larger scale overflights, the updating of land use and agricultural data, and the location of areas of early ephemeral forage production. A.L.W.

A80-49139 * # A review of future remote sensing satellite capabilities. M. A. Calabrese (NASA, Resource Observation Div., Washington, D.C.). In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979.

Omaha, Neb., Missouri River Basin Commission, 1980, p. 17-26.

Existing, planned and future NASA capabilities in the field of remote sensing satellites are reviewed in relation to the use of remote sensing techniques for the identification of irrigated lands. The status of the currently operational Landsat 2 and 3 satellites is indicated, and it is noted that Landsat D is scheduled to be in operation in two years. The orbital configuration and instrumentation of Landsat D are discussed, with particular attention given to the thematic mapper, which is expected to improve capabilities for small field identification and crop discrimination and classification. Future possibilities are then considered, including a multi-spectral resource sampler supplying high spatial and temporal resolution data possibly based on push-broom scanning, Shuttle-maintained Landsat follow-on missions, a satellite to obtain high-resolution stereoscopic data, further satellites providing all-weather radar capability and the Large Format Camera. A.L.W.

A80-49140 * # Identifying and locating land irrigated by center-pivot irrigation systems using satellite imagery. R. O. Hoffman (Nebraska, University, Lincoln, Neb.). In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979.

Omaha, Neb., Missouri River Basin Commission, 1980, p. 31-36. 5 refs. Research supported by the U.S. Department of the - Interior, University of Nebraska, and Nebraska Natural-Resources Commission; Grant No. NGL-28-004-020.

A methodology for using Landsat imagery for the identification and location of land irrigated by center-pivot irrigation systems is presented. The procedure involves the use of sets of Landsat band 5 imagery taken separated in time by about three weeks during the irrigation season, a zoom transfer scope and mylar base maps to record the locations of center pivots. Further computer processing of the data has been used to obtain plots of center-pivot irrigation systems and tables indicating the distribution and growth of systems by county for the state of Nebraska, and has been found to be in 95% agreement with current high-altitude IR photography. The information obtainable can be used for models of ground-water

A80-49141 # The Columbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans. G. E. Johnson (U.S. Geological Survey, EROS Data Center, Sioux Falls, S. Dak.) and T. R. Loveland. In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979.

AIW

aquifers or resource planning.

Omaha, Neb., Missouri River Basin Commission, 1980, p. 37-47.

The Columbia River and Tributaries Irrigation Withdrawals Analysis Project was instituted as a demonstration project to examine the utility of remote sensing techniques for meeting the information requirements for estimating the water requirements for future irrigation development in the Columbia River Basin. Project plans are for the evaluation of the irrigated agriculture of the Umatilla and Yakima sub-basins by the manual interpretation and digital analysis of Landsat images. A feasibility analysis has been conducted to evaluate existing land cover, soil characteristics and slope as well as distance from water resource's as variables to be used in creating a composite map of suitability for irrigation development of a small area. The analysis has effectively demonstrated the usefulness of a geobased information system in combination with remotely sensed data to predict the location of irrigation development and will be applied to the larger project study areas. A.L.W.

A80-49142 * # Irrigation mapping in western Kansas using Landsat. I - Key parameters. J. Poracsky. In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979. Omaha, Neb., Missouri River Basin Commission, 1980, p. 48-54. 14 refs. Grant No. NGL 17-004-024.

The procedure used in the identification and mapping of irrigated lands in six counties of western Kansas is presented and key considerations for the identification of irrigated lands during the project are discussed. The procedure involved the compilation of a field-by-field map of irrigated lands on the basis of multi-date Landsat band 5 imagery, the entry of map data into a computer, and the retrieval of the data in the form of maps, tables and statistics. Comparison of the positional results of the image interpretation with statistical data for a single county was used to verify the mapping procedure, as accuracies of from 80-100% were obtained, depending on the type of crop. Considerations relevant to the identification of irrigated land on the basis of remote sensing data include the form of the final data, irrigation practices in the area, the soil moisture budget, the number and kinds of crops, the crop calendar, and the availability of usable imagery. A.L.W.

A80-49143 # Irrigation mapping in western Kansas using Landsat. II - Practices and problems. T. H. L. Williams (Kansas, University, Lawrence, Kan.). In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979.

Omaha, Neb., Missouri River Basin Commission, 1980, p. 55-63.

Refinements and alternatives to the techniques used to produce maps of irrigated lands in six western Kansas counties on the basis of multi-date Landsat band 5 imagery are discussed, and the relation between irrigation parameters and ground water decline is considered. Modifications planned to reduce interpretation time and simplify data coding include the increase in the size of the reporting unit and the use of a digitizer to input location coordinates into the computer, while digital image analysis techniques may be used to replace manual interpretation. Considerations in the selection of interpretation techniques are discussed, with emphasis on the types of crop data required. A model of the effects of irrigation on the decline of ground water levels is then developed on the basis of the results of the irrigation study. A.L.W.

A80-49144 # Development and application of Landsatderived irrigation cropland maps for water use determination in the High Plains. F. J. Heimes (U.S. Geological Survey, Denver, Colo.) and G. P. Thelin (U.S. Geological Survey, Moffett Field, Calif.). In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979. Omaha, Neb., Missouri River Basin Commission, 1980, p. 76, 77.

A80-49652 # Evaluation of the fire hazard of taiga forests from their thermal radio emission (Otsenka pozharnoi opasnosti taezhnykh lesov po radioteplovomu izlucheniiu). E. N. Valendik, E. K. Kisiliakhov, and A. I. Sukhinin (Akademiia Nauk SSSR, Institut Lesai Drevesiny, Krasnoyarsk, USSR). *Issledovanie Zemli iz Kosmosa,* May-June 1980, p. 14-19. 9 refs. In Russian.

A microwave remote sensing method has been developed for investigating the fire hazard of taiga forests. The seasonal dynamics of the microwave thermal emission intensity of forest elements is considered as a function of the moisture content of these elements. The limiting brightness temperature (above which there is a fire hazard) is determined for an emission wavelength of 2.25 cm. B.J.

A80-49655 # A method for mapping soil reflectance (K voprosu o metodike sostavleniia kart otrazhatel'noi sposobnosti pochvennogo pokrova). A. P. Tishchenko and G. I. Stepanova (Gosudarstvennyi Nauchno-Issledovatel'skii Tsentr Izucheniia Prirodnykh Resursov, Moscow, USSR). Issledovanie Zemli iz Kosmosa, May-June 1980, p. 34-40. In Russian.

A method based on the spectral brightness coefficient has been developed for the mapping of soil reflectance. As an example, soil reflectance maps were compiled for various types and subtypes of soils in the European part of the Soviet Union. Maps were compiled for wavelengths of 0.5-0.6 micron and 0.7-0.8 micron. B.J.

A80-50877 Inventory, mapping and evaluation of the agricultural potential of soils - Status of studies and needs of remote sensing (Inventaire, cartographie et évaluation des potentialités agricoles des sols - Etat des recherches et des besoins en télédétection). B. Naert, M. Jamagne, J. Kilian, N. Leneuf, E. Servat (Institut National de la Recherche Agronomique; Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières; Office de la Recherche Scientifique et Technique Outre-Mer, Paris, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 6-13. In French.

The utilization of aerial and spatial remote sensing techniques for soil mapping and classification in France is discussed. A theoretical model separates the soil mapping procedure into three successive phases: (a) a preliminary study, (b) the actual survey, and (c) an analysis of the results. The relative importance of each phase is dependent upon the chosen scale. The application of remote sensing at four different levels with the model is emphasized: (1) the exploitation of raw data from existing references and documents, (2) the preparation of various types of soil models before the actual survey, (3) the addition of complementary data before synthesizing the results, and (4) the transfer and preparation of data for the final map. The amount of remote sensing data which is needed during the procedure varies at different stages and for different scales. A.C.W. A80-50900 The cartography of Chizé forest through remote sensing (La cartographie de la forêt de Chizé par télédétection). J.-M. Monget, M. Poisson (Paris, Ecole Nationale Supérieure des Mines, Paris, France), and F. Verger (Ecole Normale Supérieure, Montrouge, Hauts-de-Seine, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 182-190. In French.

A simple classification method for multispectral imagery has been developed using digitized ground truth data. An application to Landsat data for forestry is discussed. (Author)

A80-50903 The use of satellite imagery for mapping - The study of soil moisture (Approche cartographique à partir des images spatiales - Connaissance du l'humidité des sols). M. C. Girard and J. P. Rogala (Institut National Agronomique Paris Grignon, Thiverval-Grignon, Yvelines, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 204-211. In French.

The possibility of using satellite imagery for the mapping of soil moisture is examined; Landsat observations of a region of Val de Loire are considered as an example. The region was characterized: (1) radiometrically, through the mean and type of variation, and (2) pedologically, through ground profiles and moisture medians. The use of satellite imagery for the mapping of ground water resources available to plant life is assessed. B.J.

A80-51944 * Aerial color infrared photography applications to citriculture. C. H. Blazquez (Florida, University, Lake Alfred, Fla.) and F. W. Horn, Jr. (NASA, Kennedy Space Center, Sciences, Technology, and Applications Office, Cocca Beach, Fla.). In: A new era in technology; Proceedings of the Seventeenth Space Congress, Cocca Beach, Fla., April 30-May 2, 1980. Cocca Beach, Fla., Canaveral Council of Technical Societies, 1980, p. 4-21 to 4-32, 14 refs.

Results of a one-year experimental study on the use of aerial color infrared photography in citrus grove management are presented. It is found that the spring season, when trees are in flush (have young leaves), is the best season to photograph visible differences between healthy and diseased trees. It is also shown that the best photography can be obtained with a 12-in, focal length lens. The photographic scale that allowed good photo interpretation with simple inexpensive equipment was 1 in. = 330 ft. The use of a window-overlay transparency method allowed rapid photo interpretation and data recording in computer-compatible forms. Aerial color infrared photography carried out during the spring season revealed a more accurate status of tree condition than visual inspection. V.L.

A80-53052 Errors incurred in estimating an area of uniform land cover using Landsat. P. F. Crapper (Commonwealth Scientific and Industrial Research Organization, Div. of Land Use Research, Canberra, Australia). *Photogrammetric Engineering and Remote Sensing*, vol. 46, Oct. 1980, p. 1295-1301. 11 refs.

A method of estimating areas of uniform land cover using the Landsat satellites is examined. It is pointed out that when the areas are small or when the boundaries are highly contorted, the relative errors in the area estimate may be very high: 1 percent for areas of 132 ha, 5 percent for areas of 15 ha, and 10 percent for areas of ha. A formula has been developed for the Landsat pixel which gives the variance of this area estimate. S.S.

A80-53056 * Using 70-mm aerial photography to identify rangeland sites. J. H. Everitt, A. H. Gerbermann, M. A. Alaniz, and R. L. Bowen (U. S. Department of Agriculture, Weslaco, Tex.). *Photogrammetric Engineering and Remote Sensing*, vol. 46, Oct. 1980, p. 1339-1348. 17 refs. NASA Order S-53876-G.

A south Texas rangeland area was used as a study site to test the

01 AGRICULTURE AND FORESTRY

use of microdensitometry on 70-mm color-infrared and black-andwhite photographs (scale 1:19,000) for distinguishing among 11 range sites (two brushland, seven grassland, two barren land) during the winter (February), spring (May), and summer (August) of 1976. Color-infrared photographs were also taken at a scale of 1:42,000 for the summer date. Film optical density readings were made on one color-infrared film with white light only. The best separations among density readings for all range sites were obtained using white light exposed on color-infrared film in the summer when vegetation was at peak foliage development. Results from this study indicate that 70-mm aerial color-infrared photography at a scale of 1:19,000 or 1:42,000 has good potential for identifying range sites in large and inaccessible areas, and could be a useful tool for range management. (Author)

A80-53890 * Microwave radiometer measurements of soil moisture content. R. W. Newton (Texas A & M University, College Station, Tex.) and J. W. Rouse, Jr. (Missouri-Columbia, University, Columbia, Mo.). *IEEE Transactions on Antennas and Propagation*, vol. AP-28, Sept. 1980, p. 680-686. 12 refs. Contract No. NAS9-13904.

A unique set of radiometer measurements is presented, recorded during a 1000-h day and night monitoring of irrigated fields from fully saturated to completely dry. Radiometer measurements were recorded at 2.8-cm (X-band) and 21.4-cm (L-band) wavelengths for a range of incident angles from nadir to 50 deg. Soil moisture and soil temperature profile measurements were recorded to a depth of 15 cm. The test site was located in east-central Texas on a clay soil (Miller clay). Three bare-surface plots were used, each having a distinctly different surface roughness. Vegetated plots were also

measured. The data quantify the sensitivity of microwave radiometer measurements to soil moisture variations, the effect of surface roughness on the measurement, and the influence of surface vegetation. (Author)

N80-29797*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.

OPERATIONAL CHANGES FOR THE KANSAS STATE UNIVERSITY WHEAT MODEL

R. L. Davenport, Principal Investigator Dec. 1977 30 p ERTS

(Contract NAS9-15200)

(E80-10223; NASA-CR-160633; LEC-11393; JSC-13813) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-29804*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

REMOTE SENSING OF TOTAL DRY-MATTER ACCUMULA-TION IN WINTER WHEAT

Compton J. Tucker. Brent N. Holben, James H. Elgin, Jr. (Agricultural Research Center, Beltsville, Md.), and James E. McMurtrey, III, Principal Investigators (Agricultural Research Center, Beltsville, Md.) Jan. 1980 28 p refs Submitted for publication ERTS

(E80-10235; NASA-TM-80631) Avail: NTIS HC A03/MF A01 CSCL 02C

The author has identified the following significant results. Red and photographic-infrared spectral data collected on 21 dates over the growing season with a hand-held radiometer was quantitatively correlated with total dry-matter accumulation in winter wheat. The spectral data were found to be highly related to vigor and condition of the plant canopy. Two periods of drought stress and subsequent recovery from it were readily apparent in the spectral data. Simple ratios of the spectral data compensated for variations in solar intensities and, when integrated over the growing season, explained 79% of the variation in total aboveground accumulation of dry matter.

N80-29815*# California Univ., Santa Barbara.

USE OF COLLATERAL INFORMATION TO IMPROVE LANDSAT CLASSIFICATION ACCURACIES Semiannual

Progress Report, Oct. 1979 - Mar. 1980

Alan H. Strahler and John E. Estes, Principal Investigators Mar. 1980 75 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (Grant NsG-2377) (E80-10268; NASA-CR-163340) Avail: NTIS HC A04/MF A01 CSCL 08B

N80-29819*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

SAMPLING OF RECTANGULAR REGIONS

George Terrell, Principal Investigator Jun. 1980 16 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS (Contract NAS9-15800; Proj. AgRISTARS) (E80-10272; NASA-CR-160730; SR-L0-00460; LEMSCO-14806; JSC-16362) Avail: NTIS HC A02/MF A01 CSCL 088

N80-29821*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

EOD SYSTEMS AND FACILITIES WORKLOAD REQUIRE-MENTS FORECAST

W. A. Stevens and J. A. Vitellaro, Principal Investigators Apr. 1977 175 p ERTS

(Contract NAS9-15200) (E80-10277: NASA-CR-160708; LEC-10522; JSC-12881) Avail: NTIS HC A08/MF A01 CSCL 05A

N80-29824*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

COMPOSITION AND ASSEMBLY OF A SPECTRAL DATA BASE FOR CORN AND SOYBEAN MULTICROP SEG-MENTS

M. H. Trenchard, M. L. Sestak, and M. C. Kinsler, Principal Investigators Jun. 1980 338 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS (Contract NAS9-15800; Proj. AgRISTARS)

(E80-10281; NASA-CR-160726; AR-10-00407;

LEMSCO-14250; JSC-13723) Avail: NTIS HC A15/MF A01 CSCL 20C

N80-30823*# Purdue Univ., Lafayette, Ind. Lab for Applications of Remote Sensing.

[REMOTE SENSING RESEARCH STUDIES] Final Report, 1 Dec. 1978 - 30 Nov. 1979

D. A. Landgrebe Nov. 1979 126 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15466; Proj. AgRISTARS)

(E80-10117: NASA-CR-160551; SR-P9-00414;

LARS-120279) Avail: NTIS HC A07/MF A01 CSCL 02C

N80-30825*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

FOREST RESOURCE INFORMATION SYSTEM, PHASE 3 Quarterly Report, 1 Jan. - 31 Mar. 1980

R. P. Mroczynski, Principal Investigator, S. Schwingendorf, D. Freeman, C. Kozlowski, C. Smith, and C. Peterson 18 Apr. 1980 121 p Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (Contract NAS9-15325)

(E80-10242: NASA-CR-160725; LARS-CR-041880) Avail: NTIS HC A06/MF A01 CSCL 02F

N80-30841*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

EVALUATING THE REFORESTED AREA FOR THE MUNICI-PALITY OF BURI BY AUTOMATIC ANALYSIS OF LANDSAT IMAGERY [AVALIACAO DE AREAS REFLORESTADAS DO

MUNICIPIO DE BURI. ATRAVES DE ANALISE AUTOMAT-ICA DE IMAGENS DO LANDSAT

Nelson deJesusParada, Principal Investigator, David Chung Liang Lee, Redro Hernandez Filho, and Yosio Edemir Shimabukuro Dec. 1979 24 p refs in PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 FRTS

(E80-10258; NASA-CR-163365; INPE-1635-RPE/094) Avail: NTIS HC A02/MF A01 CSCL 02F

The author has identified the following significant results. The class of reforestation (Pinus, Eucalyptus, Araucaria) was defined using iterative image analysis (1-100) and LANDSAT MSS data. Estimates of class area by 1-100 were compared with data supplied by the forestry institute in Sao Paulo. LANDSAT channels 4 and 5 served to differentiate the Pinus, Eucalyptus, and Araucaria from the other trees. Channels 6 and 7 gave best results for differentiating between the classes. A good representative spectral response was obtained for Auraucaria on these two channels. The small relative differences obtained were +4.24% for Araucaria, -7.51% for Pinus, and -32.07% for Eucalyptus.

N80-30843*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)

USE OF LANDSAT DATA FOR ESTIMATING THE AREA OF SUGAR CANE IN THE STATE OF SAO PAULO M.S. Thesis [USO DE DADOS DO LANDSAT PARA AVALIACAO DE AREAS OCUPADAS COM CANA-DE-ACUCAR NO ESTADO DE SAO PAWLO]

Nelson deJesusParada, Principal Investigator and Francisco Jose Mendonca Apr. 1980 83 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS

(E80-10260; NASA-CR-163367; INPE-1713-TDL/023) Avail: NTIS HC A05/MF A01 CSCL 02C

N80-30844*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil),

UTILIZATION OF LANDSAT DATA TO INVENTORY THE SUGAR CANE IN THE STATE OF SAO PAULO [UTILIZACAO DE DADOS DO LANDSAT PARA INVENTARIO DA CANA-DE-ACUCAR DO ESTADO DE SAO PAULO

Nelson DeJesusParada, Principal Investigator, Francisco Jose Mendonca. David Chung Liang Lee, Yosio Edemir Shimabukuro, Antonio Tebaldi Tardin, Rene Antonio Novaes, and Sherry Chou Che Jan. 1980 18 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS

(E80-10261; NASA-CR-163368; INPE-1668-NTE/157) Avail: NTIS HC A02/MF A01 CSCL 02C

N80-30847*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

THE INTEGRATED ANALYSIS PROCEDURE FOR IDENTIFI-CATION OF SPRING SMALL GRAINS AND BARLEY R. W. Payne, Principal Investigator May 1980 20 p refs

Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS

(Contract NAS9-15800: Proj. AgRISTARS)

(E80-10274; NASA-CR-160727; FC-L0-451; LEMSCO-14385; JSC-16360) Avail: NTIS HC A02/MF A01 CSCL 02C

N80-30851*# Pan American Univ., Edinburg, Tex. Dept. of Physical Science.

LIGHT REFLECTANCE, TRANSMITTANCE, AND UTILIZA-TION WITHIN A VEGETATIVE CANOPY Final Report, 1 Oct. 1978 - 30 Sep. 1979

E. W. LeMaster and J. E. Chance, Principal Investigators Apr. 1980 39 p refs ERTS

(Grant NsG-9015) (E80-10282; NASA-CR-163347) Avail: NTIS HC A03/MF A01 CSCL 20F

N80-30860*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

AGRISTARS CROPPING PRACTICES AND CROP CHARAC-TERISTICS BASED ON 1979 ESCS OBSERVATIONS

M. A. Wise and D. E. Pitts, Principal Investigators Apr. 1980 448 p Sponsored by NASA, USDA, Dept. of Commerce. Dept. of Interior and Agency for International Development (Proj. AgRISTARS)

(E80-10292; NASA-TM-81105; SR-JO-00438; JSC-16353) Avail: NTIS HC A 19/MF A01 CSCL 02C

N80-30863*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

AN EXPLORATORY STUDY TO DEVELOP A CLUSTER-BASED AREA ESTIMATION PROCEDURE

R. K. Lennington, Principal Investigator May 1980 102 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS (Contract NAS9-15800; Proj. AgRISTARS)

(E80-10295; NASA-CR-160729; SR-LO-00442;

LEMSCO-14670; JSC-16358) Avail: NTIS HC A06/MF A01 CSCL 02C

N80-30867*# Montana Univ., Missoula. Wildlife-Wildlands Inst

GRIZZLY BEAR HABITAT ANALYSIS. SECTION 3: LANDSAT-1 MULTISPECTRAL IMAGERY AND COMPUTER ANALYSIS OF GRIZZLY BEAR HABITAT

John J. Craighead, Principal Investigator 1980 300 p refs Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(F80-10300⁻ NASA-CR-163382) Avail[.] NTIS HC A13/MF A01 CSCL 06C

N80-30869*# Kansas State Univ., Manhattan. Evapotranspiration Lab.

USE OF SOIL MOISTURE INFORMATION IN VIELD MODELS

Edward Kanemasu, Arlin Feyerherm, John Hanks, Mel Keener, Dan Lawlor, Phil Rasmussen, Harold Reetz, Keith Saxton, and Craig Wiegand, Principal Investigators Jul. 1980 48 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-14899; Proj. AgRISTARS) (E80-10302; NASA-CR-160749; SM-MO-00462) Avail: NTIS HC A03/MF A01 CSCL 08M

N80-30882# Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

REMOTE SENSING OF WILDLAND RESOURCES: A STATE-OF-THE-ART REVIEW Forest Service Final General **Technical Report**

Robert C. Aldrich Dec. 1979 62 p refs (PB80-184609; FSGTR-RM-71) NTIS Avail: HC A04/MF A01 CSCL 14E

A review, with literature citations, of current remote sensing technology, applications, and costs for wildland resource management, including collection, interpretation, and processing of data gathered through photographic and nonphotographic techniques for classification and mapping, interpretative information for specific applications, measurement of resource parameters, and observations and counts of occurrences is presented.

GRA

N80-32805*# Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.

EVALUATION OF REMOTE SENSING TECHNIQUES ON SELECTED FOREST SITES IN FLORIDA Final Report

L. G. Arvanitis, R. Reich, and R. Newburne, Principal Investigators Feb. 1980 127 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS (Contract NAS10-9466) NASA-CR-154635) NTIS (E80-10296; Avail: HC A07/MF A01 CSCL 08B

N80-32809*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.

AN ALGORITHM FOR ESTIMATING CROP CALENDAR SHIFTS OF SPRING SMALL GRAINS USING LANDSAT SPECTRAL DATA

Eric P. Crist and William A. Malila, Principal Investigators Jun. 1980 40 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS

(Contract NAS9-15476; Proj. AgRISTARS)

(E80-10314; NASA-CR-160762; ERIM-132400-41-T; *

SR-EO-00459) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-32815*# California Univ., Berkeley. Space Sciences Lab.

IRRIGATED LANDS ASSESSMENT FOR WATER MANAGE-MENT APPLICATIONS PILOT TEST (APT) Final Report

Robert N. Colwell, John E. Estes, and Larry Tinney, Principal Investigators 31 Jan. 1980 156 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(Grant NsG-2207)

(E80-10324; NASA-CR-163404; SSL-Ser-21-Issue-5) Avail: NTIS HC A08/MF A01 CSCL 08H

N80-32818*# California Univ., Berkeley. Space Sciences Lab.

DEVELOPMENT OF AI PROCEDURES FOR DEALING WITH THE EFFECTS OF EPISODAL EVENTS ON CROP TEMPORAL SPECTRAL RESPONSE AND DEVELOPMENT OF AI GUIDELINES FOR CORN AND SOYBEAN LABELING Annual Progress Report, 15 Nov. 1978 - 14 Nov. 1979

Robert N. Colwell, Principal Investigator Nov. 1979 193 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS (Contract NAS9-14565; Proj. AgRISTARS)

(E80-10327; NASA-CR-160733; SSL-Ser-20-Issue-44; SR-B9-00434) Avail: NTIS HC A09/MF A01 CSCL 02C

N80-32819*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. USING LANDSAT DIGITAL DATA FOR ESTIMATING GREEN BIOMASS

D. W. Deering and Robert H. Haas, Principal Investigators (Texas A and M Univ., College Station) Jun. 1980 26 p refs Presented at the 30th Ann. Meeting of the Soc. for Range Management Symp. on Rangeland Remote Sensing, Portland, Oreg., 17 Feb. 1977 Submitted for publication Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E80-10328: NASA-TM-80727) Avail: NTIS HC A03/MF A01 CSCL 06C

The author has identified the follwoing significant results. Relationships between the quantity of mixed prairie rangelenad vegetation and LANDSAT MSS response were studied during four growing seasons at test sites throughout the United States Great Plans region, A LANDSAT derived parameter, the normalized difference was developed from theoretical considerations fro statistical estimation of the amount and seasonal condition of rangeland vegetation. This parameter was tested for application to local assessment of green forage biomass and regional monitoring of range feed conditions and drought. Results show that for grasslands in the Great Plains with near continuous vegetative cover and free of heavy brush and forbs, the LANDSAT digital data can provide a useful estimate of the quantity of green forage biomass (within 250 kg/ha), and at least five levels of pasture and range feed conditions can be adequately mapped for extended regions.

N80-32821*# Arizona Univ., Tucson. Office of Arid Lands Studies.

APPLIED REMOTE SENSING PROGRAM (ARSP) Annual Report, 1979 - 1980

Jack D. Johnson, Charles F. Hutchinson, David A. Mouat, Principal Investigators, Robert A. Schowengerdt, Linda S. Leigh, Michael C. Parton, Karen L. Reichardt, Charles H. Sauerwein, and Peter L. Warren Jul. 1980 87 p Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (Grant NGL-03-002-313)

(E80-10330; NASA-CR-163416) Avail: NTIS HC A05/MF A01 CSCL 08B

N80-32822*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif. INFRARED-TEMPERATURE VARIABILITY IN A LARGE AGRICULTURAL FIELD

John P. Millard, Robert C. Goettelman (LFE Corp., Richmond, Calif.), and Mary L. LeRoy, Principal Investigators Aug. 1980 26 p refs Submitted for publication Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E80-10331; NASA-TM-81222; A-8283) Avail: NTIS HC A03/MF A01 CSCL 02C

The combined effect of water carved gullies, varying soil color, moisture state of the soil and crop, nonuniform phenology, and bare spots was measured for commercially grown barley planted on varying terrain. For all but the most rugged terrain, over 80% of the area within 4, 16, 65, and 259 ha cells was at temperatures within 3 C of the mean cell temperature. The result of using relatively small, 4 ha instantaneous field of views for remote sensing applications is that either the worst or the best of conditions is often observed. There appears to be no great advantage in utilizing a small instantaneous field of view instead of a large one for remote sensing of crop canopy temperatures. The two alternatives for design purposes are then either a very high spatial resolution, of the order of a meter or so, where the field is very accurately temperature mapped, or a low resolution, where the actual size seems to make little difference

N80-32823*# Joint Research Centre of the European Communities, Ispra (Italy).

HCMM SATELLITE FOLLOW-ON INVESTIGATION NO. 025: SOIL MOISTURE AND HEAT BUDGET EVALUATION IN SELECTED EUROPEAN ZONES OF AGRICULTURAL AND ENVIRONMENTAL INTEREST (TELLUS PROJECT) Progress Report, 1 Sep. 1979 - 31 Mar. 1980

S. Galli deParatesi, Principal Investigator 31 Mar. 1980 63 p refs Sponsored by NASA HCMM (Proj. TELLUS)

(E80-10332; NASA-CR-163539; PR-2) Avail: NTIS HC A04/MF A01 CSCL 08M

N80-32824*# Joint Research Centre of the European Communities, Ispra (Italy).

FURTHER DEVELOPMENTS OF THE TELL-US MODEL 1: AN IMPLICIT FINITE DIFFERENCE SCHEME FOR THE NUMERICAL APPROXIMATION OF THE GROUND HEAT FLUX. 2: A SIMPLE ALGORITHM FOR ESTIMATING THE ACTUAL AND POTENTIAL EVAPOTRANSPIRATION OF VEGETATED SURFACES FROM ONE REMOTELY SENSED SURFACE TEMPERATURE NEAR THE DAILY MAXIMUM J. Huygen, Principal Investigator Nov. 1979 19 p refs Sponsored by NASA HCMM (Proj. TELLUS) (E80-10333; NASA-CR-163540) Avail: NTIS

(E80-10333; NASA-CR-163540) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-32830*# Martin Marietta Aerospace, Denver, Colo. THE APPLICABILITY OF REMOTE SENSING TO EARTH BIOLOGICAL PROBLEMS. PART 2: THE POTENTIAL OF REMOTE SENSING IN PEST MANAGEMENT Final Report J. T. Polhemus Aug. 1980 41 p refs 2 Vol. (Contract NAS9-15918) (NASA-CR-163589: MCR-80-610-pt-2: FR-2-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 06C

Five troublesome insect pest groups were chosen for study. These represent a broad spectrum of life cycles, ecological indicators, pest management strategies, and remote sensing requirements. Background data, and field study results for each of these subjects is discussed for each insect group. Specific groups studied include tsetse flies, locusts, western rangeland grasshoppers, range caterpillars, and mosquitoes. It is concluded that remote sensing methods are aplicable to the pest management of the insect groups studied. J.M.S.

N80-32833# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

PLANNING AND EXECUTION OF A PHOTOGRAPHIC MISSION OVER A WHEAT PRODUCING REGION IN RIO GRANDE DO SUL, BRAZIL

Paulo Cesar Gurgel de Albuquerque and Dal Arthur Cottrell Jun. 1980 11 \ensuremath{p}

(INPE-1793-RPE/165) Avail: NTIS HC A02/MF A01

A wheat survey program was completed with the execution of a photographic mission during the booting growth stage of wheat. Three 20 km. by 40 km. target areas in Rio Grande do Sul were flown after cost/time saving changes in aircraft. oxygen requirements, geometric parameters and base of operations. A WILD RC-10 metric camera with WRATTEN filter was used to expose color IR film to produce 1:20.000 scale transparencies and semicontrolled mosaics for hectareage estimations and data integration with hardware for CCT analyses. R.K.G.

N80-32835# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CHARACTERIZATION OF CERRADO VEGETATION USING AUTOMATICALLY CLASSIFIED LANDSAT MSS DATA

Joao Roberto Dos Santos, Vitor Celso DeCarvalho, and Hideyo Aoki (Sao Paulo Univ.) Jun. 1980 13 p refs Presented at the 14th Intern. Symp. on Remote Sensing of Environ., San Jose, Costa Rica, 23-30 Apr. 1980

(INPE-1790-RPE/162) Avail: NTIS HC A02/MF A01

The characterization of physiognomic unities of cerrado vegetation through automatic IMAGE 100 analysis of LANDSAT MSS data was studied. The separability of the unities analyzed was verified (cerrado, campo cerrado, campo sujo) from respective spectral signatures obtained using a MAXVER and a JM distances algorithm. A correlation analysis of correctly classified values was performed. The results obtained include the following: (1) the use of four channels together presented the best class separation, independent of season; (2) in considering the use of isolated channels, channel 5 provided the largest percent correct classification: and (3) the highest separability was observed between cerrado and campo sujo forms. It is concluded that the separability of physiognomic unities can contribute to studies for the rational use of cerrado areas. R.K.G.

N80-32836# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

THE USE OF LANDSAT DATA FOR EVALUATION AND CHARACTERIZATION OF DEFORESTED PASTURELAND AND REFORESTED AREAS IN BRAZIL

Pedro Hernandez Filho, Armando Pacheco Dossantos, Evlyn Marcia Leao DeMoraesNovo, Yosio Edemir Shimabukuro, Valdete Duarte, Jose Simeao deMedeiros, Eduardo Carlos Mignone Alves, and Carlito Chefer deSantana Jun. 1980 9 p refs Presented at the 14th Intern. Symp. on Remote Sensing of Environ., San Jose, Costa Rica, 23-30 Apr. 1980 Prepared in cooperation with Brazilian Inst. for Forest Development, Sao Jose dos Campos

(INPE-1794-RPE/166) Avail: NTIS HC A02/MF A01

The compatibility of using LANDSAT data for pastureland and reforestation studies was studied. The degradation of pastureland after deforestation was identified automatically using four indicators: the percentages of exposed soil, lateritic soil, types of juquira and Gramineae species. Pine and eucalypt plantations were identified manually and automatically. The classification accuracy is 94.31 percent for pine and ranges from 67.23 to 92.30 percent for eucalypt. S.F.

N80-33828 Texas A&M Univ., College Station. DEVELOPMENT OF A SOIL MOISTURE MODEL FOR USE WITH PASSIVE MICROWAVE REMOTE SENSORS Ph.D. Thesis

Walter Charles Bausch 1980 185 p

Avail: Univ. Microfilms Order No. 8023014

Soil moisture profiles were simulated for a hypothetical loamlike soil with a water and heat balance model. Expected X-band and L-band radiometer response to these conditions were simulated by a radiative transfer model. From these simulations, a model was developed to estimate soil water content in two layers of a 1.5 m soil profile. This model was tested with measurements of soil water content and soil temperature collected during the four seasons of the year in a sandy loam soil contained in an array of lysimeters. X-band and L-band emissivities required in the predictor equations were calculated by the radiative transfer model from measured soil moisture and soil temperature data. The technique developed from simulated results to classify inverted soil moisture profiles was found to be seasonally dependent. It was also found that the second layer algorithm showed seasonal dependence. Predictions of soil water content in the top 21 cm of the soil profile from L-band emissivity calculated by the radiative transfer model occasionally conformed with measured soil water content. Dissert, Abstr.

N80-33829*# Freiburg Univ. (West Germany). Geographisches Inst.

THE INFLUENCE OF TOPOGRAPHIC STRUCTURES ON NIGHT-TIME SURFACE TEMPERATURES: EVALUATION OF A SATELLITE THERMAL IMAGE OF THE UPPER RHINE PLAIN AND THE SURROUNDING HIGHLANDS

Hermann Gossmann, Principal Investigator Ispra, Italy Joint Research Centre of the European Communities Jun. 1980 63 p refs In GERMAN: ENGLISH summary Sponsored by NASA Original contains imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (code 601), Greenbelt, Md. 20771. Domestic users send orders to 'Attn: National Space Science Data Center': non-domestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM

(E80-10228: NASA-CR-163543) Avail: NTIS HC A04/MF A01 CSCL 05B

The author has identified the following significant results. Satellite data supplied the same information as aerial IR registrations with corresponding averaging for all studies requiring a survey of the thermal pattern within an area measuring 10 km x 10 km or more, provided that sufficiently precise control points could be established for the purpose of geometric rectification in the surroundings of the area observed. Satellite thermal data are more comprehensive than aircraft data for studies on a regional, rather than a local scale, since airborne images off a variety of irrelevant topographical detail. The satellite data demonstrate the dependence of surface temperature on relief more clearly than comparable airborne imagery.

 $\textbf{N80-33835}^{*}\#$ Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

A MODEL OF PLANT CANOPY POLARIZATION RE-SPONSE

V. C. Vanderbilt, Principal Investigator 1980 11 $\,p$ refs Presented at the 1980 Machine Process, of Remotely Sensed Data Symp. ERTS

(E80-10336; NASA-CR-163444) Avail: NTIS HC A02/MF A01 CSCL 20F

N80-33839# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil). Dept. of Remote Sensing.

THE USE OF RADIATION TEMPERATURE TO DETECT WATER-STRESS IN SUGARCANE CROP M.S. Thesis [O USO DA TEMPERATURA DE RADIACAO PARA DETECTAR

01 AGRICULTURE AND FORESTRY

O ESTRESSSE DE AGUADA CULTURA DA CANA-DE-ACUCAR)

Liane Antunes Maciel Lucht Jun. 1980 156 p refs In PORTUGUESE: ENGLISH summary Revised (INPE-1767-TDL/028) Avail: NTIS HC A08/MF A01

A 36m by 150m section of a 150m by 150m plot in which sugar cane was planted was irrigated periodically over a 4 month period to maintain optimum water level. Field measurements of radiation temperature, soil moisture, and plant water content taken at different times of the year were used to determine a relationship between the radiation temperature (which can be remotely determined), and the soil water content. A heat transfer model for the plant was used to extrapolate the temperature for the complete range of possible values of soil water potential. From the results obtained it is concluded that, in the case of sugar cane, the differences in temperature due to water stress are not so accentuated as in the case of wheat and cotton. The relationship between plant temperature and soil water content show the existence of four distinct regions. An aerial thermal scanner was used to obtain infrared images of the field plot. The contrast between irrigated and nonirrigated images areas leads to a difference of 1 deg C in temperature, which is in close agreement with predictions. ARH

N80-33841# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

THERMAL BALANCE OF SOILS (BALANCO TERMICO DE SOLOS]

L. M. Moreira-Nordemann and L. A. Maciel Lucht Aug. 1980 21 p refs In PORTUGUESE: ENGLISH summary Presented at 32d Ann. Meeting of SBPC Revised

(INPE-1859-RPE/210) Avail: NTIS HC A02/MF A01

Soil temperature is a decisive factor controlling bacterial activity, and the processes of plant development and production. For a specific climate condition, soil temperature is a function of the soil geological nature and humidity. The soil energy balance was studied. Measurements of the soil temperatures were made in the infrared region, using a PRT-5 radiometer. The relation between soil absorption heat and its cooling process was determined from terrestrial radiation emission. Correlations between temperature and the main constituents of the soils were studied by means of photoacustic spectroscopy. Thermal inertia and the ratio of heating and cooling of different soil types were determined and these parameters were related to vegetation coverage. ARH

ENVIRONMENTAL CHANGES AND CULTURAL RESOURCES

Includes land use analysis, urban and metropolitan studies, environmental impact, air and water pollution, geographic information systems, and geographic analysis.

A80-47746 Effects of radar system parameters, population, and environmental modulation on settlement visibility. F. M. Henderson and M. A. Anuta (New York, State University, Albany, N.Y.). International Journal of Remote Sensing, vol. 1, Apr.-June 1980, p. 137-151. 8 refs.

The detectability of settlements and factors influencing their visibility are explored using imagery from two side-looking airborne radar systems. K-band and X-band imagery of diverse areas in the United States are examined to discover the minimum population needed for a settlement to be consistently detected. The percentage of settlements visible by size of population are calculated and omission/commission errors analyzed. Particular attention is devoted to the effects of environmental modulation and a near-, mid-, or far-range location, but the factors of scale, resolution, and system are also addressed. Results indicate that imagery at a scale of 1:200,000 or larger is requisite for settlement detection. At this scale, 60-70 percent of settlements with 200-300 population can be identified with accuracies rising as population increases. Errors of commission were less than 1 percent. A settlement's location in the range direction had significant bearing on detectability but in an unpredictable manner. Environmental characteristics (e.g., landform, land cover) were determined to be of little or no significance in explaining variation in settlement detection except for the effect of vegetation on selected settlements. (Author)

A80-47750 The application of remote sensing to environmental management. J. F. Handley (Merseyside County Council, Liverpool, England). (*Remote Sensing Society, Annual Conference,* 5th, Durham, England, Dec. 18-21, 1978.) International Journal of *Remote Sensing*, vol. 1, Apr.-June 1980, p. 181-195. 36 refs.

The contribution of remote sensing to environmental management procedures at the sub-regional scale is examined in relation to the County Structure environmental management plan for Merseyside County, England. The various seasons, scales and emulsions used for aerial photography in the county are indicated, and results of aerial surveys of the distribution of derelict and despoiled land and of natural environments are presented and compared with ground surveys. The use of color infrared and panchromatic aerial photographs indicating areas of environmental stress and land use in the formulation, implementation and monitoring of environmental management activities is then discussed. A.L.W.

A80-48534 Conversion of nitrogen oxide gases to nitrate particles in oil refinery plumes. F. P. Parungo and R. F. Pueschel (NOAA, Atmospheric Physics and Chemistry Laboratory, Boulder, Colo.). (Symposium on Budget and Cycles of Trace Gases and Aerosols in the Atmosphere, Boulder, Colo., Aug. 12-18, 1979.) Journal of Geophysical Research, vol. 85, Aug. 20, 1980, p. 4507-4511.6 refs.

An instrumented aircraft was used to survey the plume constituents of oil refineries in southern Los Angeles. Concentrations of NO, NO2, O3, Aitken nuclei, and aerosol size distribution were measured continuously in situ. Aerosols were collected with an impactor and were later analyzed with an electron microscope for particle morphology and chemical composition. The results led to the following conclusions: (1) The refineries are a strong source of NO; as the plume travels, NO reacts with entrained O3 to form NO2 and subsequently converts to nitrate particles. (2) Diurnal variations in NO, NO2, O3 concentrations are directly correlated with solar radiation. In nocturnal stable conditions, NO concentration is as high as 0.7 ppm in the plume. NO2 is low, and O3 approaches nil. After sunrise, NO decreases, and NO2 and O3 increases. (3) Inorganic nitrate particles, which can be identified with an electron microscopic spot test, are found farther downwind of the refineries. They are observed as particles imbedded in droplets with diameters between 1 and 10 microns. (4) Because these large nitrate particles are hygroscopic, they can serve as cloud condensation nuclei to form large cloud droplets and enhance droplet coalescence. Thus they play very important roles in the processes of cloud formation and precipitation. (Author)

A80-48908 * Fluorescence lidar. T. J. McIlrath (Maryland, University, College Park, Md.). *Optical Engineering*, vol. 19, July-Aug. 1980, p. 494-502. 18 refs. Grant No. NsG-5315.

The physics of fluorescence lidar is reviewed, with emphasis placed on understanding the features which determine its applicability to particular species and environments. The successful applications of fluorescence lidar to date are covered, and a range of proposed measurements is considered. Attention is given to stratospheric applications. V.T.

A80-48909 * Development of a pulsed 9.5 micron lidar for regional scale O3 measurement. R. W. Stewart (NASA, Goddard Space Flight Center, Greenbelt, Md.). *Optical Engineering*, vol. 19, July-Aug. 1980, p. 503-507. 22 refs.

A pulsed infrared lidar system designed for application to the remote sensing of atmospheric trace gases from an airborne platform is described. The system is also capable of measuring the infrared backscatter characteristics of the ocean surface, terrain, cloud, and aerosol targets. The lidar employed is based on dual wavelength pulse energy measurements in the 9-11 micrometer wavelength region.

V.T.

A80-50882 A study of the needs of French government agencies in remote sensing mapping (Etude des besoins des administrations françaises en cartographie par télédétection). M. Bied-Charreton, P. Fournier (Opération Pilote Interministérielle de Télédétection, Paris, France), B. Susplugas (Groupement pour le Développement de la Télédétection Aérospatiale, Paris, France), and P. Gonfreville (Centre National d'Etudes Spatiales, Paris, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 36-43. In French.

A study of existing and potential remote sensing mapping needs within France is presented, providing a detailed outline of mapping applications and several tables cataloging the utilization of territories and agricultural zones. References are made to the principal French bureaus responsible for the management of national territory and natural resources, the development of agricultural policies, and international cooperation in managing earth resources. The study aims to help initiate an improvement of administrative procedures for the exploitation and future application of remote sensing in France. A.C.W.

A80-51935 * The environmental program at Kennedy Space Center - Baseline to monitoring. W. M. Knott (NASA, Kennedy Space Center, Cocca Beach, Fla.). In: A new era in technology; Proceedings of the Seventeenth Space Congress, Cocca Beach, Fla., April 30-May 2, 1980. Cocca Beach, Fla., Canaveral Council of Technical Societies, 1980, p. 2-44 to 2-49.

KSC has developed an environmental program to ensure that its activities do not adversely affect the surrounding environment. Two essential elements of the total program are the baseline and monitoring programs. The goal of the baseline program is to collect sufficient information about the environment prior to Shuttle launches so that adverse changes in the environment - if and when they occur after the Shuttle program becomes active - can be detected and cause-effect relationships established when possible. The goal of the monitoring program is to use information from the baseline program along with survey and sampling operations during the period of initial Shuttle launches to document adverse changes in the environment.

A80-52332 Remote sensing of NO using a differential absorption lidar. N. Menyuk, D. K. Killinger, and W. E. DeFeo (MIT, Lexington, Mass.). *Applied Optics*, vol. 19, Oct. 1, 1980, p. 3282-3286. 15 refs. USAF-supported research.

Single-ended remote sensing measurements of atmospheric NO have been made using differential absorption of frequency-doubled pulsed CO2 laser radiation backscattered from topographic targets. Returns were obtained from targets at ranges out to 1.4 km, and significant NO concentrations above ambient were observed over a path which crossed a traffic roadway at a range of 0.5 km. In view of the severe atmospheric water vapor absorption in the spectral region containing the NO absorption band, the range dependence of the lidar returns was also measured in order to determine the differential absorption of the ambient atmosphere. The results differed significantly from those computed from atmospheric transmission data tapes. (Author)

A80-52346 * Polar nephelometer for atmospheric particulate studies. M. Z. Hansen (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, Md.) and W. H. Evans (Arizona, University, Tucson, Ariz.). *Applied Optics*, vol. 19, Oct. 1, 1980, p. 3389-3395. 20 refs. Contract No. N00014-75-C-0208.

A unique polar nephelometer was designed and constructed for the measurement of atmospheric particulate characteristics. The nephelometer produces visible light from a self-contained laser to irradiate an air sample drawn into the instrument. The light scattered from the particulates and molecules in the sample is detected as a function of scattering angle for each of four different incident light polarizations. These measurements are used to determine the particulate scattering matrix which is a function of the size, shape, and index of refraction of the particles. The region of sensitivity for the measurements corresponds to the size range of particles that strongly affects visible radiative transfer in the atmosphere, which is the primary application for the derived information. (Author)

A80-53131 Laser studies of the atmosphere and underlying surface (Issledovanie atmosfery i podstilaiushchei poverkhnosti s ispol'zovaniem lazernoi tekhniki). Edited by A. I. German. Moscow, Gidrometeoizdat (Tsentral'naia Aerologicheskaia Observatoriia, Trudy, No. 138), 1979. 128 p. In Russian.

Papers are presented on such topics as the use of spaceborne lidar to study space-time variations of atmospheric aerosol, lidar measurements of stratospheric and tropospheric ozone, experimental studies of air pollution, and optical measurements of NO2 concentration in the atmosphere. Consideration is also given to intensity fluctuations of light beams reflected from the turbulent sea surface, lidar studies of sea surface patterns, and lidar studies of clouds and underlying surfaces. B.J.

A80-53265 Smoke as a quantitative atmospheric diffusion tracer. F. A. Gifford (NOAA, Air Resources Atmospheric Turbulence and Diffusion Laboratory, Oak Ridge, Tenn.). (Workshop on Atmospheric Tracers and Tracer Applications, University of California, Los Alamos, N. Mex., May 23, 24, 1979.) Atmospheric Environment, vol. 14, no. 10, 1980, p. 1119-1121. 8 refs.

Generalizations of the 'opacity method' of analyzing visible smoke-plume diffusion are presented. The horizontal dispersion length, sigma-y, is derived from the outline of a plume having an arbitrary vertical concentration distribution. The vertical dispersion length, sigma-z, is derived for a plume with concentration varying as arbitrary powers of y and z in the exponential terms. Examples of observations of sigma-y and sigma-z based on Skylab-4, U-2, and ordinary land-based photographs are presented. (Author) A80-53269 Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume. W. H. Chan, R. J. Vet, M. A. Lusis, J. E. Hunt, and R. D. S. Stevens (Ontario Ministry of the Environment, Air Resources Branch, Toronto, Canada). Atmospheric Environment, vol. 14, no. 10, 1980, p. 1159-1170. 20 refs.

A80-54074 Volcanic material from Mount St Helens in the stratosphere over Europe. M. Ackerman, C. Lippens (Institut d'Aéronomie Spatiale de Belgique, Brussels, Belgium), and M. Lechevallier (Etablissement Technique Central Armement, Arcueil, Val-de-Marne, France). *Nature*, vol. 287, Oct. 16, 1980, p. 614, 615. 9 refs.

Observations of aerosols in the stratosphere prior to and following the eruption of Mount St. Helens volcano on May 18, 1980 are reported. Photographic observations of the earth limb in the azimuthal direction of the sun at low solar elevations were obtained at balloon altitudes over Europe on October 10, 1979 and May 7 and June 5, 1980. Analysis of the limb pictures acquired reveals an abrupt increase in earth limb radiance between 15 and 16 km altitude on June 5 relative to the earlier dates, at which radiance varied smoothly with altitude. The increased radiance is attributed to aerosols from the volcanic event, and possible mechanisms for the decrease of the amount of solar radiation reaching the ground due to the stratospheric aerosols are indicated. A.L.W.

N80-30868*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

MAPPING URBANIZED AREA EXPANSION THROUGH DIGITAL IMAGE PROCESSING OF LANDSAT AND CONVENTIONAL DATA

Steven Z. Friedman, Principal Investigator 1 Mar. 1980 88 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(Contract NAS7-100) (E80-10301; NASA-CR-163355; JPL-Pub-79-113) Avail: NTIS HC A05/MF A01 CSCL 08B

N80-30877# Wisconsin Univ. - Madison.

MONITORING THE USE OF RIVERWAYS WITH AERIAL PHOTOGRAPHY: THE DEVELOPMENT, TESTING, AND EVALUATION OF A COMPUTER ASSISTED METHODOL-OGY Final Report

R. H. Becker, William A. Gates, and Bernard J. Niemann, Jr. 31 Mar. 1980 363 p

(Contract DACW25-79-C-0008)

(AD-A086471) Avail: NTIS HC A16/MF A01 CSCL 14/5 The objectives of this investigation were to develop, test and evaluate a recreational monitoring methodology using aerial photography and computer assisted data capture with auxiliary equipment. To meet these objectives, photography was flown, interpretation techniques were developed and utilized, hardware was assembled, software was written and recreational monitoring results were obtained. Section 1, includes a statement of objectives, how the report is organized, a summary of available photography, a brief summary of methods employed, and some conclusions. Section 2, Pool 16 Users Results, includes the results obtained from applying the methodology for six flights over Pool 16. It also includes discussion of the results and provides graphic

examples of results. Section 3, Evaluation of the Methodology, includes equipment and personnel requirements, the time utilized developing and testing the methodology, and the costs incurred. The reliability of the methodology, error control and error discovery are discussed. Section 4. Aerial Photographic Methods, includes a detailed discussion of the methods and equipment employed to purchase, obtain and process the aerial photography for the riverway. Section 5, Interpretative methods, discusses the methods employed to interpret, locate and encode targets from the photography. Section 6, Handbook/Codebook, includes a detailed description of each variable encoded as part of the methodology. It also includes the rules used to interpret each of the target types. GRA N80-31862# Rockwell International Corp., Richland, Wash. Energy Systems Group.

LANDSAT DATA AS A BASIS FOR REGIONAL ENVIRON-MENTAL ASSESSMENT WITHIN THE COLUMBIA PLA-TEAU

L. S. Leonhart and J. G. Stephan (Battelle Pacific Northwest Labs., Richland, Wash.) May 1980 19 p Presented at the 6th Can. Symp. on Remote Sensing, Halifax, Canada, 21-23 May 1980

(Contract DE-AC06-77RL-01030)

(RHO-BWI-SA-43; CONF-800577-1) Avail: NTIS HC A02/MF A01

An environmental assessment is being performed in conjunction with siting a radioactive waste terminal-storage facility within the federally operated Hanford Site in south-central Washington. Initial assessments involved classification of four contiguous LANDSAT scenes recorded over the region and about 300 high-altitude (U-2) photographs. The resulting mosaic was segregated into ten land-cover classes. The classified land-cover data were then machine-integrated with digital irrigation well-location data. The resulting groundwater multi-source data product was required by hydrologists to segregate potential artificial recharge areas from artificial groundwater discharge areas. Related studies employed LANDSAT data and aerial imagery to identify linear structures and other geologic features which may have a significant bearing on the tectonic and/or hydrologios setting of the Columbia Plateau. DOE

N80-31969*# University of Central Florida, Orlando. Dept. of Biological Sciences.

A CONTINUATION OF BASE-LINE STUDIES FOR ENVIRON-MENTALLY MONITORING SPACE TRANSPORTATION SYSTEMS (STS) AT JOHN F. KENNEDY SPACE CENTER. VOLUME 4: THREATENED AND ENDANGERED SPECIES OF THE KENNEDY SPACE CENTER. PART 1: MARINE TURTLE STUDIES Final Report, 1976 - 1979

L. M. Ehrhart Sep. 1980 417 p refs

(Contract NAS10-8986)

(NASA-CR-163122-Vol-4-Pt-1; TR-51-2-Vol-4Pt-1) Avail: NTIS HC A18/MF A01 CSCL 13B

The status of marine turtle populations in the KSC area was studied using data from previous results from ground and aerial surveillance conducted from 1976 to April 1979. During ground surveillance, various data were recorded on emergent turtles such as: species, weight, tag number (if previously tagged), time discovered, activity at discovery and the location of discovery. Observations were also made on nesting and reproductive characteristics, population estimates, immigration and emigration and growth rate of the turtles. Mortality studies were additionally made and autopsies performed on dead turtles found in the area. It is concluded that further mortality documentation should be done just prior to and just after a future space launch operation in order to accurately assess the cause and effect relationship of such a launch on the turtle population. A.R.H.

N80-31970*# University of Central Florida, Orlando. Dept. of Biological Sciences.

A CONTINUATION OF BASE-LINE STUDIES FOR ENVIRON-MENTALLY MONITORING SPACE TRANSPORTATION SYSTEMS (STS) AT JOHN F. KENNEDY SPACE CENTER. VOLUME 4: THREATENED AND ENDANGERED SPECIES OF THE KENNEDY SPACE CENTER. PART 2: THREATENED AND ENDANGERED BIRDS AND OTHER THREATENED. AND ENDANGERED FORMS Final Report, Sep. 1976 -Apr. 1979

L. M. Ehrhart Sep. 1980 148 p refs (Contract NAS10-8986)

(NASA-CR-163122-Vol-4-Pt-2; TR-51-2-Vol-4-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 06C

Data are presented which were collected by ground and aerial surveillance of 37 species of birds observed within the environs of KSC which are on lists of rare and endangered biota in Florida. Additional information was obtained on other threatened species such as the West Indian manatee, the salt marsh snake, the Indigo snake, the Gopher tortoise, the American alligator, and the Florida mouse. Results of the literature search were used to obtain a historical perspective and aid in the analysis of the field data collected. $$A,R,H$.}$

N80-32817*# California Univ., Berkeley. Space Sciences Lab.

APPLICATION OF REMOTE SENSING TO SELECTED PROBLEMS WITHIN THE STATE OF CALIFORNIA Annual Report

Robert N. Colwell, Andrew S. Benson, John E. Estes, and Claude Johnson, Principal Investigators 1 May 1980 438 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS

(Grant NsG-7220)

(E80-10326; NASA-CR-163405; SSL-Ser-21-Issue-14) Avail: NTIS HC A19/MF A01 CSCL 058

N80-32825*# Kansas Univ. Center for Research, Inc., Lawrence. Space Technology Center.

THE APPLICATION OF REMOTE SENSING TO RESOURCE MANAGEMENT AND ENVIRONMENTAL QUALITY PRO-GRAMS IN KANSAS Annual Report, 1 Apr. 1979 - 31 Mar. 1980

B. G. Barr and E. A. Martinko, Principal Investigators Jul. 1980 108 p Original contains color imagery. Orginal photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(Grant NGL-17-004-024)

(E80-10337; NASA-CR-163417) Avail: NTIS HC A06/MF A01 CSCL 13B

N80-32826*# Mississippi State Univ., Mississippi State. APPLICATION OF REMOTE SENSING TO STATE AND REGIONAL PROBLEMS Semiannual Progress Report, 1 May - 31 Oct. 1979

W. Frank Miller, Dale A. Quattrochi, Bradley D. Carter, Gary K. Higgs, and Jimmy L. Solomon, Principal Investigators 1 Nov. 1979 55 p. Original contains color illustrations ERTS (Grant NGL-25-001-054) (E80-10338; NASA-CR-163418; SAPR-12) Avail: NTIS

HC A04/MF A01 CSCL 05B

N80-33928*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

IN SITU OZONE DATA FOR EVALUATION OF THE LASER ABSORPTION SPECTROMETER OZONE REMOTE SENSOR: 1979 SOUTHEASTERN VIRGINIA URBAN PLUME STUDY SUMMER FIELD PROGRAM

Gerald L. Gregory, David S. McDougal, and Joe J. Mathis, Jr. Oct. 1980 57 p refs

(NASA-TM-81831) Avail: NTIS HC A04/MF A01 CSCL 13B

Ozone data from the 1979 Southeastern Virginia Urban Study (SEV-UPS) field program are presented. The SEV-UPS was conducted for evaluation of an ozone remote sensor, the Laser Absorption Spectrometer. During the measurement program, remote-sensor evaluation was in two areas: (1) determination of the remote sensor's accuracy, repeatability, and operational characteristics, and (2) demonstration of the application of remotely sensed ozone data in air-quality studies. Data from six experiments designed to provide in situ ozone data for evaluation of the sensor in area 1, above, are presented. Experiments consisted of overflights of a test area with the remote sensor aircraft while in situ measurements with a second aircraft and selected surface stations provided correlative ozone data within the viewing area of the remote sensor. T.M.

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GEODESY AND CARTOGRAPHY

Includes mapping and topography.

A80-45297 # The use of space data for the mapping of coastal areas (Ispol'zovanie kosmicheskoi informatsii dlia kartografirovaniia shel'fa). E. S. Zubchenko and V. D. Kondiurin. *Geodeziia i Kartografiia*, June 1980, p. 54-58. 13 refs. In Russian.

Recent work on the use of remote sensing data for the mapping of coastal areas is reviewed. Consideration is given to such topics as the digital mapping of coastal areas from Landsat, the use of point classification methods for the mapping of estuarine areas from Landsat, and the geometric and cartographic accuracy of ERIS-1 imagery. B.J.

A80-46967 # A photogrammetric method of processing space photographs (Ob odnom sposobe fotogrammetricheskoi obrabotki kosmicheskikh snimkov). V. D. Bol'shakov and I. G. Zhurkin (Moskovskii Institut Inzhenerov Geodezii, Aerofotos'emki i Kartografii, Moscow, USSR). Geodeziia i Aerofotos'emka, no. 3, 1980, p. 76-85. In Russian.

The paper examines a method of determining the relative position in space of two surveying systems with respect to a fixed absolute (inertial) coordinate system using support points of a moving object. It was shown that in a general case, a violation of coplanarity of the three vectors occurs in solving this problem. One of these vectors is oriented along the line which connects two mapping points, and the other two vectors are oriented from each mapping point toward the object of the survey. An algorithm for the solution of this problem is presented for the case of mapping of the earth surface from a satellite. A.T.

A80-50876 Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings (Traitement et exploitation cartographique des images spatiales; Colloque International, 3rd, Toulouse, France, June 19-22, 1979, Proceedings). Conference sponsored by the Groupement pour le Développement de la Télédétection Aérospatiale. Saint-Etienne, Loire, France, Edition Gedim (Annales des Mines, Apr.-May 1980), 1980. 232 p. In French and English. \$42.37.

The use of remote sensing imagery for purposes of mapping is considered with attention given to photogrammetric processing, methods for the extraction of cartographic information, topographic mapping, and the use of satellite imagery for thematic mapping. Particular consideration is given to soil inventory and mapping, cartographic display of space information, the needs of French government agencies in remote sensing mapping, the geometric experiments. B.J.

A80-50888 Automatic mapping of snow cover by means of Landsat - Application to the central Pyrenees (Cartographie automatique du manteau neigeux à l'aide due satellite Landsat Application aux Pyrénées centrales). C. Leprieur (Ecole Nationale Supérieure Agronomique, France), M. Traizet, and J. C. Favard (Centre National d'Etudes Spatiales, Toulouse, France). In: Cartographic processing and analysis of satellite imagery: International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim,

1980, p. 92-99. In French.

A criterion for the automatic recognition of snow cover is developed. The application of this criterion to Landsat images of the central Pyrenees is discussed. B.J.

A80-50892 Spatial filtering of Landsat data for urban cartography (Filtrage spatial des données Landsat en vue de la

cartographie urbaine). M. Bozet, H. Dotu, M. Installe, and J. Wilmet (Louvain, Université, Louvain-la-Neuve, Belgium). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 122-129. 12 refs. In French.

Several techniques of unsupervised classification of multispectral scanner (MSS) data using spectral-spatial information and spectral information only are examined. The shortcomings of these techniques are pointed out and spatial filtering based on the contrast property is proposed in order to improve the classification using spectral information only. In addition to the greater accuracy, the advantages of classification using this filtering are the preservation of really small and filtform objects, the great consideration of local details of the image and the results are in a more desirable form for interpretation. Two urban-area Landsat 1 images are used to illustrate the results of the proposed technique. (Author)

A80-50895 The combined plotting of satellite photographs and aerial photographs for topographic mapping (Restitution combinée de photographies de satellite et de photographies aériennes pour la cartographie topographique). O. R. Kölbi (Lausanne, Ecole Polytechnique Fédérale, Lausanne, Switzerland). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 145-151. In French.

It is shown that topographic mapping can be rationalized by the use of satellite photographs and is especially applicable to the needs of developing countries. It is suggested that satellite photographs be used both for aerial triangulation and for supplying the geometrical information for topographic mapping. Aerial photographs are used at picture scales between 1:50,000 and 1:100,000 for the purpose of topographic photointerpretation. The combined plotting of satellite and aerial photographs is discussed. B.J.

A80-50896 Tidal land mapping from Landsat. H.-P. Bahr and E. Dennert-Moller (Hannover, Universität, Hanover, West Germany). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 152-160. 11 refs.

Precise digital geometrical rectification of Landsat MSS data leading to m(x) equals plus or minus 25.7 m and m(x) equals plus or minus 51.3 m rms was executed in order to prepare multispectral classification of the North Fresian tidal flats at the German North Sea coast. The maximum likelihood method was applied to 7 classes resulting in an accuracy better than 89 percent. (Author)

A80-50897 Basic topographic mapping - Renewal and revision (Cartographie topographique de base - Réfection et révision). J. Poulain (Institut Géographique National, Paris, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 161-165. In French.

The use of remote sensing for topographic mapping is reviewed with particular attention given to the application of interactive image processing to the revision of small-scale maps and the compilation of new maps. Two examples are discussed: (1) the revision of a 1:100,000 map of Verdun-sur-Meuse; and (2) the compilation of a color map of the Sudan. B.J.

A80-50902 Evaluation of Landsat image data for the extraction of land use information and its presentation in thematic maps. W. Kirchhof, P. Haberacker, E. Krauth, G. Kritikos, and R. Winter (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Nachrichtentechnik, Wessling, West Germany). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979.

03 GEODESY AND CARTOGRAPHY

Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 196-203. 20 refs.

For the northern part of the Rhinegraben a supervised classification of Landsat image data has been performed. As a result, a geometrical rectified map of land use at a scale 1:200,000 has been produced, coinciding with the topographical map CC 7110, Mannheim, 8500 sq km. By overprinting this map with features the geometrical rectification and consistency of eight land use classes was verified. For the community of Speyer a demonstration of consistency with aerial photo interpretation was made on the level of land use inventory and spatial distribution of discrepancies. The study yields, that for a central European region the available Landsat image data may be suitable for the construction of thematic maps of land use, for land use inventories and as interpretation aids for a variety of applications. (Author)

A80-53051 Applications of statistics to thematic mapping. G. H. Rosenfield and M. L. Melley (U.S. Geological Survey, Reston, Va.). Photogrammetric Engineering and Remote Sensing, vol. 46, Oct. 1980, p. 1287-1294. 11 refs.

Two statistical problems occurring in the effort to analyze thematic maps and mapping are determining the accuracy of thematic content and comparing factors studied in thematic mapping. Statistical procedures applicable to thematic mapping involve sampling, determining accuracy, and comparing factors. A sampling procedure using an unaligned pattern within a square grid network is applicable for use with thematic maps. Sample size may be determined using the binomial distribution based upon the confidence interval to define the true mean of the population within certain limits. The confidence interval may also be used to define the upper and lower limits of the accuracy of the thematic map. Several tests for comparing factors using differences of paired samples are the t test, the signed rank test, and the sign test. When more than two factors are being studied, analysis of variance is the most efficient procedure to use. (Author)

A80-54021 # Optimal conditions for determining the coordinates of the earth's center of mass (Ob optimal'nykh usloviiakh opredeleniia koordinat tsentra mass zemli). B. L. Kaplan and K. K. Nasretdinov. *Geodeziia i Kartografiia*, Aug. 1980, p. 12-14. In Russian.

Gravimetric and satellite data are used to determine the parameters of the total ellipsoid of the earth, referred to the earth's center of mass. The method is applied to the case when the geocentric radius-vectors of points in the reference system are known.

A80-54023 # An automated aerial-photographic information-search system (Aerofotos'emochnaia avtomatizirovannaia informatsionno-poiskovaia sistema). A. G. Zhuchenko, L. A. Morozova, and V. Ia. Petrov. *Geodeziia i Kartografiia*, Aug. 1980, p. 33-37. 12 refs. In Russian.

The paper describes an automated system for the extraction of geological information from aerial photographs; the system used is an information-search language of descriptor type, represented in the form of classifiers. A block diagram of the system is presented. B.J.

A80-54024 # The geometric calibration of multispectral photographic equipment (Geometricheskaia kalibrovka mnogozonal'noi fotoapparatury). V. I. Iurov. *Geodeziia i Kartografiia*, Aug. 1980, p. 37-42. In Russian.

A method for determining the geometric parameters of a multispectral photography system is presented. The method is used to calibrate a nine-channel system. Calibration results are presented and calibration accuracy is discussed.

A80-54025 # The use of space photographic data for the study and mapping of anthropogenic landscapes (Primenenie kosmicheskoi fotoinformatsii dlia izucheniia i kartografirovaniia antropogennykh landshaftov). S. V. Skatershchikov. *Geodeziia i Kartografiia*,

Aug. 1980, p. 47-54. 14 refs. In Russian.

The paper examines the feasibility of using space photography to study anthropogenic landscapes (i.e., natural landscapes modified by man). The use of space data for landscape mapping and resources monitoring is considered.

N80-28809*# New South Wales Univ., Sydney (Australia). School of Surveying.

CRUSTAL DEFORMATION AT VERY LONG BASELINE INTERFEROMETRY SITES DUE TO SEASONAL AIR MASS AND GROUND WATER VARIATIONS

A. Stolz and Douglas R. Larden (Colorado Univ., Boulder) In NASA, Goddard Space Flight Center Radio Interferometry Jul. 1980 p 145-151 refs

Avail: NTIS HC A20/MF A01 CSCL 08B

The seasonal deformation normal to the Earth's surface was calculated at stations involved or interested in very long baseline interferometry (VLBI) geodesy and at hypothetical sites in Australia and Brazil using global atmospheric pressure data, values for groundwater storage, and load Love numbers deduced from current Earth models. It was found that the annual range of deformation approached the centimeter level measuring potential of the VLBI technqiue at Greenbank, Haystack, and the Brazil site.

R.E.S.

N80-28838*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SATELLITE EMISSION RADIO INTERFEROMETRIC EARTH SURVEYING (SERIES)

P. F. MacDoran In NASA. Goddard Space Flight Center Radio Interferometry Jul. 1980 p 403-408

(Contract NAS7-100)

Avail: NTIS HC A20/MF A01 CSCL 088

Existing satellite radio emissions of the global positioning system were exploited as a resource for cost effective high accuracy geodetic measurements. System applications were directed toward crustal dynamics and earthquake research.R.C.T.

N80-28841^{*}# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt Md.

NASA GEODETIC APPLICATIONS OF THE MARK 3 VLBI SYSTEM

Robert Coates In its Radio Interferometry Jul. 1980 p 425-433 refs

Avail: NTIS HC A20/MF A01 CSCL 088

The Mark 3 very long baseline interferometer system was used in monitoring the following geodetic phenomena: the regional deformation and strain accumulation related to large earthquakes in the plate boundary region of the western United States; contemporary relative plate tectonic motions of the North American, Pacific, South American, Eurasian, and Australian Plates: the internal deformation of continental and oceanic lithospheric plates with particular emphasis on North America and the Pacific: the rotational dynamics of the Earth and their possible correlation to earthquakes, plate motions, and other geophysical phenomena; and motions and deformation occurring in regions of high earthquake activity. R.C.T.

N80-29818*# Ohio State Univ., Columbus. Dept. of Geodetic Science.

IMPROVEMENT OF THE EARTH'S GRAVITY FIELD FROM TERRESTRIAL AND SATELLITE DATA Status Report No. 16, 1 Jan. 1979 - 30 Jun. 1980 Jul. 1980 5 p ERTS (Grant NGR-36-008-161; OSURF Proj. 783210)

(E80-10271: NASA-CR-163343) Avail: NTIS HC A02/MF A01 CSCL 08E

N80-30876*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. THE CONTRIBUTION OF THE DIFFUSE LIGHT COMPO-NENT TO THE TOPOGRAPHIC EFFECT ON REMOTELY

SENSED DATA

Chris Justice and Brent Holben Jun. 1980 45 p refs Submitted for publication

(NASA-TM-80728) Avail: NTIS HC A03/MF A01 CSCL 20F

The topographic effect is measured by the difference between the global radiance from inclined surfaces as a function of their orientation relative to the sensor position and light source. The short wave radiant energy incident on a surface is composed of direct sunlight, scattered skylight, and light reflected from surrounding terrain. The latter two components are commonly known as the diffuse component. The contribution of the diffuse light component to the topographic effect was examined and the significance of this diffuse component with respect to two direct radiance models was assessed. Diffuse and global spectral radiances were measured for a series of slopes and aspects of a uniform and surface in the red and photographic infrared parts of the spectrum, using a nadir pointing two channel handheld radiometer. The diffuse light was found to produce a topographic effect which varied from the topographic effect for direct light. The topographic effect caused by diffuse light was found to increase slightly with solar elevation and wavelength for the channels examined. The correlations between data derived from two simple direct radiance simulation models and the field data were not significantly affected when the diffuse component was removed from the radiances. Radiances from a 60 percent reflective surface, assuming no atmospheric path radiance, the diffuse light topographic effect contributed a maximum range of 3 pixel values in simulated LANDSAT data from all aspects with slopes up to 30 degrees. RKG.

N80-31860# Army Engineer Topographic Labs., Fort Belvoir, Va.

TERRAIN ANALYST SYNTHESIZER STATION

Gunther Schwarz Jun. 1980 28 p

(DA Proj. 4A7-62707-A-855)

(AD-A087370: ETL-0231) Avail: NTIS HC A03/MF A01 CSCL 08/2

This report describes the Terrain Analyst Synthesizer Station built under contract for USAETL. Tests were performed to determine the characteristics and adherence to the specifications set forth in the Purchase Description. GRA

N80-33999*# National Aeronautics and Space Administration, Washington, D. C.

THE COORDINATED FEDERAL PROGRAM FOR THE APPLICATION OF SPACE TECHNOLOGY TO CRUSTAL DYNAMICS AND EARTHQUAKE RESEARCH

Pitt G. Thome Jan. 1979 17 p refs Prepared in cooperation with NOAA and Geological Survey and NSF and Defense Mapping Agency

(NASA-TM-82215) Avail: NTIS HC A02/MF A01 CSCL 08G

The application of space technology to important problems relating to crustal dynamics and earthquake research is described. Federal plans for such applications are summarized.T.M.

N80-34000*# National Aeronautic Association, Washington, D. C. NASA PLAN FOR INTERNATIONAL CRUSTAL DYNAMICS STUDIES

Apr. 1979 34 p refs

(NASA-TM-82214) Avail: NTIS HC A03/MF A01 CSCL 08G

The international activities being planned as part of the NASA geodynamics program are described. Methods of studying the Earth's crustal movements and deformation characteristics are discussed. The significance of the eventual formalations of earthquake predictions methods is also discussed. R.C.T.

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04

GEOLOGY AND MINERAL RESOURCES

Includes mineral deposits, petroleum deposits, spectral properties of rocks, geological exploration, and lithology.

A80-48975 Remote sensing for tunnel siting studies, O. R. Russell, J. R. Everett (Earth Satellite Corp., Washington, D.C.), and D. T. Stanczuk (Science Applications, Inc., McLean, Va.). (American Society of Civil Engineers, Annual Convention and Exposition, Atlanta, Ga., Oct. 22-26, 1979.) ASCE, Transportation Engineering Journal, vol. 106, Sept. 1980, p. 523-537. 5 refs. U.S. Department of Transportation Contract No. FH-11-8598.

An investigation was held to evaluate the contribution of various airborne remote sensing systems and interpretive techniques to the development of improved three-dimensional geologic models needed to select and analyze highway tunnel sights. During this study, data from most types of remote sensing imaging systems were tested (Landsat, Skylab, side-looking radar; black-and-white photography, color, color-infrared, low-sun-angle black-and-white infrared photography; thermal infrared and multispectral scanner; airborne electromagnetic systems and magnetometers). All these devices are characterized and their advantages are emphasized. An economic analysis is provided, and an attempt is made to estimate costs for data acquisition using different sensors. Tables compare the units of exploratory work with the units of construction work and capability ratings of conventional and remote sensing methods under optimum conditions. S.S.

A80-49524 • Uranium - Spectral discrimination of alteration phenomena in sediments. J. E. Conel, M. J. Abrams, and K. W. Baird (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *Modern Geology*, vol. 7, no. 2, 1980, p. 115-135. Research supported by the U.S. Department of Energy; Contract No. NAS7-100.

A80-49654 # The Mesozoic and Cenozoic depressions of the Baikalo-Amur region from the interpretation of space photographs (O mezozoiskikh i kainozoiskikh vpadinakh raiona BAM po dannym deshifrirovaniia kosmicheskikh snimkov). L. G. Vasiutina (Vsesoiuznoe Aerogeologicheskoe Nauchno-Proizvodstvennoe Ob'edinenie Aerogeologia, Moscow, USSR) and A. P. Kuskov. *Issledovanie Zemli iz Kosmosa*, May-June 1980, p. 27-33. 11 refs. In Russian.

Space photographs, taken in conjunction with geological, geophysical, geomorphological, and morphostructural data, make it possible to evaluate certain depressions in the Baikalo-Amur region that are not compensated (or only slightly compensated) by contemporaneous sediments. Information on the extended troughs and the erosion characteristics of these noncompensated depressions has been obtained.

A80-49663 # Characteristics of the representation of tectonic faults on space photographs (Osobennosti otobrazheniia tektonicheskikh razlomov na snimkakh iz kosmosa). L. N. Rozanov (Vsesoiuznyi Neftianoi Nauchno-Issledovatel'skii Geologorazvedochnyi Institut, Leningrad, USSR). *Issledovatel zemli iz Kosmosa*, May-June 1980, p. 98-100. 6 refs. In Russian.

The use of geological surveys and spaceborne photography to detect tectonic faults is considered. It is shown that space photographs are adequate for the identification of extension faults, but are inadequate for the identification of compression-stress faults (these latter faults must be detected by geological survey methods). B.J.

A80-49664 # The appearance of the Main Ural Fault in a cloud field on space photographs (Proiavlenie glavnogo Ural'skogo razloma v pole oblachnosti na kosmicheskikh snimkakh). L. I. Morozova (Nizhnevolzhskii Nauchno-Issledovatel'skii Institut Geologii i Geofiziki, Saratov, USSR). Issledovanie Zemli iz Kosmosa, May-June 1980, p. 101-104. In Russian.

An analysis of space photographs (taken from the Meteor-25 satellite) in the visible and near-IR ranges was used to study the effects of the Main Ural Fault and the Timan ridge on the cloud cover of the Urals. The perturbed atmospheric layer above the fault was found to be 6 km high, while above the ridge the perturbed layer was 4 km high.

A80-50880 Landsat imagery in oil exploration - Six years of experience (Les images Landsat en exploration pétrolière - 6 ans d'expérience). A. Fontanel and J.-C. Riverau (Institut Français du Pétrole, Rueil-Malmaison, Hauts-de-Seine, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 27-30. In French.

A review of the most common utilizations of Landsat images in geological and petroleum studies is presented. Included in the report are characteristics of the geological surveys such as scale, percentage and type of color compositions, and type of digital processing. The cost of the surveys and various financial constraints of digital processing are also presented. A.C.W.

A80-50881 Review of BRGM research activities in geological remote sensing and medium-term perspectives (Bilan des activités de recherche du BRGM en télédétection appliquée à la géologie et perspectives à moyen terme). G. Weecksteen (Bureau of Recherches Géologiques et Minières, Orléans, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 31-35. 19 refs. In French.

Remote sensing technology as a tool for geological mapping and mineral research is discussed. The relative importance of spatial vectors and sensors for specific domains of geology are considered. Both lineaments and circular structures are discussed in relation to their various applications in geology mapping, mineral research, geothermal survey, and estimate of seismic hazards. The difference in data obtained from multispectral sensors over arid zones and soil covered regions is examined. Thermal remote sensing is shown to provide improvements for detecting sub-surface geological anomalies in soil covered areas. A.C.W.

A80-51076 Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Workshop sponsored by COSPAR, International Union of Geological Sciences, UNESCO, Geological Survey of India, et al. Edited by W. D. Carter, L. C. Rowan (U.S. Geological Survey, Reston, Va.) and J. F. Huntington (Commonwealth Scientific and Industrial Research Organization, North Rhyde, Australia). Oxford, Pergamon Press, Ltd. (Advances in Space Exploration. Volume 10), 1980. 182 p. S60.

Papers presented in this volume reflect the international state-of-the-art of remote sensing in the field of geology and exploration for mineral and energy resources. The papers include: contribution of Landsat data to the objectives of the geological survey of India; mineral resource exploration, inventory, and assessment; geological ground-truths and Landsat imagery interpretation for parts of Karnataka State (India); and the application of remote sensing techniques to petroleum exploration in India. V.L.

A80-51077 Contribution of Landsat data to the objectives of the geological survey of India. V. S. Krishnaswamy (Geological Survey of India, Calcutta, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980 p. 1-9.

Satellite-generated data are considered in relation to geoseismological, geohydrological, geomorphological, glaciological, mineral resource location, and tectonic studies in India. Future programs of the Geological Survey of India are considered, including the incorporation of automated systems for data handling and the procurement of equipment. RC

Characteristics of the Landsat system and data A80-51078 for geologic applications - Availability of data. W. D. Carter (U.S. Geological Survey, Reston, Va.). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May Oxford, Pergamon Press, Ltd., 29-June 9, 1979. 1980, p. 17-21.

Characteristics of Landsat series satellites and the data available from them are outlined with respect to their peologic applications. The operational status of the Landsat 1, 2, and 3 satellites, launched in July 1972, January 1975, and March 1978, respectively, is indicated, and the direct acquisition of Landsat data by means of ground stations located throughout the world is discussed. The Landsat D satellite, planned to be launched in 1981 from a Space Shuttle Sortie mission, is described, with particular attention given to the new 5-band MSS system and thematic mapper instruments to be carried on board. Means of acquiring worldwide Landsat data are indicated, and applications of this data to mineral and energy resource exploration and to global comparative studies of rock types and mineral deposits are considered. A.L.W.

A80-51079 Status and plans of SEO satellite and receiving station. D. S. Kamat (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 25-38.

This paper describes the data products concerning the vidicon camera payload data, the passive microwave radiometer payload data, and the data collection platform data to be collected from the Satellite for Earth Observation (SEO) which Indian Space Research Organization is to launch in the near future. This paper also describes, in brief, SEO satellite and ground receiving system for data reception when SEO is in orbit. (Author)

Geological ground-truths and Landsat imagery A80-51080 interpretation for parts of Karnataka State /India/. J. G. Krishnamurty, K. P. Gopalakrishnan, and T. V. Ramachandran (Geological Survey of India, Bangalore, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 45-58. 23 refs.

A80-51081 Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration · Progress report of work done in India/: I.G.C.P. Project 143. B. N. Raina. In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 59-78.

Work on this project was started in India in August, 1977. Six project areas were selected for such studies in areas of known mineralization. Five of these projects are located on the Precambrian rocks of the Indian Peninsular Shield and one in the Himalayan area. Work carried out so far includes collection of regional and detailed geological data, interpretation of regional structure and lineaments from Landsat images and preparation of combined maps on which an attempt has been made to integrate the Landsat data with the conventional data. In most cases it has been possible to establish relationships between the reported mineral occurrences and areas of intersection between major lineaments and/or curvilinear features. In some cases such studies have thrown new light on the regional structure of the area and possible genetic relationship between the mineral occurrences, structure and lithology of the area. (Author)

A80-51082 Fracture mapping of the Narmada-Tapti basin using Landsat imagery. S. N. Pandey (Saugar, University, Sagar, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 79-86. 5 refs. Research supported by the Association of Commonwealth Universities of England.

A80-51083 Lineament study of the Bastar district. Madhya Pradesh, India, from Landsat imagery. V. D. Bhate (Geological Survey of India, Calcutta, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 87-93, 8 refs.

Study of the Landsat-1 MSS imagery covering the Bastar district, Madhya Pradesh, India, has brought out the lineament pattern, major structural trends, and main geological formations of the area. The lineaments in Bastar trend mainly NW-SE, NE-SW, N-S, NNE-SSW, E-W and ENE-WSW, the NW-SE trend being the most predominant. The study of the lineaments indicates that the Central Bastar Plateau probably represents an uplifted block bounded on three sides by major faults. (Author)

Tectonics and lineament patterns of the A80-51084 Vindhyan basin based on Landsat imagery data. M. Krishnamurty and V. C. Srivastava (Geological Survey of India, Lucknow, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 95-99.

A study of Landsat imagery of the Vindhyan basin covered 124,000 sq km on 1:1 million scale extending between the coordinates 24 deg N to 26 deg N and 78 deg E to 84 deg E was conducted to review the regional tectonics of the basin. The distinct set of lineaments trending (ENE-WSW) along the Son-Narmada and Asmara directions appears to have been responsible in pre-Bijawar times for carving out the Bijawar/Vindhyan basin. There appear to be a series of movements along these geosutures during Bijawar and Semri times and also at the end of Semri time. There are diamondiferous plugs along these two fractures as well as basemetal and radioactive mineralization, thus establishing the idea that they are of deep seated crustal origin. (Author)

A80-51085 Lineaments and their tectonic significance in relation to mineral potential in south India. M. Ahmad (Geological Survey of India, Hyderabad, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 101-104.

A lineament map of Peninsular India south of 21 deg N latitude was prepared involving 51 frames of Landsat I and Landsat II on scale 1:1 million. A study of this map has shown significant relationship of the lineaments in the tectonic history and sedimentation in parts of south India and the preferential location of features like mineralization, seismicity, hot springs, localization, and movement of groundwater along the lineaments. (Author)

A80-51086 Interfacing with SEO technology - A case study in geological application. J. K. Sircar, S. Chakravarti, P. K. Guha, and P. K. Banerji (Geological Survey of India, Photography and Remote Sensing Div., Calcutta, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 105-108.

The present paper embodies the results of a study on remotely sensed multispectral data, including panchromatic and CIR photographs, from an airborne sensor system with the dual aim of creating the necessary interfacing infrastructure for the utilization of the anticipated Indian Satellite for Earth Observation (SEO) technology and assessing the utility of data generated in this quasi-operational system simulation of the SEO. Specifically, the study involves an inventory of the interpretational possibilities of the various airborne data products involving both visual and computer aided analysis on a well defined geological problem within a small area of the Bihar Mica

04 GEOLOGY AND MINERAL RESOURCES

Belt, India. The study reveals that visual interpretation based on digitally enhanced data products has a distinct economic advantage over fully automated schemes of pattern recognition. (Author)

A80-51087 Surface characteristics of Precambrian stromatolitic phosphorites of a part of the Indian shield. D. M. Banerjee (Delhi, University, Delhi, India). In: Remote sensing and mineral exploration: Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 109-119. 10 refs.

The utility of aerial photographs and MSS imagery for exploration of Precambrian phosphorites in a part of Indian shield is discussed. In view of small dimensions of each deposit, the low altitude aerial photography has been found suitable for exploration purpose. Landsat MSS images with advance sensors may be found useful in geo-chemical mapping and for identifying individual phosphate units. (Author)

A80-51088 Application of remote sensing techniques to petroleum exploration in India. S. N. Talukdar (Oil and Natural Gas Commission, Institute of Petroleum Exploration, Dehra Dun, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 121-126.

The extensive use of remote sensing techniques in petroleum exploration in India had a modest beginning in 1930s when the geologists of Assam Oil Company employed photogeological methods to map the densely forested, and highly inaccessible areas in Assam, Tripura and Mizoram in the eastern part of India. After the 'Oil and Natural Gas Commission' was set up in 1956, to explore for petroleum in India, photogeological and photogeomorphological studies were extended to cover all the sedimentary basins of interest in India. With the availability of Landsat data, both visual and machine aided interpretation techniques have greatly facilitated the oil exploration efforts. An outline of the activities of Oil and Natural Gas Commission in this fascinating field is presented in this paper.

(Author)

A80-51089 Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin, Andhra Pradesh, India. D. N. Setti and K. Krishnanunni (Geological Survey of India, Calcutta, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 127-130.

A80-51090 Use of Landsat data products for geological mapping - A case history in Tamilnadu, India. V. Srinivasan, A. Sevugan Chetty (Madras, State Geology Dept., Madras, India), V. L. Swaminathan, and V. Tamilarasan (Indian Space Research Organization, Space Application Centre, Ahmedabad, India). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 131-137.

Under a joint project of Tamilnadu Geology Branch and Indian Space Research Organization, various data products of Landsat-2 were utilized to prepare geological maps and lineament maps of Archaean metamorphic terrain in Tamilnadu. Additional information from aerial photographs and from ground checks were also incorporated for limited area taken up as test sites. The study has shown that Landsat imagery and aerial photographs can be useful as tools in the hands of an experienced geologist, even though they have certain limitations particularly in crystalline shield areas. (Author)

A80-51091 Some results of remote sensing in Yugoslavia. B. Koscec (Industroprojekt Co., Zagreb, Yugoslavia). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 143-150. 8 refs.

A short history of application of remote sensing technology and methods in Yugoslavia is given in the paper, with special emphasis to geological and affiliate purposes. Some case histories of successfull application of Landsat images, standard issues and computer enhanced, in exploration of different mineral resources in different regions of Yugoslavia are briefly discussed. Thermal infrared scanning has been carried out in order to locate possible mineralized zones, to check some geothermal anomalies, to solve certain coastal hydrogeological and water pollution problems on Adriatic shore as well as to perform the energy-loss survey for industrial and urban purposes. (Author)

A80-51092 Application of Landsat-2 data for obtaining land information. R. Haydn, F. Jaskolla, and J. Bodechtel (Zentralstelle für Geophotogrammetrie und Fernerkundung, Munich, West Germany). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 151-155.

A strategy for the routine utilization of Landsat data in the derivation of thematic information on the earth's surface is presented. The concept involves the acquisition of all available Landsat CCTs, thematic maps and additional literature, image preprocessing to obtain a preliminary interpretation of satellite images, and subsequent verification and interpretation, making use of ground truth data, digital image processing and conventional photointerpretation. The application of the concept is illustrated for the production of geological, vegetation, soil and potential land use maps for the Targant region of the Sahel area of Mauritania. A.L.W.

A80-51093 Measurement results and conclusions on the spectral reflective coefficients of volcanites, granitoides and gneisses. Kh. B. Spiridonov, A. Kh. Krumov (B'Igarska Akademiia na Naukite, Tsentralna Laboratoriia po Kosmicheski Izsledvaniia, Sofia, Bulgaria), N. K. Katskov, and S. R. Iovchev (Applied Research Laboratory, Sofia, Bulgaria). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 157-163.

A80-51094 An automatic method of discriminating rock outcrops using Landsat data. P. Chagarlamudi (Haskins and Sells Associates, Ottawa, Canada). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 165-168.

A method of discriminating rock outcrops has been developed using Landsat data. The method, based on a hierarchical classification scheme, has been calibrated and tested in the Coppermine River area of the Northwest Territories of Canada. Maps showing outcrop locations have been prepared using this method. These maps were compared with the published geological maps, field notes, and aerial photos. The study shows that rock outcrops can be uniquely identified and that discrimination among different rock types is possible. Further, the results indicate that the Landsat data are as good as aerial photos for locating rock outcrops. (Author)

A80-51095 L-band radar and geology - Some results in south-east of France. P. Rebillard (Institut Dolomien-Géologie et Minéralogie, Grenoble, France). In: Remote sensing and mineral exploration; Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 169-172. Research supported by the Centre National d'Etudes Spatiales, Institut Dolomien-Géologie et Minéralogie, and Commissariat à l'Energie Atomique.

One L-Band Side Looking Airborne Radar experiment was carried out in the SW of the French Alpes in June, 1977. A comparison has been made between geological maps and aerial views taken with HH and HV polarization. Two results are remarkable: (1) the roughness of the objects can influence the image on the pictures in HH polarization, and (2) white marks in HH (and black in HV) can be seen; a field analysis has shown the structural reality of this line. These results should be correlated with results obtained from SEASAT or other sensors. (Author)

N80-28852# Geological Survey, Reston, Va.

US GEOLOGICAL SURVEY SOURCES OF PHOTOGRAPHS AND IMAGES OF BIOSPHERE RESERVES TAKEN FROM SPACECRAFT AND AIRCRAFT, SAN JOAQUIN EXPERI-MENTAL RANGE

Janet Bonner, comp. and Marrianne Moskowitz, comp. 1980 56 p

(PB80-169295) Avail: NTIS HC A04/MF A01 CSCL 08F Photographs and images of the San Joaquin experimental range and adjacent areas available from the U.S. Geological Survey (USGS) are listed. LANDSAT, Skylab, NASA aircraft, and USGS photographs are included in the listing. Computer listings of data are provided by the EROS Data Center which contains in its archives all of the listed material in photographic form and, in the case of LANDSAT images, can make available computer-compatible magnetic tapes of any LANDSAT scene.

GRA

N80-29798*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GEOLOGIC APPLICATION OF THERMAL INERTIA IMAGING USING HCMM DATA Quarterly Report, Oct. - Dec. 1979 Helen N. Paley, Anne B. Kahle, and Stuart E. Matsh, Principal Investigators May 1980 4 p HCMM (Contract NAS7-100)

(E80-10229: NASA-CR-163334) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-29799*# Geological Survey, Denver, Colo.

GEOLOGIC APPLICATION OF THERMAL-INERTIA MAP-PING FROM SATELLITE Progress Report, Mar. - May 1980

Terry W. Offield, Principal Investigator, Susanne H. Miller, and Kenneth Watson Jun. 1980 5 p Sponsored by NASA HCMM

(E80-10230: NASA-CR-163335) Avail: NTIS HC A02/MF A01 CSCL 08B

The author has identified the following significant results. Two night-time thermal images of the Powder River Basin, Wyoming distinctly show a major thermal feature. This feature is substantially coincident with a drainage divide and the southward facing slope appears cooler, suggesting a lower thermal inertia. An initial examination of regional geologic maps provides no clear evidence to suggest what type of geologic feature or structure may be present, although it can be noted that its northeastern end passes directly through Lead, South Dakota where the Homestake Gold Mine is located.

N80-29800*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GEOLOGIC APPLICATION OF THERMAL INERTIA IMAGING USING HCMM DATA Quarterly Report, Jan. - Mar. 1980 Helen N. Paley and Anne B. Kahle, Principal Investigators May

1980 4 p HCMM (Contract NAS7-100) (E80-10231; NASA-CR-163336) Avail: NTIS HC A02/MF A01 CSCL 08B

N80-29817*# Phoenix Corp., McLean, Va. IMPROVED DEFINITION: OF CRUSTAL ANOMALIES FOR MAGSAT DATA Quarterly Report 25 Jun. 1980 3 p ERTS (Contract NAS5-25882) (E80-10270: NASA-CR-163342; QR-3) Avail: NTIS HC A02/MF A01 CSCL 08G

N80-29822*# Stanford Univ., Calif. Dept. of Applied Earth Sciences.

GEOLOGICAL AND GEOTHERMAL DATA USE INVESTIGA-TIONS FOR APPLICATION EXPLORER MISSION-A (HEAT CAPACITY MAPPING MISSION) Technical Report, 1 Oct. - 31 Dec. 1979

R. J. P. Lyon and A. E. Prelat, Principal Investigators 31 Dec.

1979 5 p HCMM (Contract NAS5-24232) (E80-10279; NASA-CR-163345) Avail: NTIS HC A02/MF A01 CSCL 08B

N80-30865*# Stanford Univ., Calif. Dept. of Geology. SOIL MOISTURE IN RELATION TO GEOLOGIC STRUCTURE AND LITHOLOGY, NORTHERN CALIFORNIA Ernest I. Rich, Principal Investigator 21 Jul. 1980 2 p HCMM

(Contract NAS5-24479) (E80-10298; NASA-CR-163352) Avail: NTIS HC A02/MF A01 CSCL 08M

The author has identified the following significant results. Structural features in the Norther California Coast Ranges are clearly discernable on Nite-IR images and some of the structural linears may result in an extension of known faults within the region. The Late Mesozoic marine sedimentary rocks along the western margin of the Sacramento Valley are clearly defined on the Nite-IR images and in a gross way individual layers of sandstone can be differentiated from shale. Late Pleistocene alluvial fans are clearly differentiated from second generation Holocene fans on the basis of tonal characteristics. Although the tonal characteristics change with the seasons, the differentiation of the two sets of fans is still possible.

N80-30866*# Consiglio Nazionale delle Ricerche, Milan (Italy). Inst. per la Geofisica della Litosfera.

STUDY OF GEOLOGICAL STRUCTURE OF SICILY AND OTHER ITALIAN AREAS Progress Report

Roberto Cassinis, Principal Investigator, Giovanni Lechi, Eugenio Zilioli, and Alberto Marini Jun. 1980 6 p Sponsored by NASA HCMM

(E80-10299; NASA-CR-163353; PR-3) Avail: NTIS HC A02/MF A01 CSCL 08B

N80-30881# Edgerton, Germeshausen and Grier, Inc., Sunnyvale, Calif.

AERIAL GAMMA RAY AND MAGNETIC SURVEY: RATON BASIN PROJECT. THE RATON AND SANTA FE QUAD-RANGLES OF NEW MEXICO Final Report

Dec. 1979 324 p refs (Contract EY-76-C-13-1664)

(GJBX-9(80)-Vol-2) Avail: NTIS HC A14/MF A01

The Santa Fe quadrangle in central New Mexico lies principally within the Southern Rocky Mountains and Great Plains Provinces. The west is dominated by the Sangre de Cristo Mountains. The eastern and southern regions contain portions of the Sierra Grande Arch and the Las Vegas and Tucumcari Basins. These structures primarily contain permian, triassic, cretaceous, and tertiary sediments. Many areas of the quadrangle are covered by cretaceous through quaternary igneous rocks of a variety of types. Magnetic data reflect both deep and shallow sources. The basins show as regions of low frequency/low amplitude wavelengths except where significant amounts of igneous rocks are exposed. The Santa Fe quadrangle has been unproductive in terms of uranium. All known uranium occurrences to date have proven uneconomic. Two goups of anomalies in the Sangre de Cristo Mountains appear to be most significant in terms of DOF their peak count rates.

N80-32013# Bureau of Mines and Geology, Moscow, Idaho. Dept. of Lands.

ADDITIONS AND CORRECTIONS TO THE BIBLIOGRAPHY OF GEOLOGIC STUDIES, COLUMBIA PLATEAU (COLUM-BIA RIVER BASALT) AND ADJACENT AREAS, IN IDAHO, 1980

William Strowd and Gail S. Hustedde 1980 124 p refs (Contract DE-AC02-77RL-01030)

(RHO-BWI-C-68) Avail: NTIS HC A06/MF A01

Materials that have become available since the original publication and pertinent literature that had originally been overlooked are included. Index maps that show locations of geologic studies and geochemical petrographic, remanent paleomagnetic, and radiometric age-dated sites within the Columbia River Basalt Group field within Idaho are presented. Archeological sites, test wells, mines, quarries, and other types of excavations are also identified. DOE

N80-32837# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

REMOTE SENSING APPLIED TO THE PROSPECTING OF GEOTHERMAL ANOMALY IN CALDAS NOVAS COUNTY, STATE OF GOIAS, BRAZIL

Paulo Veneziani and Celio Eustaquio DosAnjos Jun. 1980 6 p refs Presented at the 14th Intern. Symp. on Remote Sensing of Environ., San Jose, Costa Rica, 23-30 Apr. 1980

(INPE-1792-RPE/164) Avail: NTIS HC A02/MF A01

Thermally anomalous areas associated with hot waters in the County of Caldas Novas, State of Goias, Brazil were studied. Data collection using a 50 cm soil thermometer and a Precision Radiation Thermometer indicated the presence of four principal anomalies. These areas were verified in the field. In the area of the town of Caldas Novas, of 14 deep wells drilled, none revealed water temperatures from 33 to 41 C, two contained hot mud, and one contained sulfurous water measured at 29 C. Two day wells were also encountered. L.F.M.

N80-32844# Bureau of Mines, Denver, Colo. Denver Research Center.

DEVELOPMENT OF A METHOD TO DETECT GEOLOGIC FAULTS AND OTHER LINEAR FEATURES FROM LANDSAT IMAGES Report of Investigations, 1980

Richard G. Burdick and Robert A. Speirer 1980 81 p refs (PB80-189665; BM-RI-8413) Avail: NTIS HC A05/MF A01 CSCL 08G

A detection method for use with a minicomputer was developed. The method comprises a suite of programs that scans an image for all 'potential' lineaments. From this partially analyzed data, the final lineaments are picked by another routine. The method was field tested and results indicated good agreement between computer picked lineaments and ground features. GRA

N80-32845# Columbia Univ., New York. Aldridge Lab. of Applied Geophysics.

DETECTION OF HIDDEN MINERAL DEPOSITS BY AIR-BORNE SPECTRAL ANALYSIS OF FOREST CANOPIES

William Collins, Sheng-Huei Chang, and John T. Kuo $\,$ 1979 66 p $\,$ refs

(Grant NSF DAR-78-16320)

(PB80-193881; NSF/RA-800041) Avail: NTIS HC A04/MF A01 CSCL 08G

Field surveys and data analysis of four biogeochemical test sites confirmed the ability of an airborne system with high spectral resolution to detect an anomalous spectral waveform that appeared to be associated with sulfide mineralization. Known or suspected sulfide zones were detected on each site. GRA

N80-33824 Colorado Univ. at Boulder. A MULTI-STEP METHOD FOR AVALANCHE ZONE REC-OGNITION AND ANALYSIS Ph.D. Thesis Thomas Patrick Huber 1980 183 p

Avail: Univ. Microfilms Order No. 8021587

Analytical tools were used to determine avalanche areas and runout zone limits in the Silverton Quadrangle, Colorado, which is located in the central San Juan Mountain Range. Vegetation and geomorphic features were analyzed by the use of natural color and color infrared aerial imagery to produce map. The geomorphology of avalanche runout zones was used to verify and rectify the preceeding mapped areas. The more distinctive features of this morphology included the concave longitudinal profile of the slope, the impact evidence across valleys, and the prominent convex transverse profile. This latter feature is primarily due to the deposition of impounded detritus by the snow avalanche. Finally the changes in soil development brought about by renewed deposition of this detritus were analyzed. It was shown that soil profile differences can be used to delimit the zone of avalanche modification and, therefore, the zone of greatest hazard. Dissert, Abstr.

N80-33842# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CONTRIBUTIONS OF LANDSAT IMAGERY TO THE GEOLOGICAL MAPPING OF THE RIO DO GRANDE SUL SHIELD (CONTRIBUICAO DAS IMAGENS LANDSAT AO CONHECIMENTO GEOLOGICO DE ESCUDO SUL RIOGRAN-DENSE)

Tomoyuki Ohara Aug. 1980 11 p refs In PORTUGUESE: ENGLISH summary Presented at 32d Ann. Reunion of the Brazilian Soc. for the Progr. of Sci., Rio de Janeiro, 6-12 Jul. 1980

(INPE-1838-RPE/199) Avail: NTIS HC A02/MF A01

The geological mapping in the central western portion of Rio Grande do Sul Shield was performed by the use of LANDSAT multispectral images at the scale of 1:500,000. The conventional photointerpretation was utilized for the geological investigation. The process of extracting information from LANDSAT imagery was based on the analysis of the various features on the Earth's surface, which reflect in diverse photographic elements such as tonal, drainage, topographic, vegetal and land use patterns, in each spectral band. A general geological view was given in the attached stratigraphic column. Interpretation of LANDSAT imagery also shows that (1) the distribution of Santa Barbara Formation is wider than that shown on the existing geological maps: (2) the subdivision of the Guaritas Formation into Varzinha and Guarda Velha Layers is possible: and (3) the granitic bodies and heterogeneous migmatites of the southeastern portion of the study area are considerably different from the existing geological maps. A.R.H.

N80-33843# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DIGITAL FILTERING OF LANDSAT IMAGES AS A VISUAL AID TECHNIQUE IN GEOLOGICAL PHOTOINTERPRETA-TION [FILTRAGENS DIGITAIS DE IMAGENS LANDSAT COMO TECNICA DE AUXILIO VISUAL NA FOTOINTERPRE-TACAO GEOLOGICA]

Waldir Renato Paradella Jul. 1980 14 p refs In PORTUGUESE: ENGLISH summary Presented at 31st Congr. of the Brazilian Geol. Soc., San Catarina, Brazil, 19-25 Oct. 1980 Submitted for publication

(INPE-1823-RPE/189) Avail: NTIS HC A02/MF A01

Digital filtering techniques of LANDSAT imagery were developed as an aid to geologic photointerpretation. Concepts and general procedures are provided for the utilization of these automatic enhancement techniques. S.F.

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OCEANOGRAPHY AND MARINE RESOURCES

Includes sea-surface temperature, ocean bottom surveying imagery, drift rates, sea ice and icebergs, sea state, fish location.

A80-44232 * # Microwave radiometric aircraft observations of the Fabry-Pérot interference fringes of an ice-water system. R. F. Harrington, C. T. Swift, and J. C. Fedors (NASA, Langley Research Center, Hampton, Va.). COSPAR and Inter-Union Commission on Radio Meteorology, Symposium on Oceanography from Space, Venice, Italy, May 26-30, 1980, Paper. 8 p.

Airborne stepped-frequency microwave radiometer (SFMR) observations of the Fabry-Pérot interference fringes of ice-water systems are discussed. The microwave emissivity at normal incidence of a smooth layered dielectric medium over a semi-infinite dielectric medium is examined for the case of ice over water as a function of ice thickness and attenuation coefficient, and the presence of quarter-wavelength oscillations in emissivity as the ice thickness and frequency are varied is pointed out. Experimental observations of pronounced quarter-wavelength oscillations in radiometric brightness temperature due to the Fabry-Pérot interference fringes over smooth sea ice and lake ice varying in roughness as the radiometer frequencies were scanned are then presented. A.L.W.

A80-45004 * # Ocean chlorophyll studies from a U-2 aircraft platform. H. H. Kim, C. R. McClain, L. R. Blaine (NASA, Goddard Space Flight Center, Greenbelt, Md.), W. D. Hart (Science Systems and Applications, Inc., Lanham, Md.), L. P. Atkinson, and J. A. Yoder (Skidaway Institute of Oceanography, Savannah, Ga.). Journal of Geophysical Research, vol. 85, July 20, 1980, p. 3982-3990. 18 refs.

Chlorophyll gradient maps of large ocean areas were generated from U-2/OCS data obtained over test sites in the Pacific and the Atlantic Oceans. The delineation of oceanic features using the upward radiant intensity relies on an analysis method which presupposes that radiation backscattered from the atmosphere and the ocean surface can be properly modeled by using a measurement made at 778 nm. The calculation of atmospheric radiance was performed by using a method developed by Dave. An estimation of the chlorophyll concentration is performed by properly ratioing radiances measured at 472 and 548 nm after removing the atmospheric effects. The correlation between the remotely sensed data and the in situ surface chlorophyll measurements has been validated in two sets of data. The results show that the correlation between the in situ measured chlorophyll and the derived quantity is a negative exponential function, and the correlation coefficient was calculated to be -0.965. (Author)

A80-45015 # Satellite observations of a nutrient upwelling off the coast of California. E. D. Traganza, D. A. Nestor, and A. K. McDonald (U.S. Naval Postgraduate School, Monterey, Calif.). *Journal of Geophysical Research*, vol. 85, July 20, 1980, p. 4101-4106. 11 refs. Navy-supported research.

Satellite thermal imagery is combined with automated chemical analysis of surface waters off central California to detect and better understand a 'nutrient upwelling' entering the California Current system. While thermal surface water features have been mapped successfully from satellites for a number of years, the relationship of satellite thermal imagery to nutrients, such as nitrates and phosphates, has not been established. As a result of such efforts, satellite remote sensors may help to explain the relationship between chemical mesoscale and pelagic ecosystems of the ocean. (Author) A80-46095 # Methods for the extraction of long-period ocean wave parameters from narrow beam HF radar sea echo. B. Lipa (SRI International, Menlo Park, Calif.) and D. Barrick (NOAA, Wave Propagation Laboratory, Boulder, Colo.). *Radio Science*, vol. 15, July-Aug. 1980, p. 843-853. 23 refs. Contract No. NOAA-03-78-B01-119.

A80-46309 Observation of wavelike motion of the Gaspe Current. C. L. Tang (Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada). *Journal of Physical Oceanography*, vol. 10, June 1980, p. 853-860. 9 refs.

A simple theoretical model of barotropic instability proposed by Niiler and Mysak (1971) is used to investigate two events observed in the movement of the Gaspe Current in the summer of 1978. According to the current meter and satellite data, on the first occasion the axis of the current moved offshore and the deep current reversed its normal seaward direction, then a wavelike structure was formed, distorted, and finally, collapsed. The time span of the event is about 10 days. In the second event a wavelike structure with an estimated wavelength of 60 km was also preceded by a shift in the position of the Gaspe Current. The barotropic instability model predicts an e-folding time of 1 day, a wavelength of 52 km and a period of 4 days, which compare well with the observed wavelength of 60 km and a period of 3-5 days.

A80-46315 Dynamical interpretation of satellite-sensed thermal features off Vancouver Island. W. J. Emery and L. A. Mysak (British Columbia, University, Vancouver, Canada). *Journal of Physical Oceanography*, vol. 10, June 1980, p. 961-970. 28 refs. Contract No. N00014-77-G-0047.

Two series of very high resolution thermal infrared satellite images, off Vancouver Island, are examined for evidence of baroclinic waves. A 1979 winter sequence of three images exhibits cold tongues, extending seaward from Vancouver Island, which have separations (wavelengths), northwest phase speeds and growth rates consistent with a model of baroclinically unstable waves. An earlier summer series of eight images displays no such propagation behavior, which may be due to upper layer thermal changes from solar insolation. (Author)

A80-46316 Direct measurement of recirculation in the Alaskan Stream. R. K. Reed (NOAA, Pacific Marine Environmental Laboratory, Seattle, Wash.). *Journal of Physical Oceanography*, vol. 10, June 1980, p. 976-978. 10 refs. NOAA-supported research.

Three drifting buoys were deployed off Kodiak Island and tracked by satellite in summer 1978; all three veered out of the southwestward flowing Alaskan Stream and moved to the east and northeast around the Gulf of Alaska gyre. This is the first direct measurement of recirculation around the gyre, but the pattern is strikingly similar to what was inferred two to three decades ago from property distributions, and it has been predicted theoretically.

(Author)

A80-48750 Thermal fronts in the Mediterranean according to NOAA 5 satellite radiometer data /September 1977-February 1979/ (Fronts thermiques en Méditerranée, d'après les données du radiomètre du satellite NOAA 5 /septembre 1977-février 1979/). M. Philippe (Establissement d'Etudes et de Recherches Météorologiques, Boulogne-Billancourt, Hauts-de-Seine, France). Académie des Sciences (Paris), Comptes Rendus, Série 8 - Sciences Physiques, vol. 291, no. 1, July 7, 1980, p. 43-46. 6 refs. In French.

A map of surface thermal fronts in the Mediterranean Sea obtained from NOAA-5 satellite infrared very high resolution radiometer data for September 1977 to February 1979 is presented, and the phenomena associated with them are identified. The fronts, with thermal gradients greater than or equal to 1 C/10 km, are found to be associated with the principle Mediterranean current, especially above vortices located between the current axis and the African coast and abnormally long continental shelves, and with cyclonic circulations supplied by branches of the principle current, including those of adjoining seas. A.L.W.

A80-49651 # The three-dimensional structure of the frontal zone of the Gulf Stream from synchronous satellite and ship data (Trekhmernaia struktura frontal'noi zony Gol'fstrima po sinkhronnym dannym sputnika i korablia). V. E. Skliarov and K. N. Fedorov (Akademiia Nauk SSSR, Institut Okeanologii, Moscow, USSR). Issledovanie Zemli iz Kosmosa, May-June 1980, p. 5-13. 12 refs. In Russian.

NOAA satellite data are used in conjunction with ship data to study the three-dimensional structure of the frontal zone of the Gulf Stream in the vicinity of a cold filament of slope water entrained across the front. It is shown that this part of the Gulf Stream contains a well-developed cyclonic eddy 25-30 km in diameter which moves downstream at a velocity of 50 cm/sec. B.J.

A80-50300 # The problems of SAR imagery of ocean waves (Osobennosti izobrazheniia morskikh voln v RSA). A. V. Ivanov (Akademiia Nauk SSSR, Institut Radiotekhniki i Elektroniki, Moscow, USSR). Radiofizika, vol. 23, no. 8, 1980, p. 923-933. 17 refs. In Russian.

The effect of defocusing of synthetic aperture radar (SAR) imagery of ocean waves, caused by wave motion is studied. Consideration is given to the speed modulation of imagery brightness. The analysis employs a two-scale model of VHF radiation scattering. V.T.

A80-51407 * # Comparison of surface wind stress measurements - Airborne radar scatterometer versus sonic anemometer. J. T. Brucks, T. D. Leming (NOAA, National Fisheries Engineering Laboratory, Bay Saint Louis, Miss.), and W. L. Jones (NASA, Langley Research Center, Hampton, Va.). Journal of Geophysical Research, vol. 85, Sept. 20, 1980, p. 4967-4976. 13 refs.

Sea surface wind stress measurements recorded by a sonic anemometer are correlated with airborne scatterometer measurements of ocean roughness (cross section of radar backscatter) to establish the accuracy of remotely sensed data and assist in the definition of geophysical algorithms for the scatterometer sensor aboard Seasat A. Results of this investigation are as follows: Comparison of scatterometer and sonic anemometer wind stress measurements are good for the majority of cases; however, a tendency exists for scatterometer wind stress to be somewhat high for higher wind conditions experienced in this experiment (6-9 m/s). The scatterometer wind speed algorithm tends to overcompute the higher wind speeds by approximately 0.5 m/s. This is a direct result of the scatterometer overestimate of wind stress from which wind speeds are derived. Algorithmic derivations of wind speed and direction are, in most comparisons, within accuracies defined by Seasat A scatterometer sensor specifications. (Author)

A80-51408 * Radar observations of wave transformations in the vicinity of islands. J. F. Vesecky, C. C. Teague (Stanford University, Stanford, Calif.), S. V. Hsiao, O. H. Shemdin (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.), and S. S. Pawka (California, University, La Jolla, Calif.). Journal of Geophysical Research, vol. 85, Sept. 20, 1980, p. 4977-4986. 21 refs. Contracts No. N00014-75-C-0356; No. NAS7-100.

Remote sensing by ground-based HF radar and airborne synthetic aperture radar and in situ wave measurements performed on March 25, 1977 during the West Coast Experiment have made it possible to form an overall picture of the 7-sec-period wave climate over a 35,000 sq km region off the southern California coast. The picture which emerges from these measurements shows a broad deep-ocean directional distribution arriving from the west and being significantly modified as it travels coastward passing San Clemente and Santa Catalina islands. B.J. A80-51409 * Comparisons between wave directional spectra from SAR and pressure sensor arrays. S. S. Pawka, D. L. Inman (California, University, La Jolla, Calif.), S. V. Hsiao, and O. H. Shemdin (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). Journal of Geophysical Research, vol. 85, Sept. 20, 1980, p. 4987-4995. 9 refs. Contracts No. N00014-75-C-0300; No. NAS7-100; No. JPL-954672.

Simultaneous directional wave measurements were made at Torrey Pines Beach, California, by a synthetic aperture radar (SAR) and a linear array of pressure sensors. The measurements were conducted during the West Coast Experiment in March 1977. Quantitative comparisons of the normalized directional spectra from the two systems were made for wave periods of 6.9-17.0 s. The comparison results were variable but generally showed good agreement of the primary mode of the normalized directional energy. An attempt was made to quantify the physical criteria for good wave imaging in the SAR. A frequency band analysis of wave parameters such as band energy, slope, and orbital velocity did not show good correlation with the directional comparisons. It is noted that absolute values of the wave height spectrum cannot be derived from the SAR images yet and, consequently, no comparisons of absolute energy levels with corresponding array measurements were intended. (Author)

A80-51411 * # Synthetic aperture radar imaging of ocean waves - Comparison with wave measurements. W. McLeish, D. Ross (NOAA, Sea-Air Interaction Laboratory, Miami, Fla.), R. A. Shuchman (Michigan, Environmental Research Institute, Ann Arbor, Mich.), P. G. Teleki (U.S. Geological Survey, Reston, Va.), S. V. Hsiao, O. H. Shemdin, and W. E. Brown, Jr. (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). Journal of Geophysical Research, vol. 85, Sept. 20, 1980, p. 5003-5011. 34 refs. NOAA-NASA-NAvy-Army-supported research.

Synthetic aperture radar images of ocean waves were obtained in conjunction with reference wave data near Marineland, Florida, December 14, 1975. Each of the various types of measurements were processed into a form that allowed direct comparisons with the others. Maxima of radar spectra occurred at the same frequencies as the maxima of reference wave height spectra. In a comparison of a radar spectrum with observed spectra of wave height, wave orbital velocity, and surface slope the high-frequency portion of the radar spectrum lay near and between the wave height and the orbital velocity spectra but differed significantly from the surface slope spectrum. The radar-derived mean directions and model-fitted directional spreads of wave energy were close to the values from a directional wave buoy and indicated the accuracy of radar measurements of wave direction. However, a directional plot of a radar spectrum near shore at the frequency of the maximum showed a sharper peak than such a plot of a fitted spectrum derived from reference data. (Author)

A80-51415 * Modulation of sea surface radar cross section by surface stress - Wind speed and temperature effects across the Gulf Stream. D. E. Weissman (Hofstra University, Hempstead, N.Y.), T. W. Thompson (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.), and R. Legeckis (NOAA, National Environmental Satellite Service, Washington, D.C.). Journal of Geophysical Research, vol. 85, Sept. 20, 1980, p. 5032-5042. 26 refs. Contract No. NAS7-100.

A80-51485 Sensing the ocean environment from space. J. H. Guill (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.). Lockheed Horizons, Fall 1980, p. 2-15.

Cost benefits of roughly \$9 billion till the end of the century and other advantages (maritime transportation, fishing, arctic operation, etc.) of oceanographic satelites are presented. The benefits from the Seasat-A satellite (launched 1978) are discussed and built upon in the proposed National Oceanic Satellite System for the 1980's. Coastal zone color scanning and Gulf Stream mapping procedures would be possible and river effluents, ice conditions and storms

05 OCEANOGRAPHY AND MARINE RESOURCES

could be studied. Data transmission features are considered with emphasis on the economic challenge. R.C.

A80-51490 * Nimbus-7 coastal zone color scanner - System description and initial imagery. W. A. Hovis, D. K. Clark (NOAA, National Environmental Satellite Service, Washington, D.C.), F. Anderson (National Research Institute for Oceanology, Cape Town, Republic of South Africa), R. W. Austin, W. H. Wilson (California, University, Scripps Institution of Oceanography, San Diego, Calif.), E. T. Baker (NOAA, Pacific Marine Environmental Laboratory, Seattle, Wash.), D. Ball (Computer Sciences Corp., Silver Spring, Md.), H. R. Gordon (Miami, University, Coral Gables, Fla.), J. L. Mueller (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, Md.), and S. Z. El-Sayed (Texas A & M University, College Station, Tex.). Science, vol. 210, Oct. 3, 1980, p. 60-63. 15 refs. Contract No. NAS5-22963.

Initial imagery from the Nimbus-7 Coastal Zone Color Scanner (CZCS) shows subtle variations in water color. Organisms, especially phytoplankton, play a major influence on the variations in water color. Processing of the visual data is described, and in particular, the use of an algorithm to remove aerosol from the image is discussed. Data on the six spectral bands (433-12,500 nm) are presented and comparisons are made between the CZCS and the Landsat-1 multispectral scanner. The implications for management of fisheries is noted. R.C.

A80-51491 * Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements. H. R. Gordon (Miami, University, Coral Gables, Fla.), D. K. Clark, W. A. Hovis (NOAA, National Environmental Satellite Service, Washington, D.C.), and J. L. Mueller (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, Md.). *Science*, vol. 210, Oct. 3, 1980, p. 63-66. 11 refs. Contract No. NAS5-22963.

Algorithms are developed for removing aerosol effects in visual data from the Nimbus-7 Coastal Zone Color Scanner (CZCS). The corrected imagery reveals eddy-like ocean circulation patterns. Pigment concentrations from CZCS are compared with surface determinations. CZCS imagery estimates pigment concentration to within 0.5 log C, where C is the sum of the concentrations of chlorophyll å and phaeopigments a. R.C.

A80-52331 * Oil film thickness measurement using airborne laser-induced water Raman backscatter. F. E. Hoge (NASA, Wallops Flight Center, Wallops Island, Va.) and R. N. Swift (EG & G Washington Analytical Services Center, Inc., Pocomoke City, Md.). Applied Optics, vol. 19, Oct. 1, 1980, p. 3269-3281. 20 refs.

The use of laser-induced water Raman backscatter for remote thin oil film detection and thickness measurement is reported here for the first time. A 337.1-nm nitrogen laser was used to excite the 3400-cm-1 OH stretch band of natural ocean water beneath the oil slick from an altitude of 150 m. The signal strength of the 381-nm water Raman backscatter was always observed to depress when the oil was encountered and then return to its original undepressed value after complete aircraft traversal of the floating slick. After removal of background and oil fluorescence contributions, the ratio of the depressed-to-undepressed airborne water Raman signal intensities, together with laboratory measured oil extinction coefficients, is used to calculate the oil film thickness. (Author)

A80-53054 Landsat detection of oil from natural seeps. M. Deutsch (U.S. Geological Survey, Reston, Va.) and J. E. Estes (California, University, Santa Barbara, Calif.). *Photogrammetric Engineering and Remote Sensing*, vol. 46, Oct. 1980, p. 1313-1322. 13 refs.

Oil on the ocean surface from the natural seeps in the Santa Barbara Channel, California, could not be detected on frames of any of the four bands of standard Landsat positive or negative film transparencies, nor could the slicks be detected using digital scaling, density slicing, or ratioing techniques. Digital contrast-stretch enhancement, however, showed the distribution of oil on the surface. Aerial observations made within a few hours of the Landsat overpass confirmed the distribution of floating oil. The detection (on Landsat images) of floating oil from submarine seeps indicates a potentially valuable application for offshore oil exploration and environmental monitoring. (Author)

A80-53683 The availability of U.S. environmental satellite data to the marine technology community. B. H. Needham (NOAA, Satellite Data Services Div., Washington, D.C.). In: Marine technology 79: Ocean energy; Proceedings of the Fifteenth Annual Conference, New Orleans, La., October 10-12, 1979.

Washington, D.C., Marine Technology Society, 1979, p. 218-222.

The United States Archive of environmental satellite data at the Satellite Data Services Division of NOAA represents a unique source of information for various investigations within many scientific disciplines. While primarily intended for meteorological purposes, many sensors orbited on the more recent spacecraft (i.e., Seasat and Nimbus-7) also provide data of great value to the marine sciences. The data held within the Archive consist of imagery in both photographic and digital tape formats, and derived parameters (i.e., wave heights, wind speed, wind directions, sea-surface temperature, etc.) on digital tapes and paper printouts. While the Archive in its present form was initiated only in late 1974, photographic imagery from the earliest meteorological satellites of the 1960s through the fatest polar-orbiting and geostationary spacecraft are included in the files. (Author)

A80-53691 Platform and buoy positioning experiments in the North Sea via Doppler satellite techniques. G. Seeber (Hannover, Universität, Hanover, West Germany). In: Marine technology 79: Ocean energy; Proceedings of the Fifteenth Annual Conference, New Orleans, La., October 10-12, 1979. Washington, D.C., Marine Technology Society, 1979, p. 405-409. 9 refs. Research sponsored by the Deutsche Forschungsgemeinschaft; Bundesministerium für Forschung und Technologie Contract No. MTK-0057.

A80-54060 Observed short-time temperature variations and tidal current constants in the North Sea south east of the Dogger Bank /Comparison of two seasons/. H. W. Riepma (Koninklijk Nederlands Meteorologisch Instituut, De Bilt, Netherlands). Deutsche Hydrographische Zeitschrift, vol. 33, no. 2, 1980, p. 82-89. 6 refs.

N80-28847*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SATELLITE REMOTE SENSING FACILITY FOR OCEANO-GRAHIC APPLICATIONS Final Report

R. H. Evans, S. S. Kent, and J. B. Seidman $\,$ 1 Jul. 1980 76 p refs

(Contract NAS7-100) (NASA-CR-163363; JPL-Pub-80-40) Avail: NTIS HC A05/MF A01 CSCL 08C

HC AUS/MF AUT US

The project organization, design process, and construction of a Remote Sensing Facility at Scripps Institution of Oceanography at LaJolla, California are described. The facility is capable of receiving, processing, and displaying oceanographic data received from satellites. Data are primarily imaging data representing the multispectral ocean emissions and reflectances, and are accumulated during 8 to 10 minute satellite passes over the California coast. The most important feature of the facility is the reception and processing of satellite data in real time, allowing investigators to direct ships to areas of interest for on-site verifications and experiments. L.F.M.

N80-28939*# University of Central Florida, Orlando. A CONTINUATION OF BASE-LINE STUDIES FOR ENVIRON-MENTALLY MONITORING SPACE TRANSPORTATION SYSTEMS AT JOHN F. KENNEDY SPACE CENTER. VOLUME 3, PART 1: ICHTHYOLOGICAL SURVEY OF LAGOONAL

WATERS Final Report

F. F. Snelson, Jr. Jul. 1980 436 p refs (Contract NAS10-8986) (NASA-CR-163122; KSC-TR-51-2-Vol-3-Pt-1) Avail: NTIS HC A19/MF A01 CSCL 13B

Ichthyological species in the Indian River lagoonal system likely to be affected by NASA's aerospace activities at the Kennedy Space Center were surveyed. The importance of the fish found to inhabit the waters in the area is analyzed. A.R.H.

N80-28940*# University of Central Florida, Orlando.

A CONTINUATION OF BASE-LINE STUDIES FOR ENVIRON-MENTALLY MONITORING SPACE TRANSPORTATION SYSTEMS AT JOHN F. KENNEDY SPACE CENTER. VOLUME 3, PART 2: ICHTHYOLOGICAL STUDIES, SAILFIN MOLLY REPRODUCTION STUDY Final Report

F. F. Snelson, Jr. Jul. 1980 182 p refs

(Contract NAS10-8986)

(NASA-CR-163122: KSC-TR-51-2-Vol-3-Pt-2) Avail: NTIS HC A09/MF A01 CSCL 13B

The applicability of monitoring populations of Poccilia latipinna (sailfin molly) and its reproductive efforts as reliable indicators of environmental effects of aerospace activities in the Kennedy Space Center area was investigated. Results show that the sailfin molly experiences drastic fluctuations in population and reproductive success and is not an appropriate factor for monitoring to establish perturbations of the environment due to space transportation system related activities. A.R.H.

N80-29005*# National Aeronautics and Space Administration, Washington, D. C.

NASA OCEANIC PROCESSES PROGRAM: STATUS REPORT, FISCAL YEAR 1980

Jul. 1980 160 p

(NASA-TM-80233) Avail: NTIS HC A08/MF A01 CSCL 08C

Goals, philosophy, and objectives of NASA's Oceanic Processes Program are presented as well as detailed information on flight projects, sensor developments, future prospects, individual investigator tasks, and recent publications. A special feature is a group of brief descriptions prepared by leaders in the oceanographic community of how remote sensing might impact various areas of oceanography during the coming decade. L.F.M.

N80-29637*# Applied Science Associates, Inc., Apex, N. C. WALLOPS WAVEFORM ANALYSIS OF SEASAT-1 RADAR ALTIMETER DATA Final Report

George S. Hayne Jul. 1980 44 p refs

(Contract NAS6-2810)

(NASA-CR-156869) Avail: NTIS HC A03/MF A01 CSCL 05B

Fitting a six parameter model waveform to over ocean experimental data from the waveform samplers in the SEASAT-1 radar altimeter is described. The fitted parameters include a waveform risetime, skewness, and track point; from these can be obtained estimates of the ocean surface significant waveheight, the surface skewness, and a correction to the altimeter's on board altitude measurement, respectively. Among the difficulties encountered are waveform sampler gains differing from calibration mode data, and incorporating the actual SEASAT-1 sampled point target response in the fitted wave form. There are problems in using the spacecraft derived attitude angle estimates, and a different attitude estimator is developed. Points raised in this report have consequences for the SEASAT-1 radar altimeter's ocean surface measurements are for the design and calibration of radar altimeters in future oceanographic satellites. Author

N80-30618# Kansas Univ., Lawrence. Remote Sensing Lab. RADAR BACKSCATTER STUDY OF SEA ICE

R. G. Onstott, George J. Dome, Clifford V. Delker, Javed S. Patel, and R. K. Moore Feb. 1980 273 p refs (Contract N00014-76-C-1105)

(AD-A087032: CRINC/RSL-TR-331-14) Avail: NTIS HC A12/MF A01 CSCL 17/9

The ability to use radar to discriminate ice types has been investigated. Radar backscatter measurements were made of shorefast sea ice near Point Barrow, Alaska in May 1977 and April 1978, with a surface-based FM-CW scatterometer that swept from 1-2 GHz and from 8.5-17.5 GHz. The 1-2 GHz measurements showed that thick first-year and multiyear sea ice cannot be distinguished at 10 deg-70 deg incidence angles, but that undeformed sea ice can be discriminated from pressureridged thick first-year sea ice and lake ice. Results also indicate that frequencies between 8-18 GHz have the ability to discriminate between thick first-year sea ice, multiyear sea ice, and lake ice. The lowest frequency, 9 GHz, was found to provide the greatest separation between these ice categories with significant levels of separation existing between angles of incidence from 15 deg to 70 deg. The radar cross-sections for the like polarizations, VV and HH, were very similar in absolute level and angular response. The radar cross-sections for VV-polarization were usually the highest in absolute level. Cross-polarization provided a slightly greater separation between these categories of ice. GRA

N80-30850*# Royal Australian Navy Research Lab., Edgecliff. HEAT CAPACITY MAPPING MISSION PROJECT HCM-051 Interim Report

C. S. Nilsson, J. C. Andrews, M. W. Lawrence, S. Ball (Weapons Systems Research Lab., Salisbury, Australia), and A. R. Latham, Principal Investigators May 1980 70 p refs Sponsored by NASA Original contains imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (code 601), Greenbelt, Md. 20771. Domestic users send orders to 'Attn: National Space Science Data Center', nondomestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM

(E80-10278; NASA-CR-163344; Internal-TM-3/80) Avail: NTIS HC A04/MF A01 CSCL 08B

N80-30880# LeSchack Associates Ltd., Silver Spring, Md. CORRELATION OF UNDER-ICE ROUGHNESS WITH SATELLITE AND AIRBORNE THERMAL INFRARED DATA Leonard A. LeSchack May 1980 46 p refs (Contract N00014-76-C-0757)

(AD-A085512; TR-2) Avail: NTIS HC A03/MF A01 CSCL 08/12

This report, based on empirical data, concludes that a correlation has been found between easily obtainable sea ice surface temperature and under-ice roughness data which are obtainable only at great expense. Under-ice roughness is valuable in evaluating acoustic attenuation beneath the Arctic ice and is expressed in terms of either root-mean-square (RMS) ice depth or standard deviation about the mean ice depth, both of which are closely correlated. By showing a functional relationship between the skewness of the surface temperature distribution as derived from NOAA VHRR Satellite thermal infrared data and the under-ice roughness, the way appears clear to make a chart of Arctic under-ice roughness for Arctic acoustic programs and for nuclear submariners. In a second study, under ice data recorded in April 1976 by the SSN GURNARD was correlated with the skewness of temperature distributions derived from NOAA VHRR IR data recorded in March 1976 over nominally the same area of the Beaufort Sea. A third study was then conducted that shows, perhaps more graphically than the others, the correlation of under-ice data recorded by the British nuclear submarine HMS SOVEREIGN between 18-21 October 1976 with airborne IR data recorded during the same period over the submarine track by a Canadian Forces Argus aircraft. In all three examples, when the RMS ice depth range was between 4 and 8 m, corresponding to a standard deviation of ice depth ranging between 2 and 6 m, there is a strong, negative linear correlation between the skewness of the temperature distributions, whether measured from satellites or aircraft, and the under-ice roughness measured by submarine upward-looking sonar. GRA

N80-30884# National Technical Information Service, Springfield, Va.

REMOTE SENSING OF THE OCEAN: PHYSICAL, CHEMI-

CAL AND GEOLOGIC PROPERTIES. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1976 - May 1980 Robena J. Brown Jun. 1980 123 p Supersedes NTIS/PS-79/ 0585; NTIS/PS-78/0563 Updates COM-73-11676

(PB80-811235: NTIS/PS-79/0585: NTIS/PS-78/0563:

COM-73-11676) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 08J

Remote sensing methods as they are applied to ocean temperature, sea ice, marine biology, and sound and light transmission are included. Techniques of measurement using radiometry, microwave spectroscopy, radar systems, infrared spectroscopy, and photography are described. These measurements are made from both aircraft and satellites. This updated bibliography contains 116 abstracts, 17 of which are new entries GRA to the previous edition.

N80-30885# National Technical Information Service, Springfield. Va.

REMOTE SENSING OF THE OCEAN: DYNAMICS. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1970 - May 1980

Robena J. Brown 1980 191 p Supersedes NTIS/PS-79/0586: NTIS/PS-78/0564 Updates COM-73-11676

(PB80-811243: NTIS/PS-79/0586: NTIS/PS-78/0564:

COM-73-11676) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 08J

Remote sensing methods as they are applied to ocean currents, wind sediment transport, ocean waves, sea states, and air water interactions are included. The various techniques of measurement using radiometers, lasers, radar, and microwave and infrared equipment are described. This updated bibliography contains 183 abstracts, 18 of which are new entries to the GRA previous edition.

N80-32050*# Texas A&M Univ., College Station. ALTIMETRY DATA OVER TRENCHES AND ISLAND-ARCS AND CONVECTION IN THE MANTLE Final Report, 1 Nov.

1979 - 31 Aug. 1980 18 Sep. 1980 26 p refs

(Contracts NCC5-11: NAGS-94)

(NASA-CR-163516) Avail: NTIS HC A03/MF A01 CSCL 08C

Transfer function techniques were developed to calculate the isostatic component of the geoid signal over trench/island arc/back arc systems. Removal of this isostatic component from geoid profiles determined by GEOS 3 radar altimetry leaves a residual geoid that can be attributed to the effect of mass inhomogeneities below the depth of compensation. Efforts are underway to extend the analysis to all the major trench/island arc systems of the world in order to provide more detailed understanding of the dynamic processes occurring beneath island A R.H. arcs.

N80-32820*# Lancaster Univ. (England). Lunar and Planetary Unit.

SATELLITE MONITORING OF SEA SURFACE POLLUTION Final Report, Jan. 1977 - Jul. 1980

Gilbert Fielder, Timothy Stuart Hall, Principal Investigators, Duncan John Telfer, Lionel Wilson, and Richard John Fryer Jul. 1980 20 p HCMM

(NASA Order RD-1182)

(E80-10329: NASA-CR-163415; Rept-2-15/DF1) Avail: NTIS HC A02/MF A01 CSCL 13B

N80-32829*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SEASAT. VOLUME 2: FLIGHT SYSTEMS Final Report E. Pounder, ed. 1 Sep. 1980 369 p refs

(Contract NAS7-100)

(NASA-CR-163571; JPL-Pub-80-38-Vol-2) Avail: NTIS HC A16/MF A01 CSCL 05B

Flight systems used in the Seasat Project are described. Included are (1) launch operation: (2) satellite performance after launch; (3) sensors that collected data; and (4) the launch vehicle that placed the satellite into Earth orbit. Techniques for sensor management are explained. S.F.

N80-33068# Naval Research Lab., Washington, D. C. Environmental Sciences Div.

PASSIVE 19.3 GHz RADIOMETER AND AEROSOL DATA FROM THE NORTH SEA DURING MARSEN I, SEPTEM-BER - OCTOBER 1979 Interim Report

S. G. Gathman and B. G. Julian 13 Aug. 1980 116 p refs NRL-MR-4285) NTIS (AD-A088229) Avail: HC A06/MF A01 CSCL 04/2

The production and distribution of the various aerosols which are a result of air sea interactions were investigated. The mechanism of maritime aerosol generation was examined and the utility of satellite derived data on sea properties were R C T analyzed.

N80-33076# Naval Research Lab., Washington, D. C. Space Systems Div.

ON THE INFERENCE OF OCEANIC CURRENTS OR EDDIES BY SPACEBORNE ALTIMETRY THROUGH THE DYNAMIC METHOD FOR THE DETERMINATION OF THREE DIMEN-SIONAL DENSITY (TEMPERATURE) FIELD Progress Report

Davidson T. Chen and Vincent E. Noble 18 Jul. 1980 33 p refs

NTIS

Avail:

(W05270S00) (AD-A088082; NRL-MR-4273)

HC A03/MF A01 CSCL 08/3

The physical theoretical background, the mathematical governing equations, the absolute error, and the relative error of the dynamic method used in inferring the geostrophic current and eddy systems from the spaceborne altimeter-sensed measurements of dynamic heights or slopes have been laboriously developed. Also, the conditions for the determination of the three dimensional density (temperature) field uniquely are mentioned and explained. The space-borne altimeter is shown to be the instrument for the provision of one condition, i.e., the ocean surface current condition. The three dimensional density (temperature) field and its boundary conditions at the air-sea interface play dominant roles in the weather prediction and the undersea technology. The interchangeable use of the terms of density and temperature fields is valid only when the salinity can be assumed as constant. GRA

N80-33077# Texas A&M Univ., College Station. Dept. of Oceanography.

THE GULF STREAM MEANDERS EXPERIMENT: CURRENT METER, ATMOSPHERIC, AND SEA LEVEL DATA REPORT FOR THE MOORING PERIOD Data Report, Jan. - May 1979

David A. Brooks, John M. Bane, Robert L. Cohen, and Paul Blankinship (North Carolina State Univ. at Raleigh) Jul. 1980 277 p refs Prepared in cooperation with North Carolina Univ. at Chapel Hill

(Contract N00014-77-C-0354; Grant NSF OCE-79-06710)

(AD-A088069: TAMU-REF-80-7-T) Avail: NTIS HC A13/MF A01 CSCL 08/3

The principal objective of the Gulf Stream Meanders experiment was to kinematically and dynamically describe the nature of meanders. The upper continental slope region off Onslow Bay, North Carolina was chosen for the experiment site because several previous investigations in that area provided a baseline data set giving some ideas about time and space variability scales within and a several month mean view of the stream. In addition, earlier observations ranging from reports in centuries-old ship logs to recent satellite infrared imagery made it apparent that Gulf Stream meandering was more intense between Charleston and Cape Hatteras than elsewhere in the South Atlantic Bight. Current, sea level, and atmospheric data from the Gulf Stream region off North Carolina for the period January - May 1979 are documented. GRA

N80-33833*# Miami Univ., Fla. School of Marine and Atmospheric Science.

INVESTIGATIONS OF MEDIUM WAVELENGTH MAGNETIC ANOMALIES IN THE EASTERN PACIFIC USING MAGSAT DATA Interim Report, Jun. - Sep. 1980

Christopher G. A. Harrison, Principal Investigator 30 Sep. 1980 57 p refs Sponsored by NASA ERTS (E80-10334: NASA-CR-163412) Avail: NTIS

HC A04/MF A01 CSCL 08G

The author has identified the following significant results. Three long total magnetic field profiles taken over ocean basins were analyzed. It is found that there is a significant signal in the wavelength range of 1500 to 150 km. This is too short a wavelength to be caused by the core field, which becomes insignificant at about a wavelength of 1500 km: this intermediate wavelength signal is not caused by a typical sea floor spreading process, which should give maximum power in the wavelength region about 50 km. It is shown that the external magnetic field contributes very little to this intermediate wavelength signal. Efforts to explain the cause of this signal have failed.

N80-33844# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

COASTAL CURRENTS: STUDY OF A MODEL APPLIED TO THE COAST OF RIO GRANDE DO SUL LATITUDE 29 DEG SOUTH TO 35 DEG SOUTH {CORRENTES COSTEIRAS: ESTUDO DE UM MODELO APLICADO AO LITORAL DO RIO GRANDE DO SUL LATITUDE 29 DEG SUL 35 DEG SUL]

Claudio Solano Pereira and Luiz Bruner deMiranda Aug. 1980 7 p refs In PORTUGUESE; ENGLISH summary Presented at 32d Ann. Reunion of Brazilian Soc. for the Progr. of Sci., Rio de Janeiro, 6-12 Jul. 1980

(INPE-1841-RPE/201) Avail: NTIS HC A02/MF A01

An analytical model developed to determine coastal currents was applied to the coast of Rio Grande do Sul (lat. 29 deg S to lat. 35 deg. S). The model describes the stationary state nontidal coastal currents. The momentum balance considered is stationary, nonaccelerated, and hydrostatic. Longshore pressure gradients are neglected, while the Coriolis parameter and the vertical momentum exchange coefficient are assumed constant. The water mean density is taken constant in a vertical column but it is allowed to change at a constant rate in the cross shelf directions. With appropriate boundary conditions, a single relationship is obtained between the wind stress, the cross shelf mean density gradient and the fluid velocity. A.R.H.

N80-34048*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ASSESSMENT OF THE ROLE OF REMOTE SENSING IN THE STUDY OF INLAND AND COASTAL WATERS

Howard J. Curfman, John D. Oberholtzer, and Ronald J. Schertler Sep. 1980 70 p refs

(NA SA-TM-81881) Avail: NTIS HC A04/MF A01 CSCL 08C

Several problems within Great Lakes, coastal, and continental shelf water were selected and organized under the topical headings of Productivity, Sedimentation, Water Dynamics, Eutrophication, and Hazardous Substances. The measurements required in the study of each of the problems were identified. An assessment was made of the present capability and the potential of remote sensing to make these measurements. The relevant remote-sensing technology for each of these classifications was discussed and needed advancements indicated. T.M.

N80-34053# National Technical Information Service, Springfield, Va.

OCEAN WAVE SENSING. CITATIONS FROM THE NTIS DATA BASE Progress Report, 1964 Jun. 1980

Audrey S. Hundemann Jul. 1980 271 p Supersedes NTIS/PS-79/0663 and NTIS/PS-78/0560

(PB80-812878; NTIS/PS-79/0663; NTIS/PS-78/0560) Avail: NTIS HC \$30.00/MF \$30.00 CSCL 08C

Abstracts pertaining to methods and equipment for measuring ocean waves and sea surface roughness are presented. Remote sensing of ocean waves, height indicators, wave spectrum measurement, the use of radar, wave direction detection, and a few abstracts dealing with general studies are included. This updated bibliography contains 263 citations, 11 of which are new entries to the previous edition. GRA

06

HYDROLOGY AND WATER MANAGEMENT

Includes snow cover and water runoff in rivers and glaciers, saline intrusion, drainage analysis, geomorphology of river basins, land uses, and estuarine studies.

A80-45005 * # Quantitative interpretation of Great Lakes remote sensing data. D. F. Shook, J. Salzman, R. A. Svehla, and R. T. Gedney (NASA, Lewis Research Center, Cleveland, Ohio). Journal of Geophysical Research, vol. 85, July 20, 1980, p. 3991-3996. 15 refs.

The paper discusses the quantitative interpretation of Great Lakes remote sensing water quality data. Remote sensing using color information must take into account (1) the existence of many different organic and inorganic species throughout the Great Lakes, (2) the occurrence of a mixture of species in most locations, and (3) spatial variations in types and concentration of species. The radiative transfer model provides a potential method for an orderly analysis of remote sensing data and a physical basis for developing quantitative algorithms. Predictions and field measurements of volume reflectances are presented which show the advantage of using a radiative transfer model. Spectral absorptance and backscattering coefficients for two inorganic sediments are reported. A.T.

A80-45428 Nonzero subsurface irradiance reflectance at 670 nm from Lake Ontario water masses. R. P. Bukata, J. H. Jerome, J. E. Bruton (National Water Research Institute, Burlington, Ontario, Canada), and S. C. Jain (Moniteq, Ltd., Toronto, Canada). *Applied Optics*, vol. 19, Aug. 1, 1980, p. 2487, 2488. 9 refs.

Data obtained by the satellite-borne Coastal Zone Scanner (CZCS) are discussed with reference to an atmospheric algorithm which infers the subsurface irradiance reflectance spectrum from the radiance spectrum recorded by the CZCS. The algorithm is based on the assumption that the irradiance reflectance beneath the surface at a wavelength of 670 nm is zero in which case the recorded CZCS radiance in that band is due to surface reflection and the molecular and aerosol scattering occurring in the intervening atmosphere. Analysis of the observed values of a(670), (Bb)(670, and Rv(670) for Western Lake Ontario reveals a large range of nonzero Rv(670) values. It is concluded that caution must be applied to the assumption of zero Rv(670) when considering the development of operational atmospheric algorithms for direct applications of CZCS data to water quality studies of inland lakes. V.L.

A80-46450 * Remote sensing of particulate concentrations in water. M. Sydor (Minnesota, University, Duluth, Minn.). Applied Optics, vol. 19, Aug. 15, 1980, p. 2794-2800. U.S. Environmental Protection Agency Grant No. R-805667-01-1; Grant No. NGL-24-005-263.

Determination of residual radiance is essential in remote sensing measurements of suspended solids in the absence of real-time ground-truth data. Some typical background corrections are presented for Lake Superior and the spectral distribution of the residual radiance is determined from three major categories of turbidity in the lake. The results tested with Landsat 2 digital tape data indicate that for large bodies of water general information on atmospheric scattering, water clarity, and optical properties of suspended solids enables one to estimate the concentrations of particulates to within + or - 0.5 mg/liter in the absence of real-time ground-truth data.

(Author)

A80-49653 # The use of space data for the prediction of mountain-river flooding in Siberia (Primenenie kosmicheskoi informatsii dlia tselei prognoza stoka polovod'ia gornykh rek). N. V. Vostriakova (Akademiia Nauk SSSR, Institut Geologii i Geofiziki, Novosibirsk, USSR). *Issledovanie Zemli iz Kosmosa*, May-June 1980, p. 20-26. 8 refs. In Russian.

It is shown that TV and multispectral images from meteorological satellites can be used to calculate and predict mountain-river flooding in Siberia related to the springtime melting of snow. The usefulness of space data on the height of the snow line and the extent of the snow cover of drainage areas is shown. B.J.

A80-49656 # Optical methods for the study of biocenoses on land and sea (Opticheskie metody izucheniia rastitel'nykh tsenozov sushi i moria). F. la. Sid'ko, A. D. Aponasenko, V. S. Filimonov, N. A. Frank, A. F. Sid'ko, L. A. Shur, and V. I. Sokolov (Akademiia Nauk SSSR, Institut Fiziki, Krasnoyarsk, USSR). *Issledovanie Zemli iz Kosmosa*, May-June 1980, p. 41-50. 21 refs. In Russian.

Optical techniques (remote and contact techniques) for the study of the spectral brightness of inner reservoirs and seas, crops, forests, and other types of vegetation cover are reviewed; techniques for the investigation of the optical characteristics (absorption, attenuation, etc.) of water are also described. The estimation of phytoplankton content in water by remote and contact methods is considered.

A80-50899 The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous shorelines (Géomorphologie de la baie du Mont-Saint-Michel par télédétection des lignes de rivage instantanées). C. Pestre (Institut Géographique National, Saint-Mandé, Val-de-Marne, France) and F. Verger (Ecole Normale Supérieure, Montrouge, Hauts-de-Seine; Ecole Pratique des Hautes f.tudes, Dinard, Côtes-de-Nord, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 175-181. In French.

Several Landsat-1 images of Mont-Saint-Michel Bay showing different tidal heights were processed in order to extract shorelines at given instants. An examination of the shorelines makes it possible to investigate the topography and geomorphology of the tidal flats and to obtain information on the evolution of the tidal flats between successive satellite views. B.J.

A80-51278 The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Symposium sponsored by COSPAR, ICSU, UNESCO, et al. Edited by V. V. Salomonson (NASA, Goddard Space Flight Center, Greenbelt, Md.) and P. D. Bhavsar (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India). Oxford, Pergamon Press, Ltd. (Advances in Space Exploration. Volume 9), 1980. 288 p. S60.

The symposium focused on hydrology, soil moisture estimation and ground water exploration, wetlands monitoring and water quality estimation, hydrometeorology, snow and ice monitoring, and evapotranspiration estimation. Other problems discussed include surface water and flood mapping, watershed runoff estimation and prediction, and new space systems contributing to water resources management. V.L.

A80-51279 Space observations for water resources - A potential to be developed. A. J. Askew and J. Nemec (World Meteorological Organization, Hydrology and Water Resources Dept.,

Geneva, Switzerland). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 3-16. 9 refs.

To make full use of space observations in hydrology and water resources, major changes in existing data acquisition, storage, and processing systems will be required. In the present paper, information is presented on the data requirements that have been established for work in hydrology and water resources. Some aspects of the transmission of hydrological data from spacecraft are examined. V.P.

A80-51280 Remote sensing application in groundwater surveys and exploration in India. B. K. Baweja and S. K. Sharma (Central Ground Water Board, New Delhi, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 17-30.

Aerial and satellite survey methods used for groundwater investigation and exploration in India are described. The effects of weathered zones, fracture traces, and lineaments on the occurrence and behavior of groundwater are discussed. Key criteria have been employed to locate water wells of maximum capacity in areas where only poor wells have been known. It has been shown that buried pediment areas, open fractures, and trellis drainage have a marked influence on groundwater occurrence in crystalline rocks. S.S.

A80-51281 Remote sensing of coastal environment and resources. V. Klemas, D. S. Bartlett, and W. D. Philpot (Delaware, University, Newark, Del.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 31-48. 43 refs.

Remote sensing techniques are applied to coastal and estuarine areas for mapping wetland boundaries, plant species diversity and productivity, monitoring man-made and natural changes in the coastal zone, charting current circulation patterns, determining the identity, concentration and dispersion of certain natural substances and pollutants, and mapping of nutrient-rich upwelling regions and coastal fresh-water springs. However, because remote sensors fail to penetrate beyond a few meters into turbid coastal waters the need for data collection from ships and ground survey teams cannot be eliminated. S.S.

A80-51282 Satellite data for the solution of problems of land hydrology. V. V. Kuprianov, V. G. Prokacheva, and V. F. Usachev (Gosudarstvennyi Gidrologicheskii Institut, Leningrad, USSR). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 49-58. 16 refs.

The paper discusses satellite data used in operational hydrology. The applications include mapping of physiographic features, land use, and snow cover; evaluation of snow cover dynamics; determination of water storage; and spring snowmelt flood measurements. Studies were made of snow cover determining urban and industrial environmental effects; evaluation of ice behavior in lakes; dates of ice pack formation and breakup; river floodings, plain inundations; and of the water balance of inland water bodies. A,T.

A80-51283 * Remote sensing applications in hydrometeorology. A. Rango (NASA, Goddard Space Flight Center, Laboratoryfor Atmospheric Sciences, Greenbelt, Md.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 59-66. 28 refs. Monitoring of precipitation using remote sensing has been carried out successfully over oceans with passive microwave data and over land with visible and infrared data. Further research is necessary to improve accuracy and timeliness of estimations in a variety of rainfall situations. Snowmelt runoff prediction has been demonstrated using satellite snowcover data. Snow depth and wetness measurements are feasible using microwave techniques. The monitoring of ice cover, type, and thickness has been carried out successfully using remote methods. Results from remote sensing evapotranspiration studies have been inconclusive. The remote measurement of evapotranspiration seems to be the most challenging of all applications of remote sensing to hydrometeorology. (Author)

A80-51284 Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid climates. C. Vaccari (Italeco S.p.A., Rome, Italy) and B. Marcolongo (CNR, Padua, Italy). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 69-77.

The use of Landsat imagery to investigate the hydrogeological characteristics of semiarid areas, particularly the location of underground water resources, is illustrated. Time-spaced Landsat data in bands of 5 and 7 was obtained for a portion of Bauci province in northern Nigeria, and analog processing of the data was performed to permit interpretation. The vegetation, lithology, pedology and drainage patterns deduced from the Landsat images were compared with available ground-based geological data in order to define the various hydrogeological units and the groundwater potential, and a model of the hydrogeologic circulation was obtained by taking into account lineation morphology. The static hydrogeological map and a ground water circulation model thus obtained can be used to quantify underground water resources, and, together with further rainfall, temperature and evapotranspiration data, estimate aquifer recharge. A.L.W.

A80-51285 Terrain analysis and hydrogeologic interpretations from satellite imagery. R. A. Chansarkar (Defence Research and Development Organization, New Delhi, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 79-84. 7 refs. The paper discusses terrain analysis and hydrologic parameters from satellite imagery. Hydrologic interpretations also require lineament levels, delineation of lithoassociations, descriptions of surface water bodies and seasonal changes, the land use pattern, and areas for augmenting superficial porosities in hard rock terrains. Terrain analysis by satellite imagery was made possible by knowledge of regional geology, joint traces, and major geomorphic zones. Possible improvements include supplementing relief and slope data through survey maps andd use of computer processing. A.T.

A80-51286 Remote sensing of water resources in Panch Mahals district. B. Sahai, M. V. Muley, S. D. Naik, and V. Tamilarasan (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 85-88.

A80-51287 Soil moisture estimation by correlated groundbased and Seasat microwave observation. E. Schanda, D. Wyssen (Bern, Universität, Berne, Switzerland), P. Meylan, and C. Morzier (Lausanne, Ecole Polytechnique Fédérale, Lausanne, Switzerland). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 89-97. 5 refs.

The paper discusses soil moisture determination based on microwave emission at sites of different mineralogic compositions and granular size distributions. Microwave probing of soil moisture can reach a depth of 10 cm in arable land; simultaneous observations were made by ground-based and Seasat Scanning Multichannel.

Microwave Radiometer at frequencies almost coinciding with the ground-based observations ranging from 1.8 to 36 GHz. Relations between moisture content and microwave radiation are described, concluding that soil moisture analysis can be improved by models which can extrapolate the moisture condition of the upper few centimeters down to the root zone of the vegetation, and separate the effects of vegetation, soil type, and roughness on backscattered and emitted radiation. A.T.

A80-51288 Evaluation of hydrogeologic conditions in Ponnaiyar River basin, South India using remotely sensed data. S. T. Govindarajan, V. Tamilarasan (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India), and G. Venkataraman. In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 99-102.

Manual interpretations of Landsat and aerial data for mapping hydrogeological features are discussed and illustrated. Reconnaissance geomorphic, geologic, structural and land use maps of the Ponnaiyar river basin of South India were prepared using Landsat data. This was followed by aerial photointerpretation and field checks. The results of this study and the geophysical resistivity data were used to evaluate the hydrogeologic setup of the basin. Correlation of the existing bore wells data with the hydromorphic units shows that the high yielding wells are located in the lineaments, buried channels, and old river courses. (Author)

A80-51289 Remote sensing in search for ground water -Some cases histories. B. K. Baweja (Central Ground Water Board, New Delhi, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 103-106.

Remote sensing surveys conducted in India for the purpose of ground water exploration are described. Aerial photography and photogeology techniques were applied to ground water exploration in the Narmada River Basin, the Poini River Basin, the Vedavati River Basin, and the Novil, Amrayati, and Ponnani subbasins. B.J.

A80-51290 Application of Landsat imagery to ground water studies in parts of Punjab and Haryana states, India. K. P. Singh (Delhi, University, Delhi, India), B. S. Tewari (Punjab University, Chandigarh, India), and T. H. L. Williams (Kansas, University, Lawrence, Kan.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 107-111. 5 refs.

Multidate Landsat false color composite images were used to study geological, hydrogeological, and hydrological features in parts of the Punjab and Haryana states in India. Aquifer recharge areas, waterlogged areas, old river courses, and severely affected saline areas were delineated on the images. The interpretations were verified by exploratory drilling and field checks. The Landsat data proved useful in identifying prominent areas for groundwater development, in planning drilling programs for the construction of tube wells, in identifying areas suitable for artificial groundwater recharge, and in identification and mapping of seasonal waterlogging patterns.

(Author)

A80-51291 Quantitative monitoring of sediment levels in freshwater lakes from Landsat. P. Chagarlamudi, J. S. Schubert (Deloitte, Hækins and Sells Associates, Ottawa, Canada), and R. E. Hecky (Department of Fisheries and the Environment, Freshwater Institute, Winnipeg, Canada). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 115-118.

A80-51292 Landsat application to the study of coastal processes. I. V. Muralikrishna (National Remote Sensing Agency,

Secunderabad, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 119-122. 7 refs.

Based on the patterns of suspended sediments on Landsat MSS imagery in bands 4 and 5, the flow directions of the near-shore surface and subsurface currents along certain reaches of each coast of India have been obtained. Making use of the imagery characteristics in these two bands, surface and subsurface sediment plumes have been identified. The extent of sediment suspension, zone of offshore turbulent mixing, submarine ridges and sloughs have been categorized. (Author)

A80-51293 * Snow mapping from space platforms. K. I. Itten (Zürich, Universität, Zurich, Switzerland). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 125-138.

25 refs. Research supported by the World Meteorological Organization, European Space Agency, and NASA.

The paper considers problems of optimum resolution, periodicity, and wavelength bands used for snow mapping. Analog and digital methods were used for application of satellite data; techniques were developed for producing steamflow forecasts, hydroelectric power generation regulation data, irrigation potentials, and information on the availability of drinking water supplies. Future systems will utilize improved spectral band selection, new spectral regions, higher repetition rates, and more rapid access to satellite data. A.T.

A80-51294 Problems of snow cover assessment - An approach using remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India. C. P. Vohra and G. S. Srivastava (Geological Survey of India, Lucknow, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 139-142. 7 refs.

A80-51295 Eurasian snow cover extent - The NOAA satellite record, 1966-79. M. Matson, D. R. Wiesner, and C. P. Berg (NOAA, National Environmental Satellite Service, Washington, D.C.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 143-152, 12 refs.

A80-51296 Studies of snow accumulation characteristics on Himalayan slopes. A. K. Bagchi (Roorkee, University, Roorkee, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 153-156. Research supported by the Indian Space Research Organization.

A method using sequential Landsat imageries in conjunction with temperature data for measurement of the depth of accumulated snow in high Himalayan slopes is considered. Snow accumulation pattern in Manali slope is presented. (Author)

A80-51297 Microwave emission properties of snow for monitoring hydrological parameters. E. Schanda, C. Mätzler (Bern, Universität, Berne, Switzerland), and R. Hofer. In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 157-161. 5 refs.

During three winter seasons ground-based microwave observations with a multichannel radiometer between 1.8 and 94 GHz at an alpine high-altitude test area have revealed important relations between hydrological parameters such as moisture content, melting

06 HYDROLOGY AND WATER MANAGEMENT

state, and depth of sounding, and the microwave emission behavior in spectrum, polarization and viewing angles. The daily variations of the state of a surface layer with thickness strongly dependent on moisture can be determined, and three stages of seasonal development of the snow cover are easily distinguishable. This allows prediction of the start of the snow melting phase with consequent runoff. These investigations are intended to yield the fundamentals for the design of monitoring payloads with near to optimum instrumentation. (Author)

A80-51299 Computer-aided watershed analyses using remote sensing based regional information systems. R. M. Ragan and J. D. Fellows (Maryland, University, College Park, Md.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 181-193. 8 refs.

The application of Landsat remotely sensed data to water resource studies is discussed with reference to a computer-based multiparameter regional information system for a 6300 sq km planning area in the vicinity of Washington, D.C. Categorized Landsat and two levels of digitized aerial photography have been merged as a matrix of five-second cells to define the land cover on a regional basis. Map data defining soil type, slope, and geology are also digitalized for storage in the same format. The data are stored on tape and disk files that can be accessed from office teletypes connected through a telephone line. Remote-sensing-based regional information systems stored on digital computers provide an efficient means of defining the quantities required by the models that must be part of the decision-making process. V.L.

A80-51300 Applications to floods of remote sensing from satellites. H. L. Ferguson, J. Kruus (Environment Canada, Atmospheric Environment Service, Ottawa, Canada), and M. Deutsch (U.S. Geological Survey, Reston, Va.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 195-206. 17 refs.

Remote sensing from satellites can be applied to flood plain mapping, monitoring of floods in progress, and the prediction of floods through observations of storms and snowpack conditions. Case studies from the literature are used to illustrate these applications. Examples are also drawn from previously unpublished North American studies. The use of satellite snow cover analysis in the WMO/WWW Saint John Basin Project is described. Probable future technological trends are discussed briefly. (Author)

A80-51301 Assessment of cyclone-caused damage in Krishna delta region using remotely sensed data. A. Narain and S. A. Patil (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 207-210.

A tropical cyclone formed in the Bay of Bengal hit the coastal districts of Andhra Pradesh, India, on Nov. 19, 1977, causing large scale damage. An aerial survey, using photographic cameras with color infrared film and a multispectral scanner, was carried out during January 1978. A two-step procedure (Landsat imagery and aerial imagery) was followed for assessing cyclone-caused damage for an area of about 320 sq km. (Author)

A80-51302 Study of Kosi river characteristics using airborne/space orbital multispectral scanner data. A. K. Chakraborty (National Remote Sensing Agency, Hyderabad, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 211-214. A80-51303 Floodplains mapping of Gangetic basin using Landsat imagery. M. S. Dhanju (Indian Space Research Organization, Space Applications Centre, Ahmedabad, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979.

Oxford, Pergamon Press, Ltd., 1980, p. 215-218. 5 refs.

The Gangetic basin of the Indian subcontinent is a scene of perennial floods during monsoon season. Using Landsat imagery, the possibility of studying the various features connected with the floodplains is investigated. The features are inundated areas, back-swamps, marshy areas, oxbow lakes, and water bodies. The various features of the river action, floodplain deposits, sandy features, and river levees are also delineated. Thus it is possible to prepare appropriate floodplain maps by integrating relevant topographical features with the above-mentioned features delineated from Landsat imagery. These maps can be of great help in designing flood control measures. (Author)

A80-51304 Satellite imagery and U.P. Himalayas and Siwalik. P. N. Gupta. In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 219-222.

The paper describes how satellite photographs are utilized for deciding priorities for soil conservation work in U.P. Himalayas and Siwalik. Measurements for demonstrating the effect of erosion in the area are given. The use of imagery directly as maps or for map-making in natural resources surveys is emphasized. (Author)

A80-51305 Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the global evaluation of ground water resources. C. Conedera (GEOMAP, Florence, Italy), G. Fraysse (Commission of the European Communities, Joint Research Centre, Ispra, Italy), and B. Marcolongo (CNR, Padua, Italy). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 223-226.

The use of remotely sensed imagery (Landsat, HCMM, airborne thermal infrared Multispectral Scanner) integrated with conventional data (maps and ground truth) permits stablishment of a model describing the circulation pattern of deep groundwater. The model has been applied to a semiarid area in southern Italy; the main structures and the hydrogeological profile have been determined.

(Author)

A80-51306 Study of floods in Bangladesh and India with the help of meteorological satellites. A. M. Choudhury (Bangladesh Atomic Energy Commission, Space and Atmospheric Research Centre, Dacca, Bangladesh). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Banglaore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 227-230.

It has been found that Meteorological Satellites often give useful information on floods when the flooded area is relatively cloud free. This paper describes study of floods that occurred in Bangladesh and India from August to early October, 1978 with the help of meteorological satellite data. Tracks of tropical disturbances responsible for the rainfall causing floods have been obtained using satellite and conventional meteorological data. An estimation of the flooded area and the extent of flooding has been made. (Author)

A80-51307 Indian remote sensing satellite program and its contribution to water resources management. D. S. Kamat (Indian Space Research Organization, Space Applications Center, Ahmedabad, India). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 233-239. 9 refs. A80-51309 * The utility of Landsat-D for water-resources studies. V. V. Salomonson (NASA, Goddard Space Flight Center, Laboratory for Atmospheric Sciences, Greenbelt, Md.). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 255-267. 9 refs.

The paper discusses applications of the Landsat-D remote sensing observations to hydrology and management of water resources. It is expected that the Landsat-D thematic mapper will provide spatial resolution of 30 m vs 79 m in the reflected solar radiation bands; additional spectral resolution in the 0.5 to 1.0 micron region and new bands covering regions in the 0.45 to 2.35 micron range will be available. The thematic mapper produces data at an 85 megabit/sec rate; an advanced data processing system will be used for improved monitoring of earth resources. A.T.

A80-51310 Earth observation systems in Japan. K. Tsuchiya (National Space Development Agency of Japan, Earth Observation Center, Hatoyama, Saitama, Japan). In: The contribution of space observations to water resources management; Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979. Oxford, Pergamon Press, Ltd., 1980, p. 269-277.

The paper describes a Japanese earth observation system which automatically collects rainfall data from 1300 unmanned automatic weather stations and distributes them to 60 forecast centers within 20 minutes. In addition, space related systems such as the geostationary meteorological satellite, rockets, and Tiros-N are discussed. The Marine Observation Satellite-1 is in a preliminary design phase, and the planning of the joint NASA/Japan research plan of managing water resources is being completed. A.T.

A80-53611 Satellite studies of fresh-water ice movement on Lake Erie. D. R. Wiesnet (NOAA, National Environmental Satellite Service, Washington, D.C.). Journal of Glaciology, vol. 24, no. 90, 1979, p. 415-426, 11 refs.

The paper discusses the NOAA visible and thermal satellite observations of Lake Erie ice movements. The NOAA polar orbiting satellites collect two thermal and one visible image per day; the GOES satellites collect visible and infrared images every 30 min; and the Landsat satellite has an 18 d revisit cycle. Ice formation, movement, and break-up depend on variations in depth of water, geomorphology, and meteorological factors; the effect of wind direction on break-up patterns is critical for the forecasting of complete ice melt and day-to-day distribution of ice. A.T.

N80-29806*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

USE OF LANDSAT DATA FOR RIVER AND LAKE ICE ENGINEERING STUDIES

Dorothy K. Hall, Principal Investigator Apr. 1980 14 p refs Submitted for publication ERTS (E80-10237: NASA-TM-80686) Avail: NTIS HC A02/MF A01 CSCL 08L

N80-29816^{*} # National Environmental Satellite Service. Washington, D. C.

APPLICATIONS OF HCMM DATA TO SOIL MOISTURE SNOW AND ESTUARINE CURRENT STUDIES Quarterly Report

Donald R. Wiesnet, Principal Investigator, David F. McGinnis, and Michael Matson 24 Jun, 1980 3 p Sponsored by NASA HCMM

(E80-10269; NASA-CR-163341) Avail: NTIS HC A02/MF A01 CSCL 08L

The author has identified the following significant results. The HCMM thermal data are useful for monitoring estuarine surface thermal patterns. Estuarine thermal patterns, are, under certain conditions, indicative of the surface tidal current circulation patterns. Under optimum conditions, estuaries as small as the Cooper River (i.e., approximately 100 sq km) can be monitored for tidal/thermal circulation patterns by HCMM-type IR sensors. N80-29832# Geological Survey, Tallahassee, Fla. Water Resources Div.

EVALUATION OF REMOTE HYDROLOGIC DATA-ACQUISITION SYSTEMS, WEST-CENTRAL FLORIDA

J. F. Turner, Jr. and W. M. Woodham Feb. 1980 71 p refs (PB80-176951; USGS/WRD/WRI-80/020;

USGS/WRI-79/102) Avail: NTIS HC A04/MF A01 CSCL 08H

An evaluation of the hydrologic applications of a land line and tow satellite data relay systems operated during 1977-78 in the Southwest Florida Water Management District is presented. These systems were tested to evaluate operational and reliability characteristics. Telephone lines were used to relay data in the land line system, and the Geostationary Operational Environmental Satellite (GOES) and were used in the satellite system. The land system was tested for a period of 15 months at a streamflow site. Accurate data were obtained 94 percent of the time during the period. Data losses were attributed to telephone line interference, low battery voltage, and vandalism. The GOES system was tested at a rainfall site for a 17 month period. GRA

N80-30829*# Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.

FLORIDA WATER RESOURCES Final Report

Apr. 1980 325 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (Contract NAS10-9348)

(E80-10246: NASA-CR-154634; KSC-TR-51-3) Avail: NTIS HC A14/MF A01 CSCL 08H

N80-30830*# Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.

FLORIDA WATER RESOURCES, EXECUTIVE SUMMARY Apr. 1980 18 p Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (Contract NAS10-9348)

(E80-10247; NASA-CR-154634-Summ; KSC-TR-51-3-Summ) Avail: NTIS HC A02/MF A01 CSCL 08H

N80-30864*# Environmental Research and Technology, Inc., Concord, Mass.

INVESTIGATION OF THE APPLICATION OF HCMM THERMAL DATA TO SNOW HYDROLOGY Progress Report, Apr. - Jun. 1980

James C. Barnes, Principal Investigator Jul. 1980 7 p Sponsored by NASA HCMM

(E80-10297: NASA-CR-163351) Avail: NTIS HC A02/MF A01 CSCL 08L

The author has identified the following significant results. Comparison of the thermal IR band temperatures over the rapidly melting snowcover in a number of locations in the Salt-Verde Arizona watershed by the U-2 high altitude multispectral scanner, with temperatures for these same locations measured by the corresponding HCMM pass, indicate that the U-2 temperatures are typically 5 C higher than the values analyzed from the HCMM infrared digital printout. Results tend to substantiate findings of other investigators that with the offset that has been applied to all HCMM data, the HCMM temperature values may, in fact, actually be 5 C too low. Analysis of differences between the HCMM day and night temperatures for selected snowcovered areas in the Sierra Nevada Mountains, derived from the daytime and nighttime printouts, show greater delta tau values for the sparsely vegetated higher elevations than for the lower elevation, more densely forested terrain. The differences for the 12 hour sequence are also greater in most instances than the 36 hour difference.

N80-31867# Kansas Water Resources Research Inst., Manhattan. SIMULATION OF RESERVOIR AND LAKE SEDIMENTATION Project Completion Report, Jul. 1973 - Jun. 1975

William M. Merrill Apr. 1980 158 p refs

(Contract DI-14-31-0001-4085)

(PB80-182801; CONTRIB=215; W80-05010;

OWRT-B-036-KAN(1)) Avail: NTIS HC A08/MF A01 CSCL 08H

Two lakes were used to develop a model of reservoir sedimentation and two computer programs to simulate it. Basis for the model is a statement of general relationships formulated to describe sedimentation in shallow marine basins, modified to apply to relatively small freshwater bodies. In its modified form, the statement serves as foundation for quantitative and semiquantitative expressions that are translated into algorithms to simulate reservoir processes. The model and programs are appropriate only for reservoirs established on alluvial streams in which an essentially unlimited supply of sediment, 90 percent or more of which is silt and clay and at least 30 percent of which is clay of two microns or less, can be assured. GRA

N80-31973# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.

REMOTE SENSING PROCEDURES FOR DETECTING AND MONITORING VARIOUS ACTIVITIES REGULATED BY THE MOBILE DISTRICT Final Report, Oct. 1976 - Sep. 1978 Horton Struve and William L. Kirk Apr. 1980 397 p refs (AD-A087584: WES/TR/EL-80-1) Avail: NTIS HC A17/MF A01 CSCL 14/5

The objective of this study was to develop procedures for use, by the U.S. Army Engineer District, Mobile, to detect and monitor activities requiring a Corps of Engineers permit pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972, Section 10 of the River and Harbor Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972. The detection and monitoring procedures developed in this study included three methods of acquiring remotely sensed data: satellite and aircraft borne digital scanner methods and airborne photographic methods. The two digital scanner systems investigated for the study were the LANDSAT Multispectral Scanner System and the National Aeronautics and Space Administration Modular Multispectral Scanner. The equipment and procedures used in these systems, which obtain the type of information required by the Regulatory Functions Branch, Mobile District, are described. Aerial photographic systems are described, and examples of several applications of detection and monitoring procedures involving wetlands, waterbodies, and structures are given. A summary of available remote sensing imagery from Federal and State agencies is given. GRA

N80-32024# RAND Corp., Santa Monica, Calif. ANOMALOUS SNOWFALL CAUSED BY NATURAL-DRAFT COOLING TOWERS

Randall L. Koenig May 1980 48 p refs (Grant DE-AC03-76EV-01191)

(RAND/N-1479-DOE) Avail: NTIS HC A03/MF A01

Tabulation of a number of aerial observations of plumes at subfreezing temperatures indicates that a cooling tower plume is likely to produce measurable snow if its temperature is colder than -13 C and the saturation deficit of the ambient air is less than 0.5 g m to the -3 power. These empirically derived criteria were tested using a numerical model of cloud microphysics that simulates the most important processes of transfer of water substance between vapor, liquid, and ice, including nucleation and development of particle-size spectra. Among the many quantities computed is the flux density of snow at the base of the plume. From this, together with average fallspeed and horizontal wind speed, the amount and pattern of snowfall at the ground was computed. Comparison of the computational results with observations of actual plumes shows that the model has skill in predicting plume behavior and strongly supports the criterion of -13 C for plume snowfall, however, the maximum snowfall depth is predicted to occur nearer the source than is observed. ARH

N80-32806*# Remote Sensing Inst., Brookings, S. Dak. HCMM ENERGY BUDGET DATA AS A MODEL INPUT FOR ASSESSING REGIONS OF HIGH POTENTIAL GROUND-WATER POLLUTION Interim Report, Apr. - Jun. 1980

Donald G. Moore, Principal Investigator and J. L. Heilman Jun. 1980 25 p refs HCMM

(Contract NAS5-24206) (E80-10310; NASA-CR-163350; SD SU-R SI-80-07) Avail; NTIS HC A02/MF A01 CSCL 13B

The author has identified the following significant results. Significant relationships were found between surface soil temperatures estimated from HCMM radiometric temperatures and depth to ground water and near surface soil moisture.

N80-32834# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil). GEOCHEMICAL BALANCE OF THE SALGADO RIVER BASIN

L. M. Moreira-Nordemann and D. Nordemann Aug. 1980 43 $\,p$ refs. Submitted for publication

(INPE-1849-RPE/206) Avail: NTIS HC A03/MF A01

The Salgado River basin (Bahia State, Brazil) was studied from the point of view of present climatic and geochemical conditions: inappropriate exploitation, irregular rainfall and high evaporation rate resulting in a state of unbalanced geochemical conditions. The water of the Salgado River showed high concentration of the total dissolved salts. The mean chemical composition and weathering rate of the rocks of the river basin were measured. S.F.

N80-33064# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.

DEVELOPMENT OF TECHNIQUES TO SPECIFY CLOUDI-NESS AND RAINFALL RATE USING GOES IMAGERY DATA Final Report

Stuart H. Muench and Thomas J. Keegan Oct. 1979 46 p refs

(AF Proj. 6670)

(AD-A084757; AFGL-TR-79-0255; AFGL-ERP-687) Avail: NTIS HC A03/MF A01 CSCL 04/2

Methods of introducing digitized satellite imagery into short range, objective forecasting operations are presented. The data archive being assembled for this study is described, with particular attention given to the steps taken to maximize the accuracy of the satellite imagery. These steps included fine tuning the navigation and selecting procedures for normalizing the data by correcting for the effects of Lambertian and anisotropic scattering. Consistency of the data, spatial and temporal, was tested by analysis of ground reflectance during cloudless days, and a pilot test of the specification of single layers of clouds was conducted. Both of these tests gave envouraging results. An investigation of specifying precipitation rate, using just the visible reflectance and infrared temperature of the cloud top, also produced good results.

N80-33823 Louisiana State Univ. and A&M Coll., Baton Rouge. A QUANTITATIVE EVALUATION OF LANDSAT FOR MONITORING SUSPENDED SEDIMENTS IN A FLUVIAL CHANNEL Ph.D. Thesis

Soon Tae Kim 1980 142 p

Avail: Univ. Microfilms Order No. 8021752

The utility of LANDSAT Multispectral Scanner (MSS) digital data for monitoring suspended sediment concentrations in a natural river channel was determined. Specific purposes of the study were: to investigate vertical distribution of suspended sediment concentrations at the cross section of the river channel: to develop a method of eliminating environmental effects from the MSS digital data obtained during successive LANDSAT overpasses: to evaluate the statistical properties of MSS digital data as related to suspended sediment concentrations in the surface layers of a natural river, and to evaluate the feasibility of estimating suspended sediment concentrations in entire depth of the river channel via LANDSAT MSS digital data.

Dissert. Abstr.

06 HYDROLOGY AND WATER MANAGEMENT

N80-33825 Johns Hopkins Univ., Baltimore, Md. A WATERSHED INFORMATION SYSTEM Ph.D. Thesis Anton Gaarde Thomsen 1980 167 p Avail: Univ. Microfilms Order No. 8022427

A watershed information system for the analysis and simulation of mountain watersheds is described. Watershed information on topography, vegetation, and soils in digital terrain models (overlays) serve as the data base for watershed analysis, classification of snow in LANDSAT imagery, and automatic generation of parameter decks for operating distributed simulation models of snow cover dynamics and streamflow generation. The computer programs that generate the parameter decks have built-in calibration options for all major processes, that permit fast model calibration from an interactive computer terminal, on watersheds with varying characteristics. Snow processes are simulated within square (5.76 ha) grid-cell elements. The hydrograph resulting from spring snowmelt is simulated by a lateral flow model of streamflow generation driven by the simulated spatially distributed imput (snowmelt and rain). Options are available for simulating the effects of forest management alternatives (thinning, clearcutting) on selected forest stands.

Dissert Abstr

N80-33834*# Institute for Land and Water Management Research, Wageningen (Netherlands),

DEFINING RELATIONSHIPS BETWEEN SURFACE CHARAC-TERISTICS AND ACTUAL EVAPORATION RATE

M. Menenti, Principal Investigator Ispra, Italy Joint Research Center of the European Communities May 1980 25 p refs Presented at the 4th Meeting of Working Group 2 of the TELLUS Proj., Monterotondo, Italy, 20-21 Nov. 1979 Sponsored by NASA HCMM

(E80-10335; NASA-CR-163541) NTIS Avail: HC A02/MF A01 CSCL 05B

N80-33849# Lockheed Electronics Co., Inc., Las Vegas, Nev. Remote Sensing Lab.

MULTISPECTRAL TECHNIQUES FOR REMOTE MONITOR-ING OF SEDIMENT IN WATER: A FEASIBILITY INVESTIGA-TION

Ronald J. Holyer Mar. 1980 173 p refs

(Contract EPA-68-03-2153) (PB80-198500) EPA-600/4-80-019) NTIS Avail: HC A08/MF A01 CSCL 13B

A data acquisition and analysis program was undertaken to demonstrate the feasibility of remote multispectral techniques for monitoring suspended sediment concentrations in natural water bodies. Two hundred surface albedo measurements (400 to 1,000 nanometers) were made at Lake Mead with coincident water sampling for laboratory analysis. Water volume spectral reflectance was calculated from the recorded surface albedo, and volume reflectance-suspended sediment relationships were investigated. Statistical analysis has shown that quantitative estimates of nonfilterable residue (105 C) and nephelometric turbidity can be made from volume spectral reflectance data with sufficient accuracy to make the multispectral technique feasible for sediment monitoring. GRA

N80-33927*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TURBID WATER MEASUREMENTS OF REMOTE SENSING PENETRATION DEPTH AT VISIBLE AND NEAR-INFRARED WAVELENGTH

W. D. Morris, W. G. Witte, and C. H. Whitlock Aug. 1980 11 p refs Presented at the Symp. on Surface-Water Impoundments, Minneapolis, 2-5 Jun. 1980

(NASA-TM-81843) Avail: NTIS HC A02/MF A01 CSCL 13B

Remote sensing of water quality is dicussed. Remote sensing penetration depth is a function both of water type and wavelength.

Results of three tests to help demonstrate the magnitude of this dependence are presented. The water depth to which the remote-sensor data was valid was always less than that of the Secchi disk depth, although not always the same fraction of that depth. The penetration depths were wavelength dependent and showed the greatest variation for the water type with largest Secchi depth. The presence of a reflective plate, simulating a reflective subsurface, increased the apparent depth of light penetration from that calculated for water of infinite depth. T.M.

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DATA PROCESSING AND DISTRIBUTION SYSTEMS

Includes film processing, computer technology, satellite and aircraft hardware, and imagery.

i

A80-44297 Segmentation-based boundary modeling for natural terrain scenes. C. A. McNary, D. K. Conti, and W. O. Eckhardt (Hughes Research Laboratories, Malibu, Calif.). In: Image understanding systems II; Proceedings of the Seminar, San Diego, Calif., August 29, 30, 1979. Bellingham, Wash., Society of Photo-Optical Instrumentation Engineers, 1980, p. 108-116. 7 refs. Contract No. F33615-77-C-1227.

A segmentation-based boundary-modeling processor for natural terrain scenes is described. The processor relies on region segmentation for establishing boundary connectivity by eliminating competing line structure resulting from texture edges. Scene-boundary models and the hierarchical line representations of curvilinear features were generated using this processor, V.T.

A80-46225 * Substorm warnings - An ISEE-3 real time data system. B. Tsurutani (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.) and D. Baker (California, University, Los Alamos Scientific Laboratory, Los Alamos, N. Mex.). *EOS*, vol. 60, no. 41, 1979. 5 p. 18 refs. Research sponsored by the U.S. Department of Energy; Contract No. NAS7-100.

The use of solar wind measurements made by ISEE-3 in its halo orbit around the L1 libration point to predict the onsets of magnetospheric substorms and geomagnetic storms is discussed. Consideration is given to the limitations on the predictive ability of the satellite measurements set by the bulk solar wind velocity, the elliptical orbit of the satellite and the correlation lengths of the magnetic field and the solar wind plasma. The ISEE-3 real-time data system is presented, with attention given to the ground receiving stations, the NASCOM communications system, the Multisatellite Operations Control Center and Information Processing Division at the Goddard Space Flight Center, the link between Goddard and the NOAA Space Environmental Services Center, and the NOAA Space Environment Laboratory data acquisition and display data system. which includes displays allowing storm forecasts. It is noted that the entire system should be operational by March, 1980. A.L.W.

A80-46522 • # The Landsat-D/Global Positioning System experiment. W. H. Wooden, II and J. Teles (NASA, Goddard Space Flight Center, Greenbelt, Md.). American Institute of Aeronautics and Astronautics and American Astronautical Society, Astrodynamics Conference, Danvers, Mass., Aug. 11-13, 1980, AIAA Paper 80-1678. 10 p. 13 refs.

The paper presents data requirements, tests, and operational procedures to validate the receiver/processor assembly (R/PA) data to the 150 meter level and to calibrate the full capability of the R/PA to the 10 meter level for the Landsat-D/Global Positioning System experiment. Current work includes designing the software for the validation and calibration processes, determining the best methods of calibration using the Ground Space Tracking Data Network (GSTDN), and determining the tracking schedule for GSTDN data to obtain best orbital accuracy. A.T.

A80-47749 Application of high efficiency data compression and 2-D digital filtering techniques to remote sensing data processing. V. Cappellini (Firenze, Università, Florence, Italy). (Remote Sensing Society, Annual Conference, 5th, Durham, England, Dec. 18-20, 1978.) International Journal of Remote Sensing, vol. 1, Apr.-June 1980, p. 175-180.

The high efficiency techniques of data compression and 2-D digital filtering for the processing of remote sensing data obtained from earth resource satellites or aircraft photographs are presented. Consideration is given to equations and techniques for 2-D digital filtering using finite impulse response and infinite impulse response filters, which is often applied before data compression techniques to improve data quality and extract useful results, and to methods of data compression using local space operators and two-dimensional transformations, which are used to reduce the amount of data and thus solve storage and handling problems. The application of these techniques to remote sensing data processing is discussed, and examples are presented.

A80-49099 A color plotter system and its applications in geoscience. K. Bladh (Lund Institute of Technology, Lund, Sweden) and M. Jern (Lund, Universitet, Lund, Sweden). *IEEE Transactions* on *Geoscience and Remote Sensing*, vol. GE-18, July 1980, p. 256-263. 9 refs. Research supported by the Styrelsen for Teknisk Utveckling.

A color plotter system using electrically controlled ink jets was developed for computer graphics output. The hardware and software of this system are briefly described. Some examples of the application of this plotter to geoscience are given and illustrated in color. (Author)

A80-49138 # Remotely sensed data processing techniques, present and future. C. L. Wilson (Michigan, Environmental Research Institute, Ann Arbor, Mich.). In: Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979.

Ornaha, Neb., Missouri River Basin Commission, 1980, p. 5-16.

Techniques currently in use for the processing of remote sensing data at the Earth Resources Data Center of the Environmental Research Institute of Michigan are presented. Consideration is given to software for the geometrical correction of Landsat data and the generation of maps and digital files using affine transformations, nonlinear nonmodel techniques and rigid model nonlinear techniques, the enhancement of images for the improved interpretation of Landsat data, spectral pattern recognition or categorization, and the combination of Landsat data with that from other sources. It is concluded that future operational problems in the handling of remotely sensed data will be managerial and political rather than technological in nature. A.L.W.

A80-49521 Computer-assisted production of multicoloured maps. P. Stefanovic and K. Sijmons (International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands). *ITC Journal*, no. 1, 1980, p. 86-94.

The paper discusses computer application in production of multicolored maps. The calendar time between compilation and publishing of a map must be minimized, particularly for thematic maps for land use, vegetation, and geology. Optronic Colorwrite C-4300 equipment can produce grey tones corresponding to the amount of yellow, magenta, and cyan required for each different area color on the map from original digital data. The continuous grey levels must be screened and enlarged in the camera before plate making; special attention was given to rapid data capture, flexibility, and elimination of slow manual processes. A.T.

A80-49657 # Photometric problems, solved by means of space photography (Fotometricheskie zadachi, reshaemye s pomoshch'iu sredstv kosmicheskoi fotos'emki). L. M. Matiiasevich (Gosudarstvennyi Nauchno-Issledovatel'skii i Proizvodstvennyi Tsentr Priroda, USSR). Issledovanie Zemli iz Kosmosa, May-June 1980, p. 51-57. In Russian.

07 DATA PROCESSING AND DISTRIBUTION SYSTEMS

Algorithms for solving direct, inverse, and atmospheric photometric problems relating to the remote sensing of earth resources are presented. Consideration is also given to the accuracy of photometric measurements carried out with the aid of space photography. B.J.

A80-49658 # Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface (Uchet rasseiania sveta v atmosfere pri obrabotke kosmicheskikh snimkov zemnoi poverkhnosti). V. G. Zolotukhin, D. A. Usikov, and V. A. Grushin (Akademiia Nauk SSSR, Institut Kosmicheskikh Issledovanii, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, May-June 1980, p. 58-68. 9 refs. In Russian.

An optical radiation transfer equation is derived that includes the atmospheric transmittance function, the light source parameters, and the spatial distribution of albedo. The kernel of the equation, which relates space imagery to ground-based imagery, was obtained both analytically and by the Monte Carlo method. An optimal filter for atmospheric noise is described. B.J.

A80-49665 # Estimates of the accuracy of the brightness conjunction of multispectral photographs (Nekotorye otsenki tochnosti energeticheskoi priviazki materialov mnogozonal'nogo fotografirovaniia). L. G. Istomina (Akademiia Nauk SSSR, Institut Okeanologii, Moscow, USSR). Issledovanie Zemli iz Kosmosa, May-June 1980, p. 104-107. In Russian.

The paper presents results of the photometric processing of space photographs of Lake Baikal in six regions of the visible and near-infrared bands. Emphasis is placed on the accuracy with which brightness conjunction can be estimated. A comparison of the present data with airborne measurements of the spectral brightness of the ocean-atmosphere system was used to determine the reliability with which multispectral systems can be used to determine the brightness of surface features. B.J.

A80-50879 Cartographic display of space information -The different methods available at IGN (Transcription cartographique des informations spatiales - Les différentes modalités disponibles à l'IGN). J. Denègre (Institut Géographique National, Paris, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 21-26. In French.

The use of different methods of display and storage of space imagery information is determined by the relationship between the image and the computer. Several computer assisted mapping techniques including the raster mode plotting technique on permanent and reproducible materials are described and examined. It is shown that pixel-image techniques provide a powerful analysis and visualization in which recognition and representation of images in two dimensions become possible. A.C.W.

A80-50889 Information extraction from a Landsat image contained within an artificial outline (Extraction de l'information d'une image Landsat contenue dans un contour artificiel). G. Flouzat, P. Cassirame, G. Giordano, and T. Gilles-Lagrange (Centre d'Etude Spatiale des Rayonnements, Toulouse, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim,

1980, p. 100-110. In French.

This paper describes a methodology used to extract a part of a remote sensing image which is delimited by a boundary obtained from external data. The processing algorithm computes the imagery coordinates of the boundary and realizes the extraction of the inner part of the image. The surface measurements permit comparison with conventional land use inventories of administrative areas. Three applications are given and show the possible help of this technique in the evaluation of a remote sensing result. (Author)

A80-50891 The use of topology concepts for supervised and unsupervised classifications (Utilisation des notions de topologie pour les classifications supervisées ou non). J. C. Lummaux (Institut Géographique National, Saint-Mandé, Val-de-Marne, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 118-121. In French.

Topology concepts are applied to the supervised and unsupervised classification of satellite images. Particular attention is given to the distinction between 'used distance' and 'used discriminant function'. The notion of improperly classified data is also considered. B.J.

A80-50894 * The potential of Landsat-3 RBV images for thematic mapping. J. R. G. Townshend (Reading, University, Reading, Berks., England) and C. O. Justice (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings.

Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 139-144. The potential of Return Beam Vidicon (RBV) imagery from

Landsat-3 is discussed for thematic mapping. The advantages of the imagery arising from its high spatial resolution are described as well as the restrictions stemming from its limited spectral characteristics. The principal application areas discussed are geomorphological and geological mapping and land cover mapping. (Author)

A80-50906 The SPOT/Landsat image ground station -Image preprocessing (Station sol images SPOT/Landsat - Prétraitement des images). B. Cabrieres (Institut Géographique National, Paris, France) and J. C. Cazaux (Centre National d'Etudes Spatiales, Toulouse, France). In: Cartographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings. Saint-Etienne, Loire, France, Edition Gedim, 1980, p. 224-232. In French.

Attention is given to the proposed ground station at Toulouse for the reception and preprocessing of SPOT and Landsat D images. The mode of operation linked to the chosen architecture, product performance, and possible applications are examined. The proposed architecture is modular, extensible, and built around three independent integrated subunits: receiving unit; the filing unit, rapid visual display, and cradle processor; and the preprocessing unit that permits the rectification of images. B.J.

A80-51013 The detection of linear features using Landsat data. C. M. Gurney (Reading University, Reading, Berks., England). British Interplanetary Society, Journal (Image Processing), vol. 33, Oct. 1980, p. 361-368. 10 refs. Research supported by the Atomic Energy Research Establishment.

Local operators are used to detect linear features in Landsat data of areas where such features are typically less than one pixel wide. Detection accuracy depends on the choice of threshold. The paper develops an analytical technique for threshold determination which predicts the detection accuracy for a linear feature of known width. The technique is limited by the assumption that data contained in a local window adequately represent the full data set. This assumption will not be met where the background consists of more than one cover type or has a high variance, higher noise levels being expected in these cases. The detection technique is tested on five areas of Landsat data of the UK, predicted results according well with those actually observed. (Author)

A80-51926 A new era in technology; Proceedings of the Seventeenth Space Congress, Cocoa Beach, Fla., April 30-May 2, 1980. Congress sponsored by the Canaveral Council of Technical Societies. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1980. 400 p. S30. The topics presented are a Shuttle update, the monitoring of the environment and natural resources, payloads, space technology applications, international activities in space, and terrestrial energy systems. Particular consideration is given to mixed mode missions in the Space Transportation System, a real-time hyperbolic system for the detection and location of thunderstorms, a review of the Canadian Space Program, and the DOE Ocean Energy Program. B.J.

A80-51943 * Satellite temperature monitoring and prediction system. U. R. Barnett (NASA, Kennedy Space Center, Sciences, Technology, and Applications Office, Cocoa Beach, Fla.), J. D. Martsolf (Florida, University, Gainesville, Fla.), and F. L. Crosby (NOAA, National Weather Service, Ruskin, Fla.). In: A new era in technology; Proceedings of the Seventeenth Space Congress, Cocoa Beach, Fla., April 30-May 2, 1980. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1980, p. 4-9 to 4-20. 5 refs.

The paper describes the Florida Satellite Freeze Forecast System (SFFS) in its current state. All data collection options have been demonstrated, and data collected over a three year period have been stored for future analysis. Presently, specific minimum temperature forecasts are issued routinely from November through March. The procedures for issuing these forecast are discussed. The automated data acquisition and processing system is described, and the physical and statistical models employed are examined. V.P.

A80-52051 # New data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite TV images (Novye dannye o geologicheskom stroenii Verkhoiano-Kolymskoi składchatoi oblasti na osnovanii analiza televizionnykh kosmicheskikh snimkov). A. L. Ianshin, Z. M. Khvorostova, and V. A. Zabelin (Akademiia Nauk SSSR, Institut Geologii i Geofiziki and Vychislitel'nyi Tsentr, Novosibirsk, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 5-12. 17 refs. In Russian.

A80-52052 # Geological analysis of the Urals-Oman superlineament from satellite imagery (Kosmogeologicheskie issledovaniia Uralo-Omanskogo superlineamenta). V. A. Bush, V. V. Kozlov (Vsesoiuznoe Aerogeologicheskoe Nauchno-Proizvodstvennoe Ob'edinenie Aerogeologiia, Moscow, USSR), V. I. Sevast'ianov, and V. V. Kovalenok. *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 13-17. 8 refs. In Russian,

The aim of the present paper is to demonstrate the effectiveness of satellite imagery application to geological studies on a global scale. The important role of the Urals-Oman superlineament in structure of the lithosphere is demonstrated. V.P.

A80-52053 # Mapping a geologicostructural scheme of the Kola peninsula from satellite imagery (Sostavlenie geologostrukturnoi skhemy Kol'skogo poluostrova po kosmicheskim snimkam). L. I. Uvad'ev, G. V. Matveeva, and V. A. Perevozhikova (Proizvodstvennoe Geologicheskoe Ob'edinenie Sevzapgeologiia, Leningrad, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 18-24. 7 refs. In Russian.

A method is proposed for the visual and photooptical interpretation of satellite images with the aim of obtaining a lineament scheme as a basis for analytical studies. Some results of this method are examined. A 1:500,000 scheme of the Kola peninsula, on which areas of useful earth resources are indicated, is presented and discussed. V.P.

A80-52054 # Experiment with the composition of a geological map on the basis of interpretations of Meteor satellite television images /using Central Asia as an example/ (Opyt sostavleniia kosmogeologicheskoi karty na osnove deshifrirovaniia televizionnykh snimkov s ISZ 'Meteor' /na primere Srednei Azii/). A. B. Kirillov and O. M. Borisov (Akademiia Nauk Uzbekskoi SSR,

Institut Geologii i Geofiziki, Tashkent, Uzbek SSR). Issledovanie Zemli iz Kosmosa, July-Aug. 1980, p. 25-29. 6 refs. In Russian.

A80-52055 # Analysis of the results of an interpretation of satellite and aerial protography of Western Uzbekistan (Analiz rezul'tatov deshifrirovaniia aerokosmicheskikh snimkov Zapadnogo Uzbekistana). M. N. Tkhai (Akademiia Nauk Uzbekskoi SSR, Institut Geologii i Geofiziki, Tashkent, Uzbek SSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 30-34. 5 refs. In Russian.

In the present paper, the results of an interpretation of satellite and aerial photography of Western Uzbekistan are compared and examined in the light of geological and physical investigations. Conjectural, likely, and reliable lineament and structural features are identified. V.P.

A80-52056 # Experiment aimed at standardizing anthropogenic changes of the natural environment from satellite and aerial photographs (Opyt etalonirovaniia antropogennykh izmenenii prirodnoi sredy po aerokosmicheskim snimkam). E. V. Glushko (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 35-39. 26 refs. In Russian.

Standardization of images is a primary requirement in the development of methods for studying anthropogenic changes of the environment. In the present paper, identified standards are classified, using systematic and territorial critera. Image characteristics are coded with respect to anthropogenic changes of the environment, the geographic conditions, the structure of satellite and aerial imagery, and the conditions under which the photographs were taken. V.P.

A80-52057 # Diurnal behavior of the spectral reflectivity of vegetation and soils (Dnevnoi khod spektral'noi otrazhatel'noi sposobnosti rastitel'nosti i pochv). K. Ia. Kondrat'ev (Glavnaia Geofizicheskaia Observatoriia, Leningrad, USSR) and P. P. Fedchenko (Vsesoiuznyi Nauchno-Issledovatel'skii Institu Sel'skokhoziaistvennoi Meteorologii, Obninsk, USSR). *Issledovanie* Zemli iz Kosmosa, July-Aug. 1980. p. 40-47. 17 refs. In Russian.

The influence of the elevation of the sun on the spectral reflectivity of soils and vegetation is examined. It is shown that variation of spectral reflectivity is caused primarily by diurnal changes in the ratio of direct to scattered radiation. V.P.

A80-52058 # Invariant photometric features of natural objects (Invariantnye fotometricheskie priznaki prirodnykh ob'ektov). I. S. Garelik (Akademiia Nauk SSSR, Institut Geografii, Moscow, USSR). Issledovanie Zemli iz Kosmosa, July-Aug. 1980, p. 48-52. In Russian.

A method is proposed for calculating the invariant photometric features of natural objects, which are functions of the optical densities of zonal photographic images of the objects and which are almost independent of the conditions under which the photographs are taken. Some example applications of such features to the remote sensing of crops are examined. V.P.

A80-52059 # Determination of the spectral characteristics of soils and vegetation (Opredelenie spektral'nykh kharakteristik pochvy i rastitel'nosti). L. N. Vasil'ev (Akademiia Nauk SSSR, Institut Geografii, Moscow, USSR). Issledovanie Zemli iz Kosmosa, July-Aug. 1980, p. 53-58. In Russian.

An MSS image processing and interpretation technique is proposed and illustrated by applying it to the soils and vegetation of a steppe region. Analysis of the spectral brightness characteristics at 490 to 1060 microns showed that observations in three narrow wavelength regions - 490 to 630 microns, 685 to 730 microns, and 800 to 1100 microns - are sufficient to solve the classification problem. The general properties of the spectral brightness density functions are identified. V.P.

A80-52060 # Practical aspects of radiative correction of multispectral video information (Prakticheskie aspekty radiatsionnoi korrektsii mnogozonal'noi videoinformatsii). V. V. Asmus, Iu. G.

Spiridonov, and A. P. Tishchenko (Gosudarstvennyi Nauchno-Issledovatel'skii Tsentr Izucheniia Prirodnykh Resursov, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 59-68. 6 refs. In Russian.

The radiative correction algorithms examined in the present paper require very little additional information and can be readily realized on a computer. A statistical approach to the correction problem is proposed, and the question of selecting image representation units is discussed. V.P.

A80-52061 # Optical spatial-frequency characteristic of the atmosphere and its applications (Opticheskaia prostranstvennochastotnaia kharakteristika atmosfery i ee prilozheniia). I. V. Mishin (Gosudarstvennyi Nauchno-Issledovatel'skii Tsentr Izucheniia Prirodnykh Resursov, Moscow, USSR) and T. A. Sushkevich (Akademiia Nauk SSSR, Institut Prikladnoi Matematiki, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 69-80. 27 refs. In Russian.

A method is proposed for studying the transformation of the spatial brightness distribution of a light field in the atmosphere. The method makes use of the spatial-frequency characteristic of the scattering layer, the calculation of which is reduced to the solution of a parametric set of boundary problems of transport theory. V.P.

A80-52062 # Imaging in many frequency bands (O strukturozonal'noi s'emke). Ia. L. Ziman (Akademiia Nauk SSSR, Institut Kosmicheskikh Issledovanii, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 81-84. In Russian.

The principle and distinctive features of a remote sensing method based on the use of various regions of the spatial frequency spectrum are examined. An onboard sensor design and a data management system are proposed. V.P.

A80-52063 # Automatic selection of reference objects for comparing aerial and satellite photographs (Avtomaticheskii vybor opornykh ob'ektov dlia sopostavleniia aerokosmicheskikh snimkov). A. N. Belinskii (Vsesoiuznyi Nauchno-Issledovatel'skii i Proektno-Tekhnologicheskii Institut Kibernetiki, Moscow, USSR) and L. P. Iaroslavskii (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug, 1980, p. 85-91. 5 refs. In Russian.

An automatic method of selecting readily identifiable landmarks on photographs is proposed. For illustration, the algorithm is applied to the selection of reference objects on aerial and satellite photographs. V.P.

A80-52064 # Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner images (Analiticheskaia geograficheskaia priviazka prirodnykh ob'ektov po skanernym aerokosmicheskim izobrazheniiam). B. A. Novakovskii and lu. V. Sventek (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 92-96. 7 refs. In Russian.

The theory underlying the analytical transition from a multispectral scanner image to a map of prescribed projection and scale, by way of modelling the corresponding coordinate determinations, is outlined. A method of allowing for the residual distortions of a multispectral scanner image is proposed. V.P.

A80-52065 # Distortion of satellite photographs obtained by scanning systems (Iskazheniia kosmicheskikh snimkov, poluchennykh skaniruiushchimi sistemami). V. I. lurov (Akademiia Nauk SSSR, Institut Kosmicheskikh Issledovanii, Moscow, USSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 97-104. 7 refs. In Russian.

The analysis deals with the influence on the image elements of such factors as the earth's curvature and rotation, the landscape features, satellite imotion, beam refraction, and imperfections of the inner geometry of the imaging system. Means of improving the geometrical quality of images by allowing for the influence of these factors are examined. V.P.

A80-52066 # Comparison of interpretations of radar images and space photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ (Sopostavlenie rezul'tatov deshifrirovaniia radiolokatsionnykh snimkov i kosmofotosnimkov detal'nogo urovnia generalizatsii na primere Zarkainarskogo intruzivnogo massiva /iuzhnyi Tian'-Shan'/). V. N. Kozlov (Akademiia Nauk Uzbekskoi SSR, Institut Geologii i Geofiziki, Tashkent, Uzbek SSR). *Issledovanie Zemli iz Kosmosa*, July-Aug. 1980, p. 109-112. In Russian.

A80-53004 # Results of the complex processing of photographs taken from the Salyut space stations (Rezul'taty kompleksnoi obrabotki materialov s'emok s orbital'nykh pilotiruemykh stantsii 'Saliut'). V. D. Bol'shakov, N. P. Lavrova, B. V. Krasnopevtseva, E. M. Nikolaeva, and V. V. Usova (Moskovskii Institut Inzhenerov Geodezii, Aerofotos'emki i Kartografii, Moscow, USSR). *Geodeziia i Aerofotos'emka*, no. 4, 1980, p. 64-72. In Russian.

The features of photographs of the earth's surface taken from the Salyut 3 and 5 stations are described along with methods for the processing of these photographs. The aim of this processing is the compilation of thematic maps and the modification of small-scale topographic maps. B.J.

A80-53005 # Investigation of the accuracy of transposition of landmarks and contour points to small-scale aerial photographs (Issledovanie tochnosti perenosa opoznakov i konturnykh tochek na melkomasshtabnye aerosnimki). M. P. Shul'mina (Moskovskii Institut Inzhenerov Geodezii, Aerofotos'emki i Kartografii, Moscow, USSR). *Geodeziia i Aerofotos'emka*, no. 4, 1980, p. 85-92. 5 refs. In Russian.

The paper analyzes errors associated with the transposition of landmarks and contour points from aerial photographs of scale 1:17,000 (from 1949) to aerial photographs of scales 1:140,000 and 1:70,000 (from 1971). A statistical approach is used to study error distributions and the factors influencing the magnitude of error. B.J.

N80-28768*# Tennessee Univ. Space Inst., Tullahoma. Remote Sensing Div.

DIGITAL LANDSAT DATA ANALYSIS OF TENNESSEE Final Report, 1 Dec. 1978 - 31 Jan. 1980

F. Shahrokhi, Principal Investigator and Asif Kahn 28 Mar. 1980 56 p $\mbox{ ERTS}$

N80-28769*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT SPECIFICATION FOR CCIT6A PROCESSOR PROGRAM

W. P. White, Principal Investigator Aug. 1978 68 p ERTS (Contract NAS9-15200)

(E80-10168; NASA-CR-160597; LEC-12303; JSC-14368) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-28770*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR LACIE FORMAT-TED DOT CARDS IN EOD-LARSYS

P. J. Aucoin, Jr. and Jeannie Gor, Principal Investigators Apr. 1978 26 p ERTS

(Contract NAS9-15200)

(E80-10169: NASA-CR-160650: LEC-12154: JSC-13972) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-28771*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE YIELD ESTIMATION SUBSYSTEM (YES) OPERATIONAL ROB-ERTSON PHENOLOGICAL MODEL

K. Williams, Principal Investigator Jun. 1977 118 p ERTS (E80-10170: NASA-CR-160680; LEC-10743; JSC-12941) Avail: NTIS HC A06/MF A01 CSCL 02C N80-28772*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div. AS-BUILT DESIGN SPECIFICATION FOR THE I-100 TAPE

READ CONSOLIDATION PROGRAM (FULOI) T. R. Kell, Principal Investigator Jul. 1977 74 p ERTS

(Contract NAS9-15200) (E80-10171; NASA-CR-160596; LEC-9925-Rev-A; JSC-11848-Rev-A) Avail: NTIS HC A04/MF A01 CSCL 058

N80-28773*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE BRAZIL AND CHINA MONTHLY DATA BASES

K. Williams, Principal Investigator May 1977 20 p ERTS (Contract NAS9-15200)

(E80-10172; NASA-CR-160677; LEC-10573; JSC-12892) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-28774*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

FINAL DESIGN SPECIFICATION FOR EOD-LARSYS/ STATISTICS AND DATA TRANSFORMATION PROCES-SORS MODIFICATION

Cheevon Bo-Linn, Principal Investigator Mar. 1978 325 p ERTS

(Contract NAS9-15200)

(E80-10173; NASA-CR-160630; LEC-12030; JSC-13921) Avail: NTIS HC A14/MF A01 CSCL 05B

N80-28775*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR EOD-LARSYS PROCEDURE 1

B. E. Wills, C. T. Gardner, and P. J. Aucoin, Jr., Principal Investigators Oct. 1977 307 p ERTS (Contract NAS9-15200)

(E80-10174; NASA-CR-160626; LEC-11293; JSC-13143) Avail: NTIS HC A14/MF A01 CSCL 05B

N80-28776*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR LACIE PHASE 3 AUTOMATIC STATUS AND TRACKING SYSTEM

D. L. Smith, J. L. Allison, J. M. Everette, and C. C. DeValcourt, Principal Investigators Jun. 1977 158 p ERTS (Contract NAS9-15200)

(E80-10175; NASA-CR-160672; LEC-10419-Rev-A;

JSC-12743-Rev-A) Avail: NTIS HC A08/MF A01 CSCL 05B

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DESIGN SPECIFICATION FOR LARSYS PROCEDURE 1 FOLLOW-ON

P. J. Aucoin, Jr., Principal Investigator Oct. 1977 9 p ERTS (Contract NAS9-15200)

(E80-10176: NASA-CR-160627: LEC-11298: JSC-13144) Avail: NTIS HC A02/MF A01 CSCL 05B

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DESIGN SPECIFICATION FOR EOD-LARSYS/STATISTICS AND DATA TRANSFORMATION PROCESSORS MODIFICA-TION

Cheevon Bo-Linn, Principal Investigator Oct. 1977 48 p ERTS (Contract NAS9-15200)

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N80-28779*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

PROGRAM DOCUMENTATION: FINAL DESIGN SPECIFI-CATION FOR DOT DATA BASE UPDATE DECK CONVER-SION PROGRAM (DOTDEC) Jeannie Gor, Principal Investigator Jul. 1977 29 p ERTS (Contract NAS9-15200) (E80-10178: NASA-CR-160647: LEC-10969; JSC-12656) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-28780*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.

FINAL DESIGN SPECIFICATION FOR ERIPS FIELDS DATA BASE DECK CONVERSION

Cheevon Bo-Linn, Principal Investigator Aug. 1977 41 p ERTS

(Contract NAS9-15200)

(E80-10179: NASA-CR-160646: LEC-10960: JSC-12655) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-28781*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div. DETAILED DESIGN SPECIFICATION FOR THE YIELD

ESTIMATION SUBSYSTEM DATA MANAGEMENT SYSTEM (YESDAMS) T. G. Phillips, R. L. Davenport, R. F. Hansen, and K. F. Williams,

Principal Investigators Jul. 1977 107 p ERTS (Contract NAS9-15200)

(E80-10180; NASA-CR-160623; LEC-11110; JSC-13064) Avail: NTIS HC A06/MF A01 CSCL 05B

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MODIFICATIONS TO THE CLASY PROGRAM B. McCray, Principal Investigator Apr. 1977 102 p ERTS (Contract NAS9-15200) (E80-10181: NASA-CR-160673; LEC-10481; JSC-12602) Avail: NTIS HC A06/MF A01 CSCL 05B

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PROGRAM DOCUMENTATIONS: MARQTY1.FTN, CAM-DATA1.FTN

M. A. Mendlowitz, Principal Investigator . Aug. 1978 25 p ERTS (Contract NAS9-15200)

(E80-10182: NASA-CR-160593: LEC-12376) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-28784*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div. DESIGN SPECIFICATION FOR DOT DATA BASE UPDATE DECK CONVERSION PROGRAM (DOTDEC) Jeannie Gor, Principal Investigator Jun. 1977 8 p ERTS

(Contract NAS9-15200) (E80-10183: NASA-CR-160681; LEC-10790; JSC-12958) Avail: NTIS HC A02/MF A01 CSCL 05B

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C. T. Gardner, Principal Investigator Nov. 1977 182 p ERTS (Contract NAS9-15200) (E80-10184; NASA-CR-160638; LEC-11678; JSC-13822) Avail: NTIS HC A09/MF A01 CSCL 05B

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LACIE/PHASE 3 ADJUSTABLE CROP CALENDAR (ACC) CONFIGURATION CONTROL PROCEDURES MANUAL K. Williams, Principal Investigator Jun. 1977 16 p ERTS (Contract NAS9-15200) (E80-10186; NASA-CR-160682; LEC-10800; JSC-12963) Avail: NTIS HC A02/MF A01 CSCL 05B

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RECOMMENDATIONS AND COMMENTS CONCERNING DOCUMENTATION ON THE MICROWAVE ACTIVE SPEC-TROMETER SYSTEMS

07 DATA PROCESSING AND DISTRIBUTION SYSTEMS

W. A. Rosenkranz and D. P. Pounds, Principal Investigators Jun. 1977 127 p refs ERTS (Contract NAS9-15200)

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N80-28788*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

FUNCTIONAL DESIGN SPECIFICATION FOR ENHANCE-MENT OF THE AUTOMATIC STATUS AND TRACKING SYSTEM SOFTWARE

D. K. McCarley, J. M. Everette, and K. P. Eckel, Principal Investigators Sep. 1977 60 p ERTS (Contract NAS9-15200)

(E80-10190; NASA-CR-160624; LEC-11199; JSC-13110) Avail: NTIS HC A04/MF A01 CSCL 05B

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A DISCRIMINANT APPROACH TO PARAMETER ESTIMA-TION IN THE LINEAR MODEL WITH UNKNOWN VARI-ANCE-COVARIANCE MATRIX

C. R. Hallum (NASA. Johnson Space Flight Center) and M. D. Pore, Principal Investigators 1977 10 p refs Presented at the Ann. Meeting of the Am. Statist. Assoc., Chicago, 15-18 Aug. 1977 ERTS

(Contract NAS9-15200)

(E80-10192; NASA-CR-160676; LEC-10532; JSC-13036) Avail: NTIS HC A02/MF A01 CSCL 05B

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LACIE FIELD MEASUREMENTS DATA ACQUISITION SUMMARY REPORT, 1975 - 1976 CROP YEAR Jan. 1977 29 p ERTS

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USER'S GUIDE: LARGE AREA CROP INVENTORY EXPERIMENT (LACIE) PHASE 3 PDP 11/45 AUTOMATIC STATUS AND TRACKING SYSTEM

C. C. deValcourt, Principal Investigator Jun. 1977 49 p ERTS

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(E80-10194; NASA-CR-160642; LEC-10148-Rev-A;

JSC-12535-Rev-A) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-28792*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

A STATISTICAL TEST PROCEDURE FOR DETECTING MULTIPLE OUTLIERS IN A DATA SET

R. S. Chhikara, Principal Investigator and A. H. Feiveson Nov. 1978 18 p refs ERTS (Contract NAS9-15200)

(E80-10195: NASA-CR-160599: LEC-12910: JSC-14594) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-28793*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION OF THE CAMS/CAS INTERFACE TAPE REPORT GENERATION PROGRAM FOR LACIE 6A

W. A. Holley, Principal Investigator Oct. 1977 63 p ERTS (Contract NAS9-15200)

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AS-BUILT DESIGN FOR ENHANCEMENT OF THE AUTO-MATIC STATUS AND TRACKING SYSTEM SOFTWARE

D. K. McCarley, Principal Investigator and L. D. Dornell Feb. 1978 146 p ERTS

(Contract NAS9-15200) (E80-10197; NASA-CR-160631; LEC-11882; JSC-13894) Avail: NTIS HC A07/MF A01 CSCL 02C

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AS-BUILT DESIGN SPECIFICATION FOR HISTORICAL DAILY DATA BASES FOR TESTING ADVANCED MODELS B. Jeun and K. Williams, Principal Investigators Jan. 1978 76 p ERTS (Contract NAS9-15200) (E80-10198; NASA-CR-160675; LEC-10572-Rev-A; JSC-12891-Rev-A) Avail: NTIS HC A05/MF A01 CSCL 058

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DESIGN SPECIFICATION FOR LARSYS PROCEDURE 1

B. E. Wills, C. T. Gardner, and P. J. Aucoin, Jr., Principal Investigators Apr. 1977 145 p ERTS (Contract NAS9-15200)

(E80-10199: NASA-CR-160671; LEC-10417; JSC-12742) Avail: NTIS HC A07/MF A01 CSCL 05B

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AS BUILT DESIGN SPECIFICATION FOR PDP 11/45 ACCURACY ASSESSMENT SYSTEM

C. W. Ahlers, Principal Investigator Dec. 1977 190 p ERTS (Contract NAS9-15200)

(E80-10200; NASA-CR-160632; LEC-11358-Rev-A;

JSC-13666-Rev-A) Avail: NTIS HC A09/MF A01 CSCL 05B

N80-28851# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Advanced Technology Div.

DIGITAL IMAGE TECHNOLOGY 1980: EMERGING PRODUCTION APPLICATIONS Final Report

Marshall B. Faintich 5 Mar. 1980 19 p ref Submitted for publication Original contains color illustrations

(AD-A085163) Avail: NTIS HC A02/MF A01 CSCL 08/2 The Defense Mapping Agency Aerospace Center has developed a program to exploit digital image technology for the advancement of mapping, charting, and geodesy. Primary investigations include image processing, analysis, and display techniques, and computer image generation. A dramatic impact has been made in the ability to produce, analyze, and validate various digital data bases produced by the Defense Mapping Agency by applying state-of-the-art digital image technology concepts to the development of new interactive prototype and production systems. GRA

N80-29780*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

USER DOCUMENTATION EOD LARSYS EARTH OBSERVA-TIONS DIVISION VERSION OF THE LABORATORY FOR APPLICATIONS OF REMOTE SENSING SYSTEM

R. T. Minter, B. E. Wills, and C. T. Gardner, Principle Investigator Jul. 1977 521 p refs Revised ERTS (Contract NAS9-15200)

(E80-10188; NASA-CR-160617; LEC-3984-Rev-4;

JSC-12504-Rev-4) Avail: NTIS HC A22/MF A01 CSCL 05B

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AS-BUILT DESIGN SPECIFICATION FOR METRO DATA EDIT PROGRAM

E. L. Wilson, Principal Investigator Dec. 1976 43 p ERTS (Contract NAS9-15200)

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AS-BUILT DESIGN SPECIFICATION OF THE CAM/CAS INTERFACE TAPE REPORT GENERATION PROGRAM FOR LACIE 7

K. P. Eckel, Principal Investigator Mar. 1978 123 p ERTS (Contract NAS9-15200) (E80-10203; NASA-CR-160629; LEC-12022; JSC-13917; LEC-11292) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-29783*# Lockheed Electronics Co., Houston, Tex. Systems

and Services Div. AS-BUILT DESIGN SPECIFICATION OF THE CAMS/CAS INTERFACE TAPE REPORT GENERATION PROGRAM

W. A. Holley, Principal Investigator Feb. 1977 69 p ERTS (Contract NAS9-15200)

(E80-10204; NASA-CR-160619; LEC-9882; JSC-12560) Avail: NTIS HC A04/MF A01 CSCL 05B

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DESIGN SPECIFICATION FOR SECONDARY ERROR SOURCES MULTI-TEMPORAL BAYES CLASSIFIER

P. J. Aucoin, Jr., Principal Investigator Dec. 1977 13 p ERTS

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DESIGN SPECIFICATION FOR EQUIPROBABLE BLOCKS DENSITY ESTIMATORY/CLASSIFIER/DOT SELECTOR P. J. Aucoin, Jr., Principal Investigator Dec. 1977 19 p

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AS-BUILT DESIGN SPECIFICATION FOR THE CAMS IMAGE-100 HYBRID SYSTEM. VOLUME 1: SYSTEM DESIGN

L. E. Giddings, Principal Investigator Aug. 1977 322 p ERTS 2 Vol.

(Contract NAS9-15200)

(E80-10207; NASA-CR-160644; LEC-10822-Vol-1;

JSC-13030-Vol-1) Avail: NTIS HC A14/MF A01 CSCL 05B

N80-29787*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE CAMS IMAGE-100 HYBRID SYSTEM. VOLUME 2: DETAILED FLOW CHARTS AND PROGRAM LISTINGS

L. E. Giddings, Principal Investigator Aug. 1977 397 p ERTS 2 Vol.

(Contract NAS9-15200)

(E80-10208: NASA-CR-160683; LEC-10822-Vol-2-Pt-2;

JSC-13030-Vol-2-Pt-2) Avail: NTIS HC A17/MF A01 CSCL 05B

N80-29788*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT SPECIFICATION FOR CCIT7 PROCESSOR PROGRAM

W. P. White, Principal Investigator Nov. 1978 64 p ERTS (Contract NAS9-15200)

(E80-10209: NASA-CR-160598: LEC-12518: JSC-14554) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-29789*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.

FINAL DESIGN SPECIFICATION FOR LARSYS MODIFICA-TION/FISHER F-DISTRIBUTION THRESHOLDING R. M. Rodriguez, Principal Investigator Dec. 1976 61 p ERTS (Contract NAS9-15200)

(E80-10210: NASA-CR-160648; LEC-9963; JSC-11864) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-29790* # Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

FINAL DESIGN SPECIFICATION FOR EOD-LARSYS/DATA TRANSFORMATION PROCESSOR MODIFICATION J. K. Rowland, Principal Investigator Apr. 1977 112 p ERTS

(Contract NAS9-15200) (E80-10211; NASA-CR-160678; LEC-10662; JSC-12917) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-29791*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

FINAL DESIGN SPECIFICATION FOR EOD-LARSYS PROCEDURE 1 FOLLOW-ON

P. J. Aucoin, Jr., Principal Investigator Dec. 1977 44 $\ensuremath{\mathsf{p}}$ ERTS

(Contract NAS9-15200)

(E80-10213: NASA-CR-160635: LEC-11618: JSC-13817) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-29792*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

PROGRAM DOCUMENTATION: AS-BUILT DESIGN SPECIFICATION FOR GENERALIZED LINEAR MODEL ANALYSIS OF VARIANCE PROGRAM (GLMAOV)

Jeannie S. Gor, Principal Investigator Mar. 1978 57 p ERTS (Contract NAS9-15200)

(E80-10214; NASA-CR-160649; LEX-12085; JSC-13945) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-29793*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DESIGN SPECIFICATION FOR LACIE FORMATTED DOT CARDS IN EOD-LARSYS

P. J. Aucoin, Jr. and Jeannie S. Gor, Principal Investigators Dec. 1977 14 p ERTS (Contract NAS9-15200)

(E80-10215; NASA-CR-160639; LEC-11703; JSC-13837)

Avail: NTIS HC A02/MF A01 CSCL 05B

N80-29794*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR BOUNDARY DETECTION AND REGISTRATION PROGRAM (BDARP1) D. P. McKay and F. Collen, Principal Investigators Aug. 1977 116 p ERTS (Contract NAS9-15200) (E80-10217; NASA-CR-160621; LEC-11074; JSC-13055) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-29795*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE YIELD ESTIMATION SUBSYSTEM (YES) MONTHLY YIELD DATA BASE AND SUPPORTING PROGRAMS

D. Cook and C. Slemons, Principal Investigators Feb. 1977 124 \ensuremath{p} ERTS

(Contract NAS9-15200)

(E80-10218: NASA-CR-160641: LEC-10034: JSC-12537) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-29796*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

PROGRAM DOCUMENTATION: MARQUIS2.FTN Maury A. Mendlowitz, Principal Investigator Dec. 1977 26 p

ERTS

(Contract NAS9-15200)

(E80-10220: NASA-CR-160622; LEC-11092; JSC-13145) Avail: NTIS HC A03/MF A01 CSCL 05B N80-29803*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DESIGN SPECIFICATION FOR A MERGING PROGRAM FOR FORMATTED IMAGE DATA FILES

P. J. Aucoin, Jr., Principal Investigator May 1978 32 p ERTS

(Contract NAS9-15200)

(E80-10234; NASA-CR-160714; LEC-12373; JSC-14289) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-29805*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

USER MANUAL FOR THE EARTH OBSERVATIONS DIVISION R AND D TO OLPARS DOT DATA CONVER-SION

R. Nugent, Principal Investigator Apr. 1980 30 p refs ERTS (Contract NAS9-15800)

(E80-10236; NASA-CR-160666; LEMSCO-14848; JSC-16665) Avail: NTIS HC A03/MF AU1 CSCL 09B

N80-29807*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

PROJECT DEVELOPMENT PLAN FOR THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES)

J. J. Carney and J. A. Vitellaro, Principal Investigators Oct. 1978 14 p ERTS

(Contract NAS9-15200)

(E80-10238; NASA-CR-160720; LEC-12856; JSC-14579) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-29808*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

TEST PLAN FOR THE LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES)

J. J Carney and J. A. Vitellaro, Principal Investigators Oct. 1978 16 p ERTS

(Contract NAS9-15200)

(E80-10239; NASA-CR-160721; LEC-12857; JSC-14578) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-29809*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

PRELIMINARY DESIGN SPECIFICATION FOR THE LAND-SAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (LIVES)

J. M. Everette, D. K. McCarley, and K. P. Eckel, Principal Investigators Oct. 1978 43 p ERTS (Contract NAS9-15200)

(E80-10240: NASA-CR-160719: LEC-12838: JSC-14577) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-29810*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR AREAS ADDED TO THE MONTHLY BASES OF TEXAS, MINNESOTA AND USSR

K. Williams, Principal Investigator Mar. 1977 22 p ERTS (Contract NAS9-15200)

(E80-10241; NASA-CR-160707; LEC-10353; JSC-12708) Avail: NTIS HC A02/MF A01 CSCL 03B

N80-29811*# Lockheed Electronics Co., Houston, Tex. Aero-space Systems Div.

AS BUILT DESIGN SPECIFICATION FOR THE INDIA MONTHLY DATA BASE

K. Williams, Principal Investigator Feb. 1977 20 p ERTS (Contract NAS9-15200)

(E80-10264; NASA-CR-160643; LEC-10253; JSC-12582) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-29812*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DESIGN SPECIFICATION FOR A LIST PROCESSING SYSTEM

C. L. Horton, C. W. Ahlers, and P. J. Aucoin, Jr. Aug. 1978 77 p ERTS (Contract NAS9-15200) (E80-10265: NASA-CR-160717: LEC-12696; JSC-14457) Avail: NTIS HC A05/MF A01 CSCL 05B

N80-29813*# Texas A&M Univ., College Station. Remote Sensing Center.

DEVELOPMENT AND EVALUATION OF SCATTEROMETER DATA PROCESSING ALGORITHMS Final Report Richard W. Newton, Principal Investigator and Billy V. Clark Aug. 1979 153 p refs ERTS (Contract NAS9-14875) (E80-10266; NASA-CR-160577; RSC-3337) Avail: NTIS HC A08/MF A01 CSCL 058

N80-29814*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

PIXEL LABELING BY SUPERVISED PROBABILISTIC RELAXATION

D. A. Landgrebe, Principal Investigator, J. A. Richards, and P. H. Swain Feb. 1980 18 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development (Contract NAS9-15466; Proj. AgRISTARS) (E80-10267; NASA-CR-160697; SR-PO-00454;

LARS-022580) Avail: NTIS HC A02/MF A01 CSCL 02C

N80-29820*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

SOME APPROACHES TO OPTIMAL CLUSTER LABELING OF AEROSPACE IMAGERY

C. B. Chittineni, Principal Investigator May 1980 56 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS (Contract NAS9-15800; Proj. AgRISTARS) (E80-10273; NASA-CR-160690; SR-L0-00440; LEMSCO-14597; JSC-16355) Avail: NTIS HC A04/MF A01 CSCL 20C

N80-29825*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. THEMATIC MAPPER STUDIES BAND CORRELATION ANALYSIS

Stephen G. Ungar and Richard Kiang Apr. 1976 28 p (NASA-TM-80716) Avail: NTIS HC A03/MF A01 CSCL 08B

Spectral data representative of thematic mapper candidate bands 1 and 3 to 7 were obtained by selecting appropriate combinations of bands from the JSC 24 channel multispectral scanner. Of all the bands assigned, only candidate bands 4 (.74 mu to .80 mu) and 5 (.80 mu to .91 mu) showed consistently high intercorrelation from region to region and time to time. This extremely high correlation persisted when looking at the composite data set in a multitemporal, multilocation domain. The GISS investigations lend positive confirmation to the hypothesis, that TM bands 4 and 5 are redundant. RKG

N80-29828# Electromagnetic Systems Labs., Inc., Sunnyvale, Calif.

IMAGE TRANSFORMATION STUDY Semiannual Technical Report, 1 Oct. 1979 - 30 Apr. 1980

Robert Devich, F. Weinhaus, L. Martin, D. Collier, G. Kiremidjian, A. Silvestri, D. Mcguirk, B. Gleaton, and R. LaPado 30 May 1980 75 p refs

(Contract MDA903-80-C-0108; ARPA Order 3854)

ESL-PR339: (AD-A086070; SATR-1) Avail: NTIS HC A04/MF A01 CSCL 14/5

The purpose of the Image Transformation Study is to develop techniques for converting oblique aerial photography to the ground level viewing perspectives that would be seen by an observer as he moves around within the imaged area. This report documents the first six months of the investigation. GRA

N80-30821 California Inst. of Tech., Pasadena. DEGRADATION OF PICTURE QUALITY BY SPECKLE IN COHERENT MAPPING SYSTEMS Ph.D. Thesis Vuaya Narayan Korwar 1980 183 p

Avail: Univ. Microfilms Order No. 8019904

The problem of specifying the extent of the degradation caused by speckle in pictures meant to be examined by a human observer was investigated. A plausible theoretical model was developed for the decision process used by the observer in the detection or discrimination task. This model was used to relate the probability of making a correct decision to the relevant picture parameters such as contrast ratio between the reflectivities of various parts of the picture, number of looks per pixel picture size, and dimension of the features of lines. Calculations for the reasonable SAR parameters of 1 dB contrast ratio and 12 looks per pixel show that, in order to achieve a probability of correct decision of 0.95, (1) a small square in a 100 by 100 pixel background needs to be about 7 pixels on a side; (2) a 100 by 100 pixel grating of line pairs needs to have lines about 2 pixels wide: and (3) a simple geometrical form (a specific one) needs to be at least 12 pixels on a side to be distinguished from another (specific) form of the same size, when these two forms are the only possible alternatives. Dissert, Abstr.

N80-30824*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR BOUNDARY DETECTION AND REGISTRATION PROGRAM (BDARP1) D. P. McKay and F. Collen, Principal Investigators Apr. 1978 124 p ERTS

(Contract NAS9-15200)

(E80-10216: NASA-CR-160651; LEC-12128; JSC-13966) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-30826*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DETAILED DESIGN SPECIFICATION FOR THE AUTOMATIC STATUS AND TRACKING SYSTEM MODIFICATIONS FOR LACIE PROCEDURE 1

J. M. Everette, D. L. Smith, and C. C. deValcourt, Principal Investigator May 1977 49 p ERTS (Contract NAS9-15200)

(E80-10243; NASA-CR-160674; LEC-10529; JSC-12885) Avail: NTIS HC A03/MF A01 CSCL 14B

N80-30827*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

PRELIMINARY USER GUIDE FOR THE PROGRAM GTDDM (GROUND TRUTH DOT DUMP)

C. W. Ahlers, Principal Investigator Jul. 1978 11 p refs ERTS

(Contract NAS9-15200)

(E80-10244; NASA-CR-160715; LEC-12636; JSC-14423) Avail: NTIS HC A02/MF A01 CSCL 09B

N80-30828*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div. DESIGN SPECIFICATION FOR COLOR CODED SPECTRAL

PLOTS

B. E. Wills, Principal Investigator Sep. 1976 28 p ERTS (Contract NAS9-12200)

(E80-10245; NASA-CR-160706; LEC-9924; JSC-11851) Avail: NTIS HC A03/MF A01 CSCL 08B

N80-30831*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

HIGH DENSITY TAPE REFORMATTING SYSTEM/LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (HDTRS/LIVES) THROUGHPUT ANALYSIS

A. J. Bowen, Jr., Principal Investigator Feb. 1980 29 p ERTS

(Contract NAS9-15800)

(E80-10248: NASA-CR-160664; LEMSCO-14548: JSC-16967) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-30832*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

IMPLEMENTATION SPECIFICATION FOR LARGE AREA CROP INVENTORY EXPERIMENT (LACIE) PHASE 3 AUTOMATIC STATUS AND TRACKING SYSTEM C. C. deValcourt Mar. 1977 46 p Revised ERTS (Contract NAS9-15200) (E80-10249; NASA-CR-160618; LEC-8675-Rev-A; JSC-11401-Rev-A) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-30833*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR SCATTER PLOTS FOR DIRECT WHEAT

O. A. Wehmanen, Principal Investigator Oct. 1978 66 p ERTS (Contract NAS9-15200)

(E80-10250; NASA-CR-160686; LEC-12822; JSC-14546) Avail: NTIS HC A04/MF A01 CSCL 02C

N80-30834*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div

CLASSIFICATION WITH SPECTRAL-SPATIAL-TEMPORAL ARCHETYPES

P. J. Aucoin, Jr. and L. E. Giddings, Principal Investigators Aug. 1978 21 p ERTS (Contract NAS9-15200)

(E80-10251; NASA-CR-160716; LEC-12691; JSC-14456) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-30835*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div. AS-BUILT DESIGN SPECIFICATION FOR FIELD STATIS-TICS (FIELDSTAT)

D. K. McCarley, Principal Investigator Sep. 1978 99 p ERTS (Contract NAS9-15200) (E80-10252; NASA-CR-160685: LEC-12804; JSC-14487)

Avail: NTIS HC A05/MF A01 CSCL 05B

N80-30836*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR CLASY PROGRAM MODIFICATION

P. J. Aucoin, Jr. and C. Horton, Principal Investigators Apr. 1978 171 p ERTS (Contract NAS9-15200)

(E80-10253; NASA-CR-160711; LEC-12185; JSC-13986) Avail: NTIS HC A08/MF A01 CSCL 05B

N80-30837*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DETAIL DESIGN SPECIFICATION FOR ENHANCEMENT OF THE AUTOMATIC STATUS AND TRACKING SYSTEM SOFTWARE

D. K. McCarley, Principal Investigator, J. M. Everette, and K. P. Eckel Nov. 1977 102 p ERTS (Contract NAS9-15200) (E80-10254; NASA-CR-160634; LEC-11512; JSC-13789)

Avail: NTIS HC A06/MF A01 CSCL 05B

N80-30838*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DESIGN SPECIFICATION FOR MERGE OF BTREAD, PHASE 1 AND PHASE 2 ACCURACY ASSESSMENT PROGRAMS

A. Rios, Principal Investigator Oct. 1978 11 p ERTS (Contract NAS9-15200) (E80-10255; NASA-CR-160718; LEC-12833; JSC-14556) Avail: NTIS HC A02/MF A01 CSCL 098

N80-30839*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.

USER'S GUIDE LARGE AREA CROP INVENTORY EXPERI-MENT (LACIE) PHASE 3 PDP 11/45 AUTOMATIC STATUS AND TRACKING SYSTEM

07 DATA PROCESSING AND DISTRIBUTION SYSTEMS

C. C. deValcourt, Principal Investigator Mar. 1977 48 p ERTS

(Contract NAS9-15200)

(E80-10256; NASA-CR-160722; LEC-10148; JSC-12535) Avail: NTIS HC A03/MF A01 CSCL 148

N80-30840*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CLASSIFICATION OF MULTISPECTRAL IMAGES ACCORD-ING TO CROSSWISE TEXTURAL CHARACTERISTICS [CLASSIFICACAO DE IMAGENS MULTIESPECTRAIS, TRAVES DE CARACTERISTICAS DE TEXTURA]

Nelson deJesusParada, Principal Investigator, Enivaldo doOFilho, Nelson D. A. Mascarenhas, and Claudio R. Sonnemburg May 1980 87 p refs In PORTUGUESE: ENGLISH summary Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E80-10257; NASA-CR-163369; INPE-1734-RPE/134) Avail: NTIS HC A05/MF A01 CSCL 05B

N80-30842*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

STUDY OF THE ATMOSPHERIC EFFECTS ON THE RADIATION DETECTED BY THE SENSOR ABOARD ORBITING PLATFORMS (ERTS/LANDSAT) M.S. Thosis -October 1978 [ESTUDO DOS EFEITOS ATMOSFERICOS SOBRE AS RADIACOES PELOS SENSORES A BORDO DE PLATFORMAS ORBIT AIS (ERTS/LANDSAT)]

Nelson deJesusParada, Principal Investigator and Tsutomu Morimoto Mar. 1980 110 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57918 ERTS

(E80-10259; NASA-CR-163366; INPE-1689-TDL/021) Avail: NTIS HC A06/MF A01 CSCL 02C

The author has identified the following significant results. Multispectral scanner data for Brasilia were corrected for atmospheric interference using the LOWTRAN-3 computer program and the analytical solution of the radiative transfer equation. This improved the contrast between two natural targets and the corrected images of two different dates were more similar than the original ones. Corrected images of MSS data for Ribeirao Preto gave a classification accuracy for sugar cane about 10% higher as compared to the original images.

N80-30845*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE PATTERSON-PITT-THADANI MINIMUM LOSS CLASSIFIER

C. W. Ahlers, Principal Investigator May 1978 56 p ERTS (Contract NAS9-15200)

(E80-10262; NASA-CR-160712; LEC-12285; JSC-14246) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-30846*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR PHASE 3 MODEL AREAS ADDED TO THE MONTHLY DATA BASE OF THE US

K. Williams, Principal Investigator Mar. 1977 28 p ERTS (Contract NAS9-15200)

(E80-10263: NASA-CR-160669: LEC-10354: JSC-12709) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-30848*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

STATISTICAL OUTLIER DETECTION (SOD): A COMPUTER PROGRAM FOR DETECTING OUTLIERS IN DATA

R. S. Chhikara, C. L. Horton, M. A. Mendlowitz, and A. H. Feiveson, Principal Investigators (NASA. Johnson Space Center) Jun. 1980 25 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS

(Contract NAS9-15800; Proj. AgRISTARS)

(E80-10275; NASA-CR-160728; FC-L0-00432; LEMSCO-14594; JSC-16346) Avail: NTIS HC A02/MF A01 CSCL 02C

 $\textbf{N80-30849}^{\texttt{H}}$ Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

USER'S GUIDE FOR THE YIELD ESTIMATION SUBSYSTEM DATA MANAGEMENT SYSTEM (YESDAMS)

Roy Davenport and Mike Sestak, Principal Investigators Apr. 1978 51 p ERTS

(Contract NAS9-15200) (E80-10276: NASA-CR-160710: LEC-12184: JSC-13985) Avail: NTIS HC A04/MF A01 CSCL 05A

N80-30852*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

OPERATOR'S GUIDE FOR LACIE PHASE 3 AUTOMATIC STATUS AND TRACKING SYSTEM

D. L. Smith, Principal Investigator Mar. 1977 8 p ERTS (Contract NAS9-15200) (ERO 10284: NASA CR 160670; ISC 12720) Avail: N

(E80-10284; NASA-CR-160670; JSC-12729) Avail: NTIS HC A02/MF A01 CSCL 02C

N80-30853*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

IMPLEMENTATION SPECIFICATION DOCUMENT FOR MERGE OF BTREAD, PHASE 1, AND PHASE 2 ACCURACY ASSESSMENT PROGRAMS

F. Tragni, Principal Investigator May 1978 14 p ERTS (Contract NAS9-15200)

(E80-10285: NASA-CR-160713: LEC-12348: JSC-14277) Avail: NTIS HC A02/MF A01 CSCL 09B

N80-30854*# Lockheed Electronics Co., Houston, Tex. Aerospace Systems Div.

DESIGN SPECIFICATION FOR ERIPS FIELDS DATA BASE DECK CONVERSION

C. T. Gardner, Principal Investigator. Jun. 1977 18 p ERTS (Contract NAS9-12200)

(E80-10286; NASA-CR-160667; LEC-10775; JSC-12950) Avail: NTIS HC A02/MF A01 CSCL 09B

 $\textbf{N80-30855}^{*}\#$ Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

DRAFT USER PROCEDURES: SOFTWARE WHEAT YIELD PREDICTIONS/FOREIGN EQUIVALENT TEST

J. Stewart, Principal Investigator Nov. 1978 32 p ERTS (Contract NAS9-15200)

(E80-10287; NASA-CR-160687; LEC-12975; JSC-14607) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-30856*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

ESTIMATION OF PROBABILITIES OF LABEL IMPERFEC-TIONS AND CORRECTION OF MISLABELS

C. B. Chittineni, Principal Investigator Mar. 1980 44 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS (Contract NAS9-15800; Proj. AgRISTARS) [E80-10288; NASA-CR-160704; SR-L0-00427;

LEMSCO-14356) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-30857*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE CMAS IMAGE-100 HYBRID SYSTEM. VOLUME 2: DETAILED FLOW CHARTS AND PROGRAM LISTINGS, PART 1

L. É. Giddings, Principal Investigator Aug. 1977 395 p ERTS (Contract NAS9-15200)

(E80-10289; NASA-CR-160709; LEC-10822-Vol-2-Pt-1;

JSC-13030-Vol-2-Pt-1) Avail: NTIS HC A17/MF A01 CSCL 09B

N80-30858*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR THE CAMS IMAGE-100 HYBRID SYSTEM. VOLUME 3: UTILITIES AND SHARED SUBROUTINES

L. E. Giddings, Principal Investigator Aug. 1977 200 p ref ERTS

(Contract NAS9-15200) (E80-10290; NASA-CR-160684; LEC-10822-Vol-3;

JSC-13030-Vol-3) Avail: NTIS HC A09/MF A01 CSCL 05B

N80-30861*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

A LABELING TECHNOLOGY FOR LANDSAT IMAGERY T. B. Dennis and M. D. Pore, Principal Investigators May 1980

37 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15800; Proj. AgRISTARS)

(E80-10293; NASA-CR-160689; AR-LO-00425;

LEMSCO-14357: JSC-16341) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-30862*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

MAXIMAL ANALYSIS LABELING PROCEDURE (PRE-LIMINARY)

J. M. Dister, Principal Investigator Feb. 1980 37 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15800; Proj. AgRISTARS)

(E80-10294; NASA-CR-160665; FC-LO-00700; JSC-16399) Avail: NTIS HC A03/MF A01 CSCL 02C

N80-30870*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

EVALUATING THE USE OF ANALYST LABELS IN MAX-IMUM LIKELIHOOD CLUSTER PROPORTION ESTIMA-TION

R. K. Lennington and G. R. Terrell, Principal Investigators Apr. 1980 14 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development FRTS

(Contract NAS9-15800; Proj. AgRISTARS)

(E80-10303; NASA-CR-160754; SR-LO-00456;

LEMSCO-14672; JSC-16538) Avail: NTIS HC A02/MF A01 CSCL 05B

N80-30871*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. EVALUATION OF BAYESIAN SEQUENTIAL PROPORTION

ESTIMATION USING ANALYST LABELS

R. K. Lennington and K. M. Abotteen, Principal Investigators May 1980 17 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15800; Proj. AgRISTARS)

(E80-10304; NASA-CR-160753; SR-LO-00453;

LEMSCO-14355; JSC-16361) Avail: NTIS HC A02/MF A01 CSCL 05B

The author has identified the following significant results. A total of ten Large Area Crop Inventory Experiment Phase 3 blind sites and analyst-interpreter labels were used in a study to compare proportional estimates obtained by the Bayes sequential procedure with estimates obtained from simple random sampling and from Procedure 1. The analyst error rate using the Bayes technique was shown to be no greater than that for the simple random sampling. Also, the segment proportion estimates produced using this technique had smaller bias and mean squared errors than the estimates produced using either simple random sampling or Procedure 1.

N80-30872*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION OF THE CAMS/CAS INTERFACE TAPE REPORT GENERATION PROGRAM FOR LACIE 8

K. P. Eckel, Principal Investigator May 1978 131 p ERTS (Contract NAS9-15200)

(E80-10306; NASA-CR-160750; LEC-12267; JSC-14238) Avail: NTIS HC A07/MF A01 CSCL 09B

N80-30873*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT SPECIFICATION FOR CLASSY CONVERSION P. J. Aucoin, Jr. and C. Horton, Principal Investigators Sep. 1978 261 p ERTS (Contract NAS9-15200)

(E80-10307: NASA-CR-160751; LEC-12743; JSC-14475) Avail: NTIS HC A12/MF A01 CSCL 098

N80-30874*# Environmental Research Inst. of Michigan, Ann Arbor

ANALYSIS OF SCANNER DATA FOR CROP INVENTORIES Progress Report, 15 Nov. 1979 - 15 Feb. 1980

May 1980 97 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15476; Proj. AgRISTARS)

(E80-10308; NASA-CR-160698; ERIM-132400-39-P) Avail: NTIS HC A05/MF A01 CSCL 05B

N80-30875*# Zentralstelle fuer Geo-Photogrammetrie und Fernerkundung, Munich (West Germany).

APPLICATION EXPLORER MISSION A HEAT CAPACITY MAPPING MISSION Progress Report

[1980] 19 p Original contains imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (code 601), Greenbelt, Md. 20771. Domestic users send orders to Attn: National Space Science Data Center': non-domestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM

(E80-10309; NASA-CR-163378) Avail: NTIS HC A02/MF A01 CSCL 08B

The author has identified the following significant results. Fine orogenic sediments, not detectable on the images recorded within the visible wavelength region, can be clearly recognized on all night IR-images. The area of glaciation in the northern foreland of the Alps can be partially identified on the basis of night-IR data. The terminal moraine of various glacierization phases can be mapped and the relative dry and unsorted moraine material consisting of crystalline components can be located through the vegetation cover. The eastern part of the glaciation area can be traced because of reverse temperature effect. In addition to the upper Bavarian lakes, the night-IR images clearly indicate the distribution of high soil moisture areas such as swamps and bogs. The geological border of the upper fresh water molasse in the northern part of the basin north of Munich is identifiable on night IR-imagery. Drift peat areas can be located on day-IR images of the dry season of the year.

N80-31012# World Meteorological Organization, Geneva (Switzerland).

WMO EXECUTIVE COMMITTE INTER-THE 7TH GOVERNMENT PANEL SESSION ON THE FIRST GARP GLOBAL EXPERIMENT Global Atmospheric Research Programme

1979 134 p refs Conf. held at Geneva, Nov. 1979 Prepared in cooperation with International Council of Scientific Unions, Rome (Italy)

(GARP-Spec-35) Avail: NTIS HC A07/MF A01

The performance of the First Garp Global Experiment (FGGE) Composite Observing System, the status of FGGE data management, and implementation of the regional experiments were reviewed. An assessment of data sets collected during the Global Weather Experiment by surface stations ships and buoys, balloons, satellites, and aircraft is presented. Author (ESA)

N80-31072*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A HILL-SLIDING STRATEGY FOR INITIALIZATION OF GAUSSIAN CLUSTERS IN THE MULTIDIMENSIONAL SPACE

John K. Park, Yung H. Chen, Daryl B. Simons, and Lee D. Miller Jul. 1980 29 p refs Presented at the Joint Soil and Machine Process. of Remotely Sensed Data Symp., West NTIS

Lafayette, Ind., 3-6 Jun. 1980 (NASA-TM-80721: Rept-80F4508) Avail: HC A03/MF A01 CSCL 09B

A hill sliding technique was devised to extract Gaussian clusters from the multivariate probability density estimate of sample data for the first step of iterative unsupervised classification. Each cluster was assumed to posses a unimodal normal distribution. A clustering function proposed distinguished elements of a cluster under formation from the rest in the feature space. Initial clusters were extracted one by one according to the hill sliding tactics. A dimensionless cluster compactness parameter was proposed as a universal measure of cluster goodness and used satisfactorily in test runs with LANDSAT multispectral scanner data. The normalized divergence, defined by the cluster divergence divided by the entropy of the entire sample data, was utilized as a general separability measure between clusters. An overall clustering objective function was set forth in terms of cluster covariance matrices, from which the cluster compactness measure could be deduced. Minimal improvement of initial data partitioning was evaluated by this objective function in eliminating scattered sparse data points. The hill sliding clustering technique developed herein has the potential applicability to decomposition any multivariate mixture distribution into a number of unimodal distributions when an appropriate distribution function to the data set is employed. RKG

N80-31429# National Environmental Satellite Service, Washington, D. C.

SATELLITE ACTIVITIES OF NOAA, 1979 Jul. 1980 25 p

Avail: NTIS HC A02/MF A01

Programs using satellite data from the National Oceanic and Atmospheric Administration's polar orbiting and geostationary systems are described. These include: determining winds and temperature: monitoring global radiation; environmental warning systems: monitoring agriculture conditions: determining Earth's shape and gravity field; fisheries monitoring; and determining oceans, lakes, and hydrological conditions. L.F.M.

N80-31856*# National Aeronautics and Space Administration, Washington, D. C.

A DESCRIPTION OF A SYSTEM OF PROGRAMS FOR MATHEMATICALLY PROCESSING ON UNIFIED SERIES (YeS) COMPUTERS PHOTOGRAPHIC IMAGES OF THE EARTH TAKEN FROM SPACECRAFT

V. G. Zolotukhin, B. I. Kolosov, D. A. Usikov, V. I. Borisenko, S. T. Mosin, and V. N. Gorokhov Jun. 1980 29 p refs Transl. into ENGLISH of "Opisaniye systemy Programm Mathematicheskoy Obrabutki na EVM Yedinoy Serii (ES) Fotograficheskikh Apparatov (Kompleks SOFI)", Rept. Pr-336 Acad. of Sci. USSR, Inst. of Space Research, Moscow, 1977 p 1-30 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Academy of Sciences (USSR), Moscow

(Contract NASw-3198)

(NASA-TM-76208: Pr-336) Avail: NTIS HC A03/MF A01 CSCL 14E

A description of a batch of programs for the YeS-1040 computer combined into an automated system for processing photo (and video) images of the Earth's surface, taken from spacecraft, is presented. Individual programs with the detailed discussion of the algorithmic and programmatic facilities needed by the user are presented. The basic principles for assembling the system, and the control programs are included. The exchange format within whose framework the cataloging of any programs recommended for the system of processing will be activated in the future is displayed. T.M.

N80-31859# Army Engineer Topographic Labs., Fort Belvoir, Va.

ERRORS IN AUTOMATIC PASS POINT MENSURATION USING DIGITAL TECHNIQUES

Michael A. Crombie Jun. 1980 22 p refs (DA Proj. 4A7-62707-A-855)

(AD-A087443; ETL-0232) Avail: NTIS HC A02/MF A01 CSCL 08/2

A technique for automatically measuring pass points from digital stereo images is evaluated. Numerical estimates of x-parallax and y-parallax for a specific stereo pair of images is presented as a function of terrain relief. GRA

N80-31864# Royal Aircraft Establishment, Farnborough (England).

A STUDY OF LANDSAT MULTISPECTRAL SCANNER DATA TAPES

A. H. Benny London HMSO Feb. 1980 37 p refs (RAE-TR-80018; RAE-Space-574; BR73767) Avail: NTIS

HC A03/MF A01 A detailed study is described of a number of computer

compatible magnetic tapes containing LANDSAT multi-spectral scanner (MSS) data. The differences between raw and corrected data tapes are shown along with the conversion process. It also shows the differences between the existing and a new form of corrected data tape. A computer program was written to enable raw data desirable for certain computer analyses to be obtained from the existing stocks of corrected data tapes. Author (ESA)

N80-31865# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Digitale Bildverarbeitung.

COMPARATIVE EXPERIMENTAL STUDY ON THE USE OF ORIGINAL AND COMPRESSED MULTISPECTRAL LAND-SAT DATA FOR APPLIED RESEARCH

Klaus A. Ulbricht Feb. 1980 81 p refs Original contains color illustrations

(Contract ESTEC-3569/78-NL-HP(SC)) (DFVLR-FB-80-03; ESA-CR(P)-1343) Avail: NTIS HC A05/MF A01

Parts of two multispectral LANDSAT scenes, compressed by ratio 6.4 to 1, were investigated to determine the effect of the compression on the image contents. The LANDSAT image of the Bayuda desert in Sudan was submitted to supervised maximum likelihood classification before and after compression of data as a function of the rejection class parameter sigma. Different approaches as to the use of circular or rectangular training areas for classification on original and compressed scene served to investigate the influence of compression on image contents. Partitioning of classified image is given on a percentage basis as a function of sigma. Three dimensional clusters of spectral channels and histograms show the influence of compression. The heavy population of blue green algae on LANDSAT scene of the baltic of August 7, 1975, was another example used to test the influence of data compression. Three dimensional clusters of grey values of spectral channels of the investigated area and histograms show influence of compression. The effects of compression on partitioning of classified scences, are displayed in several tables and figures. Author (ESA)

N80-31975# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL SOLAR DATA NETWORK Progress Report, Feb. 1980 Feb. 1980 221 p

(Contract DE-AC01-79CS-30027)

(SOLAR/0010-80/02) Avail: NTIS HC A10/MF A01

The network consits of (1) sensors which measure key performance parameters at a selected site; (2) a Site Data Acquisition System (SDAS): (3) telephone transmission circuits: and (4) a Central Data Processing System (CDPS). Sensor data are collected and stored on a cassette tape in the SDAS. The CDPS collects and processes the information and performs the required computations. For the majority of parameters, raw data is collected approximately every five minutes. Solar insolation and certain other parameters, which are subject to rapid variance, are sampled every 32 seconds. The CDPS interrogates each SDAS on a daily basis and retrieves all accumulated data. At the conclusion of data retrieval, the SDAS Cassette is reset by command from the CDPS for continuing data collection. Environmental information collected at the sites for the reporting month are presented. Only those sites for which the data are found to be valid are reported. DOE

N80-32808*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

A MULTIPROCESSOR IMPLEMENTATION OF A CONTEX-TUAL IMAGE PROCESSING ALGORITHM

B. W. Smith, H. J. Siegel, and P. H. Swain, Principal Investigators Jul. 1980 234 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS

(Contract NAS9-15466; Proj. AgRISTARS)

(E80-10313; NASA-CR-163402; LARS-070180; SR-PO-00474) Avail: NTIS HC A11/MF A01 CSCL 05B

N80-32810*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

SEASAT-A LAND APPLICATIONS DATA PROCESSING PLAN

S. B. Chism, Jr., Principal Investigator Jan. 1977 50 p refs ERTS

(Contract NAS9-15200)

(E80-10317; NASA-CR-160640; JSC-12574; LEC-9978) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-32811*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

HIGH DENSITY TAPE REFORMATTING SYSTEM/LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (HDTRS/LIVES) PRODUCTION TEST THROUGHPUT ANALYSIS

A. J. Bowen, Jr., Principal Investigator Jun. 1980 39 p refs ERTS

(Contract NAS9-15800)

(E80-10319; NASA-CR-160735; JSC-16718; LEMSCO-15039) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-32812*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

AS-BUILT DESIGN SPECIFICATION FOR EQUIPROBABIL-ITY ELLIPSES REPRESENTATION OF CLASSY CLUSTERS C. L. Horton and R. K. Lennington, Principal Investigators Mar. 1980 52 p ref ERTS (Contract NAS9-15800)

(E80-10320; NASA-CR-160740; JSC-16703; LEMSCO-15019) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-32813*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

OPERATION PLAN FOR THE HIGH DENSITY TAPE/ LANDSAT IMAGERY VERIFICATION AND EXTRACTION SYSTEM (HDT/LIVES) DATA PROCESSING SUPPORT

A. J. Bowen, Jr., Principal Investigator Jun. 1980 28 p. refs (Contract NAS9-15800) (E80=10322; NASA=CR=160736) Avail: NTIS HC A03/MF A01

CSCL 05B

N80-32814*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR CCIT8 PROCES-SOR PROGRAM

R. F. Hansen, Principal Investigator Feb. 1979 65 p ERTS (Contract NAS9-15800)

(E80-10323; NASA-CR-160738; LEC-13077; JSC-14704) Avail: NTIS HC A04/MF A01 CSCL 05B

N80-32816*# Lockheed Electronics Co., Houston, Tex. Systems and Services Div.

AS-BUILT DESIGN SPECIFICATION FOR A LIST PROCESS-ING SYSTEM

C. W. Ahlers, P. J. Aucoin, Jr., and C. L. Horton, Principal Investigators Jan. 1979 281 p refs ERTS (Contract NAS9-15800)

(E80-10325; NASA-CR-160739; JSC-14663; LEC-13076) Avail: NTIS HC A13/MF A01 CSCL 05B

N80-32832# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

COLLECTION, PROCESSING, AND DISTRIBUTION OF REMOTE SENSING DATA FROM BRAZILIAN RECEIVING STATION

Nelson deJesusParada Jun. 1980 18 p (INPE-1784-RPE/156) Avail: NTIS HC A02/MF A01

Basic information about the Brazilian LANDSAT tracking, receiving, processing and distribution system operated by INPE the Cachoeira Paulista Electronic and Photographic Processing Laboratory and Distribution Center. The increase of the users community - with more than 1,200 participant organizations and the increase of the volume of images produced - near 20,000 in 1979 - are effective demonstration of the importance of remote sensing in Brazil. Types and prices of products available, product request and related items are discussed. Also, the already planned future achievements of the Brazilian Remote Sensing Satellite Program are briefly described. R.K.G.

N80-32838*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ON EXTRACTING BRIGHTNESS TEMPERATURE MAPS FROM SCANNING RADIOMETER DATA

P. Argentiero and Raul Garza-Robles Aug. 1980 27 p refs Submitted for publication

(NASA-TM-81989) Avail: NTIS HC A03/MF A01 CSCL 08B

The extraction of brightness temperature maps from scanning radiometer data is described as a typical linear inverse problem. Spatial quantization and parameter estimation is described and is suggested as an advantageous approach to a solution. Since this approach takes into explicit account the multivariate nature of the problem, it permits an accurate determination of the most detailed resolution extractable from the data as well as explicitly defining the possible compromises between accuracy and resolution. To illustrate the usefulness of the method described for algorithm design and accuracy prediction, it was applied to the problem of providing brightness temperature maps during the NOSS flight segment. The most detained possible resolution was determined and a curve which displays the possible compromises between accuracy and resolution was provided.

Author

N80-33647# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

PLATFORM ANTENNAS FOR DATA COLLECTION (ANTENA PARA PLATFORMA DE COLETA DE DEOS

Benjamin daSilva M. C. Galvao and Carlos E. Santana Jul. 1980 33 p refs in PORTUGUESE; ENGLISH summary Presented at 32d Reunion of the Brazilian Soc. for the Prog. of Sci., Rio de Janeiro, 6-12 Jul. 1980

(INPE-1820-RPE/186) Avail: NTIS HC A03/MF A01

The theoretical development and the design of a quadrifilar helix antenna to be used in platforms for the collection and transmission of environmental data are presented. The chief characteristic of the antenna is its shaped radiation diagram, with a reduced gain in the vertical (axial) pointing direction, in order to compensate for the variation in attenuation due to slant range to a low orbit satellite. Author

N80-33830*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

A MULTISPECTRAL DATA SIMULATION TECHNIQUE

Marwan J. Muasher and Philip H. Swain, Principal Investigators Jul. 1980 27 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15466; Proj. AgRISTARS)

(E80-10311; NASA-CR-163379; SR-PO-00469;

LARS-TR-070980) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-33831*# South Dakota State Univ., Brookings. Remote Sensing Inst.

IMPACT OF CELL SIZE ON INVENTORY AND MAPPING ERRORS IN A CELLULAR GEOGRAPHIC INFORMATION

07 DATA PROCESSING AND DISTRIBUTION SYSTEMS

SYSTEM

Michael E. Wehde, Principal Investigator Apr. 1979 96 p refs ERTS

(Grant NGL-42-003-007)

(E80-10315; NASA-CR-163403; SDSU-RSI-79-03) Avail: NTIS HC A05/MF A01 CSCL 08B

The author has identified the following significant results. The effect of grid position was found insignificant for maps but highly significant for isolated mapping units. A modelable relationship between mapping error and cell size was observed for the map segment analyzed. Map data structure was also analyzed with an interboundary distance distribution approach. Map data structure and the impact of cell size on that structure were observed. The existence of a model allowing prediction of mapping error based on map structure was hypothesized and two generations of models were tested under simplifying assumptions.

N80-33832*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

UTILIZATION OF SPECTRAL-SPATIAL INFORMATION IN THE CLASSIFICATION OF IMAGERY DATA

C. B. Chittineni, Principal Investigator Jun. 1980 69 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior and Agency for International Development ERTS

(Contract NAS9-15800; Proj. AgRISTARS)

(E80-10321: NASA-CR-160737; SR-LO-00419;

LEMSCO-14310; JSC-16335) Avail: NTIS HC A04/MF A01 CSCL 02C

N80-33837# National Physical Research Lab., Pretoria (South Africa). Optical Sciences Division.

BONNE'S PROJECTION OF METEOSAT IMAGES

A. S. VanZyl Oct. 1979 20 p refs

(CSIR-SR-FIS-201: ISBN-0-7988-1656-2) Avail: NTIS HC A02/MF A01

Bonne projection achieves area preservation at the expense of shape in representing the curved surface of a sphere on a flat plane. Equal area map projection subroutines were developed, integrated into the CSIR-VICAR image processing system, and applied to Meteosat images for geometric transformation of specified areas. The subroutines are functionally described and factors detracting from the accuracy of the projection are examined. A.R.H.

N80-33840# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil). Division de Information.

A METHOD FOR EDGE DETECTION IN IMAGES OF NATURAL RESOURCES [PROCESSAMENTO DE IMAGENS] DETECCAO DE BORDASSEGMENTACAO DE IMAGENS] Nelson D. A. Mascarenhas and Luciano V. Dutra Dutra Jun. 1980 20 p refs In PORTUGUESE Presented at 20th Symp. of Appl. Graphics and Interactive Graphic Systems, 20-22 Aug. 1980, Sao Paulo, Brazil Revised

(INPE-1768-RPE/154) Avail: NTIS HC A02/MF A01

Images derived from remote and metéorological sensing present a problem in distinguishing the borders (edges) among regions of differing textures. Where texture is defined as localized density, a two stage algorithm is employed: (1) a binary image is statistically derived: (2) regions of high and low density are reduced to uniformity by topological methods. The LANDSAT images thus processed show improved continuity and compare favorably with the natural borders. Transl. by S.F.

N80-33847# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C. APPLICATION OF THEMATIC MAPPING TECHNIQUES IN

TERRAIN ANALYSIS Theodore W. Howard Jan. 1980 9 p refs Presented at the

ACSM/ASP Conf. (AD-A089061) Avail: NTIS HC A02/MF A01 CSCL 08/2 The mission to support the Department of Defense (DoD) with terrain information has recently become the responsibility of the Defense Mapping Agency (DMA). The techniques employed to produce data bases of terrain conditions and the synthesizing of this data base information into terrain analysis products are critical in supporting mission requirements. Thematic mapping procedures provide the mechanism by which remote sensors, interpretation techniques, thematic subjects, data analysis techniques, and products can be examined in terms of production feasibility and capabilities.

N80-33848# I8M Federal Systems Center, Gaithersburg, Md. INTERACTIVE DIGITAL IMAGE PROCESSING INVESTIGA-TION, PHASE 2

W. C. Rice and J. S. Shipman Apr. 1980 194 p

(Contract DAAK70-77-C-0166)

(AD-A087518; ETL-0221) Avail: NTIS HC A09/MF A01 CSCL 20/6

The development of the interactive multi-channel image classification capabilities of the DIAL system is addressed. Additional DIAL algorithms to support classification were developed, coded, and tested. These included a program module (PM) to apply the Karhunen-Loeve transformation to a multichannel image, which has the effect of reducing the dimensionality of an image without significantly descreasing its information content. In addition two algorithms in refining class assignment by relaxation methods were developed. One was selected, then coded on DIAL and was applied to a classification of a site, where it removed speckle, sharpened field boundaries, and increased the overall classification accuracy. The programming of the computationally intensive part of the maximum likelihood method on the STRAN computer is described. Finally an experiment in the maximum likelihood classification of a LANDSAT scene using the DIAL PMs was performed. This experiment demonstrated the the utility of the interactive classification algorithms in the study of the relationship between flora and geological structures. M.G.

INSTRUMENTATION AND SENSORS

Includes data acquisition and camera systems and remote sensors.

A80-45766 # A telemechanical system for hydrophysical studies in the ocean (Sistema telemekhaniki dlia gidrofizicheskikh issledovanii v okeane). V. M. Zhukov, L. G. Palevich, and V. N. Tutevich (Akademiia Nauk SSSR, Institut Okeanologii, Moscow, USSR). Okeanologiia, vol. 20, May-June 1980, p. 545-547. In Russian.

The paper describes a pulse-code telemechanical system for the acquisition of ocean data. The system is capable of transmitting data concerning 32 different ocean parameters from the sensors to the control point aboard a ship. A block diagram of the system is presented.

A80-47480 * Spaceborne imaging radar - Geologic and oceanographic applications. C. Elachi (California Institute of Technology, Jet Propulsion Laboratory, Earth and Space Sciences Div., Pasadena, Calif.). *Science*, vol. 209, Sept. 5, 1980, p. 1073-1082. 35 refs. Contract No. NAS7-100.

Synoptic, large-area radar images of the earth's land and ocean surface, obtained from the Seasat orbiting spacecraft, show the potential for geologic mapping and for monitoring of ocean surface patterns. Structural and topographic features such as lineaments, anticlines, folds and domes, drainage patterns, stratification, and roughness units can be mapped. Ocean surface waves, internal waves, current boundaries, and large-scale eddies have been observed in numerous images taken by the Seasat imaging radar. This article gives an illustrated overview of these applications. (Author)

A80-48911 Large field-of-view interferometers for environmental sensing. D. J. Baker (Utah State University of Agriculture and Applied Science, Logan, Utah). *Optical Engineering*, vol. 19, July-Aug. 1980, p. 515-517. 7 refs.

The paper deals with the optical compensation of an interferometer-spectrometer used for remotely sensing optical emission spectra associated with the environment. For a practical instrument using prism-type compensator elements, a viewing field can be extended to more than ten degrees full range. V.T.

A80-49662 # Spacecraft trajectories for the remote sensing of the earth (Traektorii dvizheniia kosmicheskikh apparatov, prednaznachennykh dlia issledovaniia zemli iz kosmosa). E. L. Lukashevich (Gosudarstvennyi Nauchno-Issledovatel'skii i Proizvodstvennyi Tsentr Priroda, USSR). *Issledovanie Zemli iz Kosmosa*, May-June 1980, p. 91-97. 7 refs. In Russian.

Satellite orbit planning for the remote sensing of the earth surface is reviewed. Attention is given to orbit calculation methods and to satellite maneuver procedures for keeping earth resources satellites within the prescribed orbits. B.J.

A80-51233 • Magsat - A new satellite to survey the earth's magnetic field. F. F. Mobley, L. D. Eckard, G. H. Fountain (Johns Hopkins University, Applied Physics Laboratory, Laurel, Md.), and G. W. Ousley (NASA, Goddard Space Flight Center, Greenbelt, Md.). (Institute of Electrical and Electronics Engineers, International Magnetics Conference, 18th, Boston, Mass., Apr. 21-24, 1980.) IEEE Transactions on Magnetics, vol. MAG-16, Sept. 1980, p. 758-760. 7 refs.

The Magsat satellite was launched on Oct. 30, 1979 into a sun-synchronous dawn-dusk orbit, of 97 deg inclination, 350 km perigee, and 550 km apogee. It contains a precision vector magnetometer and a cesium-vapor scalar magnetometer at the end of a 6-m long graphite epoxy scissors boom. The magnetometers are accurate to 2 nanotesla. A pair of star cameras are used to define the body orientation to 10 arc sec rms. An 'attitude transfer system' measures the orientation of the magnetometer sensors relative to the star cameras to approximately 5 arc sec rms. The satellite position is determined to 70 meters rms by Doppler tracking. The overall objective is to determine each component of the earth's vector magnetic field to an accuracy of 6 nanotesla rms. The Magsat satellite gathers a complete picture of the earth's magnetic field every 12 hours. The vector components are sampled 16 times per second with a resolution of 0.5 nanotesla. The data will be used by the U.S. Geological Survey to prepare 1980 world magnetic field charts and to detect large-scale magnetic anomalies in the earth's crust for use in planning resource exploration strategy. (Author)

A80-51579 * Microwave radiometric determination of oceanographic and meteorological parameters. T. T. Wilheit (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Space research. Volume 20 - Proceedings of the Open Meetings of the Working Groups on Physical Sciences, Bangalore, India, May 29-June 9, 1979. Oxford and Elmsford, N.Y., Pergamon Press, 1980, p. 15-20.9 refs.

The thermal microwave brightness from the atmosphere over an ocean in the range 5-40 GHz is influenced primarily by the distribution of vapor and liquid water in the atmosphere and the temperature and wind speed at the sea surface. The Scanning Multichannel Microwave Radiometer (SMMR), which was carried aboard both the Nimbus-7 and Seasat satellites (both launched in 1978), measures this radiation at five frequencies to find these four parameters. A retrieval algorithm has been developed which, on simulated data, yields accuracies of 1.5 C in sea surface temperature, 0.9 m/s in wind speed, 4 mg/ sq cm of cloud liquid water content and 0.14gm/sq cm of precipitable water vapor. Results from the Seasat SMMR, while both preliminary and sparse, are consistent with these simulations. (Author)

A80⁵52046 Airborne thermal viewer having a circular scanner viewing axis. A. A. Babaev. (*Optiko-Mekhanicheskaia Promyshlennost'*, vol. 47, Jan. 1980, p. 15-17.) Soviet Journal of Optical Technology, vol. 47, Jan. 1980, p. 15-17. Translation.

It is shown that the use of a two-mirror scanning system, high-performance stabilization, and proper selection of the ratio of the sides of the radiant energy receiver (RER) make it possible to scan the earth's surface with practically no distortions due to line overlap and omission. Through the use of a mosaic RER and multichannel signal transmission it is possible to obtain a limited improvement in the sensitivity in the middle of the strip being scanned. (Author)

A80-53094 Activities and future plan of earth observation by satellites. Y. Hakura (National Space Development Agency of Japan, Tokyo, Japan). Acta Astronautica, vol. 7, Aug.-Sept. 1980, p. 1049-1064.

The Earth Observation Center of NASDA has been receiving MSS and RBV (return beam vidicon) data from NASA's Landsat satellites since January 1979. The data are widely used for research and applications by government institutions, universities, industries, etc. The first of the Japanese earth observation satellite series, MOS-1 (Marine Observation Satellite-1), which carries MESSR (visible and near-IR radiometer of push-broom scanning type), VTIR (visible and thermal IR radiometer), and MSR (microwave scanning radiometer), is under development with target launch date in FY 1984. (Author)

08 INSTRUMENTATION AND SENSORS

A80-53609 Landsat-D - Overview and implications. L. W. Warzecha and R. J. Katucki (General Electric Co., Space Div., Philadelphia, Pa.). In: Space developments for the future of mankind; International Astronautical Congress, 30th, Munich, West Germany, September 17-22, 1979, Selected Papers. Congress sponsored by the International Astronautical Federation. Oxford, Pergamon Press, Ltd., 1980, p. 91-100.

The Landsat-D mission system is reviewed with reference to the program objectives, flight segment, ground segment, and planned operation in orbit. The goal of Landsat-D is to advance the technology of remote sensing of the earth's resources from space. Landsat-D will incorporate new technology in the flight segment through the Thematic Mapper (TM), a new sensor which extends from four to seven bands the spectral region sensing capacity of previous Landsat spacecraft. High-resolution TM data will be transmitted at a rate of 84.9 Mbps, necessitating changes in the ground data processing equipment. Consideration is also given to the international implications of the mission. V.L.

A80-53891 * Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering. G. S. Hayne (Applied Science Associates, Inc., Apex, N.C.). *IEEE Transactions on Antennas and Propagation*, vol. AP-28, Sept. 1980, p. 687-692. 19 refs. Contract No. NAS6-2810.

Under assumptions common in radar altimetry, the mean backscattered return power for a short-pulse radar and near-normalincidence scattering from a rough ocean surface is given by the convolution of several terms. For a nearly Gaussian transmitted pulse shape scattered from a nearly Gaussian distributed sea surface, a small-argument series expansion of one of the terms within the convolution leads to a several-term power series expansion for the mean return waveform. Specific expressions are given for the first four terms. These results, which require much less computer time than would the otherwise necessary numerical convolution, are useful for data analysis from current or past radar altimeters and for design studies of future systems. Several representative results are presented for an idealized Seasat radar altimeter. (Author)

N80-28637*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THE DEVELOPMENT OF A STEPPED FREQUENCY MI-CROWAVE RADIOMETER AND ITS APPLICATION TO REMOTE SENSING OF THE EARTH

Richard F. Harrington Jun. 1980 181 p refs (NASA-TM-81847) Avail: NTIS HC A09/MF A01 CSCL

090

The design, development, application, and capabilities of a variable frequency microwave radiometer are described. This radiometer demonstrated the versatility, accuracy, and stability required to provide contributions to the geophysical understanding of ocean and ice processes. A closed-loop feedback method was used, whereby noise pulses were added to the received electromagnetic radiation to achieve a null balance in a Dicke switched radiometer. Stability was achieved through the use of a constant temperature enclosure around the low loss microwave front end. The Dicke reference temperature was maintained to an absolute accuracy of 0.1 K using a closed-loop proportional temperature controller. A microprocessor based digital controller operates the radiometer and records the data on computer compatible tapes. This radiometer exhibits an absolute accuracy of better than 0.5 K when the sensitivity is 0.1 K. The sensitivity varies between 0.0125 K and 1.25 K depending upon the bandwidth and integration time selected by the digital controller. Remote sensing experiments were conducted from an aircraft platform and the first radiometeric mapping of an ocean polar front: exploratory experiments to measure the thickness of lake ice; first discrimination between first year and multiyear ice below 10 GHz; and the first known measurements of frequency sensitive characteristics of sea ice. L.F.M. N80-28853# Virginia Dept. of Highways and Transportation, Richmond. Aerial Safety Section.

AEROTRIANGULATION CONTROL OF LARGE SCALE PHOTOGRAPHY FROM SMALL SCALE PHOTOGRAPHY Final Report

George W. Habel, Jr. 26 Oct. 1979 49 p Sponsored by Federal Highway Administration

(PB80-161524: FHWA-VA-79-1) Avail: NTIS HC A03/MF A01 CSCL 14E

Tests were conducted to determine if a simultaneous adjustment of high and low altitude photography would yield results superior to either scale when used alone. These tests also offered an excellent opportunity to test the metric qualities of two different cameras and the relative metric qualities of black and white and color film. It was concluded that using a simultaneous adjustment is a good photogrammetric practice under certain circumstances. It was also found that the RC-10 camera normally gave a flatter bridge than the RC-8, and there was no appreciable difference in the metric qualities of the black and white and color film used in these tests. GRA

N80-29407# Dornier-Werke G.m.b.H., Friedrichshafen (West, Germany). Hauptabteilung Raumfahrtprogramme.

CONCEPTUAL STUDY OF A EUROPEAN REMOTE SENSING SATELLITE WITH COMBINED OPTICAL AND MICROWAVE PAYLOAD Final Report

Wolfgang Gilg, E. Achtermann, K.-L. Bitzer, K. Ernsberger, K.-H. Fabiunke, G. Lehn, W. Schuler, W. Trogus, E. Velten, M. Westphal et al Bonn Bundesmin. fuer Forsch. u. Technol. Nov. 1979 110 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in cooperation with DFVLR, Oberpfaffenhofen, West Germany (BMFT-FB-W-79-18) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22,70

The concept of a European remote sensing satellite (ERDSAT) launched by ARIANE and carrying a model payload, consisting of a synthetic aperture radar and an optical multispectral scanner with nine channels for land applications or coastal zone missions is characterized. The mission goal of ERDSAT is based on European user requirements where a strong need for optical and microwave sensor operation on board the same satellite in a simultaneous or sequential mode is expressed. A data collection system is included. The proposed satellite is three-axes-stabilized and has a Sun-synchronous, near polar circular orbit at 750 km altitude. The selected configuration separates payload module and bus module. A thermostable carbon fiber grating structure constitutes the central framework of the satellite. Each major subsystem is housed in a separate compartment and can be integrated and tested individually. First mass estimates result in 450 kg for the payload and 880 kg for the bus. The maximum power needed is 1750 W (for 6 minutes, three times a day), which is provided by a 1330 W solar array and two batteries. Author (ESA)

N80-29801*# Eastman Kodak Co., Rochester, N. Y. ADVANCED SOLID STATE EARTH RESOURCES SATELLITE STUDY Final Report

30 Jun. 1980 $70~p\,$ refs. Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 $\,$ ERTS

(Contract NASw-3375) (E80-10232: NASA-CR-163337: RC-00221) Avail: NTIS HC A04/MF A01 CSCL 22B

N80-30822 Old Dominion Univ., Norfolk, Va. THE DEVELOPMENT OF A STEPPED FREQUENCY MI-CROWAVE RADIOMETER AND ITS APPLICATION TO REMOTE SENSING OF THE EARTH Ph.D. Thesis Richard Harrington 1980 188 p

Avail: Univ. Microfilms Order No. 8020139

The design, development, application, and capabilities of a variable frequency microwave radiometer are described. This radiometer has demonstrated the versatility, accuracy, and stability required to provide contributions to the geophysical understanding

of ocean and ice processes. The design technique utilized a closed loop feedback method, whereby noise pulses were added to the received electromagnetic radiation to achieve a null balance in a Dicke switched radiometer. Stability was achieved through the use of a constant temperature enclosure around the low loss microwave front end. Remote sensing experiments were conducted from an aircraft platform using this radiometer. Four significant scientific observations were accomplished during these experiments. These observations consisted of the first radiometer imaging of an ocean polar front, exploratory experiments to measure the thickness of lake ice, first discrimination between first year and multiyear ice below 10 GHz, and the first known measurements of frequency sensitive characteristics of sea ice.

 $\textbf{N80-31857}^{\texttt{\#}}$ National Aeronautics and Space Administration, Washington, D. C.

RADUĞA EXPERIMENT: MULTIZONAL PHOTOGRAPHING THE EARTH FROM THE SOYUZ-22 SPACECRAFT

Ya. Ziman, Yu. Chesnokov, B. Dunayev, V. Aksenov, V. Bykovskiy, R. Ioaskhim, K. Myuller, V. Choppe, and V. Volter Jul. 1980 27 p refs Transl. into ENGLISH of "Eksperiment Raduga--Mnogozonal Nove Fotografirovan ye Zemli s Kosmicheskogo Korablya Soyuza-22" Rept D-254 Acad. of Sci. USSR, Inst. of Space Res., Moscow, 1977 p 1-35 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NA SA-TM-76234: D-254) Avail: NTIS HC A03/MF A01 CSCL 14E

The main results of the scientific research and 'Raduga' experiment are reported. Technical parameters are presented for the MKF-6 camera and the MSP-4 projector. Characteristics of the obtained materials and certain results of their processing are reported.

N80-31863# Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.

SENSORS FOR REMOTE SENSING (SENSORI PER TELERILEVAMENTO)

E. M. Bastida, F. Gardossi, A. Sona, F. Svelto, and V. Svelto Jan, 1979 53 p refs In ITALIAN; ENGLISH summary (CISE-N-190) Avail: NTIS HC A04/MF A01

The most important remote sensing methods are discussed. Particular attention is devoted to the sensors, defined as the components transforming the electromagnetic information into usable data, Photographic methods, radar and microwave methods, and applications of infrared and laser radiation are included.

Author (ESA)

N80-32807*# Dartmouth Coll., Hanover, N.H. AN INVESTIGATION OF VEGETATION AND OTHER EARTH RESOURCE/FEATURE PARAMETERS USING LANDSAT-AND OTHER REMOTE SENSING DATA. 1: LANDSAT. 2: REMOTE SENSING OF VOLCANIC EMISSIONS Semiannual Status Report, 1 Feb. - 31 Jul. 1980

Richard W, Birnie and Richard E. Stolber, Principal Investigators 31 Jul. 1980 45 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S. D. 57198 ERTS

(Contract NCC5-22)

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(E80-10312: NASA-CR-163401: SASR-1) Avail: NTIS HC A03/MF A01 CSCL 05B

N80-33047*# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

A 94/183 GHz MULTICHANNEL RADIOMETER FOR CONVAIR FLIGHTS Final Technical Report, 6 Apr. 1978 -2 Feb. 1979

J. A. Gagliano, J. A. Stratigos, R. E. Forsythe, and J. M. Schuchardt Jan. 1979 243 $\,p$

(Contract NAS5-24480)

(NASA-CR-160032) Avail: NTIS HC A11/MF A01 CSCL 148

A multichannel 94/183 GHz radiometer was designed, built, and installed on the NASA Convair 990 research aircraft to take data for hurricane penetration flights, SEASAT-A underflights for measuring rain and water vapor, and Nimbus-G underflights for new sea ice signatures and sea surface temperature data (94 GHz only). The radiometer utilized IF frequencies of 1, 5, and 8.75 GHz about the peak of the atmospheric water vapor absorption line, centered at 183.3 GHz, to gather data needed to determine the shape of the water molecule line. Another portion of the radiometer operated at 94 GHz and obtained data on the sea brightness temperature, sea ice signatures, and on areas of rain near the ocean surface. The radiometer used a multiple lens antenna/temperature calibration technique using 3 lenses and corrugated feed horns at 94 GHz and 183 GHz. Alignment of the feed beams at 94 GHz and 183 GHz was accomplished using a 45 deg oriented reflecting surface which permitted simultaneous viewing of the feeds on alternate cycles of the chopping intervals. Author

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GENERAL

Includes economic analysis.

A80-45575 Space law - A new proposal. F. Lay (United Nations, New York, N.Y.). *Journal of Space Law,* vol. 8, Spring 1980, p. 41-57. 35 refs.

The paper discusses the U.N. Agreement Governing the Activities of States on the Moon which was concluded in 1979. The agreement binds the contracting states to elaborate a regime for the equitable allocation of benefits which will result when the commercial exploitation of the moon's resources becomes feasible; in addition, it provides that the international community will be informed of the results of research and findings of space powers on the moon. The U.N. is continuing work on space applications including the elaboration of principles for the regulation of future direct television broadcasting via satellite, study of remote sensing of earth resources from space, and regulation of nuclear-power sources on space vehicles. Dangers of militarization of outer space are discussed, raising a question as to whether military space technology can be considered a peaceful activity compatible with the objective of 'peaceful use' of outer space. ΔΤ

A80-46300 # Concept of a research aircraft for remote sensing, using an integrated sensor/data system (Konzept eines Forschungsflugzeuges für die Fernerkundung mit integriertem Sensor- und Datensystem). G. Miosga (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Optoelektronik, Braunschweig, West Germany). Deutsche Gesellschaft für Luftund Raumfahrt, Jahrestagung, 13th, Braunschweig, West Germany, May 28-30, 1980, Paper 80-051. 34 p. In German.

The paper deals with a concept for defining an experimental aircraft for earth resource surveys. The mission requirements are formulated, and the determination of the type of aircraft best suited to meet these requirements is discussed, along with the onboard data-acquisition and sensor systems. V.P.

A80-50280 # Earth observation from space today and tomorrow (Kosmicheskoe prirodovedenie segodnia i zavtra). Iu. Kienko (Gosudarstvennyi Nauchno-Issledovatel'skii i Proizvodstvennyi Tsentr Priroda, USSR). Aviatsiia i Kosmonavtika, Aug. 1980, p. 38, 39. In Russian.

Soviet efforts involving the remote sensing of earth resources and environmental monitoring from space are briefly reviewed. The importance of remote sensing for economic development is emphasized. B.J.

A80-52691 Brazil in space. T. Pirard. Spaceflight, vol. 22, June 1980, p. 237-239. 5 refs.

The objectives of the Brazilian space research are reviewed, emphasizing those technical applications which will aid in Brazil's social and educational development. The various projects and research activities in Brazil are the responsibility of both the Institute for Space Research (INPE) and the Institute for Space Activities (IAE). Remote sensing of resources, such as sugar cane crops with Landsat imagery, and the use of communications satellites for economic and educational purposes are the two space applications in which INPE is interested, while the principal task of the IAE engineers and technicians is the development of the national launch vehicle, based on the technology of the present Sonda rockets.

A.C.W.

A80-53148 Utilization of space for scientific and economic purposes in the USSR in 1978 (Osvoenie kosmicheskogo prostranstva v SSSR 1978: Kosmos-nauke i narodnomu khoziaistvu). Edited by R. Z. Sagdeev. Moscow, Izdatel'stvo Nauka, 1980. 190 p. In Russian.

This volume is a compilation of TASS communications published in the USSR in 1979, concerning the exploration of space. The communications deal with remote sensing of earth resources from Saliut 6 and satellites of the Cosmos and Molniia series, the exploration of the planet Venus by means of the Venera 11 and 12 probes, the achievements of the Saliut 6 space laboratory, the contribution to star catalogs, lunar explorations, manufacturing under conditions of weightlessness, etc. V.P.

A80-53350 # China space report /Based on observations made during an invited tour with an AIAA delegation, November 1979/. W. L. Pritchard (Satellite Systems Engineering, Inc., Bethesda, Md.) and J. J. Harford (American Institute of Aeronautics and Astronautics, Inc., New York, N.Y.). New York, American Institute of Aeronautics and Astronautics, Inc., 1980. 212 p. 16 refs. \$20.

The book describes an invited tour of an AIAA delegation to the People's Republic of China to promote cooperation through the exchange of scientific and technological information in the fields of communication satellites, earth resources satellites, and meteorological satellites. Background of U.S. China relations is discussed, chronology of specific visits is presented, and observations and tips for travel in China are outlined. V.T.

N80-29802*# Washington Univ., St. Louis, Mo. Center for Development Technology.

PROGRAM ON STIMULATING OPERATIONAL PRIVATE SECTOR USE OF EARTH OBSERVATION SATELLITE DATA Technical Progress Status Report, 15 Jan. - 15 Jun. 1980 Lester F. Eastwood, Jr., Jerry Foshage, Guillermo Gomez, Becky Kirkpatrick, Barry Konig, Bret Smith, Robert Stein, Francis Vithayathil, and Katherine Warner, Principal Investigators 15 Jun. 1980 125 p refs ERTS (Contract NASw-3331) (E80-10233; NASA-CR-163338) Avail: NTIS HC A06/MF A01 CSCL 05B

N80-29823*# Cornell Univ., Ithaca, N. Y. Remote Sensing Program.

CORNELL UNIVERSITY REMOTE SENSING PROGRAM Semiannual Status Report, 1 Dec. 1979 - 31 May 1980 Ta Liang, Principal Investigator and Warren R. Philipson Jun. 1980, 100 p. refs. Original contains imagery. Original photography may bé pürchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (Grant NGL-33-010-171) (E80-10280: NASA-CR-163346) Avail: NTIS HC A05/MF A01 CSCL 05B

N80-31420*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. **REPORT ON ACTIVE AND PLANNED SPACECRAFT AND**

EXPERIMENTS Richard Horowitz, ed. and Robert W. Nostreys, ed. Aug. 1980 319 p

(NASA-TM-80905: NSSDC/WDC-A-R/S-80-06) Avail: NTIS HC A14/MF A01 CSCL 22A

Information on current and planned spacecraft activity for a broad range of scientific disciplines is presented. The information covers a wide range of disciplines: astronomy, Earth sciences, meteorology, planetary sciences, aeronomy, particles and fields, solar physics, life sciences, and material sciences. These spacecraft projects represent the efforts and funding of individual countries as well as cooperative arrangements among different countries. R.C.T.

N80-32295# Council on Environmental Quality, Washington, D.C.

THE GLOBAL 2000 REPORT TO THE PRESIDENT. ENTER-ING THE TWENTY-FIRST CENTURY, VOLUME 1

1980 55 p refs 2 Vol.

Avail: SOD HC

Probable trends in population, resources, and environment were estimated between the year 1975 and 2000. Trend projections were developed using the long term global models employed by federal agencies. It is indicated that if present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world today. Major findings and conclusions are reported. R.C.T.

NBO-32296# Council on Environmental Quality, Washington, D.C. THE GLOBAL 2000 REPORT TO THE PRESIDENT. ENTER-

ING THE TWENTY-FIRST CENTURY, VOLUME 2: THE TECHNICAL REPORT

1980 775 p refs 2 Vol.

Avail: SOD HC

Changes in pollution, climate, technology, Earth resources, energy, and the environment until the end of the century as projected by U.S. Government agencies using their most frequently employed long term planning models and analytical tools are discussed. A sequential approach was used to obtain a measure of self consistency, coherence, and interrelationship so as to provide an integrated global model which reflects the implications if current U.S. policies remain unchanged. Each of the models used is described and other global models are examined and compared with the global model developed. A.R.H.

 $\textbf{N80-33425}^{*}\#$ National Aeronautics and Space Administration, Washington, D. C.

THE UNITED STATES SPACE OBSERVATION POLICY

Michele Chevrel Oct. 1980 10 p Transl. into ENGLISH from Les Cahiers de l'OPIT (France), Dossier no. 2, Winter 1979/1980 p 22-25 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3198)

(NA \$A-TM-76373) Avail: NTIS HC A02/MF A01 CSCL 22A

The steps pursued since 1978 to establish an operational civil space remote sensing system are outlined. The role of the National Oceanographic and Atmospheric Agency is defined, and the problems still remaining are discussed. T.M.

N80-33845*# National Aeronautics and Space Administration, Washington, D. C.

PRIVATE SECTOR INVOLVEMENT IN CIVIL SPACE REMOTE SENSING. VOLUME 1: REPORT

15 Jun. 1979 37 p Sponsored in part by NOAA, Dept. of the Interior, Dept. of Agriculture, DOD, EPA, Army Corps of Engineers and Dept. of State

(NA SA-TM-82206) Avail: NTIS HC A03/MF A01 CSCL 058

A survey of private sector developers, users, and interpreters of Earth resources data was conducted in an effort to encourage private investment and participation in remote sensing systems. Results indicate positive interest in participation beyond the current hardware contracting level, however, there is a substantial gap between current market levels and system costs. Issues identified include the selection process for an operating entity, the public/private interface, data collection and access policies, price and profit regulation in a subsidized system, international participation, and the responsibility for research and development. It was agreed that the cost, complexity, and security implications of integrated systems need not be an absolute bar to their private operation. J.M.S. N80-33846*# National Aeronautics and Space Administration, Washington, D. C.

PRIVATE SECTOR INVOLVEMENT IN CIVIL SPACE REMOTE SENSING. VOLUME 2: APPENDICES

15 Jun. 1980 123 p. Sponsored in part by NOAA, Dept. of the Interior, Dept. of Agriculture, DOD, EPA, Army Corps of Engineers and Dept. of State

(NASA-TM-82207) Avail: NTIS HC A06/MF A01 CSCL 058

The U.S. Space Policy concerning the investment and direct participation in the establishment and operations of remote sensing systems is addressed. Private sector views and state and local government views are presented. Results of a market analysis are pregiven and the economic feasibility of such a program is considered. J.M.S.

N80-34041# National Oceanic and Atmospheric Administration, Washington, D. C. Federal Coordinator for Meteorological Services and Supporting Research.

THE FEDERAL PLAN FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH, FISCAL YEAR 1981 T. B. Owen Mar. 1980 120 p

(PB80-199482: FCM-80-3: NOAA-80051901) Avail: NTIS HC A06/MF A01 CSCL 04B

This Federal Plan is the sixteenth in an annual series, produced in compliance with Section 304 of Public Law 87-843, to provide the Congress with a description of governmental programs in meteorology, and to outline the specific functions and funding requested by each agency involved. GRA

N80-34294# Committee on Commerce, Science, and Transportation (U. S. Senate).

OPERATIONAL REMOTE SENSING LEGISLATION, PART 1 Washington GPO 1979 245 p Hearings on S. 663 and S. 875 before the subcomm. on Sci., Technol., and Transportation, 96th Congr., 1st Sess., 9 and 11 Apr. 1979

(GPO-45-048) Avail: Subcomm. on Sci., Technol., and Space Legislation to establish an Earth data and information service in NASA is presented. Legislation to provide for the establishment. ownership. operation, and regulation of a commercial Earth resources information service, utilizing satellites and other technologies. is presented. These hearings on remote sensing were before the Subcommittee on Science, Technology, and Space of the United States Senate. T.M.

N80-34295# Committee on Commerce, Science, and Transportation (U. S. Senate).

OPERATIONAL REMOTE SENSING LEGISLATION, PART 2 Washington GPO 1979 74 p refs Hearings on S. 663 and S. 875 before the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci., and Transportation

(GPO-52-581) Avail: Subcommittee on Science, Technology, and Space

Legislation to establish an Earth data and information service in NASA is presented. Legislation to provide for the establishment, ownership, operation, and regulation of a commercial Earth resources information service, utilizing satellites and other technologies, is presented. These hearings on remote sensing were before the Subcommittee on Science, Technology, and Space of the United States Senate. T.M.

SUBJECT INDEX

An algorithm for estimating crop calendar shifts of spring

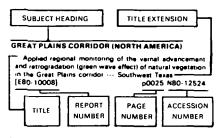
Operation plan for the High Density Tape/LANDSAT Imagery Verification and Extraction System (HDT/LIVES)

mall grains using LANDSAT spectral data

[E80-10314]

Earth Resources/A Continuing Bibliography (Issue 28)

Typical Subject Index Listing



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The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section (of this supplement). If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

Δ

- ABSORPTION SPECTROSCOPY
- In situ ozone data for evaluation of the laser absorption spectrometer ozone remote sensor: 1979 southeastern 1979 southeastern Virginia urban plume study summer field program [NASA-TM-81831] p0183 N80-33928 [NASA-TM-81831]
- ACCURACY As-built design specification for CCIT8 processor
- program [E80-10323] p0221 N80-32814 AERIAL PHOTOGRAPHY
- Image transformation study [AD-A086070] p0216 N80-29828 AERIAL RECONNAISSANCE
- Concept of a research aircraft for remote sensing, using an integrated sensor/data system
- [DGLR PAPER 80-051] n0227 A80-46300 AEROSOLS
- Polar nephelometer for atmospheric particulate studie p0182 A80-52346 Volcanic material from Mount Helens in p0182 A80-54074 stratosphere over Europe Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September - October 1979 AD-A088229] p0199 N80-33068
- AGRICULTURE Separability of agricultural cover types in spectra p0173 A80-49100 channels and wavelength regions
- n0174 A80-49137 Overview of the Landsat system The Columbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans p0174 A80-49141
- A study of the needs of French go ernment agencies in p0181 A80-50882 remote sensing mapping LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas Williams County, North Dakota; and Hand County, South
- Dakota [E80-10193] n0214 N80-28790
- Program on stimulating operational private sector use of Earth observation satellite data n0227 N80-29802 [E80-10233]
- ote sensing research studies Remote ser [E80-10117] p0176 N80-30823 Use of LANDSAT data for estimating the area of sugar
- the state of Sao Paulo --- Brazil [E80-10260] p0177 N80-30843

Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo [E80-10261] p0177 N80-30844

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota. Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

A labeling technology for	LANDSAT imagery
[E80-10293]	p0219 N80-30861

Sensors for remote sensing	
[CISE-N-190]	p0225 N80-31863

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [E80-10324] p0178 N80-32815

Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling Corn Belt

[E80-10327] p0178 N80-32818

Applied Remote Sensing Program (ARSP) --- Arizona [E80-10330] p0178 N80-32821

Infrared-temperature variability in a large agricultural field --- Dunnigan, California [E80-10331] n0178 N80-32822

The application of remote sensing to resource

management and environmental quality programs in Kansas --- kansas; roy's and phony creeks watersheds: the proposed tallgrass prairie national park and pin ford lake, missouri [E80-10337]

- The use of radiation temperature to detect water-stress in sugarcane crop --- Brazil [INPE-1767-TDL/028] p0179 N80-33839
- AGRISTARS PROJECT
- Pixel labeling by supervised probabilistic relaxation p0216 N80-29814 [E80-10267]
- Sampling of rectangular regions [E80-10272] p0176 N80-29819 Some approaches to optimal cluster labeling of aerospace
- nagery [E80-10273] p0216 N80-29820

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and [E80-10281]

- p0176 N80-29824 Remote sensing research studies
- [E80-10117] p0176 N80-30823 The integrated analysis procedure for identification of spring small grains and barley --- Great Plains Corridor: J.S. and Canada

[E80-10274] p0177 N80-30847 Statistical Outlier Detection (SOD): A computer program for detecting outliers in data --- AgRISTARS Proj [E80-10275] D0218 N80 p0218 N80-30848

Estimation of probabilities of label imperfections and orrection of mislabels

[E80-10288] p0218 N80-30856 AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, California, Georgia, Illinois, Iowa, Journano, Mississippi, Mississippi, Mississippi, Mississipri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

A labeling technology for LANDSAT imagen [E80-10293] n0219 p0219 N80-30861 Maximal analysis labeling procedure (preliminary)

- [E80-10294] p0219 N80-30862 An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North
- Dakota [E80-10295] p0177 N80-30863
- Use of soil moisture information in yield models 30-103021 p0177 N80-30869 [E80-10302]
- Evaluating the use of analyst labels in maximum likelihood cluster proportion estimation [E80-10303] p0219 N80-30870
- Evaluation of Bayesian sequential proportion estimation using analyst labels [E80-10304] p0219 N80-30871
- Analysis of so anner data for crop inventori [E80-10308] p0219 N80-30874
- A multiprocessor implementation of a contextual image processing algorithm p0221 N80-32808

[E80-10313]

- data processing support [E80-10322] p0221 N80-32813 Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling --- Corn Belt p0178 N80-32818 [E80-10327] A multispectral data simulation technique 80-10311) p0221 N80-33830
- Utilization of spectral-spatial information in the classification of imagery data
- [E80-10321] p0222 N80-33832 AGROCLIMATOLOGY
- Williams County, North Dakota; and Hand County, South Dakota [E80-10193]
- Florida water resources
- [E80-10246]
- Satellite activities of NOAA, 1979 p0220 N80-31429
- of episodal events on crop temporal spectral response and development of Al guidelines for corn and soybean labeling Corn Belt
- [E80-10327] AGROMETEOROLOGY
- Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties [E80-10326]
- p0183 N80-32817 AIR LAND INTERACTIONS
- The appearance of the Main Ural Fault in a cloud field p0189 A80-49664 on space photographs
- Defining relationships between surface characteristics evaporation rate
- and actual ev [E80-10335] D0207 N80-33834 AIR POLLUTION
- Conversion of nitrogen oxide gases to nitrate particles in oil refinery plumes p0181 A80-48534
- Remote sensing of NO using a differential absorption p0182 A80-52332 lidar
- Smoke as a quantitative atmospheric diffusion tracer p0182 A80-53265
- Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269 AIR QUALITY
- Applied Remote Sensing Program [E80-10330] (ARSP) --- Arizona p0178 N80-32821
- In situ ozone data for evaluation of the laser absorption spectrometer ozone remote sensor: 1979 southeastern
- study summer field program p0183 N80-33928 Virginia urban plume [NASA-TM-81831]

AIR SAMPLING

Polar nephelometer for atmospheric particulate studies p0182 A80-52346

AIR WATER INTERACTIONS

- Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemomete p0196 A80-51407
- Comparisons between wave directional spectra from SAR p0196 A60-51409 and pressure sensor arrays
- Modulation of sea surface radar cross section by surface ress Wind speed and temperature effects across the stress
- Gulf Stream p0196 A80-51415 Satellite studies of fresh-water ice movement on Lake p0205 A80-53611 Frie
- Remote sensing of the ocean: Dynamics. Citations from NTIS data base
- p0199 N80-30885 [PB80-811243] Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September - October 1979
- [AD-A088229] p0199 N80-33068 On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature)
- [AD-A088082] o0199 N80-33076

AIRBORNE EQUIPMENT

L-band radar and geology - Some results in south-east of France p0191 A80-51095

LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas. D0214 N80-28790 p0205 N80-30829 Florida water resources, Executive sum [E80-10247] p0 ummary p0205 N80-30830 Development of AI procedures for dealing with the effects p0178 N80-32818 Maximal analysis labeling procedure (preliminary) [E80-10294] p0219 N80-30862

p0183 N80-32825

53 [E80-10311]

JANUARY 1981

p0178 N80-32809

ΔΙΔΒΔΜΔ

ALABAMA

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Alabam, Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Ohio, Pennsylvania, South Carolina, and Texas 2921 00177 N80-30860 Dakota, [F80.10292] ALASKA

Use of LANDSAT data for river and lake ice engineering tudie [E80-10237]

p0205 N80-29806 Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618

ALBENO Defining relationships between surface characteristics and actual evaporation rate

[E80-10335] n0207 N80-33834 ALFALFA

Program on stimulating operational private sector use f Earth observation satellite data p0227 N80-29802 [F80-10233]

Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of Al guidelines for corn and soybean labeling Corn Belt

n0178 N80-32818 [E80-10327] ALGORITHMS

On extracting brightness temperature maps from scanning radiometer data --- techniques for algorithm design [NASA-TM-81989] p0221 N80-32838

ALLUVIUM

Simulation of reservoir and lake sedimentation n0206 N80-31867 [PB80-182801] ALPS MOUNTAINS (EUROPE)

- L-band radar and geology Some results in south-east France p0191 A80-51095 of France Microwave emission properties of snow for monitoring vitrological parameters p0203 A80-51297
- hydrological parameters Application Explorer Mission-A heat capacity mapping mission --- Bavaria, Germany and Marrakech, Morocco [F80-10309] p0219 N80-30875
- ANALYSIS OF VARIANCE Program documentation: As-built design specification Generalized Linear Model Analysis Of Variance program (GLMAOV) [F80-10214]
- p0215_N80-29792 ANNUAL VARIATIONS Soil moisture in relation to geologic structure and
- lithology, northern California [E80-10298] p0192 N80-30865

ANOMALOUS TEMPERATURE ZONES Remote sensing applied to the prospecting of geothermal anomaly in Caldas Novas County, State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837

ANTENNA DESIGN

Platform antennas for data collection [INPE-1820-RPE/186]

- p0221 N80-33647 ANTENNA RADIATION PATTERNS
- Recommendations and comments concerning documentation on the microwave active spectrometer systems [E80-10187] p0213 N80-28787

AQUIFERS Application of Landsat imagery to ground water studies

in parts of Punjab and Haryana states, India p0203 A80-51290

ARCTIC OCEAN

Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618 Correlation of under-ice roughness with satellite and airborne thermal infrared data --- Beaufort Sea and Arctic Ocean pack ice [AD-A085512] p0198 N80-30880

AREA

- Errors incurred in estimating an area of uniform land cover using Landsat p0175 A80-53052
- ARID LANDS. Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid p0202 A80-51284 climates

Applied Remote Sensing Program (ARSP) --- Arizona [E80-10330] p0178 N80-32821 ARIZONA

Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California

p0205_N80-30864 [E80-10297] Applied Remote Sensing Program (ARSP) --- Arizona [E80-10330] p0178 N80-32821

ARKANSAS

A-2

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Alabam, Arkansas, California, Georgia. Illinois, Iowa, Louisiana, Minnesota. Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 ASBESTOS

Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin, Andhra Pradesh, India p0191 A80-51089 ASIA

p0203 A80-51295

Eurasian snow cover extent - The NOAA satellite record. 1966-79

Experiment with the composition of a geological map on the basis of interpretations of Meteor satellite television images /using Central Asia as an example/ p0211 A80-52054

ATLANTIC OCEAN

- Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004
- Observation of wavelike motion of the Gasne Current p0195 A80-46309
- The three-dimensional structure of the frontal zone of the Gulf Stream from synchronous satellite and ship data o0196 A80-49651
- Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements p0196 A80-51411

nent: Current meter, The Gulf Stream Meanders expen atmospheric, and sea level data report for the mooring

- [AD-A088069] n0199 N80-33077 of medium Investigations wavelength magnetic anomalies in the eastern Pacific using Magsat data
- p0199 N80-33833 [E80-10334]
- Coastal currents: Study of a model applied to the coast of Rio Grande do Sul latitude 29 deg south to 35 deg south [INPE-1841-RPE/201] p0200 N80-33844
- ATMOSPHERIC ATTENUATION
- Study of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/LANDSAT) --- Ribeirao Preto and Brasilia, Brazil
- [E80-10259] p0218 N80-30842 A 94/183 GHz multichannel radiometer for Convair fliahts
- [NASA-CR-160032] p0225 N80-33047 ATMOSPHERIC CHEMISTRY Airborne sulfur dioxide to sulfate oxidation studies of
- the INCO 381M chimney plume p0182 A80-53269 ATMOSPHERIC CIRCULATION
- Volcanic material from Mount stratosphere over Europe St Helens in the p0182 A80-54074
- ATMOSPHERIC COMPOSITION Fluorescence lidar --- for remote sensing of environments
- and atmospheric constituents p0181 A80-48908 Laser studies of the atmosphere and underlying surface - Russian book p0182 A80-53131
- ATMOSPHERIC DIFFUSION Smoke as a quantitative atmospheric diffusion tracer D0182 A80-53265
- ATMOSPHERIC MOISTURE
- Anomalous snowfall caused by natural-draft cooling [RAND/N-1479-DOE]
- p0206 N80-32024 ATMOSPHERIC RADIATION
- Practical aspects of radiative correction of multispectral video information p0211 A80-52060 p0211 A80-52060 ATMOSPHERIC SCATTERING
- Nonzero subsurface irradiance reflectance at 670 nm from Lake Ontario water masses p0201 A80-45428 p0201 A80-45428 Photometric problems, solved by means of space photography p0209 A80-49657
- Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface p0210 A80-49658
- Optical spatial-frequency characteristic of the atmosphere and its applications --- atmospheric scattering earth surface image distortion p0212 A80-52061 image distortion Polar nephelometer for atmospheric particulate studies
- p0182 A80-52346 The contribution of the diffuse light component to the p0186 N80-30876
- topographic effect on remotely sensed data [NASA-TM-80728] p018 ATMOSPHERIC TEMPERATURE Satellite temperature monitoring and prediction
- p0211 A80-51943 As-built design specification for historical daily data bases for testing advanced models --- Kansas, North Dakota, and U.S.S.R. p0211 A80-51943
- [E80-10198] n0214 N80.28795
- As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana. South Dakota, Oklahoma, Nebraska, and Colorado p0218 N80-30846 [E80-10263] On the inference of oceanic currents or eddies by
- spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field [AD-A088082] p0199_N80-33076
- ATTENUATION
- Platform antennas for data collection [INPE-1820-RPE/186] p p0221 N80-33647 AUSTRALIA
- Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and ground water variations p0186 N80-28809 Heat capacity mapping mission project HCM-051 --- East
- Australian Current and the Tasman Front [E80-10278] pC AUTOMATIC WEATHER STATIONS
- p0205 A80-51310
- AVALANCHES A multi-step method for avalanche zone recognition a
- analysis --- San Juan Mountains (co) p0193 N80-33824

BACKSCATTERING

Vegetation clutter model p0173 A80-44262 Development of a pulsed 9.5 micron lidar for regiona scale O3 measurement p0181 A80-48909 Oil film thickness measurement using airborne

B

- laser-induced water Raman backscatter p0197 A80-52331 Radar altimeter mean return waveforms from
- near-normal-incidence ocean surface scattering p0224 A80-53891
- Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618
- BALTIC SEA Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied
- oreareh [DFVLR-FB-80-03] n0220 N80-31865
- BANGLADESH
- Study of floods in Bangladesh and India with the help of meteorological satellites p0204 A80-51306 BARIEY
- Soil water and plant canopy effects on remotely measured surface temperatures p0173 A80-47748 The integrated analysis procedure for identification of
- spring small grains and barley --- Great Plains Corridor: U.S. and Canada [E80-10274] p0177 N80-30847
- AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Alabam, Arkansas, California, Georgia, Illinois, Iowa, Louisana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860
- HCMM energy budget data as a model input for assessing regions of high potential groundwater pollution --- South Dakota
- [F80-10310] n0206_N80-32806 Infrared-temperature variability in a large agricultural field
- --- Dunnigan, California [E80-10331] p0178 N80-32822
- BAROCLINIC WAVES Dynamical interpretation of satellite-sensed thermal

features off Vancouver Island p0195 A80-46315 BABOTROPIC FLOW

- Observation of wavelike motion of the Gaspe Current p0195 A80-46309 BARREN LAND
- Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056 sites
- BATCH PROCESSING Final design specification for EOD-LARSYS procedure
- 1 follow-on [E80-10213] D0215 N80-29791
- BAYES THEOREM Design specification for secondary error sources multi-temporal Bayes classifier
- p0215 N80-29784 [E80-10205] **BAYS (TOPOGRAPHIC FEATURES)** The geomorphology of Mont-Saint-Michel Bay studied

The Gulf Stream Meanders experiment: Current meter

Application of remote sensing to state and regional

Correlation of under-ice roughness with satellite and

Landsat exploration of Himalayan and Peninsular regions

Surface characteristics of Precambrian stromatolitic

Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil [INPE-1838-RPE/199] p0193 N80-33842

HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European

zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and

Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base

Remote sensing of the ocean: Dynamics. Citations from the NTIS data base

/Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143

airborne thermal infrared data --- Beaufort Sea and Arctic

atmospheric, and sea level data report for the mooring

p0201 A80-50899

p0199 N80-33077

p0183 N80-32826

p0198 N80-30618

p0198 N80-30880

p0190 A80-51081

p0191 A80-51087

p0178 N80-32823

p0198 N80-30884

p0199 N80-30885

from the remote sensing of instantaneous shoreling

period

BEACHES

[AD-A088069]

[E80-10338]

Ocean pack ice [AD-A085512]

[INPE-1838-RPE/199]

the Benefux countries

[E80-10332]

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[PB80-811243]

BEDROCK

BELGIUM

ms --- Mississippi

REALEORT SEA (NORTH AMERICA)

Radar backscatter study of sea ice [AD-A087032]

phosphorites of a part of the Indian shield

Additions and corrections to the bibliography of geologic studies Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho. 1980

n0192 N80-32013 [RHO-BWI-C-68] Ocean wave sensing. Citations from the NTIS data hase

[PB80-812878] p0200 N80-34053 BIOMASS

Remote sensing of total dry-matter accumulation in vinter whe

[E80-10235] p0176 N80-29804 BIRDS

A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 2: Threatened and endangered birds and other threatened and endangered forms

[NASA-CR-163122-VOL-4-PT-2] p0183 N80-31970 BLIGHT

Aerial color infrared photography applications to citriculture p0175 A80-51944 BLUE GREEN ALGAE

Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research

[DEVI 8-EB-80-03] n0220 N80-31865 BONNE PROJECTION

Bonne's projection of Meteosat images --- subroutine: [CSIR-SR-FIS-201] p0222 N80-3383 p0222 N80-33837 BORDERS

A method for edge detection in images of natural

[INPE-1768-RPE/154] p0222 N80-33840 BOUNDARIES

Segmentation-based boundary modeling for natural terrain scenes p0209 A80-44297 BRAZIL

Brazil in space --- space programs applications p0227 A80-52691 As-built design specification for the Brazil and China

monthly data bases [E80-10172] p0213 N80-28773

- Crustal deformation at very long baseline interferometry and ground water p0186 N80-28809 sites due to seasonal air-mass and variations
- Classification of multispectral images according to rosswise textural characteristics --- Mato Grasso, Brazil [E80-10257] p0218 N80-30840

Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo, Brazil

[E80-10258] p0176 N80-30841 Study of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/LANDSAT)

p0218_N80-30842 [E80-10259] Use of LANDSAT data for estimating the area of sugar cane in the state of Sao Paulo --- Brazil

[E80-10260] p0177 N80-30843 Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo

p0177 N80-30844 [E80-10261] Collection, processing, and distribution of remote sensing data from Brazilian Receiving Station

[INPE-1784-RPE/156] p0221 N80-32832 Planning and execution of a photographic mission over a wheat producing region in Rio Grande do Sul, Brazil [INPE-1793-RPE/165] p0179 N80-32833

Geochemical balance of the Salgado River basin p0206 N80-32834

UNDELTIGATION CONTRACT OF CONT vegetation usina p0179 N80-32835

[INPE-1790-RPE/162] p0179 N80-32835 The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil p0179 N80-32836 [INPE-1794-RPE/166]

Remote sensing applied to the prospecting of geothermal in Caldas Novas County, State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837 Platform antennas for data collection

p0221 N80-33647 [INPE-1820-RPE/186] The use of radiation temperature to detect water-stress

in sugarcane crop --- Brazil [INPE-1767-TDL/028] p0179 N80-33839
 [INPE-1767-TDL/028]
 p0179 N80-33839

 Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil

 [INPE-1838-RPE/199]
 p0193 N80-33842

Coastal currents: Study of a model applied to the coast of Rio Grande do Sut latitude 29 deg south to 35 deg

south [INPE-1841-RPE/201] p0200 N80-33844 BRIGHTNESS

As-built design specification for equiprobability ellipses epresentation of CLASSY clusters

p0221 N80-32812 [E80-10320] BRIGHTNESS TEMPERATURE

Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an ice water system p0195 A80-44232

Evaluation of the fire bazard of taiga forests from their p0175 A80-49652 thermal radio emission Optical methods for the study of biocenoses on land p0201 A80-49656 and sea

Estimates of the accuracy of the brightness conjunction

of multispectral photographs p0210 A80-49665 Microwave radiometric determination of oceanographic and meteorological parameters p0223 A80-51579

A labeling technology for LANDSAT imagery [E80-10293] p0219 N80-30861

Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI quidelines for corn and sovbean labeling - Corn Belt

p0178 N80-32818 [E80-10327] extracting brightness temperature **n** mans scanning radiometer data --- techniques for algorithm

design [NASA-TM-81989] p0221 N80-32838 A 94/183 GHz multichannel radiometer for Convair flights

[NASA-CR-160032]	p0225	N80-33047
The use of radiation temperature to	detect	water-stress
in sugarcane crop Brazil		
[INPE-1767-TDL/028]	n0179	N80-33839

[INPE-1767-TDL/028] **BROWN WAVE EFFECT**

Remote sensing of total dry-matter accumulation in winter wheat p0176 N80-29804

[E80-10235] BUOYS

Platform and buoy positioning experiments in the North Sea via Doppler satellite techniques p0197 A80-53691

С

CALCIUM

Geoch mical balance of the Salgado River basir [INPE-1849-RPE/206] p0206 N80-32834 CALIBRATING

The geometric calibration of multispectral photographic p0186 A80-54024 CALIFORNIA

Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004 Satellite observations of a nutrient upwelling off the coast

p0195 A80-45015 of California of California points ABU-4501 Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979

p0174 A80-49136 Satellite remote sensing facility for oceanograhic applications

[NASA-CR-163363] n0197 N80-28847 US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft, San Joaquin Experimental Range

[PB80-169295] p0192 N80-28852 Geologic application of thermal inertia imaging using HCMM data --- Pisgah Crater, California and Walker Lake, Nevada Test Sites

80-10229] p0192 N80-29798 Use of collateral information to improve LANDSAT [F80-10229] classification accuracies --- Ventura County and Klamath National Forest, California

California, Georgia, Illinois, Iowa, Louisiana, Minnesota Mississippi, Missouri, Nebraska, North Carolina, Mimesola, Molakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 [F80-10292]

Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California

p0205 N80-30864 [E80-10297] Soil moisture in relation to geologic structure and

tithology, northern California [E80-10298] p0192 N80-30865 Irrigated lands assessment for water management

Applications Pilot Test (APT) --- California [E80-10324] p01 D0178 N80-32815

on of remote sensing to selected problems within Applicatio the state of California --- Mendocino, Colusa, and Shasta Countie [E80-10326] p0183 N80-32817

Infrared-temperature variability in a large agricultural field -- Dunnigan, California

p0178 N80-32822 [E80-10331] CAMERAS

The geometric calibration of multispectral photograph p0186 A80-54024 equinment CANADA

- Dynamical interpretation of satellite-sensed thermal features off Vancouver Island p0195 A80-46315 An automatic method of discrimi ating rock outcrops
- p0191 A80-51094 using Landsat data The integrated analysis procedure for identification of

spring small grains and barley --- Great Plains Corridor: U.S. and Canada [E80-10274] o0177 N80-30847

CANOPIES (VEGETATION) Simulation of solar radiation absorption in vegetation p0173 A80-46451

Soil water and plant canopy effects on remotely measured p0173 A80-47748 surface temperatures Cornell University remote sensing program --- New York

[E80-10280] D0227 N80-29823

Light reflectance, transmittance, and utilization within a ative canopy --- Texas [E80-10282] p0177 N80-30851

CLASSIFICATIONS

Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, ntana

[NASA-CR-163382] p0177 N80-30867 HCMM energy budget data as a model input for assessing

egions of high potential groundwater pollution --- South)akota [F80-10310] n0206 N80-32806

Infrared-temperature variability in a large agricultural field Dunnigan, California

[E80-10331] p0178 N80-32822 Detection of hidden mineral deposits by airborne spectral

analysis of forest canopies [P880-193881] p0193 N80-32845

A model of plant canopy polarization response [E80-10336] p0179 N80-33835 CAPE KENNEDY LAUNCH COMPLEX

The environmental program at Kennedy Space Cente

Baseline to monitoring p0181 A80-51935 A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3, part 2: Ichthyological studies, ailfin molly reproduction study

[NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940 A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John

F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 2: Threatened and endangered birds and other threatened and endangered forms [NASA-CR-163122-VOL-4-PT-2]

p0183 N80-31970 CELESTIAL GEODESY

- A photogrammetric method of processing space photographs p0185 A80-46967
- Optimal conditions for determining the coordinates of the earth's center of mass p0186 A80-54021 the earth's center of mass p0186 A80-54021 Satellite activities of NOAA, 1979 p0220 N80-31429

CENSUS ENSUS Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, Florida: Seattle, Washington: and Boston, Massachusetts [E80-10301] 0182 N80-30868

NTER OF MASS Optimal conditions for determining the coordinates of CE

the earth's center of mass p0186 A80-54021 CHAPARRAL

Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties

[F80-10326] n0183 N80-32817 CHINA

Comparison of interpretations of radar images and space photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066

As-built design specification for the Brazil and China monthly data bases [E80-10172] n0213 N80-28773

CHINESE SPACE PROGRAMS China space report /Based on observations made during

an invited tour with an AIAA delegation, November 1979/ --- Book p0227 A80-53350 CHLOROPHYLIS

Ocean chlorophyll studies from a U-2 aircraft platform

p0195 A80-45004 Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements p0197 A80-51491

Remote sensing of total dry-matter accumulation in vinter w p0176 N80-29804 [E80-10235] Spatial filtering of Landsat data for urban cartography

Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, Florida: Seattle, Washington; and Boston, Massachusetts

The influence of topographic structures on night-time

Remotely sensed data processing techniques, present and

Inventory, mapping and evaluation of the agricultural

sensing pursue not concepts for supervised and munsupervised classifications --- of satellite images p0210 A80-50831

Spatial filtering of Landsat data for urban cartography p0185 A80-50892

The cartography of Chize forest through remote ensing p0175 A80-50900

Determination of the spectral characteristics of soils and

surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland

Aerial color infrared photography

potential of soils - Status of studies and needs

p0185 A80-50892

p0182 N80-30868

n0179 N80-33829

applications

p0209 A80 49138

p0175 A80-50877

p0211 A80-52059

A-3

p0175 A80-51944

CITIES

[E80-10301]

[F80-10228]

CLASSIFICATIONS

CITRUS TREES

citriculture

sensino

vegetation

CLAYS

Modifications to the CLASY program

- [E80-10181] p0213 N80-28782 Classification with spectral-spatial-temporal archetypes [E80-10251]
- 80-10251] p0217 N80-30834 As-built design specification for CLASY program odification
- [E80-10253] p0217 N80-30836 As-built design specification for the
- Patterson-Pitt-Thadani minimum loss classifier [EB0-10262] o0218 N80-30845 natysis labeling procedure (prelimi Maximal
- p0219 N80-30862 [E80-10294] An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota,
- Nebraska, Texas, South Dakota, Oklahoma, and North [E80-10295] p0177_N80-30863
- Evaluating the use of analyst labels in maximum likelihood cluster proportion estimation [E80-10303] p0219 N80-30870
- Evaluation of Bayesian sequential proportion estimation
- using analyst labels [E80-10304] 0219 N80.30971 As-built design specification of the CAMS/CAS interface
- tape report generation program for LACIE 8 [E80-10306] p0219 N80-30872 As-built specification for CLASSY conversion
- p0219 N80-30873 [F80-10307] 80-10307] Analysis of scanner data for crop inventories p0219 N80-30874
- [F80-10308] A hill-sliding strategy for initialization of Gaussian clusters in the multidimensional space
- [NASA-TM-80721] 0219 N80-31072 Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied
- [DFVLR-FB-80-03] p0220 N80-31865 As-built design specification for equiprobability ellipses representation of CLASSY clusters
- [E80-10320] p0221 N80-32812 As-built design specification for a list processing system
- [E80-10325] n0221 N80-32816 Utilization of spectral-spatial information in the classification of imagery data
- p0222 N80-33832 [E80-10321] Interactive digital image processing investigation, phase
- AD-A087518 D0222 N80-33848 CLAYS
- Microwave radiometer measurements of soil moisture content p0176 A80-53890 Simulation of reservoir and lake sedin
- [PB80-182801] p0206 N80-31867 CLIMATE
- The Federal Plan for Meteorological Services and Supporting Research, fiscal year 1981 [PB80-199482] p0228 N80-34041
- CLIMATOLOGY The global 2000 report to the president. Entering the venty-first century. Volume 2: The technical report --twenty-first century. Volume 2: The technical report ---trends in population, climate, gross national product, earth resources, technology, and man environment intera
- p0228 N80-32296 Seasat. Volume 2: Flight systems p0199 N80-32829 [NASA-CR-163571]
- CLOUD COVER The appearance of the Main Ural Fault in a cloud field space photographs p0189 A80-49664 on space photographs
- Estimates of the accuracy of the brightness conjunction p0210 A80-49665 of multispectral photographs Florida water resources
- p0205 N80-30829 [E80-10246] Development of techniques to specify cloudiness and rainfall rate using GOES imagery data [AD-A084757]
- p0206 N80-33064 CLOUD PHOTOGRAPHY
- Development of techniques to specify cloudiness and infall rate using GOES imagery data p0206 N80-33064 [AD-A084757]
- The United States space observation po 00228 N80-33425 [NASA-TM-76373] CLOUD PHYSICS
- Anomalous snowfall caused by natural-draft cooling
- [RAND/N-1479-DOE] p0206 N80-32024 CLUMPS
- As-built design specification for equiprobability ellipses epresentation of CLASSY clusters [E80-10320] n0221 N80-32812
- As-built design specification for CCIT8 processor rogram [E80-10323] p0221 N80-32814
- CLUTTER Vegetation clutter model p0173 A80-44262
- COASTAL CURRENTS Satellite observations of a nutrient upwelling off the coast of California p0195 A80-45015
- Observation of wavelike motion of the Gaspe Current p0195 A80-46309
- Direct measurement of recirculation in the Alaskan po195 A80-46316 Stream

A-4

Remote sensing of coastal environment and resources p0202 A80-51281

- Coastal currents: Study of a model applied to the coast of Rio Grande do Sul latitude 29 deg south to 35 deg south
- [INPE-1841-RPE/201] p0200 N80-33844 COASTAL ECOLOGY
- Remote sensing of coastal environment and resources D0202 A80-51281 COASTAL PLAINS
- Assessment of cyclone-caused damage in Krishna delta region using remotely sensed data ____0204 A80-51301 p0204 A80-51301
- COASTAL RANGES (CA) Soil moisture in relation to geologic structure and lithology, northern California
- [E80-10298] p0192 N80-30865 COASTAL WATER
 - Some results of remote sensing in Yugoslavia
 - p0191 A80-51091 Landsat application to the study of coastal processes p0203 A80-51292
- Radar observations of wave transformations in the vicinity of islands p0196 A80-51408
- Comparisons between wave directional spectra from SAR and pressure sensor arrays D0196 480-51409
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490
- Phytoplankton pigments from the Nimbus-7 Coastal Zone Phytoplankton pigments non-the kindle - Construction Color Scanner - Comparisons with surface measurements p0197 A80-51491
- Assessment of the role of remote sensing in the study of inland and coastal waters [NASA-TM-81881] p0200 N80-34048
- COASTS
- The use of space data for the mapping of coastal areas p0185 A80-45297 Tidal land manning from Landsat n0185 A80-50896
- Study of geological structure of Sicily and other Italian areas --- Gulf of Orosei, Eastern Sardinia p0192 N80-30866 [E80-10299]
- Remote sensing procedures for detecting and monitoring arious activities regulated by the Mobile District [AD-A087584] p0206 N80-31973 COLOR
- color plotter system and its ts applications in p0209 A80-49099 aeoscience
- Design specification for color coded spectral plots [E80-10245] p0217 N80-3 n0217 N80-30828 COLOR PHOTOGRAPHY
- Aerial color infrared photography citriculture p applications p0175 A80-51944 Aerotriangulation control of large scale photography from
- small scale photography [PB80-161524] p0224 N80-28853
- COLORADO As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana,
- South Dakota, Oklahoma, Nebraska, and Colorado [E80-10263] p0218 N80-30846
- An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North [F80-10295] n0177 N80-30863
- A multi-step method for avalanche zone recognition and nalysis --- San Juan Mountains (co) p0193 N80-33824 COLUMBIA RIVER BASIN (ID-OR-WA)
- mbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans
- p0174 A80-49141 LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau
- [RHO-BWI-SA-43] HO-BWI-SA-43 p0183 N80-31862 Additions and corrections to the bibliography of geologic
- studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-32013
- COMMUNICATION SATELLITES China space report / Based on observations made during
- an invited tour with an AIAA delegation. November 1979/ --- Book p0227 A80-53350 COMMUNITIES
- Effects of radar system parameters, population, and environmental modulation on settlement visibility p0181 A80-47746
- COMPUTER COMPATIBLE TAPES Overview of the Landsat system p0174 A80-49137
- US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft. San Joaquin Experimental Range [PB80-169295] p0192 N80-28852
- A study of LANDSAT multispectral scanner data tapes --- corrected data and data restoration [RAE-TR-80018]
- p0220 N80-31864 Operation plan for the High Density Tape/LANDSAT Imagery Verification and Extraction System (HDT/LIVES) data processing support
- [F80-10322] p0221 N80-32813 COMPUTER GRAPHICS its applications
 - A color plotter system and geoscience p0209 A80-49099 Computer-assisted production of multi-coloured maps

p0209 A80-49521 Basic topographic mapping - Ren wal and revision p0185 A80-50897

Digital image technology 1980: Emerging production applications [AD-4085163]

SUBJECT INDEX

p0214 N80-28851 Final design specification for modification/Fisher F-distribution thresholding LARSYS

[E80-10210] p0215 N80-29789 Remote sensing research studies [F80-10117]

- 80-10117] p0176 N80-30823 Implementation specification for Large Area Crop Inventory Experiment (LACIE) phase 3 automatic status and tracking system [E80-10249]
- p0217_N80-30832 User's guide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking system
- [E80-10256] p0217 N80-30839 Design specification for ERIPS fields data base deck
- [F80-10286] o0218 N80-30854 As-built design specification for the CMAS image . 100 hybrid system. Volume 2: Detailed flow charts and program
- listings, part 1 [E80-10289] p0218 N80-30857 As-built design specification for the CAMS image-100
- hybrid system. Volume 3: Utilities and charod ubroutine [E80-10290] p0218 N80-30858
- An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North
- [E80-10295] p0177_N80-30863 Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test
- [E80-10296] p0177 N80-32805 As-built design specification for equiprobability ellipses presentation of CLASSY clusters
- p0221 N80-32812 [E80-10320] A method for edge detection in images of natural
- resources [INPE-1768-RPE/154] n0222 N80-33840 Interactive digital image processing investigation, phase
- AD-4087518 p0222 N80-33848
- COMPUTER PROGRAMS Remotely sensed data processing techniques, present and
- p0209 A80-49138 As-built specification for CCit6A processor program [E80-10168] 0212 N80-28769
- As-built design specification for LACIE formatted dot cards in EOD-LARSYS [E80-10169] p0212 N80-28770
- As built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological
- [E80-10170] p0212 N80-28771 As-built design specification for the I-100 tape read onsolidation program (FULOI)
- [E80-10171] p0213 N80-28772 Final design specification for EOD-LARSYS/statistics and data transformation processors modification

As-built design specification for EOD-LARSYS procedure

As-built design specification for LACIE phase 3 automatic

Design specification for LARSYS procedure 1 follow-or [E80-10176] p0213 N80-28777

Design specification for EOD-LARSYS/statistics and data

Program documentation: Final design specification for

Final design specification for ERIPS fields data base deck

Detailed design specification for the Yield Estimation ubsystem Data Management System (YESDAMS)

Design specification for dot data base update deck

LACIE/phase 3 Adjustable Crop Calendar (ACC)

Functional design specification for enhancement of the

(LACIE) phase 3 PDP 11/45 automatic status and tracking

Large Area Crop Inventory Experiment

base update deck conversion program (DOTDEC) 178] p0213 N80-28779

D0213 N80-28774

o0213 N80-28775

p0213 N80-28776

n0213 N80-28778

p0213 N80-28780

p0213 N80-28781

p0213 N80-28782

00213 N80-28783

p0213 N80-28784

p0213 N80-28785

p0213 N80-28786

p0214 N80-28788

p0214 N80-28791

Production Film

MARQTY1.FTN.

[E80-10173]

[E80-10174]

[E80-10175]

[E80-10177]

[E80-10178]

[E80-10179]

[E80-10180]

[E80-10181]

Prooram

[E80-10182]

[E80-10183]

[E80-10184]

[E80-10186]

[E80-10190]

system [E80-10194]

User's quide:

CAMDATA1.FTN

status and tracking system

transformation processors modification

Modifications to the CLASY orogram

conversion program (DOTDEC)

documentations:

As-built design specification for Produc Converter Gains And Biases program (PFCGAB)

matic status and tracking system softwa

configuration control procedures manual

As-built design specification of the CAMS/CAS interface tape report generation program for LACIE [E80-10196] p0214 N80-28793

As-built design for enhancement of the automatic status and tracking system software [E80-10197] p0214 N80-28794

Design specification for LARSYS procedure 1 [E80-10199] 00214 N80-28796

As-built design specification for PDP 11/45 accuracy assessment system (F80.10200) n0214 N80-28797

User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote ensing system

n0214 N80-29780 [E80-10188] As-built design specification of the CAM/CAS interface pe report generation program for LACIE 7

p0214 N80-29782 [E80-10203] As-built design specification of the CAMS/CAS interface ape report generation program

[E80-10204] p0215 N80-29783 Design specification for secondary error sources ulti-temporal Bayes classifier

[F80-10205] n0215 N80-29784 Design specification for equiprobable blocks density stimatory/classifier/dot selector

[E80-10206] p0215 N80-29785 As-built design specification for the CAMS image-100 hvbrid system. Volume 1: System design

[F80-10207] p0215 N80-29786 As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program listinos

p0215 N80-29787 [F80-10208] As-built specification for CCIT7 processor program p0215 N80-29788 [E80-10209]

Final design specification for LARSYS modification/Fisher F-distribution thresholding [E80-10210] p0215 N80-29789

Final design specification for EOD-LARSYS/data transformation processor modification

[E80-10211] 0215 N80-29790 Final design specification for EOD-LARSYS procedure follow-on

[E80-10213] 0215 N80-29791 Program documentation: As-built design specification for Generalized Linear Model Analysis Of Variance program (GI MAOV)

[E80-10214] p0215 N80-29792 Design spece ecification for LACIE formatted dot cards in

[E80-10215] n0215 N80-29793 As-built design specification for Boundary Detection And

Registration Program (BDARP1) [E80-10217] n0215 N80-29794 As-built design specification for the Yield Estimation Subsystem (YES) monthly yield data base and supporting

[E80-10218] p0215 N80-29795

Program documentation: MARQUIS2.FTN [E80-10220] p0215 N80-29796 Operational changes for the Kansas State University

[F80-10223] p0176 N80-29797

Design specification for a merging program for formatted nage data files image data file [E80-10234]

p0216 N80-29803 User manual for the Earth observations Division R and D to OLPARS dot data conversion

[E80-10236] n0216 N80-29805 Project development plan for the LANDSAT Imagery Verification and Extraction System (LIVES)

p0216 N80-29807 [E80-10238] Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES) [E80-10239] p0216 N80-29808

Preliminary design specification for the LANDSAT magery Verification and Extraction System (LIVES) Imagery

As built design specification for areas added to the monthly bases of Texas, Minnesota and USSR [E80-10241]

As-built design specification for the India monthly data p0216 N80-29811 [E80-10264]

Design specification for a list processing system PO.102651 p0216 N80-29812 [E80-10265]

Development and evaluation of scatterometer data processing algorithms [F80.10266] 00216 N80-29813

Improved definition of crustal anomalies for Magsat data [E80-10270] p0192 N80-29817

As-built design specification for Boundary Detection And Registration Program (BDARP1)

[80-10216] p0217 N80-30824 Forest resource information system, phase 3 --- St. Regis Paper Co.: Picayune, Mississippi [E80-10242]

p0176 N80-30825 Detailed design specification for the automatic status and tracking system modifications for LACE procedure 1 [E80-10243] p0176 N80-30825

Design specification for color coded spectral plots [E80-10245] p0217 N80-30828

As-built design specification for scatter plots for direct [E80-10250] p0217 N80-30833

As-built (FIELDSTAT) design specification for field statistics

[E80-10252] p0217 N80-30835 As-built design specification for CLASY program modification

[F80-10253] p0217 N80-30836 Detail design specification for enhancement of the

automatic status and tracking system software 80-10254) p0217 N80-30837 Design specification for merge of BTREAD, Phase 1 and [E80-10254]

Phase 2 accuracy assessment programs [E80-10255] p0217 N80-30838 specification for As-built desian the

Patterson-Pitt-Thadani minimum loss classifier

[E80-10262] pO218 N80-30845 Statistical Outlier Detection (SOD): A computer program for detecting outliers in data --- AGRISTARS Project [E80-10275] pO218 NPO 20015

User's guide for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10276]

80-10276] pO218 N80-30849 Operator's guide for LACIE phase 3 automatic status and tracking system

[E80-10284] p0218 N80-30852 Implementation specification document for merge of BTREAD, phase 1, and phase 2 accuracy assessment programs

[F80, 10285] n0218 N80-30853 Design specification for ERIPS fields data base deck

conversion [E80-10286]

p0218 N80-30854 Software wheat procedures: Draft user vield predictions/foreign equivalent test --- Kansas, Oklahoma,

[E80-10287] p0218 N80-30855 As-built design specification for the CMAS image-100 hybrid system. Volume 2: Detailed flow charts and program listings, part 1

[E80 10289] p0218 N80-30857 As-built design specification for the CAMS image-100 hybrid system. Volume 3: Utilities and shared subroutines

[F80-10290] p0218 N80-30858 As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 8

p0219 N80-30872 [E80-10306] As-built specification for CLASSY conversion

p0219 N80-30873 [E80-10307] A description of a system of programs for mathematically processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft

ASA-TM-76208] p0220 N80-31856 A multiprocessor implementation of a contextual image [NASA-TM-76208]

processing algorithm [E80-10313] p0221 N80-32808

p0221 N80-32808 An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [E80-10314] 00178 NPO 20000

High Density Tape Reformatting System (HDTRS/LIVES) Imagery Verification and Extraction System (HDTRS/LIVES) roduction test throughput analysis [E80-10319] p0221 N80-32811

As built design specification for equiprobability ellipses presentation of CLASSY clusters p0221 N80-32812 [E80-10320]

Operation plan for the High Density Tape/LANDSAT Imagery Verification and Extraction System (HDT/LIVES) data processing support

p0221 N80-32813 [E80-10322] As-built design specification for CCIT8 processo

[E80-10323] p0221 N80-32814 As-built design specification for a list processing vstem

[E80-10325] p0221 N80-32816 Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely sensed surface temperature near the daily maximum

p0178 N80-32824 [E80-10333] Bonne's projection of Meteosat images --- subroutines [CSIR-SR-FIS-201] p0222 N80-33837 COMPUTER SYSTEMS PROGRAMS

As-built design specification for Metro data edit

[E80-10201] p0214 N80-29781 COMPUTER TECHNIQUES

Segmentation-based boundary modeling for natural terrain scenes p0209 A80-44297 Computer-aided watershed analyses using remote

sensing based regional information syste p0204 A80-51299 Grizzly bear habitat analysis. Section 3: LANDSAT-1

multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana p0177 N80-30867 [NASA-CR-163382]

COMPUTERIZED SIMULATION

A multispectral data simulation technique [E80-10311] p0221 N80-33830

CONFERENCES Identifying irrigated lands using remote sensing techniques: State of the Art: Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979 p0174 A80-49136

COTTON

Cartographic processing and analysis of satellite imagery: International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings p0185 A80-50876

Remote sensing and mineral exploration: Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979 p0189 A80-51076

The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278

A new era in technology: Proceedings of the Seventeenth Space Congress, Cocoa Beach, Fla., April 30-May 2, 1980 p0210 A80-51926

The 7th WMO Executive Committe Inter-Government Panel Session on the First GARP Global Experiment [GARP-SPEC-35] p0219 N80-31012

CONGRESSIONAL REPORTS

The Federal Plan for Meteorological Services and Supporting Research, fiscal year 1981 [PB80-199482] p0228 N80-34041

Operational remote sensing legislation, part 1 PO-45-048] p0228 N80-34294 [GPO-45-048]

Operational remote sensing legislation, part 2 p0228 N80-34295 [GPO-52-581]

CONIFERS Simulation of solar radiation absorption in vegetation mopies p0173 A80-46451 canopies

Evaluation of the fire hazard of taiga forests from their p0175 A80-49652 thermal radio emission CONSERVATION

Satellite imagery and U.P. Himalayas and Siwalik --- for soil conservation p0204 A80-51304 p0204 A80-51304

CONTINENTAL SHELVES TINENTAL SHELVED The use of space data for the mapping of coastal areas p0185 A80-45297

The Gulf Stream Meanders experiment: Current meter. atmospheric, and sea level data report for the mooring period

p0199 N80-33077 [40.4088069] Assessment of the role of remote sensing in the study

of inland and coastal waters [NASA-TM-81881] p0200 N80-34048

COORDINATES Impact of cell size on inventory and mapping errors in

a cellular geographic information system [E80-10315] pt p0221 N80-33831 CORN

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and

[E80-10281] p0176 N80-29824 Remote sensing research studies [E80-10117]

p0176 N80-30823 Light reflectance, transmittance, and utilization within a

tative canopy --- Texas [E80-10282] p0177 N80-30851 AgRISTARS cropping practices and crop characteristics

based on 1979 ESCS observations ---Arkansas. based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

Maximal analysis labeling procedure (preliminary) [E80-10294] p0219 N80-3 p0219 N80-30862

Analysis of scanner data for crop inventories [E80-10308] p0219 N80-30874 Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling

A model of plant canopy polarization response

Sensing the ocean environment from space

Remote sensing of wildland resources: A state-of-the-art

Light reflectance, transmittance, and utilization within a

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas,

California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North

Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

Applications Pilot Test (APT) --- California [E80-10324] p0178 N80-32815

Irrigated lands assessment for water management

p0178 N80-32818

p0179 N80-33835

p0216 N80-29825

o0177 N80-30882

p0196 A80-51485

n0177_N80-30851

p0177 N80-30860

A-5

Corn Belt

[E80-10327]

[E80-10336]

COST ANALYSIS

[PB80-184609]

[E80-10282]

COTTON

COST EFFECTIVENESS

CORRELATION COEFFICIENTS

egetative canopy --- Texas

Thematic mapper studies band con [NASA-TM-80716]

Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties

[E80-10326] p0183 N80-32817 CROP GROWTH

LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas; Williams County, North Dakota; and Hand County, South Dakota

[E80-10193] p0214 N80-28790 Use of soil moisture information in yield models [E80-10302] p0177 N80-30869

An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [F80-10314] p01 p0178 N80-32809

The Federal Plan for Meteorological Services and Supporting Research, fiscal year 1981 [PB80-199482]

p0228 N80-34041 CROP IDENTIFICATION

Vegetation clutter model p0173 A80-44262 Unsupervised classification of MSS Landsat data for mapping spatially complex vegetation p0173 A80-47744 Separability of agricultural cover types in spectral channels and wavelength regions p0173 A80-49100

Identifying irrigated lands using remote sensing techniques: State of the Art: Proceedings of the Symposium, Sioux Falls. S. Dak., November 15, 16, 1979

p0174 A80-49136 A review of future remote sensing satellite capabilities p0174 A80-49139

Irrigation mapping in western Kansas using Landsat. I -av parameters p0174 A80-49142 Key narameters Program documentation: Final design specification for

lot data base update deck conversion p ogram (DOTDEC) [F80-10178] p0213 N80-28779 LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas;

Williams County, North Dakota; and Hand County, South Dakota [E80-10193] p0214 N80-28790

Remote sensing research studies [E80-10117] p0176 N80-30823

The integrated analysis procedure for identification of spring small grains and barley --- Great Plains Corridor: U.S. and Canada [E80-10274] p0177_N80-30847

Light reflectance, transmittance, and utilization within a egetative canopy --- Texas

[E80-10282] p0177 N80-30851 Estimation of probabilities of label imperfections and orrection of mislabels

[E80-10288] p0218 N80-30856 Maximal analysis labeling procedure (preliminary) [E80-10294]

80-10294] p0219 N80-30862 Development of Al procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean tabeling - Corn Belt

[E80-10327] p0178 N80-32818 Applied Remote Sensing Program (ARS [E80-10330] n017 (ARSP) --- Arizona p0178 N80-32821

A model of plant canopy polarization n response p0179 N80-33835 [E80-10336] CROP INVENTORIES

Invariant photometric features of natural objects p0211 A80-52058

Errors incurred in estimating an area of uniform land p0175 A80-53052 cover using Landsat Modifications to the CLASY program

p0213 N80-28782 [E80-10181] Program de CAMDATA1.FTN MARQTY1.FTN, documentations:

p0213 N80-28783 [E80-10182] LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas; Williams County, North Dakota; and Hand County, South

Dakota [E80-10193] p0214 N80-28790 As-built design specification for PDP 11/45 accuracy

assessment System [E80-10200] p0214 N80-28797

Program documentation: MARQUIS2.FTN [E80 10220] n0215 N80-29796

As-built design specification for the India monthly data base {E80-10264} p0216 N80-29811

Sampling of rectangular regions [E80-10272] p0176 N80-29819

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississiopi, Indiana, Kentucky, Minnesota, Michigan, and Louisian

[E80-10281] p0176 N80-29824 Thematic mapper studies band correlation analysis [NASA-TM-80716] p0216 N80-2 p0216 N80-29825

Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1 p0217 N80-30826

[E80-10243] As-built design specification for scatter plots for direct vheat

[E80-10250] p0217 N80-30833 Classification with spectral-spatial-temporal archetypes p0217 N80-30834 [E80-10251]

As-built design specification for field statistics (FIELDSTAT) p0217 N80-30835 [E80-10252]

User's guide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking

[E80-10256] p0217 N80-30839 Use of LANDSAT data for estimating the area of sugar one in the state of Sao Paulo --- Brazil

[E80-10260] p0177 N80-30843 Utilization of LANDSAT data to inventory the sugar cane

the state of Sao Paulo [EBO-10261] p0177 N80-30844

As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado [E80-10263] p0218 N80-30846

User's guide for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10276] p0218 N80-30849

Draft user Software wheat yield procedures: predictions/foreign equivalent test --- Kansas, Oklahoma, p0218 N80-30855 [E80-10287]

An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Min Nebraska, Texas, South Dakota, Oklahoma, and North Dakota

[F80-10295] p0177 N80-30863 Evaluating the use of analyst labels in maximum likelihood

cluster proportion estimation [E80-10303] n0219 N80-30870 Evaluation of Bayesian sequential proportion estimation

using analyst labels [E80-10304] p0219_N80-30871 As-built design specification of the CAMS/CAS interface

tape report generation program for LACIE 8 [E80-10306] n021 p0219 N80-30872 As-built specification for CLASSY conversion

[E80-10307] p0219 N80-30873 Analysis of scanner data for crop inventories

[E80-10308] p0219 N80-30874

An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [E80-10314] p0178 N80-32809 p0178 N80-32809

As-built design specification for CCIT8 processor [E80-10323] p0221 N80-32814

Irrigated lands assessment for water management pplications Pilot Test (APT) --- California p0178 N80-32815 [E80-10324]

Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta

[E80-10326] p0183 N80-32817 Planning and execution of a photographic mission over

a wheat producing region in Rio Grande do Sul, Brazil [INPE-1793-RPE/165] p0179 NB0-32833 CROP VIGOR Remote sensing of total dry-matter accumulation in

winter wheat [E80 10235] p0176 N80-29804

Cornell University remote sensing program --- New York State

[E80-10280] p0227 N80-29823 CRUDE OIL

Conversion of nitrogen oxide gases to nitrate partic p0181 A80-48534 oil refinery plumes CRUSTAL FRACTURES

The coordinated federal program for the application of space technology to crustal dynamics and earthquake

[NASA-TM-82215] oQ187 N80-33999 NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80-34000

CYCLONES Assessment of cyclone-caused damage in Krishna de region using remotely sensed data p0204 A80-51301

D

DATA ACQUISITION

[E80-10179]

The use of space data for the mapping of coastal areas p0185 A80-45297 Substorm warnings - An ISEE-3 real time data system

p0209 A80-46225 Environmental data for sites in the National Solar Data

[SOLAR/0010-80/02]

SOLAR/0010-80/02} p0220 NB0-31975 As-built design specification for CCIT8 processor program

[F80.10323] p0221 N80-32814 DATA BASES

As-built design specification for the Brazil and China onthly data bases [E80-10172] p0213 N80-28773

Program documentation: Final design specification for to data base update deck conversion program (DOTDEC) [E80-10178] p0213 N80-28779 Final design specification for ERIPS fields data base deck onversion

p0213 N80-28780

As-built design specification for the Yield Estimation Subsystem (YES) monthly yield data base and supporting nrograms

SUBJECT INDEX

[E80-10218] p0215 N80-29795 As-built design specification for the India monthly data

[E80-10264] p0216 N80-29811 Composition and assembly of a spectral data base for

corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and Louisiana [E80-10281] p0176 N80-29824

Remote sensing research studies [E80-10117] o0176 N80-30823

Detail design specification for enhancement of the automatic status and tracking system software p0217 N80-30837 [E80-10254]

As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado

p0218 N80-30846 [E80-10263] Application of thematic mapping techniques in terrain anatysis

[AD-AD89061] p0222 N80-33847 DATA COLLECTION PLATFORMS

Platform antennas for data collection [INPE-1820-RPE/186] p0221 N80-33647 DATA COMPRESSION

Application of high efficiency data compression and 2-D gital filtering techniques to remote sensing data ocessing p0209 A80-47749 digital Drocessing

Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied esearch p0220 N80-31865

[DFVLR-FB-80-03] DATA CONVERSION ROUTINES

User manual for the Earth observations Division R and to OLPARS dot data conversion [F80-10236] n0216 N80-29805

Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1

[E80-10243] p0217 N80-30826 Implementation specification document for merge of BTREAD, phase 1, and phase 2 accuracy assessment

programs [E80-10285] p0218 N80-30853 Design specification for ERIPS fields data base deck

[E80-10286] p0218 N80-30854

As-built specification for CLASSY conversion [E80-10307] p0219 N80-30873 A description of a system of programs for mathematically

processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft p0220 N80-31856 [NASA-TM-76208]

DATA CONVERTERS

Design specification for merge of BTREAD, Phase 1 and Phase 2 accuracy assessment programs [E80-10255] p0217 N80-30838 DATA MANAGEMENT

Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS)

[E80-10180] p0213 N80-28781 Detail design specification for enhancement of the utomatic status and tracking system software

[E80-10254] p0217 N80-30837 User's guide for the Yield Estimation Subsystem Data t System (YESDAMS) lanageme

Operation plan for the High Density Tape/LANDSAT

Imagery Verification and Extraction System (HDT/LIVES)

Unsupervised classification of MSS Landsat data for mapping spatially complex vegetation p0173 A80-47744

Application of high efficiency data compression and 2-D digital filtering techniques to remote sensing data processing p0209 A80-47749

Remotely sensed data processing techniques, present and ture p0209 A80-49138

Status and plans of SEO satellite and receiving station p0190 A80-51079

Investigation of the accuracy of transposition of landmarks

As-built specification for CCit6A processor program

As-built design specification for LACIE formatted dot

As-built design specification for the I-100 tape read consolidation program (FULOI)

Final design specification for EOD-LARSYS/statistics and ata transformation processors modification

As-built design specification for LACIE phase 3 automatic

and contour points to small-scale aerial photograph

Digital LANDSAT data analysis of Tennessee

[E80-10276]

[E80-10322]

future

[E80-10130]

[E80-10168]

[E80-10169]

[E80-10171]

[E80-10173]

[E80-10175]

rds in EOD-LARSYS

status and tracking system

DATA PROCESSING

data processing support

Overview of the Landsat system

p0218 N80-30849

p0221 N80-32813

n0174 A80-49137

p0212 A80-53005

p0212 N80-28768

n0212 N80-28769

p0212 N80-28770

n0213 N80-28772

D0213 N80-28774

p0213 N80-28776

Design specification for LARSYS procedure 1 follow-on 80-10176l p0213 N80-28777 [E80-10176] Design specification for EOD-LARSYS/statistics and data sformation processors modification

[E80-10177] . p0213 N80-28778 Program documentation: Final design specification for dot data base update deck conversion program (DOTDEC) [E80-10178] p0213 N80-28779

Final design specification for ERIPS fields data base deck conversion [E80-10179] p0213 N80-28780

Program de CAMDATA1.FTN documentations: MARQTY1.FTN. p0213 N80-28783 [E80-10182]

Design specification for dot data base update deck onversion program (DOTDEC) p0213 N80-28784 [E80-10183]

LACIE/phase 3 Adjustable Crop Calendar (ACC) in control procedures manual

p0213 N80-28786 [E80-10186] Functional design specification for enhancement of the automatic status and tracking system software [E80-10190]

- p0214 N80-28788 User's quide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking system
- (F80-10194) -0214 NR0-28791 A statistical test procedure for detecting multiple outliers in a data set

[E80-10195] p0214 N80-28792 As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 6A [E80-10196] p0214

p0214 N80-28793 As-built design for enhancement of the automatic status and tracking system software [E80-10197]

p0214 N80-28794
 [E80-10199]
 p0214 N80-26734

 Design specification for LARSYS procedure 1
 [E80-10199]

 p0214 N80-28796
 As-built design specification for PDP 11/45 accuracy

assessment system [E80-10200]

p0214 N80-28797 Satellite remote sensing facility for oceanograhic

[NASA-CR-163363] p0197 N80-28847 User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote sensing system

p0214 N80-29780 [E80-10188] As-built design specification for Metro data edit

LCBU-10201] p0214 N80-29781 As-built design specification of the CAM/CAS interface tape report generation program for LACIE 7 [E80-10203] program [E80-10201]

As-built design specification of the CAMS/CAS interface tape report generation program [E80-10204]

- n0215 N80-29783 As-built specification for CCIT7 processor program [E80-10209] p0215 N80-29788
- Final design specification for EOD-LARSYS/data ransformation processor modification

Design specification for LACIE formatted dot cards in EOD-LARSYS [E80-10215] p0215 N80-29793

As-built design specification for Boundary Detection And Registration Program (BDARP1) p0215 N80-29794

[E80-10217] Project development plan for the LANDSAT Imagery Verification and Extraction System (LIVES)

p0216 N80-29807 [E80-10238] Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES)

p0216 N80-29808 [E80-10239] Preliminary design specification for the LANDSAT Verification and Extraction System (LIVES)

- p0216 N80-29809 [E80-10240] Development and evaluation of scatterometer data ocessing algorithms
- [EBO-10266] n0216 N80-29813 EOD systems and facilities workload requirements
- forecast p0176 N80-29821 [E80-10277]
- Remote sensing research studies [E80-10117] p0176 N80-30823 As-built design specification for Boundary Detection And
- Registration Program (BDARP1) p0217 N80-30824 [E80-10216]

Forest resource information system, phase 3 --- St. Regis Paper Co.: Picayune, Mississippi [E80-10242] p0176 N80-30825

High Density Tape Reformatting System/LANDSAT imagery verification and Extraction System (HDTRS/LIVES) throughout analysis P0217 N80-30831 [E80-10248]

Implementation specification for Large Area Crop Inventory Experiment (LACE) phase 3 automatic status and tracking system [E80-10249] p0217 N80-30832

p0217 N80-30832 Detail design specification for enhancement of the tomatic status and tracking system software p0217 N80-30837 [E80-10254]

Design specification for merge of BTREAD, Phase 1 and Phase 2 accuracy assessment programs

p0217 N80-30838 [E80-10255]

User's guide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking system [E80-10256] p0217_N80-30839

- for detecting outliers in data --- AgRISTARS Project [E80-10275]
- Operator's guide for LACIE phase 3 automatic status nd tracking system [E80-10284] p0218 N80-30857
- pv218 N80-30852 Draft user procedures: Software wheat yield predictions/foreign equivalent test ---- Kansas, Oklahoma, and Nebraska TERD. 1022
- [E80-10287] o0218 N80-30855 As-built design specification of the CAMS/CAS interface
- tape report generation program for LACIE 8 [E80-10306] nO21 p0219 N80-30872 Analysis of scanner data for crop inventories
- p0219 N80-30874 [E80-10308] Remote sensing of wildland resources: A state-of-the-art roviou
- [PB80-184609] p0177 N80-30882
- The 7th WMO Executive Committe Inter-Government anel Session on the First GARP Global Experiment n0219 N80-31012 [GARP-SPEC-35]
- A hill-sliding strategy for initialization of Gaussian clusters in the multidimensional space [NASA-TM-80721] D0219 N80-31072
- A description of a system of programs for mathematically processing on unified series (YeS) computers photographic
- images of the Earth taken from spacecraft [NASA-TM-76208] p02 n0220 N80-31856
- Seasat-A land applications data processing plan 80-10317] p0221 N80-32810 [E80-10317] High Density Tape Reformatting System/LANDSAT
- Imagery Verification and Extraction System (HDTRS/LIVES) ction test throughput analysis p0221 N80-32811 [E80-10319]
- As-built design specification for CCIT8 processor orooram
- p0221 N80-32814 [E80-10323] Collection, processing, and distribution of remote sensing ata from Brazilian Receiving Station
- p0221 N80-32832 [INPE-1784-RPE/156] On extracting brightness temperature maps from scanning radiometer data --- techniques for algorithm
- design [NASA-TM-81989] p0221 N80-32838
- Impact of cell size on inventory and mapping errors in cellular geographic information system p0221 N80-33831 [E80-10315]
- DATA REDUCTION Contribution of Landsat data to the objectives of the
- geological survey of India p0189 A80-51077 Improvement of the Earth's gravity field from terrestrial and satellite data
- [E80-10271] p0186 N80-29818 DATA RETRIEVAL
- The availability of U.S. environmental satellite data to p0197 A80-53683 the marine technology community DATA SAMPLING
- Applications of statistics to thematic mapping c mapping p0186 A80-53051
- DATA SYSTEMS Concept of a research aircraft for remote sensing, using
- an integrated sensor/data system [DGLR PAPER 80-051] n0227 A80-46300 Characteristics of the Landsat system and data for
- geologic applications Availability of data p0190 A80-51078 DATA TRANSMISSION
- A telemechanical system for hydrophysical studies in the ocean p0223 A80-45766
- Space observations for water resources A potential to p0201 A80-51279 he developed Landsat-D - Overview and implications
- p0224 A80-53609
- Evaluation of remote hydrologic data-acquisition systems, west-central Florida [PB80-176951] D0205 N80-29832
- DEER Application of remote sensing to state and regional
- problems --- | [E80-10338] Mississippi p0183 N80-32826
- DEFORESTATION
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil p0179 N80-32836 [INPE-1794-RPE/166]
- DEFORMATION
- Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and ground water variations p0186 N80-28809 DELAWARE BAY (US)
- Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware Bay
 - p0205 N80-29816 [E80-10269]
- DELTAS Assessment of cyclone-caused damage in Krishna delta p0204 A80-51301 region using remotely sensed data

DRAINAGE PATTERNS

DEMOGRAPHY

The global 2000 report to the president. Entering the twenty-first century. Volume 2: The technical report --- trends in population, climate, gross national product, earth resources, technology, and man environme o0228 N80-32296

DENMARK

HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) ---- France, Germany, Italy, United Kingdom, and Benelux countries

[E80-10332] D0178 N80-32823 DESERTS

- Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research
- [DEVI 8-E8-80-03] n0220 N80-31865 DICKE RADIOMETERS
- The development of a stepped frequency microv radiometer and its application to remote sensing of the
- Farth [NASA-TM-81847] p0224 N80-28637 The development of a stepped frequency microwave
- radiometer and its application to remote sensing of the p0224 N80-30822 Farth DIFFRACTION PATTERNS
- Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an ice-water system pO195 A80-44232
- DIFFUSE RADIATION The contribution of the diffuse light component to the topographic effect on remotely sensed data
- p0186 N80-30876 [NASA-TM-80728] DIGITAL DATA
 - LANDSAT data analysis of Tenness p0212 N80-28768 [E80-10130] Digital image technology 1980: Emerging production
 - applications p0214 N80-28851 [AD-A085163]
 - Development and evaluation of scatterometer data ocessing algorithms
- p0216 N80-29813 [E80-10266] Use of LANDSAT data for estimating the area of sugar
- cane in the state of Sao Paulo --- Brazil [E80-10260] p0177 N80-30843
- Seasat-A land applications data processing plan 80-10317] p0221 N80-32810 [EBO-10317]
- Using LAND SAT digital data for estimating green biomass Throckmorton, Texas test site and Great Plans Corridor, 115
- [E80-10328] p0178 N80-32819
- A quantitative evaluation of LANDSAT for monitoring suspended sediments in a fluvial channel p0206 N80-33823

Application of high efficiency data compression and 2-D

p0193 N80-33843

n0222 N80-33848

p0218 N80-30840

n0220 N80-31859

p0222 N80-33840

p0210 A80-50879

p0204 A80-51299

p0211 A80-52057

p0199 N80-33833

0192 N80-29799

p0202 A80-51284

p0227 N80-29823

A-7

wavelength magnetic

digital filtering techniques to remote sensing data processing p0209 A80-47749

processing p0209 A80-47749 Digital filtering of LANDSAT images as a visual aid

Interactive digital image processing investigation, phase

Errors in automatic pass point mensuration using digital

A method for edge detection in images of natural

Cartographic display of space information - The different

Computer-aided watershed analyses using remote sensing based regional information systems

Diurnal behavior of the spectral reflectivity of vegetation

Platform and buoy positioning experiments in the North

ea via Doppler satellite techniques p0197 A80-53691

Geologic application of thermal-inertia mapping from

Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid

Cornell University remote sensing program --- New York

of medium

anomalies in the eastern Pacific using Magsat data

- Powder River Basin, Wyoming

DIGITAL TECHNIQUES Tidal land mapping from Landsat Cassification of multispectral images according to crosswise textural characteristics --- Mato Grasso, Brazil

technique in geological photointerpretation [INPE-1823-RPE/189] p015

DIGITAL FILTERS

DIGITAL SYSTEMS

AD-A087518

[E80-10257]

[AD-A087443]

DISPLAY DEVICES

[INPE-1768-RPE/154]

DISTRICT OF COLUMBIA

DIURNAL VARIATIONS

Investigations

80-10334]

DOPPLER EFFECT

available at IGN

techniques

resources

and soils

DRAINAGE

satellite ...

climates

State

[F80-10230]

[E80-10280]

DRAINAGE PATTERNS

EARTH (PLANET)

Irrigated lands assessment for were have a see s Irrigated lands assessment for water management

[E80-10324] The application of remote sensing resource management and environmental quality programs in Kansas --- kansas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, misso [E80-10337] p0183 N80-32825 p0207 N80-33825 A watershed information system

Ε

EARTH (PLANET)

- Optimal conditions for determining the coordinates of p0186 A80-54021 the earth's center of mass EARTH CRUST
- Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and ground water and ground water p0186 N80-28809 variations Satellite Emission Radio Interferometric Earth Surveyin
- p0186 N80-28838 (SERIES) --- astrometry Improved definition of crustal anomalies for Magsat iata p0192 N80-29817
- p0192 N80-29817 Investigations of medium wavelength magnetic anomalies in the eastern Pacific using Magsat data [E80-10334] p0199 N80-33833 NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80 24055 ARTH MAMPI e
- EARTH MANTLE
- Altimetry data over trenches and island-arcs and convection in the mantle
- [NASA-CR-163516] Investigations of p0199 N80-32050 medium wavelength magnetic in the eastern Pacific using Magsat data 34] p0199 N80-33833 omalies [E80-10334]
- EARTH MOVEMENTS The coordinated federal program for the application of space technology to crustal dynamics and earthquake research [NASA-TM-82215]
- p0187 N80-33999 NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80-34000
- EARTH OBSERVATIONS (FROM SPACE) surface temperatures
- p0182 A80-53131 Russian book
- Private sector involvement in civil space remote sensing. Volume 1: Report [NASA-TM-82206] p0228 N80-33845
- Private sector involvement in civil space remote sensing.
- Volume 2: Appendices [NASA-TM-82207] p0228 N80-33846 FARTH RESOURCES
- The global 2000 report to the president. Entering the venty-first century, volume 1 p0228 N80-32295 twenty-first century, volume 1 EARTH SURFACE
- processing space p0185 A80-46967 A photogrammetric method of photographs Satellite temperature monitoring and prediction system p0211 A80-51943
- Airborne thermal viewer having a circular scanner viewing p0223 A80-52046 axis
- Invariant photometric features of natural objects p0211 A80-52058 Practical aspects of radiative correction of multispectral
- video information p0211 A80-52060 Optical spatial-frequency characteristic of the atmosphere
- and its applications --- atmospheric scattering earth surface image distortion p0212 A80-52061 image distortion Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner images
- D0212 A80-52064 Distortion of satellite photographs obtained by scanning p0212 A80-52065 systems
- Laser studies of the atmosphere and underlying surface Russian book p0182 A80-53131 --- Russian book
- An automated aerial-photographic information-search p0186 A80-54023 system
- The geometric calibration of multispectral photographic p0186 A80-54024 equipment The use of space photographic data for the study and
- happing of anthropogenic landscapes p0186 A80-54025 EARTHQUAKES
- tellite Emission Radio Interferometric Earth Surveyir (SERIES) --- astrometry p0186 N80-28838 NASA geodetic applications of the Mark 3 VLEI stem p0186 N80-28841 system
- The coordinated federal program for the application of space technology to crustal dynamics and earthquake research [NASA-TM-82215]
- p0187 N80-33999 ECOLOGY
- The global 2000 report to the president. Entering the twenty-first century, volume 1 p0228 N80-32295 The global 2000 report to the president. Entering the

- Satellite observations of a nutrient upwelling off the coast of California p0195 A80-45015 Grizzly bear habitat analysis. Section 3: LANDSAT-1
- multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana
- p0177 N80-30867 [NASA-CR-163382] EDITING ROUTINES (COMPUTERS)
- As-built design specification for Metro data edit program [E80-10201]
- p0214 N80-29781 ELLIPSES
- As-built design specification for equiprobability ellipses epresentation of CLASSY clusters [E80-10320] p0221 N80-32812
- EMISSIVITY Development of a soil moisture model for use with passive
- microwave remote sensors p0179 N80-33828 ENERGY BUDGETS
- Defining relationships between surface characteristics and actual evaporation rate
- p0207 N80-33834 [E80-10335] ENGLAND
- The application of remote sensing to environmental p0181 A80-47750 management ENGLISH CHANNEL
- The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous shorelin p0201 A80-50899
- ENVIRONMENT MANAGEMENT
- Effects of radar system parameters, population, and environmental modulation on settlement visibility p0181 A80-47746
- The application of remote sensing to environmental p0181 A80-47750 management The global 2000 report to the president. Entering the
- enty-first century, volume 1 p0228 N80-32295 ENVIRONMENT MODELS
- Simulation of reservoir and lake se [PB80-182801] dimentation p0206 N80-31867
- ENVIRONMENTAL MONITORING Nonzero subsurface irradiance reflectance at 670 nm from Lake Ontario water masses p0201 A80-45428
- p0201 A80-45428 Soil water and plant canopy effects on remotely measured surface temperatures p0173 A80-47748
- Fluorescence lidar --- for remote se sing of environments p0181 A80-48908 and atmospheric constituents
- Development of a pulsed 9.5 micron lidar for regional ale Q3 measurement p0181 A80-48909 scale 03 measurement
- Large field-of-view interferometers for environmental p0223 A80-48911 sensing
- Evaluation of the fire hazard of taiga forests from their p0175 A80-49652 thermal radio emission Earth observation from space today and tomorrow
 - p0227 A80-50280 Sensing the ocean environment from
- m space p0196 A80-51485 A new era in technology: Proceedings of the Seventeenth
- Space Congress, Cocoa Beach, Fla., April 30-May 2 1980 p0210 A80-51926 The environmental program at Kennedy Space Center
- Baseline to monitoring p0181 A80-51 Satellite temperature monitoring and prediction syst p0181 A80-51935 p0211 A80-51943
- Experiment aimed at standardizing anthropogenic changes of the natural environment from satellite and aerial photographs p0211 A80-52056
- Smoke as a quantitative atmospheric diffusion trace p0182 A80-53265
- The availability of U.S. environmental satellite data to the marine technology community p0197 A Digital LANDSAT data analysis of Tennessee p0197 A80-53683
- [E80-10130] p0212 N80-28768 As-built design specification for the Brazil and China
- monthly data bases [E80-10172] p0213 N80-28773 Satellite remote sensing facility for oceanograhic
- nlications [NASA-CR-163363] p0197 N80-28847
- A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3, part 1: Ichthyological survey
- Space Center, Volume 3, part 1, Introvingical servey of lagoonal waters --- Indian River lagoon system [NASA-CR-163122-VOL-3-PT-1] p0197 N80-28939 A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center, Volume 3, part 2; Ichthyological studies,
- sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940 Cornell University remote sensing program --- New York State [E80-10280]
- p0227 N80-29823 The 7th WMO Executive Committe Inter-Government Panel Session on the First GARP Global Experiment [GARP-SPEC-35] p0219 N80-31012
- Satellite activities of NOAA, 1979 p0220 N80-31429 A continuation of base-line studies for environmentally A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 1: Marine turtle studies [NASA-CR-163122-VOL-4-PT-1] p0183 N80-31969

A continuation of base-line studies for environmentally A continuation of base ine studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part Threatened and endangered birds and other threatened and endangered forms [NASA-CR-163122-VOL-4-PT-2]

SUBJECT INDEX

p0183 N80-31970 Satellite monitoring of sea surface pollution --- irish and rth sea

[E80-10329] o0199 N80-32820 The application of remote sensing to resource management and environmental quality programs in Kansas --- kahsas; roy's and phony creeks watersheds; the proposed

prairie national park and pin ford lake, missor [E80-10337] p0183 N80-32825 Application of remote sensing to state and regional problems --- Mississippi

- [E80-10338] p0183 N80-32826 The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in
- pest management [NASA-CR-163589] p0178 N80-32830
- Platform antennas for data collection [INPE-1820-RPE/186] p0221 N80-33647
- Private sector involvement in civil space remote sensing. Volume 1: Report [NASA-TM-82206] p0228 N80-33845
- Private sector involvement in civil space remote sensing. Volume 2: Appendices [NASA-TM-82207] p0228 N80-33846
- The Federal Plan for Meteorological Services and Supporting Research, fiscal year 1981
- [PB80-199482] p0228 N80-34041 EROSION
 - The Mesozoic and Cenozoic depressions of the Baikalo-Amur region from the interpretation of space photographs p0189 A80-49654
 - Satellite imagery and U.P. Himalayas and Siwalik --- for p0204 A80-51304 soil conservation
- The application of remote sensing to resource management and environmental quality programs in Kansas -- kansas: roy's and phony creeks watersheds: the proposed tallgrass prairie national park and pin ford lake, missouri
- [E80-10337] p0183 N80-32825 Application of remote sensing to state and regional
- problems --- Mississippi [E80-10338] p0183 N80-32826 ERBOR ANALYSIS
- Investigation of the accuracy of transposition of landmarks and contour points to small-scale aerial photographs p0212 A80-53005
- Errors incurred in estimating an area of uniform land over using Landsat p0175 A80-53052 cover using Landsat p0175 A80-53052 Estimation of probabilities of label imperfections and
- correction of mislabels [E80-10288] p0218 N80-30856
- ERROR DETECTION CODES Errors in automatic pass point mensuration using digital
- techniques [AD-A087443] p0220 N80-31859
- Impact of cell size on inventory and mapping errors in a cellular geographic information system [E80-10315]
- p0221 N80-33831 ESTUARIES
- The use of space data for the mapping of coastal areas p0185 A80-45297 Remote sensing of coastal environment and resources
- p0202 A80-51281 Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware

An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire:

Mt. St. Helens and Metsachee Creek, Washington; and the

Automatic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888

L-band radar and geology - Some results in south-east

Eurasian snow cover extent - The NOAA satellite record,

Microwave emission properties of snow for monitoring ydrological parameters p0203 A80-51297

Application Explorer Mission-A heat capacity mapping hission --- Bavaria, Germany and Marrakech, Morocco

HCMM satellite follow-on investigation no. 025: Soil

moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS

Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries

Assessment of the role of remote sensing in the study of inland and coastal waters [NASA-TM-81881] p0200 N80-34048

intiaguito and Feugo volcanoes, Guatemala

A method for mapping soil reflectance

p0205 N80-29816

p0225 N80-32807

p0175 A80-49655

o0191 A80-51095

p0203 A80-51295

p0219 N80-30875

o0178 N80-32823

Bav

[E80-10269]

[E80-10312]

of France

1966-79

[E80-10309]

[E80-10332]

UTROPHICATION

hydrological parameters

EUROPE

SUBJECT INDEX

EVAPORATION RATE

Defining relationships between surface characteristics and actual evaporation rate [FR0.10335] DO207 NR0-33834

EVAPORATIVE COOLING

Anomalous snowfall caused by natural-draft cooling [RAND/N-1479-DOE] p0206 N80-32024

EVAPOTRANSPIRATION

The contribution of space observations to water resources management: Proceedings of the Sympo India, May 29-June 9, 1979 p0 D0201 A80-51278 Remote sensing applications in hydrometeorology n0202 A80-51283

Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid D0202 A80-51284 climates

Florida wat [E80-10246] water resources p0205 N80-30829

Use of soil moisture information in yield models po177 N80-30869 [E80-10302]

HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benefux countries [E80-10332] n0178 N80-32823

Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely sensed surface temperature near the daily maximum n0178 N80-32824 [F80-10333]

Defining relationships between surface characteristics and actual evaporation rate [E80-10335] p0207 N80-33834

EVERGLADES (FL) Florida water resources [E80-10246] n0205 N80-30829

F

FANS (LANDFORMS)

- Soil moisture in relation to geologic structure and lithology, northern California [E80-10298] p0192 N80-30865
- FARM CROPS Vegetation clutter model n0173 A80-44262
- Optical methods for the study of biocenoses on land of sea p0201 A80-49656 and sea Invariant photometric features of natural objects p0211 A80-52058

AgRISTARS cropping practices and crop characteristics

Intrastissippi, missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texa: [E80-10292] DO177 NR0-30867 p0177 N80-30860 FARMLANDS

- Development and application of Landsat-derived cropland maps for water use determinatio the High Plains p0175 A80-49144 Irrigated lands assessment for water management Applications Pilot Test (APT) --- California
- p0178 N80-32815 [E80-10324] Infrared-temperature variability in a large agricultural field
- --- Dunnigan, California [E80-10331] D0178 N80-32822 HCMM satellite follow-on investigation no. 025: Soil

moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and Benelux countries [E80-10332] p0178 N80-32823

FERTILIZERS Remote sensing research studies

- p0176 N80-30823 [E80-10117] FIELD OF VIEW
- Large field-of-view interferometers for em p0223 A80-48911 ennein
- FILE MAINTENANCE (COMPUTERS) Design specification for a merging program for formatted lage data files image data

p0216 N80-29803 [E80-10234] FIRE 8

Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties [E80-10326] p0183 N80-32817

FISHERIES Satellite activities of NOAA, 1979 p0220 N80-31429

- FISHES Nimbus-7 coastal zone color scanner - System d
- p0197 A80-51490 and initial imagery A continuation of base-line studies for environmentally

monitoring space transportation systems at John F. Kenned Space Center. Volume 3, part 1: Ichthyological survey --- Indian River lagoon system - al water [NASA-CR-163122-VOL-3-PT-1] p0197 N80-28939

A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3, part 2: Ichthyological studies, sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940

FLOOD DAMAGE Study of Kosi river characteristics usin ribital multispectral scanner data pC airborne

using airborne/space p0204 A80-51302 FLOOD PLAINS

Applications to floods of remote sensing from n0204 A80-51300 Study of Kosi river characteristics u

p0204 A00-51300 p0204 A80-51302 orbital multispectral scanner data Floodplains mapping of Gangetic basin using Landsat hagery p0204 A80-51303 imagery

The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland E80-10228) p0179 N80-33829

FLOOD PREDICTIONS

The use of space data for the prediction of mountain-rive ing in Siberia p0201 A80-49653 FLOODS

The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278 India, May 29-June 9, 1979 Satellite data for the solution of problems of land hydrology p0202 A80 51282 Applications to floods of remote sensing from satellites p0204 A80-51300 Study of floods in Bangladesh and India with the help of meteorological satellites p0204 A80-51306 Indian remote sensing satellite program and its contribution to water resources managem

D0204 A80-51307 Digital LANDSAT data analysis of Tenne [E80-10130] D0212 N80-28768

Use of LANDSAT data for river and lake ice engineering p0205 N80-29806 [E80-10237]

Cornell University remote sensing program --- New York [280-10280] p0227 N80-29823

Florida water resources [F80-10246] p0205 N80-30829 Application of remote sensing to state and regional

-- Mississippi [E80-10338] p0183 N80-32826

FLORIDA

The environmental program at Kennedy Space Cente Baseline to monitoring D0181 A80-51935 Satellite temperature monitoring and prediction system p0211 A80-51943

A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center, Volume 3, part 2: Ichthyological studies sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2]

p0198 N80-28940 Evaluation of remote hydrologic data-acquisition systems, vest-central Florida

[PB80-176951] p0205 N80-29832 Florida water resources

[E80-10246] p0205 N80-30829 Florida water resources. Executive summary [E80-10247]

p0205 N80-30830 Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, eattle, Washington; and Boston, Massachusetts 01] p0182 N80-30868 [E80-10301]

A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part Marine turtle studies

[NASA-CR-163122-VOL-4-PT-1] p0183 N80-31969 Remote sensing procedures for detecting and monitoring prious activities regulated by the Mobile District

p0206 N80-31973 [AD-A087584] Evaluation of remote sensing techniques on selected

forest sites in Florida --- Fort Myers and Gainesville test [F80-10296] p0177 N80-32805

FLUORESCENCE

Fluorescence lidar --- for remote sensing of environme and atmospheric constituents p0181 A80-489 p0181 A80-48908 FOLDS (GEOLOGY)

New data on the geological structure of the sis of satellite Verkhoiany-Kolyma fold region from an ar p0211 A80-52051 TV images FOLIAGE

Aerial color infrared photography annlications p0175 A80-51944 citriculture FOREST FIRES

Program on stimulating operational private sector use of Earth observation satellite data [E80-10233] p0227 N80-29802

FOREST MANAGEMENT

Digital LANDSAT data analysis of Ter 00212 N80-28768 (E80-10130) Program on stimulating operational private sector use of Earth observation satellite data

[E80-10233] p0227 N80-29802

FRONTS (METEOROLOGY)

Cornell University remote sensing program --- New York

p0227 N80-29823 [E80-10280] Forest resource information system, phase 3 --- St. Regis

Paper Co : Picavune, Mississippi [E80-10242] p0176 N80-30825 The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested

areas in Brazil [INPE-1794-RPE/166] p0179 N80-32836

A watershed information system 00207 N80-33825 FORESTS

Evaluation of the fire hazard of taiga forests from their p0175 A80-49652 thermal radio emission Optical methods for the study of biocenoses on land

p0201 A80-49656 and sea The cartography of Chize forest through remote

p0175 A80-50900 sensing Use of collateral information to improve LANDSAT

classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268] n0176 N80-29815

EOD systems and facilities workload requirements forecast [E80-10277]

p0176 N80-29821 Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo.

[E80-10258] p0176 N80-30841 Grizzly bear habitat analysis. Section 3: LANDSAT-1

multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, lontana p0177 N80-30867 [NASA-CR-163382]

Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test

p0177 N80-32805 [E80-10296] An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: M. St. Helens and Metsachee Creek, Washington: and the Santiaguito and Feugo volcanoes, Guatemala [E80-10312] p0225

p0225 N80-32807 Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta [E80-10326] p0183 N80-32817

The application of remote sensing to resource management and environmental quality programs in Kansas -- kansas; roy's and phony creeks watersheds; the proposed Ilgrass prairie national park and pin ford lake, mis [E80-10337] n0183 N80-32825

Application of remote sensing to state and regional -- Mississippi [E80-10338] p0183 N80-32826

Detection of hidden mineral deposits by airborne spectral alvsis of forest canopies

[PB80-193881] p0193 N80-32845 The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland

[E80-10228] p0179 N80-33829 FRANCE

Inventory, mapping and evaluation of the agricultural potential of soils - Status of studies and needs of remote p0175 A80-50877 sensina

A study of the needs of French government agencies in mote sensing mapping p0181 A80-50882 remote sensing mapping

Automatic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888 Basic topographic mapping - Renewal and revision

o0185 A80-50897 The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous

p0201 A80-50899 The cartography of Chize forest st through remote p0175 A80-50900 sensing

The use of satellite imagery for mapping - The study of p0175 A80-50903 soil moisture

L-band radar and geology - Some results in south-east of France p0191 A80-51095

HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries

[F80-10332] D0178 N80-32823 FRESH WATER

Quantitative monitoring of sediment levels in freshwater p0203 A80-51291 lakes from Landsat FRONTAL WAVES The three-dimensional structure of the frontal zone of the Gulf Stream from synchronous satellite and ship data

Thermal fronts in the Mediterranean according to NOAA 5 satellite radiometer data / September 1977-February

FRONTS (METEOROLOGY)

1979/

p0196 A80-49651

p0195 A80-48750

A-9

SUBJECT INDEX

FROST

FROST

Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties [E80-10326]

p0183 N80-32817 FRUITS Application of remote sensing to selected problems

the state of California --- Mendocino, Colusa, and Shasta [E80-10326] p0183 N80-32817

G

GEOBOTANY

An investigation of vegetation and other Earth An investigation of vegetation and other Lann resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire; Mt St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemati p0225 N80-32807 [F80-10312]

GEOCENTRIC COORDINATES Optimal conditions for determining the coordinates the earth's center of mass p0186 A80-54021

GEOCHEMISTRY Geochemical balance of the Salgado River bas [INPE-1849-RPE/206] p0206 N8 00206 N80-32834

GEODESY Platform and buoy positioning experiments in the North

Sea via Doppler satellite techniques p0197 A80-53691 Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and ground wate

variations p0186 N80-28809 Satellite Emission Radio Interferometric Earth Surveying (SERIES) --- astrometry

ERIES) -- astrometry point 3 VLBI p0186 N80-28841 system Digital image technology 1980: Emerging production

applications [AD-A085163] n0214 N80-28851 Improvement of the Earth's gravity field from terrestrial

and satellite data

and satellite data [E80-10271] p0186 N80-29818 NASA plan for international crustal dynamics studies [NA\$A-TM-82214] p0187 N80-34000 GEODETIC SURVEYS

Satellite Emission Radio Interferometric Earth Surveying (SERIES) --- astrometry ERIES) --- astrometry p0186 N80-28838 NASA geodetic applications of the Mark 3 VLBI

system D0186 N80-28841 The coordinated federal program for the application space technology to crustal dynamics and earthquake eastch

[NASA-TM-82215] p0187 N80-33999 NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80-34000

GEODYNAMICS

Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and and ground water p0186 N80-28809 variations Altimetry data over trenches and island-arcs and

convection in the mantle [NASA-CR-163516] p0199 N80-32050 The coordinated federal program for the application of space technology to crustal dynamics and earthquake

research [NASA-TM-82215] p0187 N80-33999 NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80-34000 p0187 N80-34000

GEOGRAPHY Impact of cell size on inventory and mapping errors in

a cellular geographic information system [E80-10315] -/ p0221 N80-33831

GEOLOGICAL FAULTS Characteristics of the representation of tectonic fa p0189 A80-49663 on space photographs The appearance of the Main Ural Fault in a cloud fie

on snace photographs p0189 A80-49664 Estimates of the accuracy of the brightness conju nction

of multispectral photographs p0210 A80-49665 Evaluation of Landsat image data for the extraction of land use information and its presentation in thematic

p0185 A80-50902 maps Fracture mapping of the Narmada-Tapti basin using p0190 A80-51082

Landsat imagery Lineament study of the Bastar district, Madhya Pradesh India, from Landsat imagery n0190 A80-51083

Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data p0190 A80-51084 Development of a method to detect geologic faults and

other linear features from LANDSAT images [PB80-189665] p0193 N80-32844 GEOLOGICAL SURVEYS

Spaceborne imaging radar - Geologic and oceanographic applications p0223 A80-47480 Remote sensing for tunnel siting studies

p0189 A80-48975 Landsat imagery in oil exploration - Six years of pote A80-50880 experience

Contribution of Landsat data to the objectives of the alogical survey of India p0189 A80-51077 geological survey of India

A-10

Characteristics of the Landsat system and data for geologic applications - Availability of data p0190 A80-51078 and Landor

Geological ground-truths interpretation for parts of Karnataka State /India/ p0190 A80-51080

Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143 p0190 A80-51081

Lineament study of the Bastar district, Madhya Pradesh India, from Landsat imagery p0190 A80-51083

Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data n0190 A80-51084 Lineaments and their tectonic significance in relation to

p0190 A80 51085 mineral potential in south India Interfacing with SEO technology - A case study in p0190 A80-51086 geological application

Application of remote sensing techniques to petroleum xploration in India p0191 A80-51088 exploration in India

Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin, Andhra Pradesh, India p0191 A80-51089

Use of Landsat data products for geological mapping -case history in Tamilnadu, India p0191 A80-51090 A case history in Tamilnadu, India An automatic method of discriminating rock outcrops sing Landsat data p0191 A80-51094

using Landsat data L-band radar and geology - Some results in south-east p0191 A80-51095 of France

New data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite p0211 A80-52051 TV images

Geological analysis of the Urals-Oman superlineament por satellite imagery p0211 A80-52052 from satellite imagery

Analysis of the results of an interpretation of satellite and aerial protography of Western Uzbekistan p0211 A80-52055

An automated aerial-photographic information-search p0186 A80-54023 svsterr

US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft. San Joaquín Experimental Range

[PB80-169295] p0192 N80-28852 Aerial camma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe quadrangles of New Mexico

[GJBX-9(80)-VOL-2] p0192 N80-30881 Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980

[RHO-BWI-C-68] p0192 N80-32013 The United States space observation policy

[NASA-TM-76373] p0228 N80-33425 [INSA-IM-76373] p0228 N80-33425 Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil [INPE-1838-RPE/199] p0193 N80-33842

GEOLOGY Program on stimulating operational private sector use

of Earth observation satellite data [E80-10233] p0227 N80-29802

GEOMAGNETISM Substorm warnings · An ISEE-3 real time data system

p0209 A80-46225 Magsat - A new satellite to survey the earth's magnetic

p0223 A80-51233 field Improved definition of crustal anomalies for Magsat

data [E80-10270] p0192 N80-29817

GEOMORPHOLOGY The Mesozoic and Cenozoic depressions of the

Baikalo-Amur region from the interpretation of photographs n0189 A80-49654 The potential of Landsat-3 RBV images for thematic

mapping --- geomorphological, geological and land cover plications p0210 A80-50894 The geomorphology of Mont-Saint-Michel Bay studied app

from the remote sensing of instantaneous shorelines p0201 A80-50899 Surface characteristics of Precambrian stromatolitic

phosphorites of a part of the Indian shield p0191 A80-51087

Application of remote sensing techniques to petroleum ploration in India p0191 A80-51088 exploration in India Use of Landsat data products for geological mapping p0191 A80-51090

A case history in Tamihadu, India p0191 A80-51090 Application Explorer Mission-A heat capacity mapping mission --- Bavaria, Germany and Marrakech, Morocco

[E80-10309] p0219 N80-30875 A multi-step method for avalanche zone recognition and analysis --- San Juan Mountains (co) p0193 N80-33824

GEOPHYSICS The coordinated federal program for the application of space technology to crustal dynamics and earthquake

earch [NASA-TM-82215] o0187 N80-33999 GEORGIA

ECRGIA AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina. North Dakota, Ohio. Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

GEOTHERMAL RESOURCES

Review of BRGM research activities in geological remote sensing and medium-term perspectives

p0189 A80-50881 Geological and geothermal data use investigations for application Explorer mission-A (heat capacity mapping mission) n0192 N80-29822 [E80.10279]

Remote sensing applied to the prospecting of geothermal anomaly in Caldas Novas County, State of Goias, Brazil INPF-1792-RPE/164 [INPE-1792-RPE/164] p0193 N80-32837 GERMANY

Application Explorer Mission-A heat capacity mapping mission --- Bavaria, Germany and Marrakech, Morocco [E80-10309] p0219 N80-30875

HCMM satellite follow-on investigation to 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries [E80-10332] p0178 N80-32823

The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland p0179 N80-33829 [F80.10228]

GLACIAL DRIFT

Application Explorer Mission-A heat capacity mapping mission --- Bavaria, Germany and Marrakech, Morocco [E80-10309] p0219 N80-30875 GLACIERS

Contribution of Landsat data to the objectives of the vological survey of India p0189 A80-51077 geological survey of India

Problems of snow cover assessment - An approach using remote sensing techniques in a pilot project in the Beas river basin. Himachal Pradesh, India p0203 A80-51294 GLOBAL ATMOSPHERIC RESEARCH PROGRAM

The 7th WMO Executive Committe Inter-Government Panel Session on the First GARP Global Experiment

[GARP-SPEC-35] p0219 N80-31012

GLOBAL POSITIONING SYSTEM The Landsat-D/Global Positioning System experiment [AIAA PAPER 80-1678] p0209 A80-46522

Satellite Emission Radio Interferometric Earth Surveying p0186 N80-28838 (SERIES) --- astrometry GNEISS

Measurement results and conclusions on the spectral reflective coefficients of volcanites, granitoides and aneisses p0191 A80-51093 GOVERNMENT/INDUSTRY RELATIONS

Private sector involvement in civil space remote sensing volume 1: Report

[NASA-TM-82206] p0228 N80-33845 Private sector involvement in civil space remote sensing.

Volume 2: Appendices [NASA-TM-82207] p0228 N80-33846 GRAINS (FOOD)

As-built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological

[E80-10170] p0212 N80-28771 Design specification for dot data base update deck

conversion program (DOTDEC) [E80-10183] p0213 N80-28784

Sampling of rectangular regions [E80-10272] p0176 N80-29819

The integrated analysis procedure for identification of spring small grains and barley --- Great Plains Corridor: .S. and Canada

[E80-10274] p0177 N80-30847 Evaluating the use of analyst labels in maximum likelihood

luster proportion estimation [E80-10303] n0219 N80-30870 Evaluation of Bayesian sequential proportion estimation

An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data

Irricated lands assessment for water management

The application of remote sensing to resource management and environmental guality programs in Kansas

Applied Remote Sensing Program (ARSP) --- Arizon [E80-10330] p0178 N80-3282

The applicability of remote sensing to Earth biological oblems. Part 2: The potential of remote sensing in

Using 70-mm aerial photography to identify rangeland

Grizzly bear habitat analysis. Section 3: LANDSAT-1

multispectral imagery and computer analysis of grizzly bear

habitat --- Slategoat, Scapegoat and Danaher areas,

- kansas; roy's and phony creeks watersheds; the proposed

pplications Pilot Test (APT) --- California

tallgrass prairie national park and pin ford lake

p0219 N80-30871

p0178 N80-32809

p0178 N80-32815

p0183 N80-32825

p0178 N80-32821

p0178 N80-32830

p0175 A80-53056

p0177 N80-30867

using analyst labels [E80-10304]

[F80-10314]

[E80-10324]

[F80-10337]

GRASSHOPPERS

oroblems. est manageme

GRASSLANDS

sites

GRAND CANYON (AZ)

[NASA-CR-163589]

[NASA-CR-163382]

115

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [E80-10324] p0 p0178 N80-32815 Application of remote sensing to selected problems within the state of California ... Mendocino, Colusa, and Shasta [FRO-10326] p0183 N80-32817 Using LANDSAT digital data for estimating green biomass Throckmorton, Texas test site and Great Plans Corridor. [80-10328] p0178 N80-32819 The application of remote sensing to resource management and environmental guality programs in Kansas sas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, missouri [E80-10337] p0183 N80-32825 The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested

areas in Brazil [INPE-1794-RPE/166] n0179 N80-32836 GRAVIMETRY

Optimal conditions for determining the coordinates of the earth's center of mass p0186 A80-54021 GRAVITATIONAL FIELDS

Improvement of the Earth's gravity field from terrestrial and satellite data [F80-10271] p0186 N80-29818

GRAVITY ANOMALIES Improvement of the Earth's gravity field from terrestrial

and satellite data [E80-10271] D0186 N80-29818

GRAZING Applied Remote Sensing Program (ARSP) --- Arizona [F80-10330] p0178 N80-32821

GREAT LAKES (NORTH AMERICA) AT LAKES (NORTH AMERICA) Quantitative interpretation of Great Lakes remote sensing p0201 A80-45005 data Use of LANDSAT data for river and lake ice engineering

etudios [E80-10237] p0205 N80-29806

Assessment of the role of remote sensing in the study of inland and coastal waters [NASA-TM-81881] p0200 N80-34048

GREAT PLAINS CORRIDOR (NORTH AMERICA) The integrated analysis procedure for identification of spring small grains and barley --- Great Plains Corridor:

U.S. and Canada p0177 N80-30847 [E80-10274] An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [E80-10314] p0178 N80-32809

Using LANDSAT digital data for estimating green biomass Throckmorton, Texas test site and Great Plans Corridor,

[E80-10328] D0178 N80-32819 GREEN WAVE EFFECT

A labeling technology for LANDSAT imager [E80-10293] p0219 N80-30861 An algorithm for estimating crop calendar small grains using LANDSAT spectral data endar shifts of spring

p0178 N80-32809 [E80-10314] Using LANDSAT digital data for estimating green biomass --- Throckmorton, Texas test site and Great Plans Corridor,

[E80-10328] p0178 N80-32819

GROUND STATIONS The SPOT/Landsat image ground station - Image o0210 A80-50906 GROUND TRUTH

The cartography of Chize forest through remote p0175 A80-50900 sensing Geological ground-truths and Landsat imagery interpretation for parts of Karnataka State /India/

p0190 A80-51080 LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas: Williams County, North Dakota; and Hand County, South Dakota

[E80-10193] p0214 N80-28790 Geologic application of thermal inertia imaging using HCMM data --- Pisgah Crater, California and Walker Lake, Nevada Test Sites

[E80-10229] n0192 N80-29798 User manual for the Earth observations Division R and D to OLPARS dot data conversion

0216 N80-29805 [E80-10236] Improvement of the Earth's gravity field from terrestrial ed estellite data

[E80-10271] p0186 N80-29818 Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Nebraska, South Dakota, Wisconsin, Iowa, Internation, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and Louisiana

[E80-10281] p0176 N80-29824 Preliminary user guide for the program GTDDM (Ground Truth Dot Dump)

[E80-10244] p0217 N80-30827 design specification for field statistics As-built ((FIELDSTAT)

[E80-10252] 0217 NR0.30935 pp217 N80-30835 Design specification for merge of BTREAD, Phase 1 and Phase 2 accuracy assessment programs [E80-10255] p0217 N80-30838

Implementation specification document for merge of BTREAD, phase 1, and phase 2 accuracy assessment programs

[F80.10285] n0218 N80-20852 gical structure of Sicily and other Italian Study of ge - Gulf of Orosei, Eastern Sardinia areae . [E80-10299]

80-10299] p0192 N80-30866 The contribution of the diffuse light component to the topographic effect on remotely sensed data [NASA-TM-80728] p0186 N80-30876

As-built design specification for a list processing [F80-10325]

p0221 N80-32816 Application of remote sensing to state and regional oblems --- Mississippi (E80-10338) p0183 N80-32826

GROUND WATER Identifying and locating land irrigated by center-pivot

irrigation systems using satellite imagery p0174 A80-49140

Irrigation mapping in western Kansas using Landsat, II - Practices and problems --- irrigation mapping in western Kansas using Landsat p0174 A80-49143 Kansas using Landsat p0174 A80-49143 Development and application of Landsat-derived

cropland maps for water use determinati the High Plains p0175 A80-49144

The use of satellite imagery for mapping - The study of ill moisture p0175 A80-50903 soil moisture Lineaments and their tectonic significance in relation to p0190 A80-51085 mineral potential in south India

Space observations for water resources - A potential to p0201 A80-51279 be developed Remote sensing application in groundwater surveys and

- p0202 A80-51280 exploration in India Use of satellite imagery for the derivation of the
- hydrogeologic characteristics of a test area in semiarid climates p0202 A80-51284 Remote sensing of water resources in Panch Mahals
- p0202_A80-51286 district

luation of hydrogeologic conditions in Ponnaiyar River basin, South India using remotely sensed data p0203 A80-51288

Remote sensing in search for ground water - Some case p0203 A80-51289

Application of Landsat imagery to ground water studies in parts of Punjab and Haryana states, India p0203 A80-51290

Perspectives of remote sensing applications to the study

of hydric balance in the EEC countries and to the global evaluation of ground water resources p0204 A80-51305 LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau [RHO-BWI-SA-43] p0183 N80-31862

HCMM energy budget data as a model input for assessing

egions of high potential groundwater pollution --- South Dakota [F80-10310] n0206 N80-32806

GUATEMALA

An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary; Maine: White Mountain National Forest, New Hampshire; Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala 0225 N80-32807 [E80-10312]

GULF OF ALASKA

Direct measurement of recirculation in the Stream p0195 A80-46316 A 94/183 GHz multichannel radiometer for Convair fliahts

[NASA-CR-160032] p0225 N80-33047 GULE STREAM

The three-dimensional structure of the frontal zone of the Gulf Stream from synchronous satellite and ship data p0196 A80-49651

Modulation of sea surface radar cross section by surface stress - Wind speed and temperature effects across the Gulf Stream p0196 A80-51415

The Gulf Stream Meanders experiment: Current meter, atmospheric, and sea level data report for the mooring o0199 N80-33077

[AD-A088069] GULFS

Observation of wavelike motion of the Gaspe Current p0195 A80-46309

Study of geological structure of Sicily and other Italian Gulf of Orosei, Eastern Sardinia areas p0192 N80-30866 [F80-10299]

н

HABITATS

Digital LANDSAT data analysis of Tennes [E80-10130]

p0212 N80-28768 Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana

[NASA-CR-163382] p0177 N80-30867 Applied Remote Sensing Program (ARSP) --- Arizona 80-10330] p0178 N80-32821 [E80-10330]

The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas: rov's and phony creeks watersheds: the proposed allgrass prairie national park and pin ford lake, [E80-10337] p0183 N80-32825 Application of remote sensing to state and regional

HIGHWAYS

problems --- Mississippi p0183 N80-32826 [E80-10338]

HEAT BALANCE

Thermal balance of s [INPE-1859-RPE/210] p0180 N80-33841 HEAT BUDGET

HCMM satellite follow-on investigation on 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) ---- France, Germany, Italy, United Kingdom, and the Benelux countries

p0178 N80-32823 [E80-10332] HEAT CAPACITY MAPPING MISSION

Geologic application of thermal inertia imaging using HCMM data --- Pisgah Crater, California and Walker Lake, Nevada Test Sites [E80-10229] p0192 N80-29798

Geologic application of thermal-inertia mapping from atellite --- Powder River Basin, Wyoming

[E80-10230] p0192 N80-29799 Geologic application of thermal inertia imaging using HCMM data

[E80-10231] p0192 N80-29800 Applications of HCMM data to soil moisture snow and

estuarine current studies --- Cooper River and Delaware B [E80-10269] o0205 N80-29816

Geological and geothermal data use investigations for application Explorer mission-A (heat capacity mapping

[E80-10279] p0192 N80-29822 Heat capacity mapping mission project HCM-051 --- East

ustralian Current and the Tasman Front [E80-10278] p0198_N80-30850 Investigation of the application of HCMM thermal data

to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California [E80-10297] p0205 N80-30864

Soil moisture in relation to geologic structure and

lithology, northern California [E80-10298] p0192 N80-30865 Study of geological structure of Sicily and other Italian reas --- Gulf of Orosei, Eastern Sardinia

p0192 N80-30866 [E80-10299]

Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco [E80-10309] p0219 N80-30875

HCMM energy budget data as a model input for assessing regions of high potential groundwater pollution --- South D-kats

[E80-10310] p0206 N80-32806 Satellite monitoring of sea surface pollution --- irish and

nonth seas p0199 N80-32820 [E80-10329]

Infrared-temperature variability in a large agricultural field - Dunnigan, California

p0178 N80-32822 [E80-10331] Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely

sensed surface temperature near the daily maximum p0178 N80-32824 [E80-10333] The influence of topographic structures on night-time

...e numerice or topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland --- Germany and Switzerland p0179 N80-33829 [E80-10228]

Impact of cell size on inventory and mapping errors in cellular geographic information system p0221 N80-33831 [E80-10315]

Defining relationships between surface characteristics and actual evaporation rate [E80-10335] p0207 N80-33834

HEAT FILLY

Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely sensed surface temperature near the daily maxim p0178 N80-32824 [E80-10333]

HELICAL ANTENNAS

Platform antennas for data collection [INPE-1820-RPE/186] p p0221 N80-33647 HIGHLANDS

The influence of topographic structures on night-time memory of population of the state of the sta HIGHWAYS

Remote sensing for tunnel siting studies p0189 A80-48975 Digital LANDSAT data analysis of Ter

[E80-10130]

p0212 N80-28768

A-11

Aerotriangulation control of large scale photography from mall scale photography [PB80-161524] p0224 N80-28853

HIMALAYAS

Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143 p0190 A80-51081

Studies of snow accumulation characteristics p0203 A80-51296 Himalayan slopes Satellite imagery and U.P. Himatayas and Siwalik --- for p0204 A80-51304 soil conservation An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing

of volcanic emissions --- Lower Hudson River estuary Maine: White Mountain National Forest, New Hampshire Mt. St. Helens and Metsachee Creek, Washington; and the antiaguito and Feugo volcanoes, Guatemala n0225 N80-32807 [F80-10312]

HUDSON RIVER (NY) An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary Maine: White Mountain National Forest, New Hampshire; Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala 0312] p0225 N80-32807

HUMIDITY Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: algorithm for estimating the actual and potentia evapotranspiration of vegetated surfaces from one remotely ensed surface temperature near the daily maximum E80-10333] p0178 N80-32824 [E80-10333]

HUBBICANES Application of remote sensing to state and regional blems --- Mississippi

roblems -[EBO-10338] p0183 N80-32826 A 94/183 GHz multichannel radiometer for Convair

fliahts NASA-CR-160032] p0225 N80-33047

HYDROGEOLOGY

Contribution of Landsat data to the objectives of th p0189 A80-51077 geological survey of India Some results of remote sensing in Yugoslavia p0191 A80-51091

Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid climates p0202 A80-51284

Terrain analysis and hydrogeologic interpretations from p0202 A80-51285 satellite imagery p0202 A80-51285 Remote sensing of water resources in Panch Mahals

strict p0202 A80-51286 Evaluation of hydrogeologic conditions in Ponnaiyar River district basin, South India using remotely sensed data

p0203 A80-51288 Remote sensing in search for ground water - Some case p0203 A80-51289 histories

Application of Landsat imagery to ground water studies in parts of Punjab and Haryana states, India p0203 A80-51290

Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the global evaluation of ground water resources p0204 A80-51305 Remote sensing of the ocean: Physical, chemical, and [PB80-811235] p0198 N80-3

p0198 N80-30884 Remote sensing applied to the prospecting of geothermal anomaly in Caldas Novas County, State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837

watershed information system p0207 N80-33825 HYDROLOGY

Lineaments and their tectonic significance in relation to p0190 A80-51085 mineral potential in south India L-band radar and geology - Some results in south-east of France p0191 A80-51095 The contribution of space observations to water resources management; Proceedings of the Sy India, May 29-June 9, 1979 mposium, Bangalore, p0201 A80-51278 Space observations for water resources - A potential to developed p0201 A80-51279 be developed Remote sensing application in groundwater surveys a exploration in India p0202 A80-51280 Satellite data for the solution of problems of land hydrology p0202 A80-51282 Quantitative monitoring of sediment levels in freshwater p0203 A80-51291 lakes from Landsat

Snow mapping from space platforms p0203 A80-51293 Problems of snow cover assessment - An approach using remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India p0203 A80-51294 Eurasian snow cover extent - The NOAA satellite record. p0203 A80-51295 1966-79

- Studies of snow accumulation characteristics on Himalayan slopes p0203 A80-51296 Microwave emission properties of snow for monitorin
- hydrological parameters p0203 A80-51297 The utility of Landsat-D for water-resources studies p0205 A80-51309
- Earth observation systems in Japan - for water resources p0205 A80-51310 study

Digital LANDSAT data analysis of Tennessee [F80-10130] n0212 N80-28768

Use of LANDSAT data for river and lake ice engineering

- [E80-10237] p0205 N80-29806 Cornell University remote sensing program --- New York State
- [E80-10280] p0227 N80-29823 Evaluation of remote hydrologic data-acquisition systems,
- vest-central Florida [PB80-176951] p0205 N80-29832
- Florida water resources p0205 N80-30829 [E80-10246]
- Florida water resources. Executive summar p0205 N80-30830 [E80-10247]
- Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front
- p0198 N80-30850 [E80-10278] Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California
- p0205 N80-30864 [E80-10297] Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco
- p0219 N80-30875 [F80.10309] Satellite activities of NOAA, 1979 p0220 N80-31429
- LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau [RHO-BWI-SA-43] p0183 N80-31862
- Sensors for remote sensing [CISE-N-190] p0225 N80-31863
- The application of remote sensing to resource
- management and environmental quality programs in Kansas
- --- kansas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, missouri. [F80-10337] p0183 N80-32825
- HYDROLOGY MODELS
- Application of remote sensing to state and regional oblems --- Mississippi F80-10338 p0183_N80-32826
- A watershed information system p0207 N80-33825 Coastal currents: Study of a model applied to the coast
- of Rio Grande do Sul latitude 29 deg south to 35 deg [INPE-1841-RPE/201] n0200 N80-33844
- HYDROMETEOROLOGY Remote sensing applications in hydrometeorology p0202 A80-51283

I

- ICE
- Radar backscatter study of sea ice [AD-A087032] n0198_N80-30618 ICE FORMATION
- Radar backscatter study of sea ice [AD-A087032]
- p0198_N80-30618 ICE MAPPING
- Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an ice ice-water system p0195 A80-44232
- Satellite studies of fresh-water ice movement on Lake Erie p0205 A80-53611
- The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth [NASA-TM-81847] n0224 N80-28637
- NASA oceanic processes program: Status report fiscal ar 1980
- [NASA-TM-80233] o0198 N80-29005
- Radar backscatter study of sea ice p0198 N80-30618 [AD-A087032]
- The development of a stepped frequency microwave radiometer and its application to remote sensing of the p0224 N80-30822 Earth
- Seasat-A land applications data pr cessing plan p0221 N80-32810 [E80-10317] A 94/183 GHz multichannel radiometer for Convair
- flights [NASA-CR-160032] n0225 N80-33047
- ICE REPORTING
- The contribution of space observations to water resources management; Proceedings of the Symposium, Ban India, May 29-June 9, 1979 p0201 A80p0201 A80-51278 Remote sensing applications in hydrometeorology
- p0202 A80-51283 Use of LANDSAT data for river and lake ice engineering studies
- [E80-10237] p0205 N80-29806 IDAHO
- The Columbia River and Tributaries Irrigation Withdrawals Analysis Project · Feasibility analysis and future plan p0174 A80-49141
- LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau [RHO-BWI-SA-43]
- HO-BWI-SA-43] p0183 N80-31862 Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and
- adjacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-32013

SUBJECT INDEX

- IGNEOUS ROCKS
- Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe guadrangles of New Mavico
- --9(80)-VOL-2] p0192 N80-30881 ILLINOIS
- Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and ouisiana
- [E80-10281] p0176 N80-29824 AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California. Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 IMAGE CONTRAST
- Degradation of picture quality by speckle in coherent mapping systems p0217 N80-30821 Study of the atmospheric effects on the radiation detected p0217 N80-30821 by the sensor aboard orbiting platforms (ERTS/LANDSAT) --- Ribeirao Preto and Brasilia, Brazil
- [E80-10259] p0218 N80-30842 MAGE CORRELATORS
- Automatic selection of reference objects for comparing p0212 A80-52063 aerial and satellite photographs IMAGE ENHANCEMENT
- Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements p0197 A80-51491
- High Density Tape Reformatting System/LANDSA Imagery Verification and Extraction System (HDTRS/LIVES) production test throughput analysis
- p0221 N80-32811 [E80-10319] Digital filtering of LANDSAT images as a visual aid
- technique in geological photointerpretation [INPE-1823-RPE/189] p01 p0193 N80-33843 MAGE PROCESSING
- Segmentation-based boundary modeling for natural rrain scenes p0209 A80-44297 terrain scenes photogrammetric method of processing
- p0185 A80-46967 photographs Remote sensing for tunnel siting studies p0189 A80-48975
- Remotely sensed data processing techniques, present and po209 A80-49138 future
- Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface
- D0210 A80-49658 Cartographic processing and analysis of satellite imagery:
- International Conference, 3rd, Toulouse, France, June 9-22, 1979, Proceedings p Landsat imagery in oil exploration p0185 A80-50876 19-22.
- Six years of D0189 A80-50880 experience
- perience Information extraction from a Landsat image contained bits on artificial outline p0210 A80-50889 within an artificial outline The use of topology concepts for supervised and unsupervised classifications --- of satellite images
- p0210 A80-50891 Spatial filtering of Landsat data for urban cartography p0185 A80-50892
- The potential of Landsat-3 RBV images for thematic mapping --- geomorphological, geological and land cover
- plications p1010 A80-50894 Tidał land mapping from Landsat p0185 A80-50896
- Basic topographic mapping Renewal and revision p0185 A80-50897 Evaluation of Landsat image data for the extraction of
- land use information and its presentation in p0185 A80-50902 maps
- The SPOT/Landsat image ground station Image p0210 A80-50906 preprocessing The detection of linear features using Landsat data
 - p0210 A80-51013 Interfacing with SEO technology -A case study
- geological application p0190 A80-51086 New data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite
- / images p0211 A80-52051 Experiment aimed at standardizing anthropogenic TV images changes of the natural environment from satellite an aerial p0211 A80-52056

Practical aspects of radiative correction of multispectral

Analytical geographic gridding of natural objects from

Distortion of satellite photographs obtained by scanning

Comparison of interpretations of radar images and space

Results of the complex processing of photographs taken

Final design specification for EOD-LARSYS/statistics and

example of the Zarkainarskii intrusive massif /southern

photographs of a high degree of generalization on

Digital LANDSAT data analysis of Tennesse

aerial and satellite multispectral scanner images p0212 A80-52064

p0211 A80-52060

p0212 A80-52065

p0212 A80-52066

p0212 A80-53004

p0212 N80-28768

p0213 N80-28772

p0213 N80-28774

the I-100 tape read

photographs

systems

Tien-Shan/

[E80-10130]

[E80-10171]

[F80-10173]

from the Satyut space stations

consolidation program (FULOI)

As-built design specification for

data transformation processors mod

video information

SUBJECT INDEX

As-built design specification for EOD-LARSYS procedure

- [E80-10174] p0213 N80-28775 As-built design specification for LACIE phase 3 automatic status and tracking system
- [E80-10175] p0213 N80-28776 Design specification for EOD-LARSYS/statistics and data transformation processors modification
- [E80-10177] p0213 N80-28778 Modifications to the CLASY program [E80-10181] p0213 N80-28782
- Design specification for dot data base update deck conversion program (DOTDEC)
- p0213 N80-28784 [E80-10183] As-built design specification for Production Film Converter Gains And Blases program (PFCGAB)
- p0213 N80-28785 [E80-10184] User's guide: Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking
- [E80-10194] o0214 N80-28791 As-built design specification for PDP 11/45 accuracy assessment system
- [E80-10200] p0214 N80-28797 Digital image technology 1980: Emerging production ations
- D-A085163] p0214 N80-28851 User documentation EQD-LARSYS Earth Observations [AD-A085163] Division version of the Laboratory for Applications of Remote
- sensing system [E80-10188] o0214 N80-29780 Design specification for secondary error sources ulti-temporal Bayes classifier
- p0215 N80-29784 [E80-10205] As-built design specification for the CAMS image-100 hybrid system. Volume 1: System design [E80-10207] p0215 N80-29786
- [E80-10207] As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program
- listings [E80-10208] p0215 N80-29787 As-built design specification for Boundary Detection And
- Registration Program (BDARP1) [E80-10217] p0215 N80-29794
- Geologic application of thermal inertia imaging using HCMM [E80-10231] p0192 N80-29800
- Design specification for a merging program for formatted image data files [F80-10234] n0216 N80-29803
- Project development plan for the LANDSAT Imagery Verification and Extraction System (LIVES)
- [E80-10238] p0216 N80-29807 Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES)
- [E80-10239] p0216 N80-2980 Preliminary design specification for the LANDSAT Imagery Verification and Extraction System (LIVES)
- [E80-10240] p0216 N80-29809 Design specification for a list processing system [E80-10265] p0216 N80-29812
- Pixel labeling by supervised probabilistic relaxation [E80-10267] p0216 N80-29814
- Use of collateral information to improve LANDSAT classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268]
- p0176 N80-29815 Some approaches to optimal cluster labeling of aerospa
- imagery [E80-10273] p0216 N80-29820 EOD systems and facilities workload requirements
- forecast [E80-10277] p0176 N80-29821
- Image transformation study [AD-A086070] n0216 N80-29828
- As-built design specification for Boundary Detection And Registration Program (BDARP1) [E80-10216] p0217 N80-30824
- Forest resource information system, phase 3 --- St. Regis Paper Co.: Picayune, Mississippi
- [E60-10242]
 p0176 N80-30825

 Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1 [E60-10243]
 p0217 N80-30826
- Preliminary user guide for the program GTDDM (Ground Truth Dot Dump) [E80-10244] p0217 N80-30827
- Design specification for color coded spectral plots [E80-10245] p0217 N80-30828
- High Density Tape Reformatting System/LANDSAT imagery verification and Extraction System (HDTRS/LIVES) throughput analysis
- [E80-10248] BO-10248) p0217 N80-30831 Implementation specification for Large Area Crop
- Inventory Experiment (LACIE) phase 3 automatic status and tracking system [E80-10249] p0217 N80-30832 As-built design specification for scatter plots for direct
- [E80-10250] p0217 N80-30833
- Classification with spectral-spatial-temporal archetypes [E80-10251] p0217 N80-30834 design specification for field statistics As-built (FIELDSTAT) [E80-10252] p0217 N80-30835

- Classification of multispectral images according to crosswise textural characteristics --- Mato Grasso, Brazil [E80-10257] p0218 N80-30840 Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo, [E80-10258]
- o0176 N80-30841 Study of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/LANDSAT) - Ribeirao Preto and Brasilia, Brazil
- EB0-10259) As-built design specification p0218 N80-30842 for the Patterson-Pitt-Thadani minimum loss classifier
- [E80-10262] p0218 N80-30845 Implementation specification document for merge of BTREAD, phase 1, and phase 2 accuracy assessment programs
- E80-10285) p0218 N80-30853 Estimation of probabilities of label imperfections and [E80-10285] correction of mislabels
- [E80-10288] p0218 N80-30856 As-built design specification for the CMAS image-100 hybrid system. Volume 2: Detailed flow charts and program listings, part 1
- [E80-10289] o0218 N80-30857 As-built design specification for the CAMS image-100 hybrid system. Volume 3: Utilities and shared broutine
- [E80-10290] p0218 N80-30858 Maximal analysis labeling procedure (preliminary)
- p0219 N80-30862 [E80-10294] An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North Dakota
- [E80-10295] p0177 N80-30863 Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana
- [NASA-CR-163382] p0177 N80-30867 Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, Florida: Seattle, Washington: and Boston, Massachusetts p0182 N80-30868 [E80-10301]
- A description of a system of programs for mathematically processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft [NASA-TM-76208] p0220 N80-31856
- Terrain analyst synthesizer station [AD-A087370] p0187 N80-31860
- Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research

p0220 N80-31865

- [DFVLR-FB-80-03]
- A multiprocessor implementation of a contextual image processing algorithm [E80-10313]
- n0221 N80-32808 Seasat-A land applications data processing plan 80-10317] p0221 N80-32810
- [E80-10317] As-huilt design specification for equiprobability ellipses epresentation of CLASSY clusters
- D0221 N80-32812 [E80-10320] Operation plan for the High Density Tape/LANDSAT Imagery Verification and Extraction System (HDT/LIVES)
- data processing support [E80-10322] p0221 N80-32813 As-built design specification for a list processing
- vstem [E80-10325] p0221 N80-32816 Application of remote sensing to selected problems within the state of California --- Mendocino. Colusa, and Shasta
- Counties [E80-10326] p0183 N80-32817 Satellite monitoring of sea surface pollution --- irish and
- orth sea [E80-10329] p0199 N80-32820 Applied Remote Sensing Program (ARSP) --- Arizona
- p0178 N80-32821 [E80-10330] Development of a method to detect geologic faults and
- Development of a method to believe getting other linear features from LANDSAT images p0193 N80-32844 [PB80-189665] Utilization of spectral-spatial information in the
- classification of imagery data [E80-10321] p0222 N80-33832 Bonne's projection of Meteosat images --- subroutines [CSIR-SR-FIS-201] p0222 N80-33837
- A method for edge detection in images of natural resources
- [INPE-1768-RPE/154] p0222 N80-33840 Interactive digital image processing investigation, phase
- [AD-A087518] p0222 N80-33848 IMAGE RECONSTRUCTION
- Optical spatial-frequency characteristic of the atmosphere and its applications --- atmospheric scattering earth surface image distortion p0212 A80-52061 IMAGE RESOLUTION
- Airborne thermal viewer having a circular scanner viewing p0223 A80-52046 IMAGING TECHNIQUES
- Irrigation mapping in western Kansas using Landsat, 1 -ey parameters p0174 A80-49142 Key parameters

Irrigation mapping in western Kansas using Landsat, II Practices and problems --- irrigation mapping in western
Kansas using Landsat p0174 A80-49143

INDIANA

- Cartographic display of space information The different methods available at IGN p0210 A80-50879 Tidal land mapping from Landsat p0185 A80-50896
- Imaging in many frequency bands --- multispectral p0212 A80-52062 spaceborne photography
- Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research
- [DFVLR-FB-80-03] p0220 N80-31865 INDIA
- Contribution of Landsat data to the objectives of the
- geological ground-truths and Landsat imagery interpretation for parts of Karnataka State /India/ p0190 A80-51080
- Landsat exploration of Himalayan and Peninsular regions / Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143 p0190 A80-51081
- Fracture mapping of the Narmada-Tapti basin using D0190 A80-51082 Landsat imagery
- Lineament study of the Bastar district, Madhya Pradesh, India, from Landsat imagery n0190 A80-51083
- Tectonics and lineament patterns of the Vindhvan basin p0190 A80-51084
- based on Landsat imagery data Lineaments and their tectonic significance in relation to mineral potential in south India p0190 A80-51085
- Interfacing with SEO technology geological application - A case study in p0190 A80-51086
- Surface characteristics of Precambrian stromatolitic phosphorites of a part of the Indian shield p0191 A80-51087
- Application of remote sensing techniques to petroleum exploration in India p0191 A80-51088
- Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin, p0191 A80-51089
- Andhra Pradesh, India Use of Landsat data products for geological mapping p0191 A80 51090 A case history in Tamilnadu, India
- Remote sensing application in groundwater surveys and p0202 A80-51280 exploration in India
- Terrain analysis and hydrogeologic interpretations from satellite imagery p0202 A80-51285
- Remote sensing of water resources in Panch Mahals strict p0202 A80-51286 district
- Evaluation of hydrogeologic conditions in Ponnaiyar River basin, South India using remotely sensed data p0203 A80-51288
- Remote sensing in search for ground water Some case stories p0203 A80-51289 histories
- Application of Landsat imagery to ground water studies in parts of Puniab and Harvana states, India
 - p0203 A80-51290 Problems of snow cover assessment - An approach using
- remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India p0203 A80-51294
- Eurasian snow cover extent The NOAA satellite record, 1966-79 p0203 A80-51295
- Studies of snow accumulation characteristics Himalayan slopes p0203 A80-51296
- Assessment of cyclone-caused at p0204 A80-51301 region using remotely sensed data Study of Kosi river characteristics using airborne/space p0204 A80-51302
- orbital multispectral scanner data Floodplains mapping of Gangetic
- basin using Landsat p0204 A80-51303 imagerv Study of floods in Bangladesh and India with the help p0204 A80-51306 of meteorological satellites p0204 A80-51306 As-built design specification for the India monthly data

resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing

of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala [E80-10312] p0225 N80-32807

Landsat application to the study of coastal processes

Status and plans of SEO satellite and receiving station

Protocological application of the second study in ecological application of Study of floods in Bangladesh and India with the help f meteorological satellites pO204 A80-51306 Indian remote sensing satellite program and its

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois,

Mississippi, Indiana, Kentucky, Minnesota, Michigan, and

An investigation of vegetation

Interfacing with SEO technology

contribution to water resources management

p0216 N80-29811

p0203 A80-51292

p0190 A80-51079

A case study in p0190 A80-51086

p0204 A80-51307

n0176 N80-29824 A-13

Farth

and other

[E80-10264]

INDIAN OCEAN

INDIANA

Louisiana

[E80-10281]

INDIAN SPACE PROGRAM

of meteorological satellites

INFESTATION

INFESTATION

- Program on stimulating operational private sector use of Earth observation satellite data D0227 N80-29802
- [E80-10233] The application of remote sensing to resource management and environmental quality programs in Kansas kansas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, mis
- [E80-10337] n0183 N80-32825 The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in
- pest management [NASA-CR-163589] p0178 N80-32830 INFORMATION DISSEMINATION
- Program on stimulating operational private sector use f Earth observation satellite data n0227 N80-29802
- [E80-10233] Collection, processing, and distribution of remote sensing data from Brazilian Receiving Station [INPE-1784-RPE/156] p0221 N80-32832
- INFORMATION SYSTEMS
- Computer-aided watershed analyses using remote sensing based regional information systems p0204 A80-51299
- The availability of U.S. environmental satellite data to e marine technology community p0197 A80-53683 the marine technology community Program on stimulating operational private sector use
- of Earth observation satellite data [F80-10233] 00227 N80-29802 Forest resource information system, phase 3 --- St. Regis
- Picayune, Mississippi Paper Co.: Pin [E80-10242] p0176 N80-30825 A watershed information system p0207 N80-33825
- A watersney minumation system pu207 N80-33825 Impact of cell size on inventory and mapping errors in a cellular geographic information system [E80-10315] p0221 N80-33831
- Operational remote sensing legislation ion, part 1 p0228 N80-34294 [GPO-45-048] INFRARED IMAGERY
- Separability of agricultural cover types in spectral Separability of agriculture. 00173 A80-49100 channels and wavelength regions 00173 A80-49100 Aerial color infrared photography applications to p0175 A80-51944
- Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front n0198 N80-30850 [F80-10278]
- Soil moisture in relation to geologic structure and lithology, northern California p0192 N80-30865
- [E80-10298] 80-10298] Analysis of scanner data for crop inventories p0219 N80-30874 [F80-10308]
- Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco miss [E80-10309]
- Correlation of under-ice roughness with satellite and borne thermal infrared decr airborne thermal infrared data --- Beaufort Sea and Arctic
- [AD-A085512] D0198 N80-30880 Remote sensing of the ocean: Physical, chemical, and properties. Citations from the NTIS data base p0198 N80-30884 [PB80-811235]
- Remote sensing of the ocean: Dynamics. Citations from the NTIS data base p0199 N80-30885 [PB80-811243]
- Sensors for remote sensing p0225 N80-31863
- [CISE-N-190] A multi-step method for avalanche zone recognition and analysis --- San Juan Mountains (co) p0193 N80-33824 INFRARED INSTRUMENTS
- Remote sensing of the ocean: Dynamics. Citations from the NTIS data base n0199 N80-30885
- [PB80-811243] INFRARED LASERS
- Development of a pulsed 9.5 micron lidar for regional rate 0.3 measurement p0181 A80-48909 scale 03 measurem INFRARED SCANNERS
- Airborne thermal viewer having a circular scanner viewing p0223 A80-52046 axis
- INFRARED SPECTROSCOPY Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884
- INFRARED TELESCOPES Advanced solid state Earth resources [E80-10232] n07 satellite st
- p0224 N80-29801 INLAND WATERS Satellite data for the solution of problems of land
- p0202 A80-51282 hydrology Monitoring the use of riverways with aerial photography: The development, testing, and evaluation of a computer
- assisted methodology [AD-A086471] p0182 N80-30877 Assessment of the role of remote sensing in the study
- of inland and coastal waters [NASA-TM-81881] p0200 N80-34048 INSECTS
- The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in pest management [NASA-CR-163589] p0178 N80-32830
- INSOLATION Environmental data for sites in the National Solar Data

Network [SOLAR/0010-80/02]	p0220 N80-31975

Δ-14

INSTRUMENT COMPENSATION

Large field-of-view interferometers for environmental sensing p0223 A80-48911

INSTRUMENT PACKAGES Status and plans of SEO satellite and receiving static

p0190 A80-51079 INTERFEROMETERS

- Large field-of-view interferometers for environmental p0223 A80-48911 sensi
- INTERNATIONAL COOPERATION
- Space law A new proposal p0227 A80-45575 A new era in technology: Proceedings of the Seventeenth Space Congress, Cocoa Beach, Fla., April 30-May 2, 1980 p0210 A80-51926
- China space report / Based on observations made during an invited tour with an AIAA delegation. November 1979. --- Book p0227 A80-53350
- Report on active and planned spacecraft and experiments [NASA-TM-80905]
- n0227 N80-31420 IOWA
- Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and ouicion
- [E80-10281] p0176 N80-29824 IRRIGATION
- Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979 p0174 A80-49136
- A review of future remote sensing satellite capabilities p0174 A80-49139
- Identifying and locating land irrigated by center-pivot irrigation systems using satellite imagery
- p0174 A80-49140 The Columbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans
- p0174 A80-49141
- Irrigation mapping in western Kansas using Landsat. I -ey parameters p0174 A80-49142 Key parameters
- Irrigation mapping in western Kansas using Landsan. If Practices and problems --- irrigation mapping in western p0174 A80-49143 Kansas using Landsat
- Development and application of Landsat-derived irrigation cropland maps for water use determination the High Plains 00175 A80-491 p0175 A80-49144 LANDSAT data as a basis for regional environmental
- assessment within the Columbia Plateau [RHO-BWI-SA-43] p0183 N80-31862
- Irrigated lands assessment for menne Applications Pilot Test (APT) --- California p0178 N80-32815
- [E80-10324] Application of remote sensing to selected problems within the state of California ---- Mendocino, Colusa, and Shasta
- [E80-10326] p0183 N80-32817
- Applied Remote Sensing Program (ARSP) --- Arizona 80-10330] p0178 N80-32821 [E80-10330]
- The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake [E80-10337] p0183 N80-32825
- ISLANDS
- Dynamical interpretation of satellite-sensed thermal features off Vancouver Island p0195 A80-46315 Radar observations of wave transformations in the vicinity
- of islands p0196 A80-51408 Altimetry data over trenches and island-arcs and provection in the mantle
- [NASA-CR-163516] p0199 N80-32050 ITALY
- Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the global evaluation of ground water resources p0204 A80-51305
- Study of geological structure of Sicily and other Italian eas --- Gulf of Orosei, Eastern Sardinia [E80-10299] p0192 N80-30866
- HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European resolute and near budget evaluation in selected European zones of agricultural and environmental interest (TELUS Project) ---- France, Germany, Italy, United Kingdom, and the Benelux countries [E80-1032] p0178 N80-32823

J

- JAPAN
- Earth observation systems in Japan --- for water resources study p0205 A80-51310
- JAPANESE SPACE PROGRAM Activities and future plan of earth observation by satellites p0223 A80-53094

KANSAS

Identifying irrigated lands using remote sensing techniques: State of the Art: Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979 D0174 480-49136

Κ

SURJECT INDEX

- Irrigation mapping in western Kansas using Landsat. II Cansas using Landsat p0174 A80-49143
- Kansas using Landsat p0174 A80-49143 LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas: Williams County, North Dakota: and Hand County, South Dakota [E80-10193]
- p0214 N80-28790 As-built design specification for historical daily data bases for testing advanced models --- Kansas, North Dakota, and
- [E80-10198] p0214 N80-28795 Operational changes for the Kansas State University wheat mode
- [E80-10223] p0176 N80-29797 Draft user procedures: Software wheat yield predictions/foreign equivalent test --- Kansas, Oklahoma. and Nebraska
- p0218 N80-30855 [E80-10287] An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North
- [E80-10295] p0177 N80-30863
- The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas; roy's and phony creeks watersheds; the proposed tallorass prairie national park and pin ford lake, miss [E80-10337] p0183 N80-32825 KENTUCKY
- Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and [E80-10281]
 - 00176 N80-29824

p0205 N80-29806

p0198 N80-30618

p0201 A80-45428

p0201 A80-46450

p0210 A80-49665

p0203 A80-51291

p0205 N80-30829

p0206 N80-31867

p0207 N80-33849

L

LAGOONS

studies

[E80-10237]

LAKE ONTARIO

LAKE SUPERIOR

of multispectral photographs

Florida water resources [E80-10246]

lakes from Landsat

[PB80-182801]

[PB80-198500]

LAND ICE

LAKES

[AD-A087032]

- A continuation of base-line studies for environmentally Space Center. Volume 3, part 1: Ichthyological survey of lagoonal waters --- Indian River lagoon system Ichthyological survey
- [NASA-CR-163122-VOL-3-PT-1] p0197 N80-28939 A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center, Volume 3, part 2: Ichthyological studies.
- sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940 LAKE ERIE
- Satellite studies of fresh-water ice movement on Lake Erie p0205_A80-53611 LAKE ICE
 - Microwave radiometric aircraft observations of the
- Fabry-Perot interference fringes of an ice-water system p0195 A80-44232
- Satellite data for the solution of problems of land p0202 A80-51282 hydrology Satellite studies of fresh-water ice movement on Lake
- p0205 A80-53611 Erie The development of a stepped frequency microwave
- radiometer and its application to remote sensing of the [NASA-TM-81847]
- p0224 N80-28637 Use of LANDSAT data for river and lake ice engineering

The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth p0224 N80-30822

Nonzero subsurface irradiance reflectance at 670 nm from Lake Ontario water masses p0201 A80-45428

Estimates of the accuracy of the brightness conjunction

Quantitative monitoring of sediment levels in freshwater

Multispectral techniques for remote monitoring of

Space observations for water resources - A potential to be developed p0201 A80-51279

Remote sensing of particulate concentrations in v

Simulation of reservoir and lake sedimentation

diment in water: A feasibility investigation

Radar backscatter study of sea ice

SUBJECT INDEX

LAND MANAGEMENT

The application of remote sensing to environmental p0181 A80-47750 management Identifying irrigated lands using remote sensing

techniques: State of the Art; Proceedings of the Symposiur Sioux Falls, S. Dak., November 15, 16, 1979 n0174 A80-49136

A review of future remote sensing satellite capabilities p0174 A80-49139

Irrigation mapping in western Kansas using Landsat, I av parameters p0174 A80-49142 Key parameters

LAND USE

Effects of radar system parameters, population, and mental modulation on settlement visibility p0181 A80-47746

Overview of the Landsat system n0174 A80-49137 Computer-assisted production of multi-coloured mans p0209 A80-49521

A study of the needs of French go ernment agencies in p0181 A80-50882 remote sensing mapping Information extraction from a Landsat image contail within an artificial outline n0210 A80-50889

- The potential of Landsat-3 RBV images for thematic mapping --- geomorphological, geological and land cover applications 0/210 A80.50894
- Evaluation of Landsat image data for the extraction of land use information and its presentation in thematic maps p0185 A80-50902

Application of Landsat-2 data for obtaining land information p0191 A80-51092

Satellite data for the solution of problems of land p0202 A80-51282 hydrology Terrain analysis and hydrogeologic

interpretations from p0202 A80-51285 satellite imagery Evaluation of hydrogeologic conditions in Ponnaivar River

basin. South India using remotely sensed data 00203 A80-51288

Using 70-mm aerial photography to identify rangeland sites p0175 A80-53056 Digital LANDSAT data analysis of Tennessee

[E80-10130] p0212 N80-28768 Use of collateral information to improve LANDSAT

classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268] p0176 N80-29815

Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco nission p0219 N80-30875 [E80-10309]

LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau [RHO-BWI-SA-43] p0183 N80-31862

Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test [E80-10296] p0177_N80-32805

Irrigated lands assessment for water managem lications Pilot Test (APT) --- California D0178 N80-32815 [E80-10324]

- Applied Remote Sensing Program (ARSP) Ariz [E80-10330] p0178 N80-32821 Application of remote sensing to state and regional
- Mississippi problems --- # [E80-10338] p0183 N80-32826

LANDMARKS Automatic selection of reference objects for comparing

aerial and satellite photographs p0212 A80-52063 Investigation of the accuracy of transposition of landmarks and contour points to small-scale aerial photographs p0212 A80-53005

LANDSAT D

The Landsat-D/Global Positioning System experiment [AIAA PAPER 80-1678] p0209 A80 46522 The utility of Landsat-D for water-resources studies

p0205 A80-51309 Landsat-D - Overview and implicatio

o0224 A80-53609 LANDSAT FOLLOW-ON MISSIONS A review of future remote sensing satellite capabilities

p0174 A80-49139 LANDSAT SATELLITES

n0174 A80-49137 Landsat system LARGE AREA CROP INVENTORY EXPERIMENT

As-built specification for CCit6A processor program [E80-10168] 0212 N80-28769 As-built design specification for LACIE formatted dot

cards in EOD-LARSYS [E80-10169] p0212 N80-28770 As-built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological

[E80-10170] 00212 N80-28771 As-built design specification for the I-100 tape read

consolidation program (FULOI) [E80-10171] p0213 N80-28772

As-built design specification for the Brazil and China onthly data bases [£80-10172] p0213 N80-28773

Final design specification for EOD-LARSYS/statistics and data transformation processors modification [E80-10173] p0213 N80-28774 As-built design specification for EOD-LARSYS procedure

[E80-10174]	p0213 N80-28775
-------------	-----------------

As-built design specification for LACIE phase 3 automatic status and tracking system

p0 Design specification for LARSYS proce [E80-10176] n0213 N80-28776 p0213 N80-28777

Design specification for EOD-LARSYS/statistics and data mation processors modification transfo [E80-10177] n0213 N80-28778

Program documentation: Final design specificati dot data base update deck conversion program (DOTDEC) p0213 N80-28779 [E80-10178] Final design specification for ERIPS fields data base deck

[E80-10179] p0213 N80-28780

Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10180] p0213 N80-28781

ns to the CLASY program Modificati p0213 N80-28782 [E80-10181] MAROTY1 FTN Program documentations:

CAMDATA1 STN p0213 N80-28783 [E80-10182]

- Design specification for dot data base update deck on program (DOTDEC) p0213 N80-28784 [E80-10183]
- As-built design specification for Production Film Converter Gains And Biases program (PFCGAB) [E80-10184] n0213 N80-28785
- LACIE/phase 3 Adjustable Crop Calendar (ACC) configuration control procedures manual

[E80-10186] p0213 N80-28786 Recommendations and com concern ints documentation on the microwave active spectrometer

[E80-10187] p0213 N80-28787 Functional design specification for enhancement of the tomatic status and tracking system software

p0214 N80-28788 [EBO-10190] LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas

Williams County, North Dakota; and Hand County, South Dakota [E80-10193] p0214 N80-28790

User's guide: Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking

[E80-10194] p0214 N80-28791 As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 6A [E80-10196] p0214 N80-28793

As-built design for enhancement of the automatic status and tracking system software [E80-10197]

n0214 N80-28794 As-built design specification for historic al daib for testing advanced models --- Kansas, North Dakota, and USSR

[E80-10198] p0214 N80-28795 Design specification for LARSYS procedure 1

[E80-10199] D0214 N80-28796 As-built design specification for PDP 11/45 accuracy assessment system

[E80-10200] As-built design specification of the CAM/CAS interface

report generation program for LACIE 7 [E80-10203] p0214 N80-29782 As-built design specification of the CAMS/CAS interface

tape report generation program [E80-10204] p0215 N80-29783

Design specification for secondary ulti-temporal Bayes classifier

[E80-10205] p0215 N80-29784 Design specification for equiproba ble blocks density estimatory/classifier/dot selector [E80-10206] o0215 N80-29785

As-built design specification for the CAMS image-100 hybrid system. Volume 1: System design

p0215 N80-29786 [E80-10207] As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program

[FRO, 10208] p0215 N80-29787

As-built specification for CCIT7 processor program p0215 N80-29788 [EBO-10209] Final design specification LARSYS for

cation/Fisher F-distribution thresholding D0215 N80-29789 [E80-10210]

specification Final design . EOD-LARSYS/data for transformation processor modification p0215 N80 29790 [E80-10211]

Final design specification for EOD-LARSYS procedure follow-or

[E80-10213] n0215 N80-29791 Program documentation: As-built design specification Generalized Linear Model Analysis Of Variance program

(GLMAOV) [E80-10214] n0215 N80.29792

Design specification for LACIE formatted dot cards in FOD-LARSYS [E80-10215] p0215 N80-29793

As-built design specification for the Yield Estimation Subsystem (YES) monthly yield data base and supporting

[E80-10218] p0215 N80-29795

Program documentation: MARQUIS2.FTN p0215 N80-29796 [E80-10220]

LARGE AREA CROP INVENTORY EXPERIMENT

Operational changes for the Kansas State University hest model p0176 N80-29797 [E80-10223]

Program on stimulating operational private sector use observation satellite data (E80-10233) 00227 N80-29802

User manual for the Earth observations Division R and D to OLPARS dot data conversion

[E80-10236] p0216 N80-29805 As-built design specification for areas added to the

monthly bases of Texas, Minnesota and USSR [E80-10241] 00216 N80-29810 Sampling of rectangular regions

[E80-10272] p0176 N80-29819 EOD systems and facilities workload requirements

[E80-10277] p0176 N80-29821 Composition and assembly of a spectral data base for

corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and Louisiana

[E80-10281] o0176 N80-29824 As-built design specification for Boundary Detection And Registration Program (BDARP1)

[F80, 10216] p0217_N80-30824 Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1 [E80-10243] pO217 N80-30826

Preliminary user guide for the program GTDDM (Ground

Truth Dot Dump) [E80-10244] p0217 N80-30827

High Density Tape Reformatting System/LANDSAT imagery verification and Extraction System (HDTRS/LIVES) throughout analysis

p0217 N80-30831 [F80-10248] Implementation specification for Large Area Crop iventory Experiment (LACIE) phase 3 automatic status

and tracking system p0217 N80-30832 [E80-10249]

As-built design specification for scatter plots for direct [E80-10250] p0217 N80-30833

Classification with spectral-spatial-temporal archetypes p0217 N80-30834 [E80-10251]

design specification for field statistics As-built FIELDSTAT

p0217 N80-30835 [E80-10252] As-built design specification for CLASY program Detail design specification for enhancement of the

Design specification for merge of BTREAD, Phase 1 and

User's guide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking

As-built design specification for phase 3 model areas

The integrated analysis procedure for identification of

Implementation specification document for merge of

As-built design specification for the CMAS image-100

hybrid system. Volume 2: Detailed flow charts and program

As-built design specification for the CAMS image-100 ybrid system. Volume 3: Utilities and shared

An exploratory study to develop a cluster-based area

ebraska, Texas, South Dakota, Oklahoma, and North

Evaluating the use of analyst labels in maximum likelihood

Evaluation of Bayesian sequential proportion estimation

As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 8 [E80-10306] p0219 N80-30872

estimation procedure --- Colorado, Kansas, Minnesota

BTREAD, phase 1, and phase 2 accuracy assessment

Design specification for ERIPS fields data base

spring small grains and barley --- Great Plains Corridor: U.S. and Canada

specification

tomatic status and tracking system software

tterson-Pitt-Thadani minimum loss classifier

South Dakota, Oklahoma, Nebraska, and Colorado

added to the monthly data base of the US

Operator's guide for LACIE phase 3

hase 2 accuracy assessment programs

design

p0217 N80-30836

n0217 N80-30837

n0217 N80-30838

p0217 N80-30839

for

p0218 N80-30845

p0218 N80-30846

n0177 N80-30847

p0218 N80-30852

o0218 N80-30853

n0218 N80-30854

p0218 N80-30857

p0218 N80-30858

p0177 N80-30863

p0219 N80-30870

p0219 N80-30871

A-15

automatic status

--- Montana,

[E80-10253]

[E80-10254]

[F80-10255]

[F80-10256]

As-built

[E80-10262]

[E80-10263]

[F80-10274]

[E80-10284]

programs [E80-10285]

[E80-10286]

[E80-10289]

subroutines

Dakota

[E80-10290]

[E80-10295]

[E80-10303]

[E80-10304]

sing analyst labels

cluster proportion estimation

hybrid system.

. stinas

and tracking system

nant 1

- As-built specification for CLASSY conversion p0219 N80-30873 [E80-10307] As-built design specification for CCIT8 processor
- program [F80-10323] p0221 N80-32814
- Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling --- Corn Belt

[F80-10327] p0178 N80-32818 LARVAE

The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in

est management NASA-CR-163589 n0178 N80-32830 LASER APPLICATIONS

- Fluorescence lidar --- for remote sensing of environments and atmospheric constituents p0181 A80-48908
- Laser studies of the atmosphere and underlying surface p0182 A80-53131 Russian book Remote sensing of the ocean: Dynamics. Citations from
- NTIS data base [PB80-811243] p0199 N80-30885
- Sensors for remote sensing [CISE-N-190] p0225 N80-31863
- LASER SPECTROSCOPY
- In situ ozone data for evaluation of the laser absorption spectrometer ozone remote sensor: 1979 southeastern 1979 southeastern Virginia urban plume study summer field program [NASA-TM-81831] p0183 N80 p0183 N80-33928
- LAW (JURISPRUDENCE) nart 1
- Operational remote sensing legislation, [GPO-45-048] pO p0228 N80-34294 Operational remote sensing legislation, part 2
- [GPO-52-581] p0228 N80-34295 I FAVES
- A model of plant canopy polarization responses [E80-10336] p0179 p0179 N80-33835 LIGHT SCATTERING
- Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface p0210 A80-49658
- Polar nephelometer for atmospheric particulate studies n0182 A80-52346
- LIGHT TRANSMISSION Light reflectance, transmittance, and utilization within a getative canopy --- Texas
- p0177 N80-30851 [E80-10282] Turbid water measurements of remote penetration depth at visible and near-infrared war remote sensing [NASA-TM-81843] p0207 N80-33927
- LIĠNITE
- Application of remote sensing to state and regional problems --- Mississippi [E80-10338] p0183 N80-32826
- LIMNOLOGY
- Quantitative interpretation of Great Lakes re p0201 A80-45005 data LINEAR POLARIZATION
- A model of plant canopy polarization response [E80-10336] p0179 N
- p0179 N80-33835 LIŤHOLOGY Landsat exploration of Himalayan and Peninsular regions
- /Remote sensing and mineral exploration Progress report of work done in India/: I.G.C.P. Project 143 p0190 A80-51081
- Soil moisture in relation to geologic structure and lithology, northern California [E80-10298] p0192_N80-30865
- Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco [E80-10309] p0219 N80-30875
- LITHOSPHERE
- Geological analysis of the Urals-Oman superlineament from satellite imagery p0211 A80-52052 NASA geodetic applications of the Mark 3 VLBI p0186 N80-28841 system
- Altimetry data over trenches and island-arcs and convection in the mantle
- [NASA-CR-163516] p0199 N80-32050 LOCUSTS
- The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in pest management [NASA-CR-163589]
- p0178 N80-32830 LOUISIANA
- Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and [E80-10281] o0176 N80-29824
- AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations ---Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 LUXEMBOURG
- HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and Benelux countries p0178 N80-32823 [E80-10332]

- MAGNESIUM
- Geochemical balance of the Salgado River basin p0206 N80-32834 [INPE-1849-RPE/206] MAGNETIC ANOMALIES
- Improved definition of crustal anomalies for Magsat data
- [E80-10270] p0192 N80-29817 Investigations of medium wavelength magnetic anomalies in the eastern Pacific using Magsat data
- p0199 N80-33833 [E80-10334] MAGNETIC FIELDS
- Investigations of medium wavelength magnetic nomalies in the eastern Pacific using Magsat data [E80-10334] p0199 N80-33833
- MAGNETIC SIGNATURES
- Investigations of medium wavelength magnetic anomalies in the eastern Pacific using Magsat data p0199 N80-33833 [F80-10334] MAGNETIC STORMS
- Substorm warnings An ISEE-3 real time data sy p0209 A80-46225 MAGSAT SATELUTES
- Magsat A new satellite to survey the earth's magnetic field p0223 A80-51233 MAINE
- An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary; Maine; White Mountain National Forest, New Hampshire; Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala p0225 N80-32807 [E80-10312]
- MAN ENVIRONMENT INTERACTIONS Experiment aimed at standardizing anthropogenic
- changes of the natural environment from satellite and aerial p0211 A80-52056 ographs The use of space photographic data for the study and
- mapping of anthropogenic landscapes p0186 A80-54025 The global 2000 report to the president. Entering the twenty-first century, volume 1 p0228 N80-32295 The global 2000 report to the president. Entering the twenty-first century. Volume 2: The technical report ---
- trends in population, climate, gross national product, earth resources, technology, and man environment interactions p0228 N80-32296
- Applied Remote Sensing Program (ARSP) [E80-10330] p0178 N80-32821 MANAGEMENT
- The global 2000 report to the president, twenty-first century, volume 1 p022 Entering t p0228 N80-32295 MANATEES
- Remote sensing procedures for detecting and monitoring various activities regulated by the Mobile District AD-A087584] p0206 N80-31973
- MÁNITOBA Quantitative monitoring of sediment le
- lakes from Landsat p0203 A80-51291 MAPPING
- A color plotter system and its applications geoscience p0209 A80-49099
- Mapping a geologicostructural scheme of the Kola eninsula from satellite imagery p0211 A80-52053 peninsula from satellite imagery put in Audust objects from Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner images p0212 A80-52064
- Forest resource information system, phase 3 --- St, Regis Paper Co.: Picayune, Mississippi
- [E80-10242] p0176 N80-30825 Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, Florida; Seattle, Washington; and Boston, Massachusetts [E80-10301] p0182 N80-30868
- Remote sensing of wildland resources: A state-of-the-art review [PB80-184609] p0177 N80-30882
- A hill-sliding strategy for initialization of Gaussian clusters in the multidimensional space p0219 N80-31072 [NASA-TM-80721]
- Terrain analyst synthesizer station p0187 N80-31860
- [AD-A087370] Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test
- [E80-10296] p0177 N80-32805 HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected E zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and Benelux countries
- [E80-10332] n0178 N80-32823 A multi-step method for avalanche zone recognition and analysis --- San Juan Mountains (co) p0193 N80-33824 Bonne's projection of Meteosat images [CSIR-SR-FIS-201] p02 - subroutin p0222 N80-33837
- MAPS Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980 [RHO-BWI-C-68]
- D0192 N80-32013 MARINE BIOLOGY
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490

Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884 A continuation of base-line studies for environmentally

SUBJECT INDEX

monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part

1: Marine turtle studies [NASA-CR-163122-VOL-4-PT-1] p0183 N80-31969 MARINE ENVIRONMENTS

- The use of space data for the mapping of coastal areas p0185 A80-45297
- Remote sensing of coastal environment and resources p0202 A80-51281
- Earth observation systems in Japan for water resources p0205 A80-51310 study
 - Modulation of sea surface radar cross section by surface stress - Wind speed and temperature effects across the
 - p0196 A80-51415 Gulf Stream Sensing the ocean environment from space
- p0196 A80-51485 Microwave radiometric determination of oceanographic ad meteorological parameters p0223 A80-51579
- and meteorological parameters A meteorological parameters pound not offer Satellite studies of fresh-water ice movement on Lake p0205 A80-53611
- Erie The availability of U.S. environmental satellite data to
- the marine technology community p0197 A80-53683 Platform and buoy positioning experiments in the North
 - a via Doppler satellite techniques p0197 A80-53691 Satellite remote sensing facility for oceanograhic Sea via Doppler satellite techniques applications
 - [NASA-CR-163363] p0197 N80-28847 Seasat. Volume 2: Flight systems
 - [NASA-CR-163571] ASA-CR-163571] p0199 N80-32829 A 94/183 GHz multichannel radiometer for Convair flights
- [NASA-CR-160032] p0225 N80-33047 Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September October 1979
- [AD-A088229] p0199 N80-33068 On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature)
- p0199 N80-33076 [AD-A088082]
- The Gulf Stream Meanders experiment: Current meter. atmospheric, and sea level data report for the mooring period
- [AD-A088069] p0199 N80-33077 MARINE TECHNOLOGY
- The availability of U.S. environmental satellite data to the marine technology community p0197 A80-53683
- Simulation of reservoir and lake sedimentation [PB80-182801] p0206 N80-31867 MARKET RESEARCH
- Program on stimulating operational private sector use of Earth observation satellite date observation satellite data
- [E80-10233] p0227 N80-29802 Private sector involvement in civil space remote sensing. Volume 1: Report
- [NASA-TM-82206] p0228 N80-33845
- Private sector involvement in civil space remote sensing. Volume 2: Appendices [NASA-TM-82207] p0228 N80-33846 MARKING

[E80-10288]

MASSACHUSETTS

[E80-10301]

[E80-10192]

vheat model

[E80-10223]

[PB80-182801]

MASSIFS

Florida water resources [E80-10246]

MATHEMATICAL MODELS

Vegetation clutter model

twenty-first century, volume 1

microwave remote sensors

A watershed information system

Florida water resources, Executive sum [E80-10247] p0.

MARSHLANDS

Estimation of probabilities of label imperfections and correction of mislabels

Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando,

Florida; Seattle, Washington; and Boston, Massachusetts

Comparison of interpretations of radar images and space

A discriminant approach to parameter estimation in the

Operational changes for the Kansas State University

The global 2000 report to the president. Entering the

The global 2000 report to the president. Entering the twenty-first century. Volume 2: The technical report --- trends in population, climate, gross national product, earth

Development of a soil moisture model for use with passive icrowave remote sensors p0179 N80-33828

resources, technology, and man environment interaction

linear model with unknown variance-covariance matrix

Simulation of reservoir and lake sedimentation

photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066

p0218_N80-30856

p0205 N80-30829

p0205 N80-30830

p0182 N80-30868

p0173 A80-44262

p0214 N80-28789

p0176 N80-29797

p0206 N80-31867

p0228 N80-32295

p0228 N80-32296

p0207 N80-33825

MAURITANIA

Application of Landsat-2 data for obtaining land information p0191 A80-51092 MEANDERS

The Gulf Stream Meanders experiment: Current meter. atmospheric, and sea level data report for the mooring period [AD-A088069] p0199 N80-33077

MEDITERRANEAN SEA

Study of geological structure of Sicily and other Italian eas --- Gulf of Orosei, Eastern Sardinia [£80-10299] p0192 N80-30866

MERRITT ISLAND (FL) A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3, part 1: Ichthyological survey of lagoonal waters --- Indian River lagoon system

[NASA-CR-163122-VOL-3-PT-1] p0197 N80-28939 A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3, part 2: Ichthyological studies, sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940 p0198 N80-28940

A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 1: Marine turtle studies [NASA-CR-163122-VOL-4-PT-1] p0183 N80-31969

A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John endangered species of the Kennedy Space Center. Part 2: Threatened and endangered birds and other threatened and endangered forms [NASA-CR-163122-VOL-4-PT-2]

p0183 N80-31970 METEOROLOGICAL FLIGHT A 94/183 GHz multichannel radiometer for Convair

[NASA-CR-160032] p0225 N80-33047

METEOROLOGICAL PARAMETERS Microwave radiometric determination of oceanographic and meteorological parameters p0223 A80-51579 As-built design specification for the Brazil and China

monthly data bases [£80-10172] p0213 N80-28773 As-built design specification for areas added to the monthly bases of Texas. Minnesota and USSR [E80-10241] p0216 N80-29810

As-built design specification for the India monthly data base [E80-10264]

p0216 N80-29811 The 7th WMO Executive Committe Inter-Government Panel Session on the First GARP Global Experiment [GARP-SPEC-35] 00219 NR0-3 n0219 N80-31012

Environmental data for sites in the National Solar Data Natwork p0220 N80-31975 [SOLAR/0010-80/02]

Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I. September - October 1979 [AD-A088229] p0199 N80-33068 METEOROLOGY

Satellite activities of NOAA, 1979 p0220 N80-31429 Seasat. Volume 2: Flight systems [NASA-CR-163571] p0199 N80-32829

The United States space observation on policy D0228 N80-33425 [NASA-TM-76373]

METRIC PHOTOGRAPHY Aerotriangulation control of large scale photography from mail scale photography

[PB80-161524] p0224 N80-28853 MICA

Interfacing with SEO technology - A case study in p0190 A80-51086 geological application MICE

A continuation of base-line studies for e monitoring Space Transportation Systems (STS) at John Kennedy Space Center. Volume 4: Threatened and idangered species of the Kennedy Space Center. Part 2: Threatened and endangered birds and other threatened endangered forms

[NASA-CR-163122-VOL-4-PT-2] p0183 N80-31970 MICHIGAN Composition and assembly of a spectral data base for

corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and ouisiar [EBO-10281] p0176 N80-29824

MICROMETEOROLOGY

ICMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European ones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries -0178 NP0-22923

100000		P*	 	
MICROWAVE	EMISSION			

Soil moisture estimation by correlated ground-based a p0202 A80-51287 Seasat microwave observation Development of a soil moisture model for use with passive p0179 N80-33828 wave remote sensors MICROWAVE IMAGERY

Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an icewater system D0195 A80-44232

Vegetation clutter model pD173 A80-44262 Evaluation of the fire hazard of taiga forests from th thermal radio emission p0175 A80-49652

Remote sensing applications in hydrometeorology p0202 A80-51283 Microwave emission properties of snow for monitoring

hydrological parameters p0203 A80-51297 Microwave radiometer measurer nts of soil moisture

p0176 A80-53890 conten Recommendations and comments concerning documentation on the microwave active spectrometer systems

[E80-10187] p0213 N80-28787 The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth p0224 N80-30822 Earth

Sen ors for remote sensing [CISE-N-190] p0225 N80-31863 On extracting brightness temperature maps from scanning radiometer data --- techniques for algorithm

design [NASA-TM-81989] p0221 N80-32838

MICROWAVE RADIOMETERS ROWAVE RADIOMETERS Microwave radiometric determination of oceanographic ad meteorological parameters p0223 A80-51579 and meteorological parameters

The development of a stepped frequency microwave radiometer and its application to remote sensing of the Farth [NASA-TM-81847] p0224 N80-28637

MICROWAVE SENSORS

Conceptual study of a European remote sensing satellite ith combined optical and microwave payload [BMFT-F8-W-79-18] p0224 N80-29407

Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884

Remote sensing of the ocean: Dynamics. Citations from NTIS data base [PB80-811243] n0199 N80-30885

MICROWAVE SPECTROMETERS Recommendations and comments concerning documentation on the microwave active spectrometer systems

[E80-10187] p0213 N80-28787 MINERAL DEPOSITS

Review of BRGM research activities in geological remote sensing and medium-term perspectives

p0189 A80-50881 Contribution of Landsat data to the objectives of the geological survey of India p0189 A80-51077 Geological ground-truths and Landsat interpretation for parts of Karnataka State / India/ Landsat imagery

p0190 A80-51080 Tectonics and lineament patterns of the Vindhvan basin

p0190 A80-51084 based on Landsat imagery data MINERAL EXPLORATION

Remote sensing and mineral exploration: Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979 p0189 A80-51076

Characteristics of the Landsat system and data for geologic applications - Availability of data p0190 A80-51078

Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143 n0190 A80-51081

Lineaments and their tectonic significance in relation to p0190 A80-51085 mineral potential in south India Surface characteristics of Precambrian stromatolitic phosphorites of a part of the Indian shield

p0191 A80-51087 Evaluation of MSS imagery Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin,

p0191 A80-51089 Andhra Pradesh India Some results of remote sensing in Yugoslavia p0191 A80-51091

Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe guadrangles of New Mexico

[GJBX-9(80)-VOL-2] p0192 N80-30881 An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington; and the ntiaguito and Feugo volcanoes, Guatemala

p0225 N80-32807 [E80-10312] Detection of hidden mineral deposits by airborne spectral analysis of forest canopies

[PB80-193881] p0193 N80-32845 MINERALOGY

Measurement results and conclusions on the spectral reflective coefficients of volcanites, s, granitoides and p0191 A80-51093 gneisses MINERALS

Uranium Spectral discrimination of alteration phenomena in sediments p0189 A80-49524 MINES

Applied Remote Sensing Program (ARSP) --- Arizon [E80-10330] p0178 N80-32821 MINES (EXCAVATIONS)

Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-32013

Application of remote sensing to state and regional problems --- Mississippi [E80-10338] p0183 N80-32826

MINING

Program on stimulating operational private sector use of Earth observation satellite data [E80-10233] p0227 N80-29802

MINNESOTA

As-built design specification for areas added to the monthly bases of Texas, Minnesota and USSR [E80-10241] p0216 N80-29810

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and - Ouisian [E80-10281] p0176 N80-29824

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota. Oklahoma, and North [E80-10295] p0177 N80-30863

MISSION PLANNING

Conceptual study of a European remote sensing satellite th combined optical and microwave payload p0224 N80-29407

[BMFT-FB-W-79-18] Report on active and planned spacecraft and experiments

[NASA-TM-80905] p0227 N80-31420 MISSIONS

HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries

[E80-10332] p0178 N80-32823 MISSISSIPPI

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and ouisiar

[E80-10281] p0176 N80-29824 Forest resource information system, phase 3 --- St. Regis

Paper Co.: Picayune, Mississippi p0176 N80-30825 [E80-10242]

AgRISTARS cropping practices and crop characteristics Agria IANS cropping practices and crop characteristics based on 1979 ESCS observations — Arkansas. California, Georgia, Illinois, Iowa. Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas p0177 N80-30860 [E80-10292] Application of remote sensing to state and regional

problems --- Mississippi [E80-10338] p0183 N80-32826

MISSISSIPPI RIVER (US)

Monitoring the use of riverways with aerial photography: The development, testing, and evaluation of a computer assisted methodology [AD-A086471] p0182 N80-30877

MISSOURI Identifying irrigated lands using remote sensing

techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979 p0174 A80-49136

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and Louisiana

[E80-10281] p0176 N80-29824 AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Ministerio Manuel Mississippi, Missouri, Nebraska, North Carolina, North Ohio, Pennsylvania, South Carolina, and Texas 292] p0177 N80-30860 [E80-10292]

The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas; roy's and phony creeks watersheds; the proposed allgrass prairie national park and pin ford lake. [E80-10337] p0183 N80-32825

MISSOURI RIVER (US) Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979

p0174 A80-49136

MOISTURE CONTENT Evaluation of the fire hazard of taiga forests from the thermal radio emission p0175 A80-49652

nemore sensing or	IDIAL DIV-matter accumulation m
winter wheat	
[E80-10235]	p0176 N80-29804
[[[]]]	poind mod-23004

MOISTURE CONTENT

Using LANDSAT digital data for estimating green biomass Throckmorton, Texas test site and Great Plans Corridor,

[E80-10328] p0178 N80-32819 Development of a soil moisture model for use with passive icrowave remote sensors p0179 N80-33828 microwave remote sensors

The use of radiation temperature to detect water-stress in sugarcane crop --- Brazil [INPE-1767-TDL/028] p0179 N80-33839

MONSOONS

Floodplains mapping of Gangetic basin using Landsat pagery p0204 A80-51303 MONTANA

As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado p0218 N80-30846 **[E80** 10263]

Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana

p0177 N80-30867 NASA-CR-163382] MONTEREY BAY (CA)

Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004 MOROCCO

Application Explorer Mission-A heat capacity mapping mission --- Bavaria, Germany and Marrakech, Moroc p0219 N80-30875 E80-10309 MOUNTAINS

The appearance of the Main Ural Fault in a cloud field n space photographs p0189 A80 49664 Satellite imagery and U.P. Himalayas and Siwalik --- for on space photographs

i conservation p0204 A80-51304 Comparison of interpretations of radar images and space soil conservation photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ D212 A80-52066 Use of collateral information to improve LANDSAT

classification accuracies --- Ventura County and Klamath National Forest, California

- [E80-10268] p0176 N80-29815 Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe quadrangles of New Aexico
- [GJBX-9(80)-VOL-2] p0192 N80-30881 MULTIPROCESSING (COMPUTERS)
- A multiprocessor implementation of a contextual image processing algorithm [EBO-10313] p0221 N80-32808

MULTISPECTRAL BAND CAMERAS

Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857

MULTISPECTRAL BAND SCANNERS Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner images p0212 A80-52064

Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 p0224 N80-29407

A study of LANDSAT multispectral scanner data tapes corrected data and data restoration

DALE-IH-80018] p0220 N80-31864 MULTISPECTRAL LINEAR ARRAYS Advanced of the Advanced solid state Earth resources satellite study p0224 N80-29801 [F80, 10232]

MULTISPECTRAL PHOTOGRAPHY

Estimates of the accuracy of the brightness conjunction of multispectral photographs p0210 A80-49665 Practical aspects of radiative correction of multispectral video information p0211 A80-52060

Imaging in many frequency bands p0212 A80-52062 Imaging in many p0212 ABU-52000 spaceborne photography p0212 ABU-52000 The geometric calibration of multispectral photographic p0186 A80-54024

Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research [DFVLR-FB-80-03] p0220 N80-31865 MULTIVARIATE STATISTICAL ANALYSIS

A discriminant approach to parameter estimation in the near model with unknown variance-covariance matrix ce-covariance matrix p0214 N80-28789 [E80-10192]

Ν

NASA PROGRAMS

A-18

A review of future remote sensing satellite capabilities p0174 A80-49139 Operational remote sensing legislation, part 1

[GPO-45-048] p0228 N80-34294 Operational remote sensing legislation, part 2 SPO-52-581] p0228 N80-34295 [GPO-52-581]

NEBRASKA Identifying and locating land irrigated by center-pivot

irrigation systems using satellite imagery p0174 A80-49140

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and Iouisiana Louisiana [E80-10281]

p0176 N80-29824

As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana. Dakota, Oklahoma, Nebraska, and Colorado p0218 N80-30846 [E80-10263]

Software wheat yield Draft user procedures: predictions/foreign equivalent test --- Kansas, Oklahoma, nd Nebraska

[F80-10287] o0218 N80-30855 AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas California, Georgia, Illinois, Iowa, Louisiana, Minnesota Mississippi, Missouri, Nebraska, North Carolina, North Ohio, Pennsylvania, South Carolina, and Texas 2921 p0177 N80-30860 [E80-10292]

An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota Nebraska, Texas, South Dakota, Oklahoma, and North Dakota p0177 N80-30863 [E80-10295]

The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas; roy's and phony creeks watersheds; the proposed tallgrass prair [E80-10337] irie national park and pin ford lake p0183 N80-32825

NEPAL Satellite imagery and U.P. Himalayas and Siwalik -

soil conservation p0204 A80-51304 NERHELOMETERS

Polar nephelometer for atmospheric particulate stud p0182 A80-52346 **NETHERLANDS**

HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries

p0178 N80-32823 [F80-10332] NEVADA

Geologic application of thermal inertia imaging using HCMM data --- Pisgah Crater, California and Walker Lake, Nevada Test Sites [E80-10229] p0192 N80-29798

NEW HAMPSHIRE

EW HAMPSHIRE An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions ---- Lower Hudson River estuary; Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemal p0225 N80-32807 [E80-10312]

NEW MEXICO

Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe quadrangles of New Mexico [GJBX-9(80)-VOL-2] n0192_N80-30881

NEW YORK

Cornell University remote sensing program --- New York State p0227 N80-29823 [E80-10280]

An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: M 5: Helene and Marchae Carth Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemal

p0225 N80-32807 [E80-10312] NIGERIA

Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid p0202 A80-51284 NIGHT

The influence of topographic structures on night-time inface temperatures: Evaluation of a satellite thermal surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- [E80-10228] - Germany and Switzerland

p0179 N80-33829 NITRATES

Conversion of nitrogen oxide gases to nitrate particle: in oil refinery plumes p0181 A80-48534 NITRIC OXIDE

Remote sensing of NO using a differential abs p0182 A80-52332 lidar NITROGEN OXIDES

Conversion of nitrogen oxide gases to nitrate particles in oil refinery plumes p0181 A80-48534 NORTH AMERICA

Quantitative interpretation of Great Lakes remote sensing p0201 A80-45005

Applications to floods of remote sensing from satellites p0204 A80-51300 Radar backscatter study of sea ice

[AD-A087032] p0198 N80-30618 The integrated analysis procedure for identification of spring small grains and barley --- Great Plains Corridor: .S. and Canada

[E80-10274] p0177 N80-30847 Correlation of under-ice roughness with satellite and airborne thermal infrared data --- Beaufort Sea and Arctic Ocean pack ice

[AD-A085512] n0198_N80-30880

An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [E80-10314] p0178 N80-32809

The Gulf Stream Meanders experiment: Current meter, atmospheric, and sea level data report for the mooring

SUBJECT INDEX

[AD-A088069] o0199 N80-33077 Assessment of the role of remote sensing in the study of inland and coastal waters

[NASA.TM.81881] DO200 N80-34048 NORTH CAROLINA

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas. California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [F80-10292] 80-10292] p0177 N80-30860 The Gulf Stream Meanders experiment: Current meter,

atmospheric, and sea level data report for the mooring

[AD-A088069] p0199 N80-33077

NORTH DAKOTA LACIE field measurements data acquisition sum mary report. 1975 - 1976 crop year --- Finney County, Kansas: Williams County, North Dakota: and Hand County, South Dakota [E80-10193]

p0214 N80-28790 As-built design specification for historical daily data bases for testing advanced models --- Kansas, North Dakota, and

[E80-10198] o0214 N80-28795 AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California. Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North

Bakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota,

ebraska, Texas, South Dakota, Oklahoma, and North Dakota [E80.10295] n0177_N80-30863

NORTH SEA

Tidal land mapping from Landsat p0185 A80-50896 Platform and buoy positioning experiments in the North Sea via Doppler satellite techniques p0197 A80-53691

Observed short-time temperature variations and tidal current constants in the North Sea south east of the Dogger Bank / Comparison of two seasons/ p0197 A80-54060 Satellite monitoring of sea surface pollution --- irish and

north seas [F80-10329] n0199 N80-32820

Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September - October 1979 p0199 N80-33068 [40.4088229] NUTS (FRUITS)

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [E80-10324] p0178 N80-32815

0

OCEAN BOTTOM

Altimetry data over trenches and island-arcs and privation in the mantle p0199 N80-32050

[NASA-CR-163516] p0199 N80-32050 Investigations of medium wavelength magnetic anomalies in the eastern Pacific using Magsat data [E80-10334] p0199 N80-33833

OCEAN CURRENTS

OCEAN SURFACE

Thermal fronts in the Mediterranean according to NOAA satellite radiometer data / September 1977-February 979/ p0195 A80-48750 1979/

Observed short-time temperature variations and tidal current constants in the North Sea south east of the Dogger Bank /Comparison of two seasons/ p0197 A80-54060

Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front [E80-10278] p0198 N80-30850

Remote sensing of the ocean: Dynamics, Citations from the NTIS data base [PB80-811243]

p0199 N80-30885 On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature)

[AD-A088082] p0199 N80-33076 The Gulf Stream Meanders experiment: Current meter,

atmospheric, and sea level data report for the mooring [AD-A088069] p0199 N80-33077

OCEAN DATA ACQUISITIONS SYSTEMS

Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004

A telemechanical system for hydrophysical studies in the p0223 A80-45766 ocean

Substorm warnings - An ISEE-3 real time data system p0209 A80-46225 Landsat application to the study of coastal process

Ocean chlorophyll studies from a U-2 aircraft platform

parameters from narrow beam HF radar sea echo

Methods for the extraction of long-period ocean wave

p0203 A80-51292

p0195 A80-45004

p0195 A80-46095

Dynamical interpretation of satellite-sensed thermal features off Vancouver Island p0195 A80-46315 Spaceborne imaging radar - Geologic and oceanographic p0223 A80-47480 applications

Development of a pulsed 9.5 micron lidar for regional scale O3 measurement p0181 A80-48909 The problems of SAR imagery of ocean waves p0196 A80-50300

Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemometer p0196 A80-51407

Radar observations of wave transformations in the vicinity p0196 A80-51408 of islands Comparisons between wave directional spectra from SAR p0196 A80-51409

and pressure sensor arrays Modulation of sea surface radar cross section by surface - Wind speed and temperature effects across the stress D0196 A80-51415 Gulf Stream

Microwave radiometric determination of oceanographic p0223 A80-51579 and meteorological parameters Oil film thickness measurement using airborne laser-induced water Raman backscatter

n0197 A80-52331 Landsat detection of oil from natural seeps

p0197 A80-53054 Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering p0224 A80-53891

Walloos waveform analysis of SEASAT-1 radar altimeter

[NASA-CR-156869] p0198 N80-29637 Seasat-A land applications data processing plan 80-10317] p0221 N80-32810

[E80-10317] On extracting brightness temperature maps from scanning radiometer data --- techniques for algorithm

design [NASA-TM-81989] p0221 N80-32838 A 94/183 GHz multichannel radiometer for Convair

fliahts [NASA-CR-160032] o0225 N80-33047 Passive 19.3 GHz radiometer and aerosol data from the

rth Sea during MARSEN I. September - October 1979 p0199 N80-33068 [AD-A088229] Ocean wave sensing. Citations from the NTIS data

base p0200 N80-34053 [PB80-812878]

OCEAN TEMPERATURE The three-dimensional structure of the frontal zone of the Gulf Stream from synchronous satellite and ship data

p0196 A80-49651 Observed short-time temperature variations and tidal current constants in the North Sea south east of the De ogge Bank / Comparison of two seasons/ p0197 A80-54060

OCEANOGRAPHIC PARAMETERS Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004

A telemechanical system for hydrophysical studies in the

Sensing the ocean environment from space p0196 A80-51485 Microwave radiometric determination

on of oceanographic p0223 A80-51579 and meteorological parameters The availability of U.S. environmental satellite data to the marine technology community p0197 A80-53683 The 7th WMO Executive Committe Inter-Government

Panel Session on the First GARP Global Experime [GARP-SPEC-35] p0219 N8 p0219 N80-31012

OCEANOGRAPHY Observation of wavelike motion of the Gaspe Current

p0195 A80-46309 Direct measurement of recirculation in the Alaskan tream p0195 A80-46316

Stream Thermal fronts in the Mediterranean according to NOAA 1977 · February satellite radiometer data /September

1979/ p0195 A80-48750 Comparison of surface wind stress measurements -

Airborne radar scatterometer versus sonic anemometer p0196 A80-51407 Synthetic aperture radar imaging of ocean waves -

Comparison with wave measurements p0196 A80-51411

The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth [NASA-TM-81847]

p0224 N80-28637 Satellite remote sensing facility for oceanograhic applications

[NASA-CR-163363] n0197 N80-28847 NASA oceanic processes program: Status report, fiscal ear 1980

p0198 N80-29005 [NASA-TM-80233] The development of a stepped frequency microwave radiometer and its application to remote sensing of the p0224 N80-30822 Earth Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884

tr B00-811235] p0198 N80-30884 Satellite activities of NOAA, 1979 p0220 N80-31429 Seasat, Volume 2: Flight systems [NASA-CR-163571] p1199 A00 00000

Private sector involvement in civil space remote sensing. Volume 1: Report

[NASA-TM-82206] n0228 N80-33845

Private sector involvement in civil space remote sensing. Volume 2: Appendices NASA-TM-82207] p0228 N80-33846

OCEANS NASA oceanic processes program: Status report, fiscal year 1980

[NASA-TM-80233] o0198 N80-29005 OFFSHORE ENERGY SOURCES

Landsat detection of oil from natural seens p0197 A80-53054

OFFSHORE PLATFORMS

Platform and buoy positioning experiments in the North Sea via Doppler satellite techniques p0197 A80-53691 OHIO

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Mis ouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas p0177 N80-30860 [FBD_10292]

OIL EXPLORATION Landsat imagery in oil exploration - Six years of perience p0189 A80-50880 experience

Application of remote sensing techniques to petroleum ploration in India p0191 A80-51088 Landsat detection of oil from natural seeps exploration in India

o0197 A80-53054 OIL FIELDS

Cornell University remote sensing program --- New York State [E80-10280] p0227 N80-29823

OIL POLLUTION Satellite monitoring of sea surface pollution --- irish and

north seas [F80-10329] p0199 N80-32820 OIL SUCKS

Oil film thickness measurement using airborne laser-induced water Raman backscatter p0197 A80-52331

OKIAHOMA As-built design specification for phase 3 model areas

added to the monthly data base of the US --- Montana. South Dakota, Oklahoma, Nebraska, and Colorado p0218 N80-30846 [E80-10263]

Draft user procedures: Software wheat predictions/foreign equivalent test --- Kansas, Oklahoma, ind Nebraska [E80-10287] p0218 N80-30855

An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North Dakota

p0177 N80-30863 [E80-10295] ONTARIO

Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume pC OPERATING SYSTEMS (COMPUTERS) p0182 A80-53269

As-built design specification of the CAM/CAS interface tape report generation program for LACIE 7 [E80-10203] p0214 N80-29782

Design specification for equiprobable blocks density ry/classifier/dot selector [E80-10206] p0215 N80-29785

As-built design specification for the CAMS image-100 hybrid system. Volume 1: System design

p0215 N80-29786 [E80-10207] As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program ings

[E80-10208] p0215 N80-29787 Final design specification for EOD-LARSYS/data transformation processor modification

00215 N80-29790 [E80-10211] Design specification for LACIE formatted dot cards in EOD-LARSYS

p0215 N80-29793 [E80-10215]

Project development plan for the LANDSAT Imagery cation and Extraction System (LIVES) p0216 N80-29807 [E80-10238]

Design specification for a list processing system 00216 N80-29812 [E80-10265]

Design specification for color coded spectral plots p0217 N80-30828 [E80-10245]

High Density Tape Reformatting System/LANDSAT imagery verification and Extraction System (HDTRS/LIVES) throughout analysis p0217 N80-30831 [E80-10248]

As-built design specification for the CMAS image-100 hybrid system. Volume 2: Detailed flow charts and program stings, part 1 p0218 N80-30857 (F80-10289)

As-built design specification for the CAMS image-100 brid system. Volume 3: Utilities and shared hybrid system. ubroutine<

p0218 N80-30858 [E80-10290] A multiprocessor implementation of a contextual image processing algorithm [E80-10313]

p0221 N80-32808 As-built design specification for a list processing system

[E80-10325] p0221 N80-32816

OPTICAL CORRECTION PROCEDURE Large field-of-view interferometers for environmental p0223 A80-48911 sensing

Practical aspects of radiative correction of multispectral p0211 A80-52060 video informatio OPTICAL DENSITY

Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelength measurements of remote sensing NASA-TM-81843] p0207 N80-33927 OPTICAL EMISSION SPECTROSCOPY

Large field-of-view interferometers for environmental p0223 A80-48911 sensing OPTICAL RADAR

Fluorescence lidar --- for remote sensing of environments

nd atmospheric constituents p0181 A80-48908 Development of a pulsed 9.5 micron lidar for regional scale O3 measurement p0181 A80-48909

Oil film thickness measurement using airborne laser-induced water Raman backscatter

n0197 A80-52331 Remote sensing of NO using a differential absorption lida p0182 A80-52332

Laser studies of the atmosphere and underlying surface p0182 A80-53131 - Russian book OPTICAL SCANNERS

Distortion of satellite photographs obtained by scanning p0212 A80-52065

ORBIT CALCULATION

The Landsat-D/Global Positioning System experiment [AIAA PAPER 80-1678] p0209 A80-46522 Spacecraft trajectories for the remote sensing of the

p0223 A80-49662 ORCHARDS

Aerial color infrared photography applications p0175 A80-51944 citriculture Irrigated lands assessment for water management

Applications Pilot Test (APT) --- California E80-10324] p0178 N80-32815 OREGON

Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium. Sioux Falls, S. Dak., November 15, 16, 1979

p0174 A80-49136 The Columbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans

p0174 A80-49141 LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau p0183 N80-31862 [RHO-BWI-SA-43]

OUTCROPS An automatic method of discriminating rock outcrops

p0191 A80-51094 using Landsat data OXIDATION

Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269 OZONOMETRY

Development of a pulsed 9.5 micron lidar for regional p0181 A80-48909 cale 03 measurement p0181 A80-48909 In situ ozone data for evaluation of the laser absorption

spectrometer ozone remote sensor: 1979 soul Virginia urban plume study summer field program 1979 southeastern p0183 N80-33928 [NASA-TM-81831]

Ρ

PACIFIC OCEAN Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004 Satellite observations of a nutrient upwelling off the coast California p0195 A80-45015 of California p0195 A80-45015 Dynamical interpretation of satellite-sensed thermal es off Vancouver Island p0195 A80-46315 atures off Vancouver Island points not account Direct measurement of recirculation in the Alaskan ream points A80-46316 Radar observations of wave transformations in the vicinity islands points A80 - 51408 Stream of islands Comparisons between wave directio al spectra from SAR p0196 A80-51409 and pressure sensor arrays p0196 Landsat detection of oil from natural seeps p0197 A80-53054 Satellite remote sensing facility for oceanograhic applications [NASA-CR-163363] p0197 N80-28847 Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front p0198 N80-30850 [E80-10278] Investigations of medium wavelength magnetic normalies in the eastern Pacific using Magsat data [E80-10334] p0199 N80-33833 PAKISTAN An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington: and the

Santiaguito and Feugo volcanoes, Guatemala [E80-10312] p0225 N80-32807 PARALLAX

techniques

PARKS

[AD-A087443]

[AD-A086471]

sted methodology

Errors in automatic pass point mensuration using digital

Monitoring the use of riverways with aerial photography:

The development, testing, and evaluation of a computer

p0220 N80-31859

p0182 N80-30877 A-19

PARTICULATE SAMPLING

PARTICULATE SAMPLING

- Polar nephelometer for atmospheric particulate studies p0182 A80-52346 PATTERN RECOGNITION
- Segmentation-based boundary modeling for natural rrain scenes p0209 A80-44297 Unsupervised classification of MSS Landsat data for terrain scenes
- mapping spatially complex vegetation p0173 A80-47744 Separability of agricultural cover types in channels and wavelength regions p0173 A80-49100
- Remotely sensed data processing tech pozog A80-49138 future Automatic mapping of show cover by means of Landsat
- Application to the central Pyrenees p0185 A80-50888 Information extraction from a Landsat image contained ithin an artificial outline p0210 A80-50889 within an artificial outline
- The detection of linear features using Landsat data p0210 A80-51013
- Interfacing with SEO technology A case study in gical application n0190 A80-51086 Automatic selection of reference objects for comparing
- p0212 A80-52063 aerial and satellite photographs Applications of statistics to thematic mapping p0186 A80-53051
- Design specification for LARSYS procedure 1 follow-on 80-10176] p0213 N80-28777 [E80-10176] Program documentation: Final design specification for
- dot data base update deck conversion program (DOTDEC) [E80-10178] p0213 N80-28779 [E80-10178] Modifications to the CLASY program
- p0213 N80-28782 [FRO-10181] A discriminant approach to parameter estimation in the
- A distribution approach to parameter estimation in the near model with unknown variance-covariance matrix 80-10192] p0214 N80-28789 As-built design specification of the CAMS/CAS interface [E80-10192]
- tape report generation program for LACIE 6A [E80-10196] n0214 p0214 N80-28793 Digital image technology 1980: Emerging prod ication
- [AD-A085163] p0214 N80-28851 User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote ensing system
- [E80-10188] 0214 N80-29780 As-built design specification of the CAMS/CAS interface tape report generation program [E80-10204]
- p0215 N80-29783 Design specification for secondary ulti-temporal Bayes classifier nulti-te
- D0215 N80-29784 [E80-10205] Design specification for equiprobable blocks density estimatory/classifier/dot selector
- [E80-10206] p0215 N80-29785 As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program
- listings [E80-10208] p0215 N80-29787 Final design specification for EOD-LARSYS pro l follov
- [E80-10213] p0215 N80-29791 Design specification for a merging program for formatted mage data files
- [E80-10234] n0216 N80-29803 al for the Earth observations Division R and User manual for the Earth obser D to OLPARS dot data conversion
- p0216 N80-29805 [E80-10236] Project development plan for the LANDSAT Imagery
- and Extraction System (LIVES) p0216 N80-29807 [E80-10238] Test plan for the LANDSAT Imagery Verification and
- Extraction System (LIVES) [E80-10239] p0216 N80-29808
- Preliminary design specification for the LANDSAT nagery Verification and Extraction System (LIVES) [E80-10240] p0216 N80-29809
- Design specification for a list processing system (E80-10265) p0216 N80-29812
- Pixel labeling by supervised probabilistic relaxation [E80-10267] p0216 N80-29814
- Use of collateral information to improve LANDSAT classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268] p0176 N80-29815
- Sampling of rectangular regions [E80-10272] p0176 N80-29819
- Some approaches to optimal cluster labeling of aerospace magery
- [E80-10273] p0216 N80-29820 Degradation of picture quality by
- speckle in coherent p0217 N80-30821 mapping systems As-built design specification for Boundary Detection And Registration Program (BDARP1)
- [E80-10216] p0217 N80-30824 Forest resource information system, phase 3 --- St. Regis Picayune, Mississippi Co
- [E80-10242] p0176 N80-30825 Design specification for color coded spectral plots [E80-10245] p0217 N80-3
- p0217 N80-30828 High Density Tape Reformatting System/LANDSAT imagery verification and Extraction System (HDTRS/LIVES) put analysis
- [E80-10248] p0217 N80-30831 Classification with spectral-spatial-temporal archetypes 80-102511 p0217 N80-30834 [E80-10251]

A-20

- As-built design specification for CLASY program nodificatio [E80-10253] p0217 N80-30836 Classification of multispectral images according to rosswise textural characteristics --- Mato Grasso, Brazil [E80-10257] p0218 N80-30840 Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo, [F80-10258] p0176 N80-30841
- Use of LANDSAT data for estimating the area of sugar cane in the state of Sao Paulo --- Brazil p0177 N80-30843 [E80-10260]
- Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo [E80-10261] p0177 N80-30844
- specification As-built design for the Patterson-Pitt-Thadani minimum loss classifier
- p0218 N80-30845 [E80-10262] The integrated analysis procedure for identification of spring small grains and barley --- Great Plains Corridor:
- nd Canada p0177 N80-30847 [E80-10274] Statistical Outlier Detection (SOD): A computer program
- for detecting outliers in data --- AgRISTARS Project p0218 N80-30848 [E80-10275]
- Estimation of probabilities of label imperfections and rrection of mislabels p0218 N80-30856 [E80-10288]
- As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 8 [E80-10306] nO21 p0219 N80-30872
- As-built specification for CLASSY conversion [E80-10307] p0219 M p0219 N80-30873
- A hill-sliding strategy for initialization of Gaussian clusters in the multidimensional space
- ASA-TM-80721] p0219 N80-31072 High Density Tape Reformatting System/LANDSAT [NASA-TM-80721]
- Imagery Verification and Extraction System (HDTRS/LIVES) oduction test throughput analysis [E80-10319] p0221 N80-32811
- Operation plan for the High Density Tape/LANDSAT Imagery Verification and Extraction System (HDT/LIVES) data processing support
- p0221 N80-32813 10322] [E80-As-built design specification for CCIT8 processor
- [E80-10323] p0221 N80-32814 As-built design specification for a list processing
- [E80-10325] p0221 N80-32816
- On extracting brightness temperature maps from scanning radiometer data --- techniques for algorithm design
- [NASA-TM-81989] p0221 N80-32838 Development of a method to detect geologic faults and other linear features from LANDSAT images
- p0193 N80-32844 [PB80-189665] A multi-step method for avalanche zone recognition and
- analysis --- San Juan Mountains (co) p0193 N80-33824 Utilization of spectral-spatial information in the classification of imagery data [E80-10321] p0222 N80-33832
- Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil INPE-1838-RPE/ 199] p0193 N80-33842
- PATTERN REGISTRATION As-built design specification for Boundary Detection And Registration Program (BDARP1)
- [E80-10217] 0215 N80-29794 0-10217) Maximal analysis labeling procedure (preliminary) 0-10204) p0219 N80-30862
- [E80-10294] PENINSULAS
- Mapping a geologicostructural scheme of the Kola eninsula from satellite imagery p0211 A80-52053 PENNSYLVANIA
- AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177' N80-30860 [E80-10292]
- PETROLOGY Spectral discrimination Uranium of alteration enomena in sediments p0189 A80-49524 Measurement results and conclusions on the spectral phenomena in sediments reflective coefficients of volcanites, granitoides and gneisses p0191 A80-51093
- An automatic method of discriminating rock outcrops using Landsat data n0191 A80-51094 Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and
- djacent areas, in Idaho, 1980 [RHO-8WI-C-68] p0192 N80-32013 PHENOLOGY
- As-built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological
- [E80-10170] p0212 N80-28771 Program de CAMDATA1.FTN documentations: MABOTY1.FTN. [E80-10182] p0213 N80-28783
- LACIE/phase 3 Adjustable Crop Calendar (ACC) configuration control procedures manual [E80-10186] n0213 N80-28786

LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas: Williams County, North Dakota; and Hand County, South [E80-10193] p0214 N80-26790

SUBJECT INDEX

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations ---Arkansas. California, Georgia, Illinois, Iowa, Louisiana, Minesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas p0177 N80-30860 [E80-10292]

- Use of soil moisture information in yield models p0177 N80-30869 [E80-10302] An algorithm for estimating crop calendar shifts of spring mall grains using LANDSAT spectral data
- [F80-10314] p0178 N80-32809 Using LAND SAT digital data for estimating green biomass - Throckmorton, Texas test site and Great Plans Corridor,
- [F80-10328] p0178 N80-32819
- Infrared-temperature variability in a large agricultural field - Dunnigan, California [E80-10331] p0178 N80-32822
- A model of plant canopy polarization response [F80-10336] p0179 N80-33835 PHOSPHATES
- Surface characteristics of Precambrian stromatolitic phosphorites of a part of the Indian shield p0191 A80-51087
- PHOTOACOUSTIC SPECTROSCOPY
 - Thermal balance of soils [INPE-1859-RPE/210] p0180 N80-33841 PHOTOGEOLOGY
 - The Mesozoic and Cenozoic depressions of the Baikato-Amur region from the interpretation of space photographs p0189 A80-49654
 - Characteristics of the representation of tectonic faults space photographs p0189 A80-49663 on Landsat imagery in oil exploration Six years of
 - p0189 A80-50880 experience Review of BRGM research activities in geological remote sensing and medium-term perspectives
 - p0189 A80-50881 The potential of Landsat-3 RBV images for thematic --- geomorphological, geological and land cover mannin
 - applications p0210 A80-50894 Characteristics of the Landsat system and data for geologic applications - Availability of data
 - geologic applications Availability of data p0190 A80-51078 Geological ground-truths and Landsat imagery interpretation for parts of Karnataka State /India/
 - 0190 A80-51080 Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143
 - p0190 A80-51081
 - Fracture mapping of the Narmada-Tapti basin using ndsat imagery p0190 A80-51082 Landsat imagery Lineament study of the Bastar district, Madhya Pradesh,
 - India, from Landsat imagery p0190 A80-51083 Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data p0190 A80-51084
 - Lineaments and their tectonic significance in relation to p0190 A80-51085 mineral potential in south India
 - Interfacing with SEO technology A case study in geological application D0190 A80-51086
 - Surface characteristics of Precambrian stromatolitic phosphorites of a part of the Indian shiel p0191 A80-51087
 - niques to petroleum p0191 A80-51088 Application of remote sensing technic exploration in India
 - Use of Landsat data products for geological mapping case history in Tamilnadu, India p0191 A80-51090 Some results of remote sensing in Yugoslavia
 - p0191 A80-51091 for obtaining land p0191 A80-51092 Application of Landsat-2 data
 - information Measurement results and conclusions on the spectral reflective coefficients of volcanites. granitoides
 - D0191 A80-51093 gneisses An automatic method of discriminating rock outcrops
 - using Landsat data p0191 A80-51094 L-band radar and geology - Some results in south-east p0191 A80-51095 of France Evaluation of hydrogeologic conditions in Ponnaiyar River

Remote sensing in search for ground water - Some case

Application of Landsat imagery to ground water studies

the geological

Verkhoiany-Kolyma fold region from an analysis of satellite

Geological analysis of the Urals-Oman superlineament om satellite imagery p0211 A80-52052

Mapping a geologicostructural scheme of the Kola aninsula from satellite imagery p0211 A80-52053

Experiment with the composition of a geological map

on the basis of interpretations of Meteor satellite television

p0203 A80-51288

p0203 A80-51289

p0203 A80-51290

p0211 A80-52051

p0211 A80-52054

the

structure of

basin, South India using remotely sensed data

in parts of Punjab and Haryana states, India

histories

TV images

New data on

from satellite imagery

peninsula from satellite imagery

images /using Central Asia as an exa

PLANTS (BOTANY)

Remote sensing application in groundwater surveys and exploration in India p0202 A80-51280

Satellite data for the solution of problems of land p0202 A80-51282 hydrology

Soil moisture estimation by correlated ground-based and Seasat microwave observation D0202 A80-51287 Mapping a geologicostructural scheme of the Kola

peninsula from satellite imagery p0211 A80-52053 Experiment with the composition of a geological map on the basis of interpretations of Meteor satellite television images / using Central Asia as an example/ p0211 A80-52054

atomatic selection of reference objects for comparing and satellite photographs p0212 A80-52063 aerial and satellite photographs

Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner imag p0212 A80-52064

Results of the complex processing of photographs taken from the Salyut space stations p0212 A80-53004 Investigation of the accuracy of transposition of landmarks

and contour points to small-scale aerial photographs p0212 A80-53005 Applications of statistics to thematic mapping

n0186 A80-53051 An automated aerial-photographic information-search

p0186 A80-54023 system

The use of space photographic data for the study and mapping of anthropogenic tandscapes p0186 A80-54025 Use of LANDSAT data for estimating the area of sugar cane in the state of Sao Paulo --- Brazil [E80-10260]

00177 N80-30843 Utilization of LANDSAT data to inventory the sugar cane the state of Sao Paulo

p0177 N80-30844 [E80-10261]

Sensors for remote sensing [CISE-N-190] o0225 N80-31863 Applied Remote Sensing Program

(ARSP) --- Arizona p0178 N80-32821 [E80-10330] Planning and execution of a photographic mission over a wheat producing region in Rio Grande do Sul, Brazil [INPE-1793-RPE/165] p0179 N80-32833

Characterization of Cerrado vegeta automatically classified LANDSAT MSS data [INPE-1790-RPE/162] p0179 HOTOMETER vegetation using

p0179 N80-32835 PHOTOMETERS

Advanced solid state Earth resources satellite study p0224 N80-29801 [F80.10222] PHOTOMETRY

Photometric problems, solved by means of space photography p0209 A80-49657

Invariant photometric features of natural objects p0211 A80-52058 PHOTOSYNTHESIS

Use of soil moisture information in vield models [E80-10302] p0177 N80-30869

PLAINS Development and application of Landsat-derived irrigation cropland maps for water use determination in

the High Plains p0175 A80-49144 PLANETARY MAPPING

Computer-assisted production of multi-coloured maps p0209 A80-49521 Analytical geographic gridding of natural objects from

aerial and satellite multispectral scanner images p0212 A80-52064

Distortion of satellite photographs obtained by scanning stems p0212 A80-52064 Results of the complex processing of photographs taken systems p0212 A80-53004

from the Salyut space stations p0212 A80-5: The use of space photographic data for the study mapping of anthropogenic landscapes p0186 A80-54025

PLANKTON Optical methods for the study of biocenoses on land and sea n0201 A80-49656

Nimbus-7 coastal zone color scanner - System description and initial imagery p0197 A80-51490

and initial imagery pullar Action and Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements p0197 A80-51491

PLANT STRESS

Soil water and plant canopy effects on remotely measured p0173 A80-47748 surface temperatures p0173 A80-47748 Remote sensing of total dry-matter accumulation in

inter wheat [E80-10235] p0176 N80-29804 Use of soil moisture information in yield models

p0177 N80-30869 [E80-10302] The use of radiation temperature to detect water-stress

in sugarcane crop ·-- Brazil INPE-1767-TDL/028] p0179 N80-33839

PLANTING AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas,

California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 p0177 N80-30850 PLANTS (BOTANY)

Grizzly bear habitat analysis. Section 3: LANDSAT-1 tispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana [NASA-CR-163382]

p0177 N80-30867 Applied Remote Sensing Program (ARSP) --- Arizon [E80-10330] p0178 N80-32821

A-21

Experiment with the composition of a geological map on the basis of interpretations of Meteor satellite television images /using Central Asia as an example/ p0211 A80-52054

Analysis of the results of an interpretation of satellite and aerial protography of Western Uzbekistan

p0211 A80-52055 Experiment aimed at standardizing anthropogenic changes of the natural environment from satellite and aerial photographs

potographs pO211 A80-52056 Comparison of interpretations of radar images and space photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066

Landsat detection of oil from natural se p0197 A80-53054

Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056 sites

An automated aerial-photographic information-search p0186 A80-54023 Pixel labeling by supervised probabilistic relaxation

80-10267] p0216 N80-29814 Use of collateral information to improve LANDSAT [E80-10267]

classification accuracies --- Ventura County and Klamath National Forest, California [EBO-10268] n0176 N80-29815

Sampling of rectangular regions [E80-10272] p0176 N80-29819

Degradation of picture quality by speckle in coherent mapping systems

Degradation of picture quality by speckie in concrent apping systems p0217 N80-30821 A labeling technology for LANDSAT imagery 80-10293] p0219 N80-30861 [280-10293]

Maximal analysis labeling procedure (preliminary) 80-10294) p0219 N80-30862 [F80-10294] An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North

Dakota [E80-10295] p0177 N80-30863

Soil moisture in relation to geologic structure and lithology, northern California

[E80-10298] n0192 N80-30865 Monitoring the use of riverways with aerial photography: The development, testing, and evaluation of a computer assisted methodology

[AD-A086471] p0182 N80-30877 Remote sensing of wildland resources: A state-of-the-art

[PB80-184609] p0177 N80-30882

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California p0178 N80-32815 [680-10324]

Infrared-temperature variability in a large agricultural field Dunnigan California [E80-10331] n0178_N80-32822

The application of remote sensing to resource management and environmental quality programs in Kansas ---- kansas; roy's and phony creeks watersheds; the proposed

allorass prairie national park and pin ford lake, miss [E80-10337] 80-10337) p0183 N80-32825 Development of a method to detect geologic faults and

other linear features from LANDSAT images p0193 N80-32844 [PB80-189665]

Digital filtering of LANDSAT images as a visual aid technique in geological photointerpretation [INPE-1823-RPE/189] p01 p0193 N80-33843 PHOTOMAPPING

Ocean chlorophyll studies from a U-2 aircraft platform

p0195 A80-45004 The use of space data for the mappin o of coastal areas

p0185 A80-45297 A photogrammetric method of processing space

D0185 A80-46967 photographs The application of remote sensing to environmental n0181 A80-47750

A method for mapping soil reflectance D0175 A80-49655

Photometric problems, solved by means of space potography p0209 A80-49657 photography Cartographic processing and analysis of satellite imagery: International Conference, 3rd, Toulouse, France, June

19-22, 1979, Proceedings p0185 A80-50876 Inventory, mapping and evaluation of the agricultural p0185 A80-50876 potential of soils - Status of studies and needs of remote

p0175 A80-50877 sensing Cartographic display of space information - The different ethods available at IGN p0210 A80-50879

Landsat imagery in oil exploration - Six years of p0189 A80-50880

Review of BRGM research activities in geological remote sensing and medium-term perspectives D0189 A80-50881

A study of the needs of French government agencies in mote sensing mapping p0181 A80-50882 remote sensing mapping The combined plotting of satellite photographs and aerial photographs for topographic mapping p0185 A80-50895

Fracture mapping of the Narmada-Tapti basin using p0190 A80-51082 Landsat imagery

Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin, p0191 A80-51089 Andhra Pradesh, India Use of Landsat data products for geological mapping

p0191 A80-51090 A case history in Tamilnadu, India Some results of remote sensing in Yucostavia

p0191 A80-51091

SUBJECT INDEX

Analysis of the results of an interpretation of satellite and aerial protography of Western Uzbekistan p0211 A80-52055

Comparison of interpretations of radar images and space Comparison of interpretations of ratio integra and speci-photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066

Investigation of the accuracy of transposition of landmarks and contour points to small-scale aerial photographs p0212 A80-53005

An automated aerial-photographic information-search p0186 A80-54023 system Digital LANDSAT data analysis of Tennessee

[E80-10130] p0212 N80-28768 Geologic application of thermal inertia imaging using HCMM data --- Pisgah Crater, California and Walker Lake. Nevada Test Sites

[E80-10229] p0192 N80-29798 Geologic application of thermal inertia imaging using HCMM data

[E80-10231] p0192 N80-29800 LANDSAT data as a basis for regional environmental ssessment within the Columbia Plateau

[RHO-BWI-SA-43] p0183 N80-31862 An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest New Hamoshire Mt. St. Helens and Metsachee Creek, Washington; and the intiaguito and Feugo volcanoes. Guatemala p0225 N80-32807 [E80-10312]

Development of a method to detect geologic faults and ar linear features from LANDSAT imag [PB80-189665] p0193 N80-32844

Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil [INPE-1838-RPE/199] p0193 N80-33842

Digital filtering of LANDSAT images as a visual aid technique in geological photointerpretation [INPE-1823-RPE/189] p01 p0193 N80-33843

PHOTOGRAMMETRY photogrammetric method of Δ

processing space p0185 A80-46967 photographs А color plotter system and its its applications in p0209 A80-49099 geoscience Canographic processing and analysis of satellite imagery; International Conference, 3rd, Toulouse, France, June 19-22, 1979, Proceedings p0185 A80-50876 The geometric calibration of multispectral photographic p0186 A80-54024 equipment

Aerotriangulation control of large scale photography from small scale photography [PB80-161524] p0224 N80-28853

PHOTOGRAPHIC EQUIPMENT Sensors for remote sensing [CISE-N-190] p0225 N80-31863

PHOTOGRAPHIC PROCESSING

San Joaquin Experimental Range

[PB80-169295]

PHOTOINTERPRETATION

within an artificial outline

Geological application

using Landsat data

information

oneisses

citriculture

features off Vancouver Island

Collection, processing, and distribution of remote sensing data from Brazilian Receiving Station [INPE-1784-RPE/ 156] p0221 N80-32832

PHOTOGRAPHIC RECORDING

Monitoring the use of riverways with aerial photography; The develop development, testing, and evaluation of a computer isted methodology [AD-A086471] n0182 N80-30877

PHOTOGRAPHS US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft,

Dynamical interpretation of satellite-sensed thermal

Information extraction from a Landsat image contained

Remote sensing and mineral exploration; Proceedings

Interfacing with SEO technology - A case study in

Measurement results and conclusions on the spectral

Terrain analysis and hydrogeologic interpretations from tellite imagery p0202 A80-51285

Mapping a geologicostructural scheme of the Kola

satellite imagery p0202 A80-51285 Application of Landsat imagery to ground water studies

reflective coefficients of volcanites, granitoides and neisses p0191 A80-51093

of the Workshop, Bangalore, India, May 29-June 9, 1979

Geological ground-truths and Lai interpretation for parts of Karnataka State

Application of Landsat-2 data for

An automatic method of discriminati

in parts of Punjab and Haryana states, India

Aerial color infrared photography

sula from satellite imagery

The detection of linear features using Landsat data

p0192 N80-28852

p0195 A80-46315

p0210 A80-50889

00210 A80-51013

p0189 A80-51076

Landsat imagery

p0190 A80-51080

n0190 A80-51086

for obtaining land p0191 A80-51092

ating rock outcrops p0191 A80-51094

p0203 A80-51290

hy applications to p0175 A80-51944

p0211 A80-52053

PLATEAUS

The application of remote sensing to resource tallgrass prairie national park and pin ford lake. [E80-10337] p0183 N p0183 N80-32825 PLATEAUS

- Lineament study of the Bastar district, Madhya India, from Landsat imagery p0190 A80-51083 LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau
- [RHO-BWI-SA-43] o0183 N80-31862 Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-32013

PLATES (TECTONICS) The coordinated federal program for the application

- space technology to crustal dynamics and earthquake o0187 N80-33999 [NASA-TM-82215]
- PLOTTERS applications its
- A color plotter system and geoscience 00209 A80-49099 Terrain analyst synthesizer station [AD-A087370]
- p0187 N80-31860 PLUMES
- nitrate particle Conversion of nitrogen oxide gases to in oil refinery plumes p0181 A80-48534 Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269
- Anomalous snowfall caused by natural-draft cooling towers [BAND/N-1479-DOF] p0206 N80-32024
- POINTING CONTROL SYSTEMS Advanced solid state Earth resources satellite study
- [E80-10232] p0224 N80-29801 POLICIES
- The United States space observation policy [NASA-TM-76373] p0228 N80-33425 POLLUTION MONITORING
- Conversion of nitrogen oxide gases to nitrate particles in oil refinery plumes p0181 A80-48534 Oil film thickness measurement using airborne laser-induced water Raman backscatter
- p0197 A80-52331 Remote sensing of NO using a differential absorption
- lidar p0182 A80-52332 Sensors for remote sensing [CISE-N-190] p0225 N80-31863
- Remote sensing procedures for detecting and monitoring vities regulated by the Mobile District
- p0206 N80-31973 [AD-A087584] A quantitative evaluation of LANDSAT for monitoring suspended sediments in a fluvial channel p0206 N80-33823
- Multispectral techniques for remote monitoring of sediment in water: A feasibility investigation [PB80-198500] p0207 N80-33849
- In situ ozone data tor evaluence: 1979 southeastern spectrometer ozone remote sensor: 1979 southeastern Virginia urban plume study summer field program p0183 N80-33928 In situ ozone data for evaluation of the laser absorption [NASA-TM-81831]
- POLLUTION TRANSPORT Smoke as a quantitative atmospheric diffusion tracer p0182 A80-53265
- POPULATION THEORY
- The global 2000 report to the president p0228 N80-32295 twenty-first century, volume 1 POTASSIUM
- Geochemical balance of the Salgado River basin [INPE-1849-RPE/206] p0206 N80-32834
- PRECIPITATION As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahorna, Nebraska, and Colorado p0218 N80-30846 [F80-10263]
- PRECIPITATION (METEOROLOGY)
- Remote sensing applications in hydrometeorology
- p0202 A80-51283 As-built design specification for historical daily data bases for resting advanced models --- Kansas, North Dakota, and U.S.S.R.

[E80-10198]	p0214 N80-28/95
Florida water resources	
[E80-10246]	p0205 N80-30829

- PRESIDENTIAL REPORTS The global 2000 report to the president. Entering the venty-first century, volume 1 p0228 N80-32295 twenty-first century, volume 1 The global 2000 report to the president. Entering the
- twenty-first century. Volume 2: The technical report ---trends in population, climate, gross national product, earth resources, technology, and man environment interactions p0228 N80-32296 PRESSURE GRADIENTS
- On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field [AD-A088082] p0199 N80-33076
- PROBABILITY THEORY
- Estimation of probabilities of label imperfections and correction of mislabels o0218 N80-30856
- [E80-10288]

- PRODUCT DEVELOPMENT
- Program on stimulating operational private sector use of Earth observation satellite data [F80.10233] p0227 N80-29802
- PRODUCTIVITY Remote sensing of total dry-matter accumulation in winter wheat
- [E80-10235] p0176 N80-29804 PROGRAM VERIFICATION (COMPUTERS)
- Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES)
- p0216 N80-29808 [E80-10239] High Density Tape Reformatting System/LANDSAT Imagery Verification and Extraction System (HDTRS/LIVES)
- production test throughput analysis [E80-10319] p0221 N80-32811
- PROJECTIVE GEOMETRY
- Image transformation study [AD-A086070] p0216 N80-29828 Bonne's projection of Meteosat in [CSIR-SR-FIS-201] nages ··· subroutine
- p0222 N80-33837 PROJECTORS
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft p0225 N80-31857 [NASA-TM-76234]
- PULSE RADAR
- Development of a pulsed 9.5 micron lidar for reg scale 03 measurement p0181 A80-46 p0181 A80-48909 PUSHBROOM SENSOR MODES
- Advanced solid state Earth resources satellite study [E80-10232] p0224 N80-29801
- PYRENEES MOUNTAINS (EUROPE) Automatic mapping of snow cover by means of Landsat • Application to the central Pyrenees p0185 A80-50888

R

- RADAR CROSS SECTIONS
- Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemometer p0196 A80-51407
- Modulation of sea surface radar cross section by surface ress Wind speed and temperature effects across the stress - Wind speed and temperature effects across the Guil Stream p0196 A80-51415 RADAR ECHOES
- Methods for the extraction of long-period ocean wave parameters from narrow beam HF radar sea echo p0195 A80-46095
- Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering p0224 A80-53891

RADAR IMAGERY

- Spaceborne imaging radar Geologic and ocean applications p0223 A80-47480 Effects of radar system parameters, population, and environmental modulation on settlement visibility
- p0181 A80-47746 The problems of SAR imagery of ocean waves
- p0196 A80-50300
- Radar observations of wave transformations in the vicinity islands p0196 A80-51408 of islands Comparisons between wave directional spectra from SAR nd pressure sensor arrays p0196 A80-51409
- and pressure sensor arrays Synthetic aperture radar imaging of ocean waves -
- Comparison with wave measurements p0196 A80-51411
- Comparison of interpretations of radar images and space photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066
- Remote sensing of NO using a differential absorptio p0182 A80-52332
- Development and evaluation of scatterometer data processing algorithms [E80-10266]
- p0216 N80-29813 Radar backscatter study of sea ice
- [AD-A087032] p0198 N80-30618 Degradation of picture quality by speckle in coherent p0217 N80-30821 mapping systems Remote sensing of the ocean: Physical, chemical, and [PB80-811235] p0198 N80-30884
- Remote sensing of the ocean: Dynamics. Citations from the NTIS data base [PB80-811243]
- p0199 N80-30885 Sensors for remote sensing [CISE-N-190] p0225 N80-31863
- RADAR MAPS
- L-band radar and geology Some results in south p0191 A80-51095 of France Degradation of picture quality by speckle p0217 N80-30821
- mapping systems RADAR SCATTERING
- Vegetation clutter model p0173 A80-44262 RADIANCE
- Remote sensing research studies p0176 N80-30823
- Design specification for color coded spectral plots [E80-10245] p0217 N80-30828
- Classification with spectral-spatial temporal archetypes p0217 N80-30834 [E80-10251]

Study of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/ LANDSAT) Ribeirao Preto and Brasilia, Brazil

SUBJECT INDEX

- [E80-10259] p0218 N80-30842 The contribution of the diffuse light component to the
- topographic effect on remotely sensed data [NASA-TM-80728] p018 p0186 N80-30876 RADIATION ABSORPTION
- Simulation of solar radiation absorption in vegeta p0173 A80-46451 canopies RADIATIVE TRANSFER
- ludy of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/LANDSAT) --- Ribeirao Preto and Brasilia, Brazil
- [E80-10259] p0218 N80-30842 EVEN (02:59) p0218 NBC-30842 Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely
- sensed surface temperature near the daily maximum [E80-10333] p0178 N80-32824 Development of a soil moisture model for use with passi p0179 N80-33828
- microwave remote sensors RADIO ALTIMETERS
- Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering 00224 A80-53891 Wallops waveform analysis of SEASAT-1 radar altimeter
- data [NASA-CR-156869] p0198_N80-29637
- On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field 1AD-40880821 p0199 N80-33076
- **RADIO INTERFEROMETERS**
 - Satellite Emission Radio Interferometric Earth Surveying (SERIES) --- astrometry p0186 N80-28838 NASA geodetic applications of the Mark 3 VLBI
- p0186 N80-28841 RADIOMETERS A 94/183 GHz multichannel radiometer for Convair
- flights [NASA-CR-160032] p0225 N80-33047
- RAIN
- Remote sensing applications in hydrometeorology p0202 A80-51283
- Study of floods in Bangladesh and India with the of meteorological satellites p0204 A80-5 p0204 A80-51306 Florida water resources, Executive summary
- [E80-10247] p0205 N80-30830 Development of techniques to specify cloudiness and rainfall rate using GOES imagery data [AD-A084757]
- p0206 N80-33064 RAIN FORESTS The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested

Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056

Remote sensing of wildland resources: A state-of-the-art

Using LANDSAT digital data for estimating green biomass Throckmorton, Texas test site and Great Plans Corridor,

Application of remote sensing to state and regional

Concept of a research aircraft for remote sensing, using an integrated sensor/data system [DGLR PAPER 80-051] p0227 A80-46300

Monitoring the use of riverways with aerial photography:

Quantitative interpretation of Great Lakes remote sensing

Nonzero subsurface irradiance reflectance at 670 nm from

Light reflectance, transmittance, and utilization within a

Development of techniques to specify cloudiness and

The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas: roy's and phony creeks watersheds; the proposed

tallgrass prairie national park and pin ford lake, missouri.

Application of remote sensing to state and regional problems --- Mississippi

The development, testing, and evaluation of a computer assisted methodology [AD-A086471] p0182 N80-30877

Applied Remote Sensing Program (ARSP) -[E80-10330] p0178 M

p0179 N80-32836

p0177 N80-30882

p0178 N80-32819

p0178 N80-32821

p0183 N80-32826

p0201 A80-45005

p0201 A80-45428

p0177 N80-30851

p0206 N80-33064

p0183 N80-32825

p0183 N80-32826

Arizon

reas in Brazil

review [PB80-184609]

[E80-10328]

RECLAMATION

RECREATION

REFLECTANCE

[E80-10282]

[E80-10337]

[E80-10338]

REGIONAL PLANNING

problems --- Mississippi [E80-10338]

RECONNAISSANCE AIRCRAFT

Lake Ontario water masses

regetative canopy --- Texas

rainfall rate using GOES imagery data [AD-A084757]

RANGELANDS

sites

us

[INPE-1794-RPE/166]

SUBJECT INDEX

RELIEF MAPS

The use of space photographic data for the study and mapping of anthropogenic landscapes p0186 A80-54025 REMOTE SENSORS

A telemechanical system for hydrophysic ocean p0223 A80-45766 The Columbia River and Tributaries Irrigation Withdrawals

Analysis Project - Feasibility analysis and future plans p0174 A80-49141

Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface p0210 A80-49658 Application of thematic mapping techniques in terrain

analysis [AD-A089061] p0222 N80-33847

REPTILES A continuation of base-line studies for environmentally in communication of basemine studies to definite many monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 2: Threatened and endangered birds and other threatened and endangered birds and other threatened and the species of the spec nd endangered form

[NASA-CR-163122-VOL-4-PT-2] p0183 N80-31970 RESERVOIRS

mulation of reservoir and lake sedimentation [PB80-182801] p0206 N80-31867

RESOLUTION Snow mapping from space platforms p0203 A80-51293

RESOLUTION CELL

Impact of cell size on inventory and mapping errors in a cellular geographic information system [EB0-10315] p0221 N80-33831

RESOURCES Enterir

The global 2000 report to the president, twenty-first century, volume 1 p022 p0228 N80-32295 RESOURCES MANAGEMENT

Identifying and locating land irrigated by center-pivot irrigation systems using satellite imagery p0174 A80-49140

Irrigation mapping in western Kansas using Landsat. II Practices and problems --- irrigation mapping in western p0174 A80-49143 Kansas using Landsat

A study of the needs of French government agencies in remote sensing mapping p0181 A80-50882

The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278 p0201 A80-51278

Problems of snow cover assessment - An approach using remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India p0203 A80-51294 Microwave emission properties of snow for monitoring

p0203 A80-51297 hydrological parameters

Satellite imagery and U.P. Himatayas and Siwalik --- for pil conservation p0204 A80-51304 Indian remote sensing satellite program and its soil conservation

contribution to water resources management p0204 A80-51307 The utility of Landsat-D for water-resources stud

p0205 A80-51309 Earth observation systems in Japan --- for water resources

study p0205 A80-51310 Remote sensing of wildland resources: A state-of-the-art

[PB80-184609] p0177 N80-30882 The global 2000 report to the president. Entering the twenty-first century, volume 1 p0228 N80-32295

The global 2000 report to the president. Entering the renty-first century. Volume 2: The technical report --twenty-first century. Volume 2: The technical report ---trends in population, climate, gross national product, earth resources, technology, and man environment interactions

p0228 N80-32296 Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta

Counties [E80-10326] p0183 N80-32817 The application of remote sensing to resource management and environmental quality programs in Kansas ---- kansas; roy's and phony creeks watersheds; the proposed

tallgrass prairie national park and pin ford lake, missou (F80-10337) p0183 N80-32825 RETURN BEAM VIDICONS The potential of Landsat-3 RBV images for thematic

mapping --- geomorphological, geological and land cover applications p0210 A80-50894 RICE

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 [E80-10292] RIVER BASINS

Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979 p0174 A80-49136

The use of space data for the prediction of mountain-rive p0201 A80-49653 flooding in Siberia Evaluation of Landsat image data for the extraction of tand use information and its presentation in thematic maps p0185 A80-50902 aps The use of satellite imagery for mapping - The study of il moisture p0175 A80-50903 soil moisture

Evaluation of hydrogeologic conditions in Ponnaiyar River basin, South India using remotely sensed data 00203 A80-51288

Remote sensing in search for ground water - Some case stories p0203 A80-51289 histories

Problems of snow cover assessment - An approach using remote sensing techniques in a pilot project in the Beas river basin. Himachal Pradesh, India p0203 A80-51294 Floodplains mapping of Gangetic basin using Landsat imagery p0204 A80-51303

Digital LANDSAT data analysis of Tennesse

[E80-10130] p0212 N80-28768 Geologic application of thermal-inertia mapping from satellite -- Powder River Basin, Wyoming [E80-10230] p0192 N80-29799 [E80-10230]

Florida water resources [E80-10246] p0205 N80-30829

Geochemical balance of the Salgado River basin [INPE-1849-RPE/206] p0206 N80-32834 RIVERS

Satellite data for the solution of problems of land hydrology p0202 A80-51282 Study of Kosi river characteristics using airborne/space

p0204 A80-51302 orbital multispectral scanner data Use of LANDSAT data for river and lake ice engineering studies p0205 N80-29806 [E80-10237]

Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware Bav p0205 N80-29816 [E80-10269]

Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test [E80-10296] p0177 N80-32805

The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas; roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, missouri [E80-10337] p0183 N80-32825

Geochemical balance of the Salgado River basin [INPE-1849-RPE/206] p0206 N80-32834 A quantitative evaluation of LANDSAT for monitoring

suspended sediments in a fluvial channel p0206 N80-33823 The influence of topographic structures on night-time

surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland [E80-10228] p0179 N80-33829

ROCK8 Remote sensing application in groundwater surveys exploration in India

ploration in India p0202 A80-51280 Geologic application of thermal inertia imaging using HCMM data -- Pisgah Crater, California and Walker Lake evada Test Sites D0192 N80-29798

[E80-10229] ROCKY MOUNTAINS (NORTH AMERICA)

Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana [NASA-CR-163382] p0177 N80-30867

RURAL LAND USE The application of remote sensing to resource

management and environmental quality programs in Kansas --- kansas: roy's and phony creeks watersheds: the proposed tallgrass prairie national park and pin ford lake, missouri, [E80-10337] p0183 N80-32825

S

SACRAMENTO VALLEY (CA)

Soil moisture in relation to geologic structure and lithology, northern California [E80-10298]

p0192 N80-30865 Irrigated lands assessment for water management

Applications Pilot Test (APT) --- California p0178 N80-32815 [E80-10324]

Infrared-temperature variability in a large agricultural field --- Dunnigan, California [E80-10331] p0178 N80-32822

SAUNITY Geochemical balance of the Salgado River basin

[INPE-1849-RPE/206] p0206 N80-32834 On the inference of oceanic currents or eddies by spaceborne attimetry through the dynamic method for the determination of three dimensional density (temperature)

[AD-A088082] p0199 N80-33076 SALVUT SPACE STATION

Results of the complex processing of photographs taken from the Salyut space stations p0212 A80-53004 p0212 A80-53004 SAN JOAQUIN VALLEY (CA)

US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft, Experimental Range

[PB80-169295] p0192 N80-28852 frigated lands assessment for water management

Applications Pilot Test (APT) --- California [E80-10324] p0178 N80-32815 Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties

SEA STATES

[E80-10326] p0183 N80-32817 SAN JUAN MOUNTAINS (CO)

A multi-step method for avalanche zone recognition and analysis --- San Juan Mountains (co) p0193 N80-33824 SATELLITE DESIGN

Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407

SATELLITE GROUND TRACKS

Seasat-A land applications data processing plan [E80-10317] p0221 N80-32810 SATELLITE INSTRUMENTS

A review of future remote sensing satellite capabilities p0174 A80-49139

Seasat. Volume 2: Flight systems [NASA-CR-163571] p0199 N80-32829

SATELLITE OBSERVATION Activities and future plan of earth observation by p0223 A80-53094 satellites

Operational remote sensing legislation, part 1 p0228 N80-34294 [GPO-45-048]

Operational remote sensing legislation, part 2 [GPO-52-581] SATELLITE ORBITS p0228 N80-34295

Spacecraft trajectories for the remote sensing of the

p0223 A80-49662 SATELLITE-BORNE INSTRUMENTS

Status and plans of SEO satellite and receiving station p0190 A80-51079 SATELLITE-BORNE PHOTOGRAPHY The SPOT/Letter

The SPOT/Landsat image ground station

Results of the complex processing p0210 Adv-00000 from the Salvut space stations p0212 A80-53004 from the Salyut space stations SCATTEROMETERS

Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemometer p0196 A80-51407

Development and evaluation of scatterometer data

processing algorithms [E80-10266] p0216 N80-29813 SCENE ANALYSIS

Segmentation-based boundary modeling for natural terrain scenes p0209 A80-44297 Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES)

[E80-10239] p0216 N80-29808 Preliminary design specification for the LANDSAT Imagery Verification and Extraction System (LIVES) [E80-10240] p0216 N80-29809

Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test sites [E80-10296]

p0177 N80-32805 High Density Tape Reformatting System/LANDSAT Imagery Verification and Extraction System (HDTRS/LIVES) iction test throughput analysis production tes [E80-10319] n0221 N80-32811

A model of plant canopy polarization respo [E80-10336] p0179

p0179 N80-33835 SEA ICE

Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an ice-water system p0195 A80-44232

The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth

[NASA-TM-81847] p0224 N80-28637 NASA oceanic processes program: Status report, fiscal year 1980

p0198 N80-29005 [NASA-TM-80233] adar backscatter study of sea ice

p0198 N80-30618 [AD-A087032] The development of a stepped frequency microwave

radiometer and its application to remote sensing of the Farth p0224 N80-30822 Correlation of under-ice roughness with satellite and

airborne thermal infrared data --- Beaufort Sea and Arctic Ocean pack ice [AD-A085512] p0198 N80-30880

Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884

A 94/183 GHz multichannel radiometer for Convair

SEA ROUGHNESS Comparison of surface wind stress measurements -

Airborne radar scatterometer versus sonic anemometer p0196 A80-51407

stress - Wind speed and temperature effects across th

Modulation of sea surface radar cross section by surface

Ocean wave sensing. Citations from the NTIS data

Methods for the extraction of long-period ocean wave

Spaceborne imaging radar - Geologic and oceanographic plications p0223 A80-47480

parameters from narrow beam HF radar sea echo p0195 A80-46095

p0225 N80-33047

p0196 A80-51415

p0200 N80-34053

A-23

flights

Gulf Stream

base [PB80-812878]

SEA STATES

applications

[NASA-CR-160032]

SEA TRUTH

Radar observations of wave transformations in the vicinity p0196 A80-51408 of islands Platform and buoy positioning experiments in the North

a via Doppler satellite techniques p0197 A80-53691 Wallops waveform analysis of SEASAT-1 radar altimeter date

[NASA-CR-156869] p0198 N80-29637 Remote sensing of the ocean: Dynamics. Citations from he NTIS data base

[PB80-811243] p0199 N80-30885 On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the

determination of three dimensional density (temperature [AD-A088082] p0199 N80-33076

Ocean wave sensing. Citations from the NTIS data base [PB80-812878] p0200 N80-34053

SEA TRUTH The three-dimensional structure of the frontal zone of

- the Gulf Stream from synchronous satellit p0196 A80-49651 Radar observations of wave transformations in the v
- p0196 A80-51408 of islands Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements
- p0196 A80-51411 Satellite monitoring of sea surface pollution --- irish and north seas

n0199 N80-32820 [E80-10329] SEA WATER

Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an ice ice-water system p0195 A80-44232

- Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004
- Satellite observations of a nutrient upwelling off the coast p0195 A80-45015 of California
- Optical methods for the study of biocenoses on land p0201 A80-49656
- Landsat application to the study of coastal processes p0203 A80-51292 Synthetic aperture radar imaging of ocean waves -

Comparison with wave measurements n0196 A80-51411

- Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements p0197 A80-51491
- Microwave radiometric determination of oceanographic meteorological parameters p0223 A80-51579 and meteorological parameters Satellite monitoring of sea surface pollution --- irish and
- north seas [E80-10329] p0199 N80-32820 Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September - October 1979

p0199 N80-33068 AD-A088229 SEAS Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front

p0198 N80-30850 [F80-10278] SEASAT A SATELLITE

Seasat-A land applications data processing plan [E80-10317] p0221 N80-32810 Seasat. Volume 2: Flight systems

p0199 N80-32829 [NASA-CR-163571] SEDIMENT TRANSPORT

- Remote sensing of the ocean: Dynamics. Citations from the NTIS data base p0199 N80-30885
- [PB80-811243] Simulation of reservoir and lake sedimentation
- [PB80-182801] p0206 N80-31867 Assessment of the role of remote sensing in the study of inland and coastal waters [NASA-TM-81881]

o0200 N80-34048 SEDIMENTARY ROCKS

- Soil moisture in relation to geologic structure and lithology, northern California [F80, 10298] n0192 N80-30865
- SEDIMENTS. Quantitative interpretation of Great Lakes re p0201 A80-45005 data
- Uranium Spectral discrimination tion of alteration p0189 A80-49524 phenomena in sediments Quantitative monitoring of sediment levels in fresh
- lakes from Landsat p0203 A80-51291 Landsat application to the study of coastal processes p0203 A80-51292

Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe quadrangles of New Mexico p0192 N80-30881

- [GJBX-9(80)-VOL-2] Simulation of reservoir and lake sedimentation [PB80-182801] p0206 N80-31867
- A quantitative evaluation of LANDSAT for monitoring suspended sediments in a fluvial channel D0206 N80-33823

SEEDS

- Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [F80 10324] n0178 N80-32815 SEISMOLOGY
- Review of BRGM research activities in geological remote sensing and medium-term perspectives

A-24

00189 A80-50881

SET THEORY

- A statistical test procedure for detecting multiple outliers in a data set
- [E80-10195] p0214 N80-28792 SHALLOW WATER
- Simulation of reservoir and lake sedimentation [PB80-182801] p0206 N80-31867 SHORELINES
- Tidal land mapping from Landsat p0185 A80-50896 The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous shorelines
- p0201 A80-50899 Some results of remote sensing in Yugoslavia
- p0191 A80-51091 SIBERIA
- The use of space data for the prediction of flooding in Siberia n0201 A80-49653
- The Mesozoic and Cenozoic depressions of the Baikalo-Amur region from the interpretation of space p0189 A80-49654 photographs SICILY
- Study of geological structure of Sicily and other Italian areas --- Gulf of Orosei, Eastern Sardinia [E80-10299] p0192 N80-30866
- SIDE-LOOKING RADAR
- L-band radar and geology Some results in south-east of France p0191 A80-51095 SIERRA NEVADA MOUNTAINS (CA)
- Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California
- p0205 N80-30864 [F80-10297] SIGNAL PROCESSING
- A telemechanical system for hydrophysical studies in the p0223 A80-45766 SIGNATURE ANALYSIS
- Separability of agricultural cover types in channels and wavelength regions p0173 A8 p0173 A80-49100 design specification for field statistics As-built (FIELDSTAT
- [E80-10252] p0217 N80-30835 Maximal analysis labeling procedure (preliminar p0219 N80-30862 [E80-10294]
- An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North Dakota
- [E80-10295] p0177 N80-30863 Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana
- [NASA-CR-163382] p0177 N80-30867 of vegetation using
- Characterization of Cerrado vegeta automatically classified LANDSAT MSS data [INPE-1790-RPE/162] p0175 p0179 N80-32835 SILVICULTURE Aerial color infrared photography
- hy applications to p0175 A80-51944 citriculture SITE SELECTION
- Remote sensing for tunnel siting studies p0189 A80-48975
- SITES Environmental data for sites in the National Solar Data
- [SOLAR/0010-80/02] p0220 N80-31975 SKY BRIGHTNESS
- LACIE field measaurements data acquisition summary report, 1975 1976 crop year --- Finney County, Kansas; Williams County, North Dakota; and Hand County, South Dakota [E80-10193] p0214 N80-28790
- SLOPES Use of collateral information to improve LANDSAT
- classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268] p0176 N80-29815
- SMOKE Smoke as a quantitative atmospheric diffusion trace
- p0182 A80-53265 SNOW
- Anomalous snowfall caused by natural-draft cooling [RAND/N-1479-DOE] p0206 N80-32024
- SNOW COVER
- The use of space data for the prediction of mountain flooding in Siberia p0201 A80-49653 Auto matic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888
- The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278
- Satellite data for the solution of problems of land drology p0202 A80-51282 hydrology Remote sensing applications in hyd
- p0202 A80-51283 Snow mapping from space platform:

p0203 A80-51293

- Problems of snow cover assessment An approach using mote sensing techniques in a pilot project in the Beas ver basin, Himachal Pradesh, India p0203 A80-51294 Eurasian snow cover extent - The NOAA satellite record, remote sensing techniques in a pilot river basin, Himachal Pradesh, India 1966-79 p0203 A80-51295
- Studies of snow accumulation characteristics Himalayan slopes p0203 A80-51296

Microwave emission properties of snow for monitoring vdrological parameters p0203 A80-51297 hydrological parameters Applications to floods of remote sensing from satellites p0204 A80-51300

- Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware
- Bav [E80-10269] p0205 N80-29816
- Cornell University remote sensing program --- New York State
- [E80-10280] p0227 N80-29823 Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California
- [E80-10297] p0205 N80-30864 A multi-step method for avalanche zone recognition and
- analysis --- San Juan Mountains (co) p0193 N80-33824 A watershed information system p0207 N80-33825 SODULM
- Geochemical balance [INPE-1849-RPE/206] e of the Salgado Riv p0206 N80-32834
- SOIL EROSION Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta
 - [E80-10326] p0183 N80-32817
- SOIL MAPPING A method for mapping soil reflectance
- p0175 A80-49655 Inventory, mapping and evaluation of the agricultural
- potential of soils Status of studies and needs of remote sensing sing p0175 A80-50877 Review of BRGM research activities in geological remote
- sensing and medium-term perspectives p0189 A80-50881
- The use of satellite imagery for mapping The study of il moisture p0175 A80-50903 Application of Landsat-2 data for obtaining land formation p0191 A 80-51092 soil moisture information
- Satellite imagery and U.P. Himalayas and Siwalik p0204 A80-51304 soil conservation
- Diurnal behavior of the spectral reflectivity of vegetatio p0211 A80-52057 and soils Determination of the spectral characteristics of soils and
- p0211 A80-52059 notation SOIL MOISTURE
- Soil water and plant canopy effects on remotely me p0173 A80-47748 surface temperatures p0173 A80-47748 Identifying irrigated lands using remote sensing
- techniques: State of the Art; Proceedings of the Symposium, Sioux Falls, S. Dak., November 15, 16, 1979 n0174 480.49136 Identifying and locating land irrigated by center-pivot

The Columbia River and Tributaries Irrigation Withdrawals

Irrigation mapping in western Kansas using Landsat. I -

Irrigation mapping in western Kansas using Landsat. II

Practices and problems ---- irrigation mapping in western Kansas using Landsat pol174 A80-49143 Development and application of Landsat-derived

Review of BRGM research activities in geological remote

Soil moisture estimation by correlated ground-based and

Microwave radiometer measurements of soil moisture

Development and evaluation of scatterometer data

Applications of HCMM data to soil moisture snow and

EOD systems and facilities workload requirements

HCMM energy budget data as a model input for assessing

Irrigated lands assessment for water management

Infrared-temperature variability in a large agricultural field

HCMM satellite follow-on investigation no. 025: Soil

moisture and heat budget evaluation in selected European

zones of agricultural and environmental interest (TELLUS

-- France, Germany, Italy, United Kingdom, and

Use of soil moisture information in yield models

egions of high potential groundwater pollution

pplications Pilot Test (APT) --- California

nigan California

estuarine current studies --- Cooper River and Delaware

irrigation cropland maps for water use determination is

Analysis Project - Feasibility analysis and future plans p0174 A80-49141

p0174 A80-49140

p0174 A80-49142

p0175 A80-49144

p0189 A80-50881

p0175 A80-50903

p0202 A80-51287

n0176 A80-53890

n0216_N80-29813

n0205 N80-29816

p0176 N80-29821

p0205 N80-30829

p0177 N80-30869

n0206 N80-32806

p0178 N80-32815

p0178 N80-32822

p0178 N80-32823

ing - The study of

irrigation systems using satellite imagery

Kansas using Landsat Development and application

sensing and medium-term perspectives

Seasat microwave observation

processing algorithms

Florida water resources [E80-10246]

The use of satellite imagery for mapp

the High Plains

soil moisture

[E80-10266]

[F80-10269]

[E80-10277]

[EBO-10302]

[E80-10310]

[E80-10324]

[E80-10331]

Dun

roject) -

[E80-10332]

the Benelux countries

content

Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely sensed surface temperature near the daily maximum [EBO-10333] p0178 NBO-32824 [F80-10333]

Development of a soil moisture model for use with passive microwave remote sensors p0179 N80-33828 Defining relationships between surface characteristics

evaporation rate [E80-10335] p0207 N80-33834 The use of radiation temperature to detect water-stress

in sugarcane crop --- Brazil [INPE-1767-TDL/028] p0179 N80-33839 SOIL SCIENCE

Remote sensing research studies [E80-10117] p0176 N80-30823

SOILS Computer-aided watershed analyses using remote sensing based regional information system

p0204 A80-51299 Geologic application of thermal inertia imaging using HCMM data -- Pisgah Crater, California and Walker Lake, evada Test Sites

[E80-10229] p0192 N80-29798 Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta

[E80-10326] p0183 N80-32817 The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested

areas in Brazil [INPE-1794-RPE/166] p0179 N80-32836 A multi-step method for avalanche zone recognition and analysis --- San Juan Mountains (co) p0193 N80-33824 A watershed information system p0207 N80-33825

Thermal balance of soils [INPE-1859-RPE/210] p0180 N80-33841

SOLAR COLLECTORS Environmental data for sites in the National Solar Data letwork

[SOLAR/0010-80/02] p0220 N80-31975 SOLAR CYCLES

Improved definition of crustal anomalies for Magsat data [E80-10270] o0192 N80-29817

SOLAR POSITION

Diurnal behavior of the spectral reflectivity of vegetation p0211 A80-52057 and soils Final design specification for EOD-LARSYS/statistics and data transformation processors modification

[E80-10173] p0213 N80-28774 Design specification for EOD-LARSYS/statistics and data

transformation processors modification [E80-10177] . p0213 N80-28778 SOLAR RADIATION

Simulation of solar radiation absorption in vegetation p0173 A80-46451 SONIC ANEMOMETERS

Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemometer p0196 A80-51407

SORGHUM

Light reflectance, transmittance, and utilization within a egetative canopy --- Texas [E80-10282] p0177 N80-30851

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas

[E80-10292] p0177 N80-30860 A model of plant canopy polarization response [F80-10336] p0179 N80-33835

SOUTH CAROLINA Applications of HCMM data to soil moisture snow

estuarine current studies --- Cooper River and Delaware E80-10269] p0205 N80-29816

AgRISTARS cropping practices and crop characteristics Arkansas. based on 1979 ESCS observations ---California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 p0177 N80-30860

SOUTH DAKOTA

LACIE field measurements data acquisition summary report, 1975 - 1976 crop year --- Finney County, Kansas; Villiams County, North Dakota; and Hand County, South Dakota

p0214 N80-28790 [E80-10193] Composition and assembly of a spectral data base for composition and asseminy of a special data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and Louisiana

[E80-10281] p0176 N80-29824 As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado [E80-10263] p0218 N80-30846

An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North Dakota [E80-10295]

p0177 N80-30863 HCMM energy budget data as a model input for assessing regions of high potential groundwater pollution --- South Dakota [E80-10310] p0206 N80-32806

SOUTHERN CALIFORNIA

Use of collateral information to improve LANDSAT classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268] p0176 N80-29815

Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties p0183 N80-32817

[F80-10326] SOVIET SPACECRAFT

Utilization of space for scientific and economic purposes in the USSR in 1978 --- Russian book

p0227 A80-53148 SOYBEANS

Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and ouiciar

[E80-10281] p0176 N80-29824 Remote sensing research studies [E80-10117] p0176 N80-30823

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas. California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860

Maximal analysis labeling procedure (preliminary) [EBO-10294] p0219 N80-30862 Analysis of scanner data for crop inventories

[BO-10308] p0219 N80-30874 Development of Al procedures for dealing with the effects [E80-10308]

of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling Corn Belt

[F80-10327] p0178 N80-32818 SPACE EXPLORATION

Utilization of space for scientific and economic purposes in the USSR in 1978 --- Russian book p0227 A80-53148

SPACE LAW D0227 A80-45575 A new proposal Space law

SPACE PROGRAMS Brazil in space --- space programs applicatio

p0227 A80-52691

SPACE TRANSPORTATION SYSTEM A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy ace Center. Volume 3, part 1: Ichthyological survey of lagoonal waters --- Indian River lagoon system

[NASA-CR-163122-VOL-3-PT-1] ASA-CR-163122-VOL-3-PT-1] p0197 N80-28939 A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 2: Threatened and endangered birds and other threatened

and endangered forms [NASA-CR-163122-VOL-4-PT-2] n0183 N80-31970 SPACEBORNE EXPERIMENTS

Report on active and planned spacecraft and voeriments p0227 N80-31420

IASA-TM-80905] SPACECRAFT LAUNCHING

Seasat. Volume 2: Flight systems [NASA-CR-163571] p0199 N80-32829 SPACECRAFT PERFORMANCE

Seasat. Volume 2: Flight systems [NASA-CR-163571]

p0199 N80-32829 SPACECRAFT TRAJECTORIES

Spacecraft trajectories for the remote sensing of the p0223 A80-49662 earth SPATIAL DISTRIBUTION

Impact of cell size on inventory and mapping errors in a cellular geographic information system [E80-10315] p(p0221 N80-33831

SPATIAL FILTERING

Spatial filtering of Landsat data for urban cartography D0185 A80 50892

SPECIFIC HEAT HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected Europ zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and the Benelux countries

[E80-10332] p0178 N80-32823 SPECKLE PATTERNS

Degradation of picture quality by speckle in coherent apping systems p0217 N80-30821 manning systems SPECTRAL BANDS

Snow mapping from space platforms p0203 A80-51293

The utility of Landsat-D for water-resources p0205 A80-51309

Landsat-D - Overview and implications p0224 A80-53609

Thematic mapper studies band correlation analysis [NASA-TM-80716] p0216 N80-2 p0216 N80-29825 SPECTRAL REFLECTANCE

Remote sensing of particulate concentrations in water p0201 A80-46450 Simulation of solar radiation absorption in vegetation

p0173 A80-46451 canopies Soil water and plant canopy effects on remotely measured

surface temperatures p0173 A80-47748 - Spectral discrimination of alteration in sediments p0189 A80-49524 Uranium

nhenomena in sediments A method for mapping soil reflectance p0175 A80-49655

Optical methods for the study of biocenoses on land p0201 A80-49656 and sea

Measurement results and conclusions on the spectral reflective coefficients of volcanites, 5. granitoides and p0191 A80-51093 gneisses

Diurnal behavior of the spectral reflectivity of vegetation p0211 A80-52057 and soils The contribution of the diffuse light component to the

opographic effect on remotely sensed data p0186 N80-30876 [NASA-TM-80728]

An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala

p0225 N80-32807 [E80-10312] Using LANDSAT digital data for estimating green biomass - Throckmorton, Texas test site and Great Plans Corridor,

us [E80-10328] p0178 N80-32819 A quantitative evaluation of LANDSAT for monitoring

suspended sediments in a fluvial channe p0206 N80-33823 Multispectral techniques for remote monitoring of

sediment in water: A feasibility investigation [PB80-198500] p0207 N80-33849 SPECTRAL SIGNATURES

Unsupervised classification of MSS Landsat data for mapping spatially complex vegetation p0173 A80-47744

Separability of agricultural cover types in spectral channels and wavelength regions p0173 A80-49100 Estimates of the accuracy of the brightness conjunction

of multispectral photographs p0210 A80-49665 The cartography of Chize forest through remote

p0175 A80-50900 sensina Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin,

Andhra Pradesh, India p0191 A80-51089 Determination of the spectral characteristics of soils and

p0211 A80-52059 vegetation Imaging in many frequency bands --- multispectral aceborne photography p0212 A80-52062

spacet Modifications to the CLASY program [E80-10181] p0213 N80-28782

Remote sensing of total dry-matter accumulation in

[E80-10235] p0176 N80-29804 User manual for the Earth observations Division R and

D to OLPARS dot data conversion p0216 N80-29805 [E80-10236] Remote sensing research studies

(E80-10117) p0176 N80-30823 As-built design specification for scatter plots for direct

p0217 N80-30833 [E80-10250]

- Classification with spectral-spatial-temporal archetypes 80-10251] p0217 N80-30834 [E80-10251] Classification of multispectral images according to
- crosswise textural characteristics --- Mato Grasso, Brazil [E80-10257] p0218 N80-30840 p0218 N80-30840

Study of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/LANDSAT) --- Ribeirao Preto and Brasilia, Brazil p0218 N80-30842

[E80-10259] A labeling technology for LANDSAT imagery [E80-10293] 0218 N 80-10293] p0219 N80-30861 Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear

habitat --- Slategoat, Scapegoat and Danaher areas,

A hill-sliding strategy for initialization of Gaussian clusters

A multiprocessor implementation of a contextual image

An algorithm for estimating crop calendar shifts of spring

Development of AI procedures for dealing with the effects episodal events on crop temporal spectral response and

development of AI guidelines for corn and soybean labeling

ins using LANDSAT spectral data

Characterization of Cerrado vegetation automatically classified LANDSAT MSS data

p0177 N80-30867

p0219 N80-31072

p0221 N80-32808

p0178 N80-32809

p0178 N80-32818

p0179 N80-32835 A-25

using

Montana

[NASA-CR-163382]

[NASA-TM-80721]

processing algorithm [E80-10313]

[E80-10314]

of epi

Corr

[E80-10327]

[INPE-1790-RPE/162]

in the multidimensional space

SPECULAR REFLECTION

Detection of hidden mineral deposits by airborne spectral analysis of forest canopies [PB80-193881] n0193 N80-32845 A multispectral data simulation technique [680.10311] 00221 NR0-33830 Utilization of spectral-spatial information in the classification of imagery data p0222 N80-33832

[E80-10321] SPECULAR REFLECTION A model of plant canopy polarization response [E80-10336] p0179 N8 p0179 N80-33835

CORINGS (WATER) Remote sensing of coastal environment o0202 A80-51281

STATISTICAL ANALYSIS Applications of statistics to thematic m

p0186 A80-53051 STATISTICAL TESTS A statistical test procedure for detecting multiple outliers

in a data se [E80-10195] n0214 NR0-28792 STEPPE8

- Determination of the spectral characteris tics of soils a etation p0211 A80-52059 STEREOSCOPY
- Errors in automatic pass point mensuration using digital techniques

[AD-A087443] p0220 N80-31859 STORM DAMAGE

Assessment of cyclone-caused damage in Krishna delta gion using remotely sensed data p0204 A80-51301 region using remotely sensed data STORMS (METEOROLOGY) The Federal Plan for Meteorological Services and

Supporting Research, fiscal year 1981 [PB80-199482] p0228 N80-34041

STRATIFIED FLOW Observed short-time temperature variations and tidal current constants in the North Sea south east of the Dogger

Bank / Comparison of two seasons/ p0197 A80-54060 STRATIGRAPHY

Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil [INPE-1838-RPE/199] p0193 N80-33842 STRATOSPHERE

Volcanic material from Mount St Holood p0182 A80-54074 stratosphere over Europe STREAMS

Simulation of reservoir and lake sedimenta [PB80-182801] p0206 p0206 N80-31867

STRUCTURAL BASINS The Mesozoic and Cenozoic depressions of the Baikalo-Amur region from the interpretation of space p0189 A80-49654 photographs Fracture mapping of the Narmada-Tapti basin using p0190 A80-51082

Landsat imagery p0190 A80-51082 Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data Evaluation of MSS image o0190 A80-51084 Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah basin, p0191 A80-51089 Andhra Pradesh, India

Indian remote sensing satellite program and its contribution to water resources manageme p0204 A80-51307

Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe quadrangles of New Mexico [GJBX-9(80)-VOL-2] p0192_N80-30881

Simulation of [PB80-182801] of reservoir and lake sedimentati p0206 N80-31867

Altimetry data over trenches and island-arcs and convection in the mantle [NASA-CR-163516] p0199 N80-32050

STRUCTURAL PROPERTIES (GEOLOGY) Spaceborne imaging radar - Geologic and oceanographic p0223 A80-47480

- applications Computer-assisted production of multi-coloured maps p0209 A80-49521
- Characteristics of the representation of tectonic faults on space photographs p0189 A80-49663 Review of BRGM research activities in geological remote

sensing and medium-term perspectives p0189_A80-50881

Contribution of Landsat data to the objectives of the geological survey of India p0189 A80-51077 Geological ground-truths and Landsat imagery

interpretation for parts of Karnataka State D0190 A80-51080

Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143 p0190 A80-51081

Lineament study of the Bastar district, Madhya Pradesh India, from Landsat imagery n0190 A80-51083 Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data p0190 A80-51084 Lineaments and their tectonic significance in relation to mineral potential in south India p0190 A80-51085 Use of Landsat data products for geological mapping p0191 A80-51090 A case history in Tamilnadu, India New data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite structure of the TV images p0211 A80-52051 Geological analysis of the Urats-Oman superlineament from satellite imagery p0211 AB0-52052

Mapping a geologicostructural scheme of the Kola peninsula from satellite imagery p0211 A80-52053 Analysis of the results of an interpretation of satellite and aerial protography of Western Uzbekistan

p0211 A80-52055 Geologic application of thermal-inertia mapping from Powder River Basin, Wyoming

- satellite --- Po [E80-10230] p0192 N80-29799 Soil moisture in relation to geologic structure and
- lithology, northern California [E80-10298] p0192 N80-30865
- Study of geological structure of Sicily and other Italian reas --- Gulf of Orosei, Eastern Sardinia -----[E80-10299] p0192 N80-30866
- Development of a method to detect geologic faults and other linear features from LANDSAT images p0193 N80-32844 [PB80-189665]

Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil [INPE-1838-RPE/199] p0193 N80p0193 N80-33842

Interactive digital image processing investigation, phase

AD-A087518 p0222 N80-33848 SUDAN

Basic topographic mapping - Renewal and revision

- 00185 A80-50897 Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied esearch
- [DFVLR-FB-80-03] p0220 N80-31865 SUGAR BEETS
- Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and elopment of Al guidelines for corn and soybean labeling

[E80-10327]

- n0178 N80-32818
- SUGAR CANE Brazil in space --- space programs applications

n0227 A80-52691 Study of the atmospheric effects on the radiation d by the sensor aboard orbiting platforms (ERTS/LANDSAT) --- Ribeirao Preto and Brasilia, Brazil

- [E80-10259] p0218 N80-30842 Use of LANDSAT data for estimating the area of sugar ane in the state of Sao Paulo --- Brazil
- p0177 N80-30843 [F80-10260] Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo
- [880-10261] p0177 N80-30844 Light reflectance, transmittance, and utilization within a
- vegetative canopy --- Texas [E80-10282] p0177 N80-30851 The use of radiation temperature to detect water-stress
- n sugarcane crop --- Brazil [INPE-1767-TDL/028] p0179 N80-33839
- SULFATES
- Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269 SULFIDES
- Detection of hidden mineral deposits by airborne spectral analysis of forest canopies p0193 N80-32845
- [PB80, 193881] SULFUR DIOXIDES
- Airborne sulfur dioxide to sulfate oxidation studies of INCO 381M chimney plume p0182 A80-53269 SUNFLOWERS
- Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling Belt
- [E80-10327] p0178 N80-32818 SUNLIGHT
- Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelengt NASA.TM.81843] p0207 N80-33927 SURFACE ROUGHNESS
- Spaceborne imaging radar Geologic and oceanographic plications p0223 A80-47480 applications Correlation of under-ice roughness with satellite and airborne thermal infrared data --- Beaufort Sea and Arctic
- Ocean pack ice p0198 N80-30880 [AD-A085512] SURFACE ROUGHNESS EFFECTS
- Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering p0224 A80-53891
- SURFACE TEMPERATURE
- Soil water and plant canopy effects on remotely mea surface temperatures p0173 A80-47748 Studies of snow accumulation characteristics
- p0203 A80-51296 Himalayan slopes Geologic application of thermal inertia imaging using CMM data --- Pisgah Crater, California and Walker Lake, HCMM data Nevada Test Sites
- Applications of HCMM data to soil moisture snow and [E80-10229] estuarine current studies --- Cooper River and Delaware
- [E80-10269] p0205 N80-29816 Geological and geothermal data use application Explorer mission-A (heat capacity mapping mission)
- [EBO-10279] p0192 N80-29822 Florida water resources [E80-10246] p0205 N80-30829

Florida water resources. Executive summary [E80-10247] p0205

0205 N80-30830 Correlation of under-ice roughness with satellite and airborne thermal infrared data --- Beaufort Sea and Arctic Ocean pack ice

SUBJECT INDEX

- [AD-A085512] p0198 N80-30880 HCMM energy budget data as a model input for assessing egions of high potential groundwater pollution --- South Dakota
- [E80-10310] p0205 N80-32806 Infrared-temperature variability in a large agricultural field
- Dunnigan, California 80-10331] n0178 N80-32822 HCMM satellite follow-on investigation no. 025: Soil
- normin satellite follow on investigation no. 025: Soli moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) ---- France, Germany, Italy, United Kingdom, and nelux countries [F80-10332] o0178 N80-32823
- Further developments of the TELL-US model. 1: Further developments of the IELE-OS model. I are implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely sensed surface temperature near the daily maximum [E80-10333] p0178 N80-32824
- On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature)
- [AD-A088082] p0199 N80-33076 The influence of topographic structures on night-time rface temperatures: Evaluation of a satellite thermal The influence or topographic surface temperatures: Evaluation of a satellite thermon-image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland p0179 N80-33829
- Defining relationships between surface characteristics
- and actual evaporation rate [E80-10335] n0207 N80-33834
- Thermal balance of soils [INPE-1859-RPE/210] o0180 N80-33841 SURFACE WATER
- Terrain analysis and hydrogeologic interpretations from satellite imagery p0202 A80-51285 Remote sensing of water resources in Panch Mahale
- p0202 A80-51286 district Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test aitac
- [F80, 10296] p0177 N80-32805 SWITZERLAND

The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands--- Germany and Switzerland [E80-10228] p0179 N80-33829

- SYNTHETIC APERTURE RADAR
- Spaceborne imaging radar Geologic and oceanograp applications n0223 A80-47480 plications The problems of SAR imagery of ocean waves p0196 A80-50300

Conceptual study of a European remote sensing satellite

with combined optical and microwave payload [BMFT-F8-W-79-18] p0224 p0224 N80-29407

Т

TASMANIA

[E80-10279]

TECHNOLOGY UTILIZATION

Reno

Votume 2: Appendices

on space photographs

geological survey of India

[NASA-TM-82206]

[NASA-TM-82207]

Landsat imagery

TECTONICS

Brazil in space --- space programs app

- Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front p0198 N80-30850 [E80-10278]
- TECHNOLOGY ASSESSMENT

Landsat-D - Overview and implication

- p0224 A80-53609 TECHNOLOGY TRANSFER
- Activities and future plan of earth observation by p0223 A80-53094 satellites
- China space report / Based on observations made during an invited tour with an AIAA delegation, November 1979/ ---- Rook p0227 A80-53350
- Program on stimulating operational private sector use of Earth observation satellite data
- p0227 N80-29802 [EBO-10233] Geological and geothermal data use investigations for application Explorer mission-A (heat capacity mapping

Private sector involvement in civil space remote sensing.

Private sector involvement in civil space remote sensing.

Characteristics of the representation of tectonic faults

Contribution of Landsat data to the objectives of the

Fracture mapping of the Narmada Tapti basin using

p0192 N80-29822

p0227 A80-52691

p0228 N80-33845

p0228 N80-33846

p0189 A80-49663

p0189 A80-51077

p0190 A80-51082

TIMBER IDENTIFICATION

Planning and execution of a photographic mission over a wheat producing region in Rio Grande do Sul, Brazil [INPE-1793-RPE/165] ____00179 NBO-32833 Impact of cell size on inventory and mapping errors in

cellular geographic information system p0221 N80-33831 [F80-10315]

Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield --- Brazil [INPE-1838-RPE/199] p0193 N80-33842 Application of thematic mapping techniques in terrain

analysis [AD-A089061] p0222 N80-33847

THERMAL MAPPING Satellite observations of a nutrient upwelling off the coast California p0195 A80-45015 of California Dynamical interpretation of satellite-sensed thermal

p0195 A80-46315 res off Vancouver Island Thermal fronts in the Mediterranean according to NOAA satellite radiometer data /September 1977-February 1979/ p0195 A80-48750

Some results of remote sensing in Yugoslavia p0191 A80-51091

Studies of snow accumulation characteristics on p0203 A80-51296 Himalayan slopes

Geologic application of thermal inertia imaging using HCMM data --- Pisgah Crater, California and Walker Lake Nevada Test Sites

[E80-10229] p0192 N80-29798 Geologic application of thermal-inertia mapping from - Powder River Basin, Wyomin

[E80-10230] p0192 N80-29799 Geologic application of thermal inertia imaging using

(CMM data [E80-10231] p0192 N80-29800 Applications of HCMM data to soil moisture snow and

tuarine current studies --- Cooper River and Delaware Bay p0205 N80-29816 [E80-10269]

Geological and geothermal data use investigations for application Explorer mission-A (heat capacity mapping ssion)

[F80-10279] p0192 N80-29822 Heat capacity mapping mission project HCM-051 --- East ustralian Current and the Tasman Front

[E80-10278] p0198 N80-30850 Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and

Sierra Nevada Mountains, California p0205 N80-30864 [E80-10297]

Soil moisture in relation to geologic structure and lithology, northern California [E80-10298] p0192 N80-30865

Study of geological structure of Sicily and other Italian eas --- Gulf of Orosei, Eastern Sardinia

[E80-10299] p0192 N80-30866 Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco

p0219 N80-30875 [E80-10309] Correlation of under-ice roughness with satellite and irborne thermal infrared data --- Beaufort Sea and Arctic

Ocean pack ice [AD-A085512] p0198 N80-30880

Infrared-temperature variability in a large agricultural field Dunnigan, California

[E80-10331] p0178 N80-32822 On extracting brightness temperature maps from scanning radiometer data --- techniques for algorithm

design [NASA-TM-81989] p0221 N80-32838

The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal hage of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland

[F80-10228] p0179 N80-33829 The use of radiation temperature to detect water-stress - Brazil

in sugarcane crop --- B [INPE-1767-TDL/028] p0179 N80-33839

THERMAL RADIATION Airborne thermal viewer having a circular scanner viewi

p0223 A80-52046 THUNDERSTORMS

A new era in technology: Proceedings of the Seventeenth Space Congress, Cocoa Beach, Fla., April 30-May 2, 1980 p0210 A80-51926 TIDAL FLATS

p0185 A80-50896 Tidal land mapping from Landsat The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous shore p0201 A80-50899

TIDES Observed short-time temperature variations and tidal current constants in the North Sea south east of the Dooger Bank / Comparison of two seasons/ p0197 A80-54060 Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware

Bay [E80-10269] p0205 N80-29816

TIMBER IDENTIFICATION Evaluating the reforested area for the municipality of Buri automatic analysis of LANDSAT imagery --- Sao Paulo.

[E80-10258] p0176 N80-30841

A-27

A review of future remote sensing satellite capabilities p0174 A80-49139 Irrigation mapping in western Kans as using Landsat. II

Practices and problems --- irrigation mapping in western Kansas using Landsat p0174 A80-49143 of Landsat-derived Development and application

irrigation cropland maps for water use determination in p0175 A80-49144 Computer-assisted production of multi-coloured maps

p0209 A80-49521 The use of space data for the prediction of m p0201 A80-49653 flooding in Siberia

Cartographic processing and analysis of satellite imagery: International Conference, 3rd, Toulouse, France,

19-22, 1979, Proceedings p0185 A80-50876 nation - The different Cartographic display of space infor p0210 A80-50879 methods available at IGN

Automatic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888 Application to the central pyreness ported actography Spatial filtering of Landsat data for urban cartography p0185 A80-50892

The potential of Landsat-3 RBV images for thematic napping --- geomorphological, geologica and land p0210 A80-50894 applications

The combined plotting of satellite photographs and aerial photographs for topographic mapping p0185 A80-50895 Tidal land mapping from Landsat p0185 A80-50896

otographs for topographic mapping from Landsat p0185 A80-5089b Tidal land mapping from Landsat p0185 A80-5089b Basic topographic mapping - Renewal and revision p0185 A80-50897 p0185 A80-50897

The cartography of Chize forest Evaluation of Landsat image data for the extraction of

land use information and its presentation in thematic maps p0185 A80-50902

The use of satellite imagery for mapping - The study of p0175 A80-50903 soil moisture

Characteristics of the Landsat system and data for

ologic applications - Availability of data p0190 A80-51078

Lineaments and their tectories of p0190 A80-51085 mineral potential in south India Application of Landsat-2 data for obtaining land p0191 A80-51092

Remote sensing of coastal envi p0202 A80-51281

Evaluation of hydrogeologic conditions in Ponnaiyar River basin. South India using remotely sensed data

00203 480-51288 sian snow cover extent - The NOAA satellite record, 9 p0203 A80-51295 1966-79

Applications to floods of remote sensing from satellites p0204 A80-51300

Floodplains mapping of Gangetic basin using Landsat p0204 A80-51303

imagery Satellite imagery and U.P. Himalayas and Siwalik --- for soil conservation p0204 A80-51304

Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the global

evaluation of ground water resources p0204 A80-51305 Indian remote sensing satellite program and its contribution to water resources manage

p0204 A80-51307 e utility of Landsat-D for water-res

pozo5 A80-51309

Results of the complex processing of photographs taken from the Salyut space stations p0212 A80-53004 Applications of statistics to thematic mapping p0186 A80-53051

Using 70-mm aerial photography to identify rangeland p0175 A80-53056

Landsat-D - Overview and implication p0224 A80-53609

ar studies band correlation analysis jp0216 N80-29825 [NASA-TM-80716]

Florida water resources [E80-10246] p0205 N80-30829

Florida water resources. Executive summary p0205 N80-30830 [E80-10247]

Classification of multispectral images according to crosswise textural characteristics --- Ma [E80-10257] p0 Mato Grasso, Brazil p0218 N80-30840

Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo,

[E80-10258] p0176 N80-30841 Use of LANDSAT data for estimating the area of sugar cane in the state of Sao Paulo --- Brazil

p0177 N80-30843 [E80-10260] Utilization of LANDSAT data to inventory the sugar cane

the state of Sao Paulo [E80-10261] p0177 N80-30844

Grizzly bear habitat analysis. Section 3: LANDSAT-1 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana [NASA-CR-163382] p0177 N80-30867

Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, Florida: Seattle, Washington; and Boston, Massachusetts [E80-10301] p0182 N80-30868

The contribution of the diffuse light component to the ic effect on remotely sensed data [NASA-TM-80728] p0186 N80-30876

Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data p0190 A80-51084 Lineaments and their tectonic significance in relation to p0190 A80-51085 mineral potential in south India Geological analysis of the Urals-Oman superlineament p0211 A80-52052 from sate lite imagery NASA geodetic applications of the Mark 3 VLBI rstem p0186 N80-28841

system LANDSAT data as a basis for regional environmental

assessment within the Columbia Plateau (RHO-8WI-SA-43) DC p0183 N80-31862 Altimetry data over trenches and island-arcs and convection in the mantle [NASA-CR-163516]

p0199 N80-32050 The coordinated federal program for the application of space technology to crustal dynamics and earthquake

[NASA-TM-82215] p0187 N80-33999 NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80-34000

TELEMETRY A telemechanical system for hydrophysical studies in the p0223 A80-45766

Substorm warnings - An ISEE-3 real time data system p0209 A80-46225 Evaluation of remote hydrologic data-acquisition systems,

west-central Florida [PB80-176951] p0205 N80-29832

Seasat-A land applications data processing plan 80-10317] p0221 N80-32810 [E80-10317] TEMPERATURE GRADIENTS

Studies of snow accumulation Himalayan slopes characteristics p0203 A80-51296

TEMPERATURE MEASUREMENT

HCMM energy budget data as a model input for assessing regions of high potential groundwater pollution --- South Dakota [E80-10310] p0206 N80-32806

On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field

AD-A088082 p0199 N80-33076 TENNESSEE Digital LANDSAT data analysis of Tenness

[E80-10130] p0212 N80-28768 TERRAIN ANALYSIS

Segmentation-based boundary modeling for natural prain scenes p0209 A80-44297 terrain scenes Terrain analysis and hydrogeologic interpretations from

p0202 A80-51285 satellite imagery Use of collateral information to improve LANDSAT classification accuracies --- Ventura County and Klamath National Forest, California

p0176 N80-29815 [E80-10268] Errors in automatic pass point mensuration using digital

[AD-A087443] p0220 N80-31859 Terrain analyst synthesizer station

[AD-A087370] p0187 N80-31860 Application of thematic mapping techniques in terrain analysis [AD-A089061]

p0222 N80-33847 TERRESTRIAL RADIATION Thermal balance of soils

[INPE-1859-RPE/210] p0180 N80-33841 TEXAS AS Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056

Microwave radiometer measurements of soil moisture

As-built design specification for areas added to the

Light reflectance, transmittance, and utilization within a

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations --- Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota,

Mississippi, Missouri, Nebraska, North Carolina, North

Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 An exploratory study to develop a cluster-based area estimation procedure --- Colorado, Kansas, Minnesota,

Nebraska, Texas, South Dakota, Oklahoma, and North

ing LANDSAT digital data for estimating green t

Throckmorton, Texas test site and Great Plans Corridor.

Classification of multispectral images according to

The Landsat-D/Global Positioning System experiment

NIAA PAPER 80-1678] p0209 A80-46522 Unsupervised classification of MSS Landsat data for

Inspire spatially complex vegetation pol 73 A80-47744 Identifying irrigated lands using remote sensing techniques: State of the Art; Proceedings of the Symposium,

Sioux Falls, S. Dak., November 15, 16, 1979

crosswise textural characteristics --- Mato Grasso, Brazil

onthly bases of Texas, Minnesota and USSR

tative canopy --- Texas

[E80-10241]

[E80-10282]

[680-10295]

[E80-10328]

[F80-10257]

THEMATIC MAPPING

[AIAA PAPER 80-1678]

US

TEXTURES

p0176 A80-53890

p0216 N80-29810

p0177 N80-30851

p0177_N80-30863

p0178 N80-32819

p0218 N80-30840

p0174 A80-49136

An investigation of vegetation and other Earth An investigation of vegetation and other Latin resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala D0225 N80-32807 [E80-10312]

Application of remote sensing to state and regional problems --- Mississippi p0183 N80-32826

[E80-10338] p0183 N80-32826 The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil [INPE-1794-RPE/166]

p0179 N80-32836 TIMBER INVENTORY

- Information extraction from a Landsat image contained within an artificial outline p The cartography of Chize forest p0210 A80-50889 st through remote p0175 A80-50900 sensina of collateral information to improve LANDSAT
- classification accuracies --- Ventura County and Klamath National Forest, California [E80-10268] p0176 N80-29815
- Cornell University remote sensing program --- New York State
- [E80-10280] p0227 N80-29823 Forest resource information system, phase 3 --- St. Regis Paper Co.: Picayune, Mississippi
- [E80-10242] p0176 N80-30825 Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo, Brazil
- [E80-10258] p0176 N80-30841 TIMBER VIGÓR
- Aerial color infrared photography citriculture p hy applications to p0175 A80-51944 TOPOGRAPHY
- Spaceborne imaging radar Geologic and oceanogra applications n0223 A80-47480 color plotter system and its its applications in p0209 A80-49099
- geoscience Cartographic processing and analysis of satellite imagery. International Conference, 3rd, Toulouse, France, June
- International Contentions p0185 A80-5007C 19-22, 1979, Proceedings p0185 A80-5007C A study of the needs of French government agencies in A study of the needs of French government agencies in p0181 A80-50882
- The combined plotting of satellite photographs and aeria photographs for topographic mapping p0185 A80-50895 Basic topographic mapping - Renewal and revision
- p0185 A80-50897 The geomorphology of Mont-Saint-Michel Bay studied
- from the remote sensing of instantaneous shorelines p0201 A80-50899
- Computer-aided watershed analyses using remote sensing based regional information systems p0204 A80-51299
- Investigation of the accuracy of transposition of landmarks and contour points to small-scale aerial photographs p0212 A80 53005
- Study of geological structure of Sicily and other Italian eas --- Gulf of Orosei, Eastern Sardinia [E80-10299]
- 80-10299] p0192 N80-30866 The contribution of the diffuse light component to the topographic effect on remotely sensed data p0186 N80-30876 [NASA-TM-80728]
- Terrain analyst synthesizer station [AD-A087370] p0187_N80-31860
- Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and djacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-32013
- A watershed information system p0207 N80-33825 The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding
- highlands --- Germany and Switzerland [E80-10228] p0179 N80-33829 TOPOLOGY
- The use of topology concepts for supervised and unsupervised classifications --- of satellite im p0210 A80-50891 TOWERS
- Anomalous snowfall caused by natural-draft cooling

A-28

- towers [RAND/N-1479-DOE] p0206 N80-32024
- TRACE CONTAMINANTS Smoke as a quantitative atmospheric diffusion trace
- p0182 A80-53265 TRAJECTORY OPTIMIZATION
- Spacecraft trajectories for the remote sensing of the p0223 A80-49662 TRANSPORTATION
- Program on stimulating operational private sector use of Earth observation satellite data
- [E80-10233] p0227 N80-29802 TREES (PLANTS)
- Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery --- Sao Paulo. [E80-10258] p0176 N80-30841
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested
- areas in Brazil [INPE-1794-RPE/166] p0179 N80-32836

TRENDS

- Entering The global 2000 report to the president. p0228 N80-32295 twenty-first century, volume 1 TROPICAL METEOROLOGY
- Study of floods in Bangladesh and India with the help of meteorological satellites p0204 A80-51306 TURBIDITY
- Multispectral techniques for remote monitoring of sediment in water: A feasibility investigation [PB80-198500] p0207 N80-33849
- Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelength p0207 N80-33927 [NASA-TM-81843] TURTLES
 - A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part Marine turtle studies
 - [NASA-CR-163122-VOL-4-PT-1] p0183 N80-31969

U

U.S.S.R.

- A method for mapping soil reflectance p0175 A80-49655 The appearance of the Main Ural Fault in a cloud field
- on space photographs p0189 A80-49664 Estimates of the accuracy of the brightness conjunction f multispectral photographs p0210 A80-49665
- of multispectral photographs data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite
- p0211 A80-52051 TV images Geological analysis of the Urals-Oman superlineament p0211 A80-52052 from satellite imagery
- Mapping a geologicostructural scheme of the Kola aninsula from satellite imagery p0211 A80-52053
- peninsula from satellite imagery p0211 A80-52053 Experiment with the composition of a geological map on the basis of interpretations of Meteor satellite television images /using Central Asia as an example/ p0211 A80-52054
- Analysis of the results of an interpretation of satellite and aerial protography of Western Uzbekistan
- p0211 A80-52055 Comparison of interpretations of radar images and space photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066
- As-built design specification for historical daily data bases for testing advanced models --- Kansas, North Dakota, and USSR
- p0214 N80-28795 [E80-10198] As-built design specification for areas added to the onthly bases of Texas, Minnesota and USSR
- p0216 N80-29810 [E80-10241] U.S.S.R. SPACE PROGRAM
 - Earth observation from space today and tomorro p0227 A80-50280 Utilization of space for scientific and economic purposes
- in the USSR in 1978 ··· Russian book
- p0227 A80-53148 UNITED KINGDOM
- The detection of linear features using Landsat data p0210 A80-51013 HCMM satellite follow-on investigation no. 025: Soil
- moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) --- France, Germany, Italy, United Kingdom, and he Benelux countries
- [E80-10332] p0178 N80-32823 UNITED STATES OF AMERICA
- Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware D0205 N80-29816
- [680-10269] As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado
- (80-10263) p0218 N80-30846 The integrated analysis procedure for identification of [E80-10263] spring small grains and barley --- Great Plains Corridor: .S. and Canada
- p0177 N80-30847 [E80-10274] Monitoring the use of riverways with aerial photography: The development, testing, and evaluation of a computer
- sisted methodology [AD-A086471] p0182 N80-30877
 - Remote sensing of coastal environment and res
- p0202 A80-51281 URANIUM
- ation of alteration p0189 A80-49524 Uranium Spectral discrimination phenomena in sediments Aerial gamma ray and magnetic survey: Raton Basin roject. The Raton and Santa Fe quadrangles of New project. Mexico
- [GJBX-9(80)-VOL-2] URBAN DEVELOPMENT p0192 N80-30881
- The application of remote sensing to resource management and environmental quality programs in Kansas --- kahsas: roy's and phony creeks watersheds: the proposed tallgrass prairie national park and pin ford lake, missouri. [E80-10337] p0183 N80-32825

URBAN PLANNING

Program on stimulating operational private sector use of Earth observation satellite data [E80-10233] p0227 N80-29802

SUBJECT INDEX

- URBAN RESEARCH
- Effects of radar system parameters, population, and environmental modulation on settlement visibility p0181 A80-47746
 - Spatial filtering of Landsat data for urba urban cartography p0185 A80-50892
- Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando. Florida; Seattle, Washington; and Boston, Massachusetts [F80-10301] p0182 N80-30868
- USER MANUALS (COMPUTER PROGRAMS)
 - Program documentation: Final design specification for dot data base update deck conversion program (DOTDEC) p0213 N80-28779 [E80-10178] LACIE/phase 3 Adjustable Crop Calendar (ACC) configuration control procedures manual
- p0213 N80-28786 [E80-10186]
- User's guide: Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking system [E80-10194] p0214 N80-28791
- As-built design for enhancement of the automatic status ind tracking system software
- [E80-10197] p0214 N80-28794 User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote
- sensing system [EBO-10188] p0214 N80-29780
- User manual for the Earth observations Division R and to OLPARS dot data conversion [E80-10236] n0216 N80-29805
- Preliminary user guide for the program GTDDM (Ground Truth Dot Dump)
- [E80-10244] p0217 N80-30827 User's guide Large Area Crop Inventory Experiment
- (LACIE) phase 3 PDP 11/45 automatic status and tracking system [E80-10256] p0217 N80-30839
- User's guide for the Yield Estimation Subsystem Data Management System (YESDAMS)
- [E80-10276] p0218 N80-30849 Operator's guide for LACIE phase 3 automatic status
- and tracking system [E80-10284] Draft user procedures: p0218 N80-30852 Draft user procedures: Software wheat yield predictions/foreign equivalent test --- Kansas, Oklahoma,
- and Nebraska [E80-10287] p0218 N80-30855 ν

VALLEYS

VEGETATION

canopies

ge

and sea

information

and soils

vegetation

content

[E80-10130]

[E80-10246]

Baseline to monitoring

cover using Landsat

Florida water resources

Vegetation clutter model

- The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands --- Germany and Switzerland
- [E80-10228] p0179 N80-33829 VEGETABLES

Simulation of a solar radiation absorption in vegetation nopies p0173 A80-46451 Unsupervised classification of MSS Landsat data for

Effects of radar system parameters, population, and

coscience p0209 A80-49099 Computer-assisted production of multi-coloured maps

Optical methods for the study of biocenoses on land

Application of Landsat-2 data for obtaining land formation p0191 A80-51092

Computer-aided watershed analyses using remote

The environmental program at Kennedy Space Center -

Diurnal behavior of the spectral reflectivity of vegetation

Determination of the spectral characteristics of soils and

Invariant photometric features of natural objects

A color plotter system and its applications

environmental modulation on settlement visibility

sensing based regional information systems

Errors incurred in estimating an

Microwave radiometer measurem

Florida water resources. Executive [E80-10247]

Digital LANDSAT data analysis of Tennesse

ing spatially complex vegetation p0173 A80-47744

p0173 A80-44262

p0181 A80-47746

p0209 A80-49521

p0201 A80-49656

n0204 A80-51299

p0181 A80-51935

p0211 A80-52057

p0211 A80-52058

p0211 A80-52059

nts of soil moisture p0176 A80-53890

p0212 N80-28768

p0205 N80-30829

รแกกกลก p0205 N80-30830

area of uniform land p0175 A80-53052

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [E80-10324] p0178 N80-32815

SUBJECT INDEX

Study of geological structure of Sicily and other Italian eas --- Gulf of Orosei, Eastern Sardinia [E80-10299] p0192 N80-30866

Application Explorer Mission-A heat capacity mapping ission --- Bavaria, Germany and Marrakech, Morocco [E80-10309] p0219 N80-30875

Evaluation of remote sensing techniques on selected forest sites in Florida --- Fort Myers and Gainesville test [E80-10296]

p0177 N80-32805 Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta Counties

[E80-10326] p0183 N80-32817 Using LANDSAT digital data for estimating green biomass Throckmonton, Texas test site and Great Plans Corridor, us

[E80-10328] p0178 N80-32819 Applied Remote Sensing Program (ARSP) --- Arizona [E80-10330] p0178 N80-32821 o0178 N80-32821

Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evaportanspiration of vegetated surfaces from one remotely sensed surface temperature near the daily maximum [E80-10333]

p0178 N80-32824 The application of remote sensing to resource nanagement and environmental quality programs in Kansas -- kansas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, missouri [E80-10337] p0183 N80-32825

Application of remote sensing to state and regional problems --- Mississippi [E80-10338] p0183 N80-32826

Characterization of Cerrado vegeta automatically classified LANDSAT MSS data [INPE-1790-RPE/162] p0175 vegetation using p0179 N80-32835

A watershed information system p0207 N80-33825 Interactive digital image processing investigation, phase

AD-A087518] 00222 N80-33848 VEGETATION GROWTH

Overview of the Landsat system p0174 A80-49137 The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in et mananemen [NASA-CR-163589] p0178 N80-32830

The use of LANDSAT data for The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil

[INPE-1794-RPE/166] p0179 N80-32836 VERY LONG BASE INTERFEROMETRY NASA conductor NASA geodetic applications of the Mark 3 VLBI

system VIEW EFFECTS p0186 N80-28841 Airborne thermal viewer having a circular scanner viewir

p0223 A80-52046 VINEYARDS

Cornell University remote sensing program --- New York State [E80-10280] D0227 N80-29823

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [E80-10324] p0178 N80-32815 VIRGINIA

In situ ozone data for evaluation of the laser absorption spectrometer ozone remote sensor: 1979 sout Virginia urban plume study summer field program 1979 southeastern p0183 N80-33928 [NASA-TM-81831] VOLCANOES

Volcanic material from Mount St Helens stratosphere over Europe An investigation of vegetation p0182 A80-54074 and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary Maine: White Mountain National Forest, New Hampshire Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala [E80-10312] p0225 N80-32807

w

WASHINGTON

The Columbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans p0174 A80-49141

Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data --- Orlando, Florida: Seattle, Washington; and Boston, Massachusetts [E80-10301] ISO-10301] p0182 N80-30868 LANDSAT data as a basis for regional environmental

An investigation of vegetation and other Fach source/feature naramet sessment within the Columbia Plateau [RHO-BWI-SA-43] An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions ---- Lower Hudson River estuary: Maine; White Mountain National Forest, New Hampshire Mt. St. Helens and Metsachee Creek, Washington; and the Santiaguito and Feugo volcanoes, Guatemala [E80-10312] 00225

p0225 N80-32807

WATER BALANCE

Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the global ation of ground water resources p0204 A80-51305 WATER CIRCULATION

Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid climates p0202 A80-51284 climates

Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the globa evaluation of ground water resources p0204 A80-51305 Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements

p0197 A80-51491 Applications of HCMM data to soil moisture snow and estuarine current studies --- Cooper River and Delaware

p0205 N80-29816

Bay [EBO-10269] WATER COLOR

Optical methods for the study of biocenoses on land p0201 A80-49656 and sea

Nimbus-7 coastal zone color scanner - System descriptio Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner · Comparisons with surface measurements

p0197 A80-51491 investigation of vegetation and other Factor ce/feature parameter An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions --- Lower Hudson River estuary: Maine: White Mountain National Forest, New Hampshire: Mt. St. Helens and Metsachee Creek, Washington; and the Spatianitio and Seuro Netzagenet

Santiaguito and Feugo volcanoes, Guatemala p0225 N80-32807 [F80-10312] WATER CONSUMPTION

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California p0178 N80-32815 [£80-10324]

WATER DEPTH The Gulf Stream Meanders experiment: Current meter,

atmospheric, and sea level data report for the mooring [AD-A088069] p0199 N80-33077

Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelength [NASA-TM-81843] p0207 N80-33927 WATER MANAGEMENT

The Columbia River and Tributaries Irrigation Withdrawats Analysis Project - Feasibility analysis and future plans p0174 A80-49141

Development and application of Landsat-derived irrigation cropland maps for water use determination the High Plains p0175 A80-49144

Earth observation systems in Japan - for water resources p0205 A80-51310 study Florida

water resources [E80-10246] p0205 N80-30829

Florida water resources, Executive summary [E80-10247] p0205 N80-30830

Irrigated lands assessment for water management Applications Pilot Test (APT) --- California [E80-10324] p0 p0178 N80-32815

Applied Remote Sensing Program (ARSP) --- Arizona 80-10330] p0178 N80-32821 [E80-10330] A watershed information system p0207 N80-33825

WATER POLLUTION Some results of remote sensing in Yugoslavia

p0191 A80-51091 HCMM energy budget data as a model input for assessing regions of high potential groundwater pollution --- South

Dakota [E80-10310] D0206 N80-32806

Satellite monitoring of sea surface pollution --- irish and north seas [E80-10329] p0199 N80-32820

Multispectral techniques for remote monitoring of sediment in water: A feasibility investigation

[PB80-198500] p0207 N80-33849 WATER QUALITY

Quantitative interpretation of Great Lakes remote sen p0201 A80-45005 data Satellite observations of a nutrient upwelling off the coast

p0195 A80-45015 of California Nonzero subsurface irradiance reflectance at 670 nm from

Lake Ontario water masses p0201 A80-45428 Remote sensing of particulate con-

centrations in water p0201 A80-46450

A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3. part 1: Ichthyological survey of lagoonal waters --- Indian River lagoon system NASA-CR-163122-VOL-3-PT-1] p0197 N80-28939

A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3. part 2: Ichthyological studies. sailfin molly reproduction study

[NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940 Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base p0198 N80-30884 [PB80-811235]

Remote sensing procedures for detecting and monitoring arious activities regulated by the Mobile District p0206 N80-31973 [AD-A087584]

A quantitative evaluation of LANDSAT for monitoring suspended sediments in a fluvial channel p0206 N80-33823

Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelength [NASA-TM-81843] p0207 N80-33927

Assessment of the role of remote sensing in the study of inland and coastal waters [NASA-TM-81881] n0200 N80-34048

WATER RESOURCES

The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278

Space observations for water resources - A potential to p0201 A80-51279 be developed

Remote sensing of coastal environment and resources p0202 A80-51281

Terrain analysis and hydrogeologic interpretations from p0202 A80-51285 satellite imagery Remote sensing of water resources in Panch Mahals

district p0202 A80-51286 Evaluation of hydrogeologic conditions in Ponnaiyar River

basin, South India using remotely sensed data p0203 A80-51288

Remote sensing in search for ground water - Some case stories p0203 A80-51289 histories Snow mapping from space platforms

D0203 A80-51293

Problems of snow cover assessment - An approach using remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India p0203 A80-51294 Microwave emission properties of snow for monitoring vdrological parameters p0203 AB0-51297

hydrological parameters Computer-aided watershed analyses using remote

sensing based regional information systems p0204 A80-51299

Floodplains mapping of Gangetic basin using Landsat nagery p0204 A80-51303 imagery Perspectives of remote sensing applications to the study

of hydric balance in the EEC countries and to the global evaluation of ground water resources p0204 A80-51305 Indian remote sensing satellite program and its

contribution to water resources manage p0204 A80-51307

The utility of Landsat-D for water-resources studies p0205 A80-51309 Earth observation systems in Japan --- for water resources udy p0205 A80-51310

study Florida water resources

p0205 N80-30829 [E80-10246] Florida water resources. Executive summary

p0205 N80-30830 [E80-10247] Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta

Counties [E80-10326] p0183 N80-32817 WATER RUNOFF

The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalo India, May 29-June 9, 1979 p0201 A80-512 p0201 A80-51278 WATER TEMPERATURE

Dynamical interpretation of satellite-sensed thermal features off Vancouver Island p0195 A80-46315 Thermal fronts in the Mediterranean according to NOAA satellite radiometer data /September 1977-February satellite radiometer data / September

1979/ 00195 A80-48750 Microwave radiometric determination of oceanographic ad meteorological parameters p0223 A80-51579 and meteorological parameters

Satellite studies of fresh-water ice movement on Lake ie p0205 A80-53611 Applications of HCMM data to soil moisture snow and Erie

estuarine current studies --- Cooper River and Delaware Bay

[E80-10269] p0205 N80-29816 Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front

[E80-10278] p0198 N80-30850

Remote sensing applied to the prospecting of geothermal nomaty in Caldas Novas County, State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837 On the inference of oceanic currents or eddies by p0193 N80-32837

spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field AD-A088082] p0199 N80-33076

WATER WAVES

of islands

data

[NASA-CR-156869]

Methods for the extraction of long-period ocean wave parameters from narrow beam HF radar sea echo n0195 A80-46095

The problems of SAR imagery of ocea

Comparison with wave measurements

Observation of wavelike motion of the Gaspe Current p0195 A80-46309

Radar observations of wave transformations in the vicinity

Comparisons between wave directional spectra from SAR

nd pressure sensor arrays p0196 A80-51409 Synthetic aperture radar imaging of ocean waves

p0196 A80-51411 Wallops waveform analysis of SEASAT-1 radar altimeter

p0196 A80-50300

p0196 A80-51408

p0196 A80-51409

p0198 N80-29637

A-29

Ocean wave sensing. Citations from the NTIS data hace

[PB80-812878] p0200 N80-34053 WATERSHEDS

The contribution of space observations to water resources management: Proceedings of the Symposium. Bangalore. India, May 29-June 9, 1979 p0201 A80-51278 Computer-aided watershed analyses using remote sensing based regional information systems

p0204 A80-51299 puzue 480-51299 Investigation of the application of HCMM thermal data to snow hydrology --- Salt-Verde watershed, Arizona and the Sierra Nevada Mountains, California (seo, 1027)

0205 N80-30864 [E80-10297] Application of remote sensing to selected problems within the state of California --- Mendocino, Colusa, and Shasta

[E80-10326] p0183 N80-32817 The application of remote sensing to resource management and environmental quality programs in Kansas --- kansas; roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, missouri, [E80-10337] p0183 N80-32825 A watershed information system p0207 N80-33825

WATERWAYS

Remote sensing procedures for detecting and monitoring various activities regulated by the Mobile District [AD-A087584] p0206 N80-31973 WAVE FRONTS

Heat capacity mapping mission project HCM-051 --- East Australian Current and the Tasman Front p0198 N80-30850 [E80-10278]

WAVEFORMS Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering p0224 A80-53891

Wallops waveform analysis of SEASAT-1 radar altimeter data

p0198 N80-29637 [NASA-CR 156869] WEATHER FORECASTING

Satellite temperature monitoring and prediction system p0211 A80-51943 Cornell University remote sensing program --- New York

[E80-10280] p0227 N80-29823

- Development of techniques to specify cloudiness and rainfail rate using GOES imagery data [AD-A084757] p0206 N80-33064
- The United States space observation policy [NASA-TM-76373] p0228 p0228 N80-33425
- The Federal Plan for Meteorological Services and Supporting Research, fiscal year 1981 [PB80-199482] p0228 N80-34041

WELLS Remote sensing application in groundwater surveys and ploration in India p0202 A80-51280 exploration in India

WETLANDS Remote sensing of coastal environment and resource

- p0202 A80-51281 Digital LANDSAT data analysis of Tennesse p0212 N80-28768 [E80-10130]
- Florida water resources p0205 N80-30829 [E80-10246]
- Florida water resources, Executive summary 80-10247] p0205 N80-30830 [E80-10247]
- Remote sensing procedures for detecting and monitoring arious activities regulated by the Mobile District p0206 N80-31973 [AD-A087584]

WHEAT

- As-built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological model
- [E80-10170] p0212 N80-28771 As-built design specification for the Brazil and China
- monthly data bases [E80-10172] p0213 N80-28773 documentations: MARQTY1.FTN,
- Program do CAMDATA1.FTN p0213 N80-28783 [E80-10182]
- LACIE field measurements data acquisition summary report, 1975 1976 crop year --- Finney County, Kansas: Williams County, North Dakota; and Hand County, South
- Dakota [E80-10193] p0214 N80-28790
- As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 6A [E80-10196] p0214 N80-28793
- As-built design specification for historical daily data bases for testing advanced models --- Kansas, North Dakota, and U.S.S.R.
- [E80-10198] p0214 N80-28795 Design specification for LARSYS procedure 1 [E80-10199] p0214 N
- p0214 N80-28796 As-built design specification for PDP 11/45 accuracy
- assessment system (E80-10200) p0214 N80-28797 Program documentation: MARQUIS2.FTN
- p0215 N80-29796 [E80-10220] Operational changes for the Kansas State University
- vheat model p0176 N80-29797 [E80-10223]
- Remote sensing of total dry-matter accumulation in [E80-10235] p0176 N80-29804

As-built design specification for areas added to the monthly bases of Texas, Minnesota and USSR [E80-10241] p0216 / p0216 N80-29810

As-built design specification for the India monthly data

- [E80-10264] D0216 N80-29811 Detailed design specification for the automatic status and tracking system modifications for LACIE procedure [E80-10243] p0217 N80-3082
- p0217 N80-30826 As-built design specification for scatter plots for direct
- wheat [E80-10250] p0217 N80-30833
- As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado [E80-10263] p0218 N80-30846
- Light reflectance, transmittance, and utilization within a egetative canopy --- Texas [E80-10282] p0177 N80-30851
- Draft user procedures: Software wheat yield redictions/foreign equivalent test --- Kansas. Oklahoma, and Nebraska
- [E80-10287] p0218 N80-30855 AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations ··· Arkansas, California, Georgia, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, and Texas [E80-10292] p0177 N80-30860 [E80-10292]
- Maximal analysis labeling procedure (preliminary) [80-10294] p0219 N80-30862 An exploratory study to develop a cluster-based area [E80-10294]
- estimation procedure --- Colorado, Kansas, Minnesota, Nebraska, Texas, South Dakota, Oklahoma, and North Dakota [E80-10295] p0177 N80-30863
- Analysis of scanner data for crop inventories [E80-10308]
- An algorithm for estimating crop calendar shifts of spring mall grains using LANDSAT spectral data E80-103.14] [E80-10314]
- Planning and execution of a photographic mission over a wheat producing region in Rio Grande do Sul. Brazi [INPE-1793-RPE/165] p0179 N80-32833
- A model of plant canopy polarization response [E80-10336] p0179 N80-33835 WILDERNESS
- Remote sensing of wildland resources: A state-of-the-art [PB80-184609] p0177 N80-30882
- WILDLIFE Digital LANDSAT data analysis of Tennessee
 - [E80-10130] p0212 N80-28768 Grizzly bear habitat analysis. Section 3: LANDSAT-1 p0212 N80-28768 multispectral imagery and computer analysis of grizzly bear habitat --- Slategoat, Scapegoat and Danaher areas, Montana [NASA-CR-163382]
 - p0177 N80-30867 A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part Marine turtle studies
 - [E80-10330] B0-10330] p0178 N80-32821 The application of remote sensing to resource
- management and environmental quality programs in Kansas kansas: roy's and phony creeks watersheds; the proposed tallgrass prairie national park and pin ford lake, missouri, [E80-10337] p0183 N80-32825
- p0183 N80-32825 WIND EFFECTS
- Comparisons between wave directional spectra from SAR and pressure sensor arrays p0196 A80-51409 WIND MEASUREMENT
- Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemometer WIND VELOCITY MEASUREMENT
- Comparison of surface wind stress measurements -
- Airborne radar scatterometer versus sonic anemomet p0196 A80-51407 WISCONSIN
- Composition and assembly of a spectral data base for corn and soybean multicrop segments --- Missouri, Nebraska, South Dakota, Wisconsin, Iowa, Illinois, Mississippi, Indiana, Kentucky, Minnesota, Michigan, and
- Louisiana p0176 N80-29824 [E80-10281] WYOMING
- Geologic application of thermal-inertia mapping from gic application of thermal-metric markets ---- Powder River Basin, Wyoming 2301 p0192 N80-29799 atellite [E80-10230]
 - γ

- YIELD As-built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological
- [E80-10170] p0212 N80-28771 As-built design specification for the Brazil and China nonthly data bases
- [F80-10172] p0213 N80-28773

Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10180] p0213 N80-28781

User's guide: Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking system p0214 N80-28791 [E80-10194]

As-built design specification for the Yield Estimation Subsystem (YES) monthly yield data base and supporting program

[E80-10218] p0215 N80-29795 Operational changes for the Kansas State University

heat model [E80-10223] p0176 N80-29797

As-built design specification for areas added to the monthly bases of Texas. Minnesota and USSR p0216 N80-29810 [E80-10241]

As-built design specification for the India monthly data

[E80-10264] p0216 N80-29811 Sampling of rectangular regions [E80-10272]

p0176 N80-29819 Remote sensing research studies

[E80-10117] p0176 N80-30823 As-built design specification for phase 3 model areas added to the monthly data base of the US --- Montana, South Dakota, Oklahoma, Nebraska, and Colorado

p0218 N80-30846 [E80-10263] User's guide for the Yield Estimation Subsystem Data Management System (YESDAMS)

DO218 N80-30849 [E80-10276] Use of soil moisture information in [E80-10302] yield models p0177 N80-30869

YUGOSLAVIA

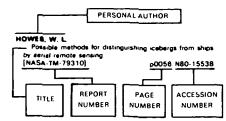
Some results of remote sensing in Yugoslavia p0191 A80-51091

PERSONAL AUTHOR INDEX

Earth Resources/ A Continuing Bibliography (Issue 28)

JANUARY 1981

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title, e.g., p0056 N80-15538. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

Α

- ABOTTEEN, K. M.
- Evaluation of Bayesian sequential proportion estimation using analyst labels [E80-10304] n0219 N80-30871
- ABRAMS, M. J. Uranium Spectral discrimination of alteration phenomena in sediments p0189 A80-49524 ACHTERMANN, E.
- Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407 [BMFT-FB-W-79-18]
- ACKERMAN, M. Volcanic material from Mount St Helens in the
- stratosphere over Europe p0182 A80-54074 AHLERS, C. W.
- As-built design specification for PDP 11/45 accuracy assessment system [E80-10200] p0214 N80-28797
- Design specification for a list processing system 80-10265] p0216 N80-29812 [E80-10265] Preliminary user guide for the program GTDDM (Ground Truth Dot Dump)
- p0217 N80-30827 [E80-10244] As-built specification design for the
- Patterson-Pitt-Thadani minimum loss classifier [E80-10262] p0218 N80-30845
- As-built design specification for a list processing system [E80-10325] p0221 N80-32816
- AHMAD M Lineaments and their tectonic significance in relation to
- mineral potential in south India n0190 A80-51085 AKSENOV, V.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857
- ALANIZ, M. A. Using 70-mm aerial photography to identify rangeland
- p0175 A80-53056 sites ALDRICH, R. C. Remote sensing of wildland resources: A state-of-the-art
- review [PB80-184609] p0177 N80-30882
- ALUSON, J. L As-built design specification for LACIE phase 3 automatic
- status and tracking system [E80-10175] p0213 N80-28776 ALVES, E. C. M.
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil [INPE-1794-RPE/166]
- n0179 N80-32836

- ANDERSON, F.
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490
- ANDERSON, W. H
- Overview of the Landsat system p0174 A80-49137 ANDREWS. J. C.
- Heat capacity mapping mission project HCM-051 [E80-10278] p0198 N80-30850

- ANUTA, M. A. Effects of radar system parameters, population, and environmental modulation on settlement visibility p0181 A80-47746 AOKI, H
- Characterization of Cerrado vegetation using utomatically classified LANDSAT MSS data [INPE-1790-RPE/162] p0179 N80-32835 APONASENKO, A. D.
- Optical methods for the study of biocenoses on land d sea p0201 A80-49656 and sea ARGENTIERO, P.
- On extracting brightness temperature maps from scanning radiometer data [NASA-TM-81989] p0221 N80-32838
- ARVANITIS, L G. Evaluation of remote sensing techniques on selected
- forest sites in Florida p0177 N80-32805 [E80-10296]
- ASKEW, A. J. Space observations for water resources p0201 A80-51279 be developed
- ASMUS, V. V. Practical aspects of radiative correction of multispectral video information n0211 A80-52060 ATKINSON, L.P.
- Ocean chlorophyll studies from a U-2 aircraft platform 00195 A80-45004
- AUCOIN, P. J., JR. As-built design specification for LACIE formatted dot cards in EOD-LARSYS
- [E80-10169] p0212 N80-28770 As-built design specification for EOD-LARSYS procedure
- [E80-10174] p0213 N80-28775
- Design specification for LARSYS procedure 1 follow-on [E80-10176] p0213 N80-28777 Design specification for LARSYS procedure 1
- [E80-10199] p0214 N80-28796 Design specification for secondary nulti-temporal Bayes classifier error sources
- p0215 N80-29784 [E80-10205] Design specification for equiprobable blocks density estimatory/classifier/dot selector
- [£80-10206] o0215 N80-29785 Final design specification for EOD-LARSYS procedure
- 1 follow-on [E80-10213]
- Design specification for LACIE formatted dot cards in EOD-LARSYS
- [E80-10215] p0215 N80-29793 Design specification for a merging program for formatted files
- p0216 N80-29803 [E80-10234]
- Design specification for a list processing system [E80-10265] p0216 N80-29812 Classification with spectral-spatial-temporal archetypes p0217 N80-30834
- [E80-10251] As-built design specification for CLASY program odificati
- [E80-10253] p0217 N80-30836 As-built specification for CLASSY conversion p0219 N80-30873 [E80-10307]
- As-built design specification for a list processing system [F80-10325] o0221 N80-32816
- AUSTIN. R. W. Nimbus-7 coastal zone color scanner - System description p0197 A80-51490 and initial imagery

В

- BABAEV, A. A Airborne thermal viewer having a circular scanner viewing p0223 A80-52046 axis BAGCHI, A. K.
- Studies of snow accumulation characteristics p0203 A80-51295 Himalayan slopes BAHR, H.-P.
- Tidal land mapping from Landsat o0185 A80-50896

- BAIRD, K. W.
- Uranium Spectral discrimination of alteration phenomena in sediments p0189 A80-49524 BAKER, D.
- Substorm warnings An ISEE-3 real time data system p0209 A80-46225
- BAKER, D. J. Large field-of-view interferometers for environmental sensina n0223 A80-48911
- BAKER, E. T. Nimbus-7 coastal zone color scanner - System description and initial imagery o0197 A80-51490
- BALL D. Nimbus-7 coastal zone color scanner - System description
- and initial imagery p0197 A80-51490 BALL S.
- Heat capacity mapping mission project HCM-051 [E80-10278] p0198 N80-30850 BANE, J. M.
- The Gulf Stream Meanders experiment: Current meter. atmospheric, and sea level data report for the mooring
- period [AD-A088069] p0199 N80-33077
- BANERJEE, D. M.
 - Surface characteristics of Precambrian stromatolitic phosphorites of a part of the Indian shield p0191 A80-51087
- BANERJI, P. K. Interfacing with SEO technology 7 - A case study in p0190 A80-51086 geological application BARNES, J. C.
- Investigation of the application of HCMM thermal data to snow hydrology [E80-10297] p0205 N80-30864
- BARNETT, U. R.
- Satellite temperature monitoring and prediction syste p0211 A80-51943 BARR, B. G.
- The application of remote sensing to resource management and environmental quality programs in Kansas
- [E80-10337] p0183 N80-32825 BARRICK, D.
 - Methods for the extraction of long-period ocean wave parameters from narrow beam HF radar sea p0195 A80-46095
 - BARTLETT, D. S. Remote sensing of coastal environment and resources p0202 A80-51281
- BASTIDA, E. M.
 - Sensors for remote sensing [CISE-N-190] p0225 N80-31863 BAUSCH, W. C.
 - Development of a soil moisture model for use with passive microwave remote sensors p0179 N80-33828 BAWEJA, B. K.
 - Remote sensing application in groundwater surveys and exploration in India p0202 A80-51280
 - Remote sensing in search for ground water Some case p0203 A80-51289 histories
 - BECKER, R. H. Monitoring the use of riverways with aerial photography:
 - The development, testing, and evaluation of a computer assisted methodology
- [AD-A086471] p0182 N80-30877 BELINSKII, A. N.
 - Automatic selection of reference objects for comparing p0212 A80-52063 aerial and satellite photographs BENNY, A. H.
- A study of LANDSAT multispectral s [RAE-TR-80018] pl canner data tapes p0220 N80-31864
- BENSON, A. S. Application of remote sensing to selected problems within tate of California
- [E80-10326] p0183 N80-32817 BERG, C. P.
- Eurasian snow cover extent The NOAA satellite record, 1966-79 p0203 A80-51295
- BHATE, V. D. Lineament study of the Bastar district, Madhya Prade
- India, from Landsat imagery p0190 A80-51083 BHAVSAR, P. D.
- The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278 **BIED-CHARRETON, M.** A study of the needs of French government agencies in mote sensing mapping p0181 A80-50882

B-1

remote sensing mapping

BIRNIE, R. W.

BIRNIE, R. W.

An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions [E80-10312] p0225 N80-32807

- BITZER K I Conceptual study of a European remote sensing satellite
- with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407 BLADH, K.
- applications A color plotter system and its neoscience D0209 A80-49099
- BLAINE L R Ocean chlorophyll studies from a U-2 aircraft platform p0195 A80-45004

BLANKINSHIP, P.

The Gulf Stream Meanders experiment: Current meter atmospheric, and sea level data report for the mooring neriod [AD-A088069] p0199 N80-33077

- BLAZQUEZ, C. H. Aerial color infrared photography application
- p0175 A80-51944 citriculture **BO-LINN, C.**
- Final design specification for EOD-LARSYS/statistics and data transformation processors modification p0213 N80-28774 [E80-10173] Design specification for EOD-LARSYS/statistics and data
- transformation processors modification [E80-10177] p0213 N80-28778
- Final design specification for ERIPS fields data base deck conversion p0213 N80-28780 [E80-10179]
- BODECHTEL, J.
- Application of Landsat-2 data for obtaining land formation p0191 A80-51092 information BOLSHAKOV, V. D.
- photogrammetric method of processing snace p0185 A80-46967 photographs Results of the complex processing of photographs taken p0212 A80-53004 from the Salvut space stations
- BONNER, J.
- US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft, San Joaquin Experimental Range p0192 N80-28852 [PB80-169295]
- BORISENKO, V. I.
- A description of a system of programs for mathematically processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft [NASA-TM-76208] p0220 N80-31856
- BORISOV, O. M. Experiment with the composition of a geological map
- on the basis of interpretations of Meteor satellite television images / using Central Asia as an example/ p0211 A80-52054
- BOWEN, A. J., JR.
- High Density Tape Reformatting System/LANDSAT imagery verification and Extraction System (HDTRS/LIVES) throughput analysis p0217 N80-30831 [E80-10248]
- High Density Tape Reformatting System/LANDSAT Imagery Verification and Extraction System (HDTRS/LIVES)
- production test throughput analysis p0221 N80-32811 [E80-10319] Operation plan for the High Density Tape/LANDSAT Imagery Verification and Extraction System (HDT/LIVES)
- data processing support n0221 N80-32813 [E80-10322]
- BOWEN, R. L Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056 sites
- BOZET. M. Spatial filtering of Landsat data for urban cartography
- p0185 A80-50892 BROOKS, D. A The Gulf Stream Meanders experiment: Current meter,
- atmospheric, and sea level data report for the mooring [AD-A088069] p0199_N80-33077
- BROWN, R. J. Remote sensing of the ocean: Physical, chemical, and
- geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884 Remote sensing of the ocean: Dynamics. Citations from
- the NTIS data base p0199 N80-30885 [PB80-811243] BROWN, W. E., JR
- Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements
- p0196 A80-51411 BRUCKS, J. T.
- Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemor p0196 A80-51407
- BRUTON, J. E.

B-2

- Nonzero subsurface irradiance reflectance at 670 nm from Lake Ontario water masses p0201 A80-45428 BUKATA R.P.
- nzero subsurface irradiance reflectance at 670 nm from p0201 A80-45428 Lake Ontario water masses

- BURDICK, R. G.
- Development of a method to detect geologic faults and other linear features from LANDSAT in p0193 N80-32844 PB80-189665]
- BUSH, V. A. Geological analysis of the Urals-Oman superlineament from satellite imagery p0211 A80-52052
- BYKOVSKIY, V. Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft
 - [NASA-TM-76234] p0225 N80-31857

С

- CABRIERES, B
- The SPOT/Landsat image ground station Image preprocessing p0210 A80-50906 CALABRESE M A
- A review of future remote sensing satellite capabilities p0174 A80-49139 CAPPELLINI, V.
- Application of high efficiency data compression and 2-D digital filtering techniques to remote sensing nrocessing p0209 A80-47749 CARNEY, J. J.
- Project development plan for the LANDSAT Imagery erification and Extraction System (LIVES) p0216 N80-29807 [E80-10238]
- Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES) [E80-10239]
- p0216 N80-29808 CARTER, B. D
- Application of remote sensing to state and regional robleme [E80-10338] p0183 N80-32826
- CARTER, W. D. Remote sensing and mineral exploration: Proceedings
- of the Workshop, Bangalore, India, May 29 ay 29-June 9, 1979 p0189 A80-51076 Characteristics of the Landsat system and data for geologic applications - Availability of data
- p0190 A80-51078 CASSINIS R
- Study of geological structure of Sicily and other Italian areas [E80-10299] p0192 N80-30866
- CASSIRAME P
- Information extraction from a Landsat image conta p0210 A80-50889 within an artificial outline CAZAUX, J. C.
- The SPOT/Landsat image ground station Image preprocessing p0210 A80-50906
- CHAGARLAMUDI, P. An automatic method of discriminating rock outcrops p0191 A80-51094 using Landsat data
- Quantitative monitoring of sediment levels in freshwater lakes from Landsat p0203 A80-51291 CHAKRABORTY & K
- Study of Kosi river characteristics using airborne/space p0204 A80-51302 orbital multispectral scanner data CHAKRAVARTI, S.
- Interfacing with SEO technology -geological application p(CHAN, W. H. A case study in p0190 A80 51086
- Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269
- CHANCE, J. E. Light reflectance, transmittance, and utilization within a egetative canopy
- [E80-10282] p0177_N80-30851 CHANG, S. H.
- Detection of hidden mineral deposits by airborne spectral analysis of forest canopies [PB80-193881] p0193 N80-32845
- CHANSARKAR, R. A. Terrain analysis and hydrogeologic into satellite imagery p0 p0202 A80-51285
- CHE. S. C. Utilization of LANDSAT data to inventory the sugar cane
- in the state of Sao Paulo [E80-10261] p0177 N80-30844 CHEN. D. T.
- On the inference of oceanic currents or eddies by spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field
- [AD-A088082] p0199_N80-33076 CHEN, Y. H.
- A hill-sliding strategy for initialization of Gaussian clusters in the multidimensional space [NASA-TM-80721] p0219 N80-31072
- CHESNOKOV, Y.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857
- CHEVREL, M. The United States space observation policy [NASA-TM-76373] p0228 N80-33425
- CHHIKARA, R. S. A statistical test procedure for detecting multiple outliers in a data set
- [E80-10195] p0214 N80-28792

Statistical Outlier Detection (SOD): A computer program

PERSONAL AUTHOR INDEX

- for detecting outliers in data [E80-10275] p0218 N80-30848
- CHISM, S. B., JR. Seasat-A land applications data processing plan (80-10317) p0221 N80-32810 [E80-10317]
- CHITTINENI, C. B. Some approaches to optimal cluster labeling of aerospace
- imagery [E80-10273] p0216 N80-29820 Estimation of probabilities of label imperfections and
- correction of mislabels p0218 N80-30856 [E80-10288] Utilization of spectral-spatial information in the
- classification of imagery data p0222_N80-33832 [E80-10321] CHOPPE, V.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234]
- p0225 N80-31857 CHOUDHURY, A. M.
- Study of floods in Bangladesh and India with the of meteorological satellites p0204 A80-51306 CIHLAR. J
- Soil water and plant canopy effects on remotely measured surface temperatures CLARK, B. V. p0173 A80-47748
- Development and evaluation of scatterometer data processing algorithms [E80-10266]
- p0216 N80-29813 CLARK D K
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80 51490 Phytoplankton pigments from the Nimbus-7 Coastal Zone
- Color Scanner Comparisons with surface measurements p0197 A80-51491 COATES, R.
- NASA geodetic applications of the Mark 3 VLBI p0186 N80-28841 COHEN, R. I
- The Gulf Stream Meanders experiment: Current meter, atmospheric, and sea level data report for the mooring period
- [AD-A088069] D0199 N80-33077 COLLEN. F.
- As-built design specification for Boundary Detection And egistration Program (BDARP1) Registration Pr [E80-10217] n0215 N80-29794 As-built design specification for Boundary Detection And Registration Program (BDARP1)

Detection of hidden mineral deposits by airborne spectral

Irrigated lands assessment for water management

Application of remote sensing to selected problems within

Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and

development of AI guidelines for corn and soybean

Perspectives of remote sensing applications to the study

Spectral discrimination of alteration

evaluation of ground water resources pO204 A80-51305

Segmentation-based boundary modeling for natural rrain scenes p0209 A80-44297

As-built design specification for the Yield Estimation

Subsystem (YES) monthly yield data base and supporting

Planning and execution of a photographic mission over a wheat producing region in Rio Grande do Sul, Brazil [INPE-1793-RPE/165] p0179 N80-32833

Grizzly hear habitat analysis Section 3: LANDSAT-1

Errors incurred in estimating an area of uniform land over using Landsat p0175 A80-53052

An algorithm for estimating crop calendar shifts of spring

Errors in automatic pass point mensuration using digital

small grains using LANDSAT spectral data [E80-10314] p01

multispectral imagery and computer analysis of grizzly bear

of hydric balance in the EEC countries and to the

n0217 N80.30824

p0216 N80-29828

p0193 N80-32845

p0178 N80-32815

o0183 N80-32817

p0178 N80-32818

p0189 A80-49524

p0215 N80-29795

p0177_N80-30867

n0178 N80-32809

p0220 N80-31859

[E80-10216]

[PB80-193881]

COLWELL, R. N.

[E80-10324]

labeling [E80-10327]

CONEDERA, C

CONEL. J. E.

CONTI, D. K.

COOK D

Uranium

terrain scenes

programs [E80-10218]

COTTRELL D. A.

CRAIGHEAD, J. J.

CRAPPER, P. F.

CROMBIE, M. A.

[AD-A087443]

[NASA-CR-163382]

cover using Landsat

habitat

CRIST, E. P.

phenomena in sediments

the state of California [E80-10326]

Image transformation study [AD-A086070]

analysis of forest canopies

Applications Pilot Test (APT)

COLLIER, D.

COLLINS. W.

CROSBY, F. L.

- Satellite temperature monitoring and prediction system p0211 A80-51943 CUREMAN, H. J.
- Assessment of the role of remote sensing in the study of inland and coastal waters [NASA-TM-81881] p0200 N80-34048

D

DAVENPORT, R.

- User's guide for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10276] p0218 N80-30849
- DAVENPORT, R. L. Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10180] p0213 N80-28781
- Operational changes for the Kansas State University vheat model (F80-10223) p0176 N80-29797
- DEALBUQUERQUE, P. C. G. Planning and execution of a photographic mission over wheat producing region in Rio Grande do Sul, Brazil
- (INPE-1793-nr.c, DECARVALHO, V. C. Concernization of Cerrado p0179 N80-32833
- Characterization of Cerrado vegetz automatically classified LANDSAT MSS data vegetation using p0179 N80-32835 [INPE-1790-RPE/162]
- DEERING, D. W. Using LANDSAT digital data for estimating green piomass
- [E80-10328] p0178 N80-32819 DEFEO, W. E.
- Remote sensing of NO using a differential absorp lidar D0182 A80-52332 DEJESUSPARADA, N.
- Classification of multispectral images according to sswise textural characteristics D0218 N80-30840 [E80-10257]
- Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT image p0176 N80-30841 [E80-10258]
- Study of the atmospheric effects on the radiation detected aboard by the sensor (ERTS/LANDSAT) orbiting platforms [E80-10259] p0218 N80-30842
- Use of LANDSAT data for estimating the area of sugar cane in the state of Sao Paulo [E80-10260] p0177 N80-30843
- Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo
- [E80-10261] p0177 N80-30844 Collection, processing, and distribution of remote sensing
- data from Brazilian Receiving Station [INPE-1784-RPE/156] p0221 N80-32832 DELKER C V
- Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618
- DEMEDEIROS, J. S. The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested
- areas in Brazil p0179 N80-32836 [INPE-1794-RPE/166]
- DEMIRANDA, L. B. Coastal currents: Study of a model applied to the coast of Rio Grande do Sul latitude 29 deg south to 35 deg south
- p0200 N80-33844 [INPE-1841-RPE/201] DEMORAESNOVO, E. M. L.
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil [INPE-1794-RPE/166] p0179 N80-32836
- DENEGRE. J. Cartographic display of space information - The different p0210 A80-50879
- methods available at IGN DENNERT-MOLLER, E. Tidal land mapping from Landsat p0185 A80-50896 DENNIS, T. B.
- A labeling technology for LANDSAT imagen [£80-10293] p0219 l
- p0219 N80-30861 DEPARATESI, S. G.
- HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS Project) [£80-10332] p0178 N80-32823
- DESANTANA, C. C. The use of LANDSAT data for evaluation and
- characterization of deforested pastureland and reforested areas in Brazil [INPE-1794-RPE/166] n0179 N80-32836
- DEUTSCH, M. Applications to floods of remote sensing from satellites
- p0204 A80-51300 Landsat detection of oil from natural seeps p0197 A80-53054
- DEVALCOURT, C. C.
- As-built design specification for LACIE phase 3 automatic status and tracking system [E80-10175] p0213 N80-28776

- User's guide: Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking [E80-10194]
- p0214 N80-28791 Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1 [E80-10243] p0217 N80-30826 p0217 N80-30826 Implementation specification for Large Area Crop
- Inventory Experiment (LACIE) phase 3 automatic status and tracking system [F80-10249] p0217 N80-30832
- User's guide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking system [F80-10256] p0217 N80-30839
- DEVICH, R.
- [AD-A086070] p0216 N80-29828
- DHANJU, M. S.
- Floodplains mapping of Gangetic basin using Landsat p0204 A80-51303 imagery DISLER, J. M.
- Maximal analysis labeling procedure (preliminary) [E80-10294] p0219 N80-30862 DOME G J.
- Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618
- DOOFILHO, E. Classification of multispectral images according to
- crosswise textural characteristics [E80-10257] p0218 N80-30840 DORNELL, L. D.
- As-built design for enhancement of the automatic status and tracking system software [E80-10197] p0214 N80-28794
- DOS SANTOS, J. R. vegetation using
- Characterization of Cerrado vegeta automatically classified LANDSAT MSS data [INPE-1790-RPE/162] p0179 p0179 N80-32835 DOSANJOS. C. E.
- Remote sensing applied to the prospecting of geothermal anomaly in Caldas Novas County. State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837
- DOSSANTOS, A. P.
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil p0179 N80-32836 [INPE-1794-RPE/166]
- DOTU. H.
- Spatial filtering of Landsat data for urban cartography p0185 A80-50892 DUARTE, V.
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil
- [INPE-1794-RPE/166] p0179 N80-32836 DUNAVEV 8.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857
- DUTRA I V D A method for edge detection in images of natural
- esources [INPE-1768-RPE/154] p0222 N80-33840

Ε

EASTWOOD, L. F., JR.

- Program on stimulating operational private sector use of Earth observation satellite data [E80-10233] p0227 N80-29802
- ECKARD, L. D.
- Magsat A new satellite to survey the earth's magnetic field p0223 A80-51233
- ECKEL K. P. Functional design specification for enhancement of the utomatic status and tracking system software
- p0214 N80-28788 [E80-10190]
- As-built design specification of the CAM/CAS interface tape report generation program for LACIE 7 [E80-10203] p0214 N80-29782 Preliminary design specification for the LANDSAT
- Imagery Verification and Extraction System (LIVES) [E80-10240] p0216 N80-29809
- Detail design specification for enhancement of the automatic status and tracking system software p0217 N80-30837 [F80-10254]
- As-built design specification of the CAMS/CAS interface ape report generation program for LACIE 8 p0219 N80-30872 [F80-10306]
- ECKHARDT, W. O. Segmentation-based boundary modeling for natural p0209 A80-44297 terrain scenes
- EHRHART, L M. A continuation of base-line studies for environmentally
- monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part 1: Marine turtle studies [NASA-CR-163122-VOL-4-PT-1] p0183 N80-31969

A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part reatened and endangered birds and other threatened 2 Th endangered forms

FERGUSON, H. L.

- [NASA-CB-163122-VOL-4-PT-2] p0183 N80-31970 EL-SAYED, S. Z.
- Nimbus-7 coastal zone color scanner System description and initial imagery 00197 A80-51490 ELACHI, C.
- Spaceborne imaging radar Geologic and oceanographic applications p0223 A80-47480
- ELGIN J. H. JR. Remote sensing of total dry-matter accumulation in
- vinter wheat [E80-10235] p0176 N80-29804 EMERY, W. J.
- Dynamical interpretation of satellite-sensed therm p0195 A80-46315 features off Vancouver Island
- ERNSBERGER, K. Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407
- ESTES, J. E.
 - Landsat detection of oil from natural seeps p0197 A80-53054
- Use of collateral information to improve LANDSAT classification accuracies [E80-10268] p0176 N80-29815
- Irrigated lands assessment for water management ations Pilot Test (APT)
- [E80-10324] p0178 N80-32815 Application of remote sensing to selected problems within the state of California
- [£80-10326] p0183 N80-32817 EVANS, R. H.
- Satellite remote sensing facility for oceanograhic applications n0197 N80-28847
- [NASA-CR-163363] EVANS. W. H. Polar nephelometer for atmospheric particulate studie
- p0182 A80-52346 EVERETT, J. R.
- Remote sensing for tunnel siting studies p0189 A80-48975 EVERETTE, J. M.
- As-built design specification for LACIE phase 3 automatic status and tracking system
- p0213 N80-28776 [E80-10175] Functional design specification for enhancement of the tomatic status and tracking system software
- p0214 N80-28788 [E80-10190] Preliminary design specification for the LANDSAT Imagery Verification and Extraction System (LIVES) [E80-10240] p0216 N80-29809 Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1 [E80-1024]

Detail design specification for enhancement of the

Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056

Conceptual study of a European remote sensing satellite

Automatic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888

The three-dimensional structure of the frontal zone of

Microwave radiometric aircraft observations of the

A statistical test procedure for detecting multiple outliers

Statistical Outlier Detection (SOD): A computer program

Computer-aided watershed analyses using remote

Applications to floods of remote sensing from satellites p0204 A80-51300

the Gulf Stream from synchronous satellite and ship data

Fabry-Perot interference fringes of an ice-water system

Diurnal behavior of the spectral reflectivity

with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407

FAINTICH, M. B. Digital image technology 1980: Emerging production

F

automatic status and tracking system software

[E80-10243]

[E80-10254]

FABIUNKE, K. H.

applications

FAVARD, J. C.

and soils

FEDOROV, K. N.

FEDORS, J. C.

FEIVESON, A. H.

in a data set [E80-10195]

(E80-10275)

FELLOWS, J. D.

FERGUSON H L

for detecting outliers in data

sensing based regional information system

[AD-A085163]

FEDCHENKO, P. P.

EVERITT, J. H.

sites

p0217 N80-30826

p0217 N80-30837

p0214 N80-28851

p0211 A80-52057

p0196 A80-49651

p0195 A80-44232

p0214 N80-28792

p0218 N80-30848

p0204 A80-51299

B-3

FEYERHERM, A.

FEYERHERM. A.

- Use of soil moisture information in yield models [E80-10302] D0177 NR0 p0177 N80-30869 FIELDER, G.
- Satellite monitoring of sea surface pollution [F80-10329] p0199 N80-32820
- FILHO, P. H. Evaluating the reforested area for the municipality of Buri by automatic analysis of LANDSAT imagery [E80-10258] p0176 N80-30841
- [F80-10258] The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested
- areas in Brazil [INPE-1794-RPE/166] p0179 N80-32836 FILIMONOV, V. S.
- Optical methods for the study of biocenoses on land p0201 A80-49656 FLOUZAT, G.
- Information extraction from a Landsat image contained p0210 A80-50889 within an artificial outline FONTANEL, A.
- Landsat imagery in oil exploration Six years of experience FORSYTHE, R. E. p0189 A80-50880
- A 94/183 GHz multichannel radiometer for Convair flights
- [NASA-CR-160032] p0225 N80-33047 FOSHAGE, J.
- Program on stimulating operational private sector use of Earth observation satellite data [E80-10233] p0227 N80-29802
- FOUNTAIN, G. H.
- Magsat A new satellite to survey the earth's magne field p0223 A80-51233 FOURNIER, P
- A study of the needs of French government agencies in remote sensing mapping p0181 A80-50882 FRANK, N. A.
- Optical methods for the study of biocenoses on land p0201 A80-49656 and FRAYSSE, G.
- Perspectives of remote sensing applications to the study of hydric balance in the EEC countries and to the global evaluation of ground water resources p0204 A80-51305 FREEMAN, D.
- Forest resource information system, phase 3 [E80-10242] p0176 I p0176 N80-30825 FRIEDMAN, S. Z.
- Mapping urbanized area expansion through digital image processing of LANDSAT and conventional data [E80-10301] p0182 N80-30868
- FRYER, R. J. Satellite monitoring of sea surface pollution [E80-10329] p0199 N80-32820

G

- GAGLIANO, J. A A 94/183 GHz multichannel radiometer for Convair
- flights [NASA-CR-160032] p0225 N80-33047 GALVAO, B. D. M. C.
- Platform antennas for data collection [INPE-1820-RPE/186] p0221 N80-33647
- GARDNER, C. T. As-built design specification for EOD-LARSYS procedure
- [E80 10174] p0213 N80-28775 As-built design specification for Production Film converter Gains And Biases program (PFCGAB)
- p0213 N80-28785 [E80-10184] Design specification for LARSYS procedure 1 [E80-10199]
- 80-10199] p0214 N80-28796 User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote insing system [F80-10188]
- p0214 N80-29780 Design specification for ERIPS fields data base deck
- conversion [E80-10286] p0218 N80-30854 GARDOSSI, F.
- Sensors for remote sensing [CISE-N-190] p0225 N80-31863
- GABELIK, I. S. Invariant photometric features of natural objects p0211 A80-52058
- GARZA-ROBLES, R.
- On extracting brightness temperature maps from scanning radiometer data [NASA-TM-81989] p0221 N80-32838 GATES, W. A.
- Monitoring the use of riverways with aerial photography: The development, testing, and evaluation of a computer assisted methodology 00182 N80-30877 [AD-A086471]
- GATHMAN, S. G. Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September - October 1979
- [AD-A088229] p0199 N80-33068 GEDNEY, R. T.
- Quantitative interpretation of Great Lakes remote sensing ata p0201 A80-45005 data

B-4

- GERBERMANN, A. H.
- Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056 sites GERMAN, A. I.
- Laser studies of the atmosphere and underlying surface p0182 A80-53131 GIDDINGS, L. E.
- As-built design specification for the CAMS image-100 hybrid system. Volume 1: System design [E80-10207] p0215 N80-29786
- As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program
- listings [E80-10208] p0215 N80-29787 Classification with spectral-spatial-temporal archetypes
- p0217 N80-30834 [E80-10251] As-built design specification for the CMAS image-100 hybrid system. Volume 2: Detailed flow charts and program stings, part 1
- [E80-10289] p0218 N80-30857 As-built design specification for the CAMS image-100 hybrid system. Volume 3: Utilities and shared
- subroutines [E80-10290] p0218 N80-30858
- GIFFORD, F. A. Smoke as a quantitative atmospheric diffusion tracer
- p0182 A80-53265 GILG, W. Conceptual study of a European remote sensing satellite
- with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407 GILLES-LAGRANGE, T.
- Information extraction from a Landsat image contained p0210 A80-50889 within an artificial outline GIORDANO, G.
- Information extraction from a Landsat image contained within an artificial outline p0210 A80-50889 GIRARD, M. C.
- The use of satellite imagery for mapping The study of soil moisture p0175 A80-50903
- GLEATON B Image transformation study [AD-A086070] p0216 N80-29828
- GLUSHKO, E. V.
- Experiment aimed at standardizing anthropogenic changes of the natural environment from satellite and aerial photographs p0211 A80-52056 GOETTELMAN, R. C.
- Infrared-temperature variability in a large agricultural field p0178 N80-32822
- [E80-10331] GOMEZ, G.
- Program on stimulating operational private sector use of Earth observation satellite data [E80-10233] p0227 N80-29802
- GONFREVILLE, P. A study of the needs of French government agencies in remote sensing mapping p0181 A80-50882
- GOPALAKRISHNAN, K. P. imagery
- Geological ground-truths and Landsat interpretation for parts of Karnataka State /India/ p0190 A80-51080 GOR J
- As-built design specification for LACIE formatted dot cards in EOD-LARSYS
- p0212 N80-28770 [E80-10169] Program documentation: Final design specification for dot data base update deck conversion program (DOTDEC) [E80-10178] p0213 N80-28779
- Design specification for dot data base update deck conversion program (DOTDEC) [E80-10183] p0213 N80-28784
- GOR, J. S. Program documentation: As-built design specification
- for Generalized Linear Model Analysis Of Variance program (GLMAOV) [E80-10214] p0215 N80-29792
- Design specification for LACIE formatted dot cards in EOD-LARSYS
- [E80-10215] p0215 N80-29793 GORDON, H. R.
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490 Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements
- p0197 A80-51491 GOROKHOV. V. N. A description of a system of programs for mathematically
- processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft p0220 N80-31856 [NASA-TM-76208] GOSSMANN, H.
- The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding highlands [E80-10228] p0179 N80-33829
- GOVINDARAJAN, S. T.
- Evaluation of hydrogeologic conditions in Ponnaiyar River basin, South India using remotely sensed data n0203 A80-51288

PERSONAL AUTHOR INDEX

GREGORY, G. L.

- In situ ozone data for evaluation of the laser absorption Virginia urban plume study summer field program p0183 N80-33928 [NASA TM-81831] GRUSHIN, V. A.
- Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface p0210 A80-49658
- GUHA. P. K. Interfacing with SEO technology - A case study in geological application p0190 A80-51086 p0190 A80-51086
- GUILL J. H. LL, J. H. Sensing the ocean environment from space p0196 A80-51485
- GUPTA, P. N. Satellite imagery and U.P. Himalayas and Siwalik
- p0204 A80-51304 GURNEY, C. M.
- The detection of linear features using Landsat data p0210 A80-51013

н

HAAS, R. H.

[E80-10302] HANSEN, M. Z.

HANSEN, R. F.

[E80-10180]

program [E80-10323]

HARFORD, J. J.

HARRINGTON, R.

HARRINGTON, R. F.

[NASA-TM-81847]

[E80-10334]

HART, W. D.

HAYDN, R.

data

HECKY. R. E.

[NASA-CR-156869]

lakes from Landsat

Farth

- Using LANDSAT digital data for estimating green biomass
- [E80-10328] p0178 N80-32819 HABEL, G. W., JR.
- Aerotriangulation control of large scale photography from small scale photography [PB80-161524] p0224 N80-28853
- HABERACKER, P. Evaluation of Landsat image data for the extraction of
- land use information and its presentation p0185 A80-50902 map HAKURA. Y.
- Activities and future plan of earth observation by satellites p0223 A80-53094 HALL, D. K
 - Use of LANDSAT data for river and lake ice engineering studie studies [E80-10237]
- p0205 N80-29806 HALL T. S.
- Satellite monitoring of sea surface pollution p0199 N80-32820 [E80-10329] HALLUM. C. R.
- Ardiscriminant approach to parameter estimation in the linear model with unknown variance-covariance matrix p0214 N80-28789 [E80-10192] HANDLEY, J. F.
- The application of remote sensing to environmental management p0181 A80-47750 HANKS, J.

Polar nephelometer for atmospheric particulate studies

Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS)

As-built design specification for CCIT8 processor

China space report / Based on observations made during

The development of a stepped frequency microwave

Microwave radiometric aircraft observations of the

The development of a stepped frequency microwave radiometer and its application to remote sensing of the

Ocean chlorophyll studies from a U-2 aircraft platform

Application of Landsat-2 data for obtaining land information p0191 A80-51092

near-normal-incidence ocean surface scattering p0224 A80-53891

Wallops waveform analysis of SEASAT-1 radar altimeter

Quantitative monitoring of sediment levels in freshwater

radiometer and its application to remote sensing of the Earth p0224 N80-30822

Fabry-Perot interference fringes of an ice-water system

HARRISON, C. G. A. Investigations of medium wavelength ma anomalies in the eastern Pacific using Magsat data

HAYNE, G. S. Radar altimeter mean return

an invited tour with an AIAA delegation, November 1979/ p0227 A80-53350

p0182 A80-52346

p0213 N80-28781

p0221 N80-32814

p0195 A80-44232

p0224 N80-28637

p0199 N80-33833

p0195 A80-45004

waveforms from

p0198 N80-29637

p0203 A80-51291

magnetic

Use of soil moisture information in yield models p0177 N80-30869

PERSONAL AUTHOR INDEX

HEILMAN, J. L

- HCMM energy budget data as a model input for assessing regions of high potential groundwater pollu [E80-10310] p020 pollution p0206 N80-32806
- HEIMES, F. J. Development and application of
- irrigation cropland maps for water use determination in the High Plains p0175 A80-49144 the High Plains HENDERSON, F. M.

Landsat-derived

- Effects of radar system parameters, population, and environmental modulation on settlement ent visibility p0181 A80-47746
- HIGGS, G. K. Application of remote sensing to state and regional problems
- [E80-10338] o0183 N80-32826 HOFER, R.
- Microwave emission properties of snow for monitoring p0203 A80-51297 hydrological parameters HOFFMAN, R. O.
- Identifying and locating land irrigated by center-pivot irrigation systems using satellite imagery p0174 A80-49140
- HOGE, F. E. Oil film thickness measurement using airborne laser-induced water Raman backscatter p0197 A80-52331
- HOLBEN B
- The contribution of the diffuse light component to the topographic effect on remotely sensed data p0186 N80-30876 [NASA-TM-80728] HOLBEN, B. N.
- Remote sensing of total dry-matter accumulation in winter wheat p0176 N80-29804 [E80-10235]
- [E80-10196] p0214 N80-28793 As-built design specification of the CAMS/CAS interface
- tape report generation program [E80-10204] p0215 N80-29783 HOLYER, R. J.
- Multispectral techniques for remote monitoring of sediment in water: A feasibility investigation [PB80-198500] ____00207 p0207 N80-33849
- HORN, F. W., JR. hy applications to p0175 A80-51944 Aerial color infrared photography citriculture
- HOROWITZ, R. Report on active and planned spacecraft and experiments
- [NASA-TM-80905] p0227 N80-31420 HORTON, C.
- As-built design specification for CLASY program odificatio p0217 N80-30836 [E80-10253]
- As-built specification for CLASSY conversion [E80-10307] p0219 N p0219 N80-30873 HORTON, C. L
- Design specification for a list processing system [E80-10265] p0216 N80-29812 Statistical Outlier Detection (SOD): A computer program
- for detecting outliers in data [EB0-10275] p0218 N80-30848 As-built design specification for equiprobability ellipses
- epresentation of CLASSY clusters p0221 N80-32812 [E80-10320]
- As-built design specification for a list processing system [F80, 10325] p0221 N80-32816
- HOVIS, W. A. mbus-7 coastal zone color scanner - System description
- p0197 A80-51490 and initial imagery Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface mea p0197 A80-51491
- HOWARD, T. W. Application of thematic mapping techniques in terrain
- analysis [AD-A089061] p0222 N80-33847 HSIAO. S. V
- Radar observations of wave transformations in the vicinity p0196 A80-51408 of islands Comparisons between wave directional spectra from SAR p0196 A80-51409 and pressure sensor arrays p0196 A80-51409 Synthetic aperture radar imaging of ocean waves -
- Comparison with wave measurements p0196 A80-51411
- HUBER, T. P A multi-step method for avalanche zone zone recognition and p0193 N80-33824 analysis
- HUNDEMANN, A. S. Ocean wave sensing. Citations from the NTIS data
- [PB80-812878] p0200 N80-34053
- HUNT, J. E. Airborne sulfur dioxide to sulfate oxidation studies the INCO 381M chimney plume p0182 A80-537 p0182 A80-53269 HUNTINGTON, J. F.
- Remote sensing and mineral exploration: Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979 p0189 A80-51076

- HUSTEDDE, G. S.
- Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) ar adjacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-3201
- p0192 N80-32013 HUTCHINSON, C. F. Applied Remote Sensing Program (ARSP)
- [E80-10330] p0178 N80-32821 HÜYGEN, J.
- Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely sed surface temperature near the daily maximum 0-10333] p0178 N80-32824 [E80-10333]

I

IANSHIN, A. L.

- New data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite p0211 A80-52051 images **IAROSLAVSKII, L. P.**
- Automatic selection of reference obje aerial and satellite photographs p p0212 A80-52063 INMAN, D. L. Comparisons between wave directional spectra from
- p0196 A80-51409 and pressure sensor arrays INSTALLE, M.
- Spatial filtering of Landsat data for urban cartograph p0185 A80-50892
- IOASKHIM, R.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857 IOVCHEV, S. R.
- Measurement results and conclusions on the spectral reflective coefficients of volcanites, s, granitoides and p0191 A80-51093 aneisses ISTOMINA, L. G.
- Estimates of the accuracy of the brightness conjunction p0210 A80-49665 of multispectral photographs ITTEN, K. I.
- now mapping from space platforms p0203 A80-51293 IUROV. V. I.
- Distortion of satellite photographs obtained by scanning p0212 A80-52065 systems
- The geometric calibration of multispectral photographic p0186 A80-54024 equipment IVANOV, A. V.
- The problems of SAR imagery of ocean waves p0196 A80-50300

J

- JAIN S C Nonzero subsurface irradiance reflectance at 670 nm fro Lake Ontario water masses p0201 A80-45428
- JAMAGNE, M. Inventory, mapping and evaluation of the agricultural potential of soils - Status of studies and needs of remote sensing p0175 A80-50877 JASKOLLA, F.
- Application of Landsat-2 data information for obtaining land p0191 A80-51092 JERN, M.
- A color plotter system and applications its p0209 A80-49099 geoscience
- JEROME, J. H. Nonzero subsurface irradiance reflectant Lake Ontario water masses pC e at 670 nm from p0201 A80-45428 JEUN. B.
- As-built design specification for historical daily data bases for testing advanced models [E80-10198]
- p0214 N80-28795 JOHNSON, C.
- Application of remote sensing to selected problems within the state of California [E80-10326] p0183 N80-32817
- JOHNSON, G. E. The Columbia River and Tributaries Irrigation Withdrawals
- Analysis Project Feasibility analysis and and future plans p0174 A80-49141
- JOHNSON, J. D. Applied Remote Sensing Program (ARSP) [E80-10330] p0178 N80-32821
- JONES, W. L Comparison of surface wind stress measurements -
- Airborne radar scatterometer versus sonic ane p0196 A80-51407 JULIAN B. G
- Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September October 1979 [AD-A088229] p0199 N80-33068 JUSTICE. C.
- The contribution of the diffuse light component to the opographic effect on remotely sensed data [NASA-TM-80728] p0186 N80-30876

JUSTICE, C. O.

Unsupervised classification of MSS Landsat data for mapping spatially complex vegetation p0173 A80-47744 The potential of Landsat-3 RBV images for thematic po210 A80-50894 mapping

KIRKPATRICK R

К

KAHLE, A. B.

- Geologic application of thermal inertia imaging using HCMM data [E80-10229] p0192 N80-29798
- Geologic application of thermal inertia imaging using HCMM data p0192 N80-29800
- [E80-10231]
- KAHN, A. Digital LANDSAT data analysis of Tennesse [E80-10130] p0212 p0212 N80-28768 KAMAT, D. S.
- Status and plans of SEO satellite and receiving station p0190 A80-51079
- Indian remote sensing satellite program and its contribution to water resources manageme p0204 A80-51307
- KANEMASU. F.
- Use of soil moisture information in yield models [E80-10302] p0177 N80-30869 KAPLAN, B. L.
- Optimal conditions for determining the coordinates of the earth's center of mass p0186 A80-54021 KATSKOV. N. K.
- Measurement results and conclusions on the spectral reflective coefficients of volcanites, granitoides and gneisses p0191 A80-51093
- KATUCKI, R. J. Landsat-D Overview and implications p0224 A80-53609
- KEEGAN, T. J.
- Development of techniques to specify cloudiness and rainfall rate using GOES imagery data [AD-A084757] p0206 N80-33064
- KEENER. M. Use of soil moisture information in yield models [E80-10302] p0177 N80
- p0177 N80-30869 KELL T R As-built design specification for the I-100 tape read
- consolidation program (FULOI) [E80-10171] n0213 N80-28772
- KENT, S. S. Satellite remote sensing facility for oceanograhic
- applications [NASA-CR-163363] p0197 N80-28847 KHVOROSTOVA, Z. M.
- New data on the geological structure of the Verkhoiany-Kolyma fold region from an analysis of satellite TV images p0211 A80-52051 KIANG, R.
- Thematic mapper studies band correlation analy [NASA-TM-80716] p0216 N86 p0216 N80-29825 KIENKO IU
- Earth observation from space today and tomorro p0227 A80-50280
- KILIAN, J. Inventory, mapping and evaluation of the agricultural potential of soils - Status of studies and needs of remote p0175 A80-50877
- KILLINGER. D. K. Remote sensing of NO using a differential abs p0182 A80-52332 tidar KIM. H. H. Ocean chlorophyll studies from a U-2 aircraft platform

suspended sediments in a fluvial channel

corn and soybean multicrop segments

Image transformation study [AD-A086070]

Simulation of solar radiation absorption in

A quantitative evaluation of LANDSAT for monitoring

Composition and assembly of a spectral data base for

Evaluation of Landsat image data for the extraction of land use information and its presentation in thematic

Experiment with the composition of a geological map

Remote sensing procedures for detecting and monitoring

Program on stimulating operational private sector use

various activities regulated by the Mobile

of Earth observation satellite data

on the basis of interpretations of Meteor satellite television images /using Central Asia as an example/

KIM, S. T.

KIMES. D. S.

canopies

KINSLER. M. C.

[E80-10281]

KIREMIDJIAN, G.

KIRILLOV, A. B.

[AD-A087584]

KIRKPATRICK, B.

[E80-10233]

KIRK, W. L.

KIRCHHOF, W.

mane

p0195 A80-45004

p0206 N80-33823

p0173 A80-46451

p0176 N80-29824

o0185 A80-50902

n0216 N80-29828

p0211 A80-52054

bile District p0206 N80-31973

p0227 N80-29802

B-5

KISILIAKHOV, E. K.

- KISILIAKHOV, E. K. Evaluation of the fire hazard of taiga forests from thermal radio emission n0175 A80-49652 KLEMAS, V. Remote sensing of coastal environment and resources
- p0202 A80-51281 KNOTT, W. M.
- The environmental program at Kennedy Space Center -Baseline to monitoring p0181 A80-51935 KOFIRI O R
- The combined plotting of satellite photographs and aerial photographs for topographic mapping p0185 A80-50895 KOENIG, A. L
- Anomalous snowfall caused by natural-draft cooling RAND/N-1479-DOE p0206 N80-32024
- KOLOSOV. B. I. A description of a system of programs for mathematically
- processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft [NASA-TM-76208] p02 p0220 N80-31856 KONDIURIN, V. D.
- The use of space data for the mapping of coastal a p0185 A80-45297
- KONDRATEV, K. IA. Diurnal behavior of the spectral reflectivity of vegetation p0211 A80-52057 and soils
- KONIG, B Program on stimulating operational private sector use of Earth observation satellite data E80-10233] p0227 N80-29802
- KORWAR V N Degradation of picture quality by speckle in coherent
- mapping systems p0217 N80-30821 KOSCEC, B. Some results of remote sensing in Yugoslavia
- p0191 A80-51091 KOVALENOK, V. V.
- Geological analysis of the Urals-Oman superlineament satellite imagery p0211 A80-52052 KOZLOV, V. N.
- Comparison of interpretations of radar images and space photographs of a high degree of generalization on the example of the Zarkainarskii intrusive massif /southern Tien-Shan/ p0212 A80-52066 KOZLOV, V. V.
- Geological analysis of the Urals-Oman from satellite imagery p02 superfineam p0211 A80-52052
- KOZLOWSKI, C. Forest resource information system, p [E80-10242] p
- p0176 N80-30825 KRASNOPEVTSEVA, B. V. Results of the complex processing of photographs taken
- p0212 A80-53004 from the Salyut space stations KRAUTH, E.
- Evaluation of Landsat image data for the extraction of land use information and its presentation D0185 A80-50902 KRISHNAMURTY, J. G.
- Geological ground-truths and Landsat interpretation for parts of Karnataka State /India/ imagery p0190 A80-51080
- KRISHNAMURTY, M. Tectonics and lineament patterns of the Vindhyan basin based on Landsat imagery data p0190 A80-51084
- KRISHNANUNNI, K. Evaluation of MSS imagery over part of the asbestos-barytes belt of south-western Cuddapah Andhra Pradesh, India p0191 A80-51089
- KRISHNASWAMY, V. S. Contribution of Landsat data to the objectives of the geological survey of India p0189 A80-51077 KRITIKOS, G.
- Evaluation of Landsat image data for the extraction of land use information and its presentation in thematic n0185 A80-50902
- KRUMOV, A. KH. Measurement results and conclusions on the spectral reflective coefficients of volcanites, granitoides and p0191 A80-51093 oneisses KRUUS. J.
- Applications to floods of remote sensin a from satellites p0204 A80-51300
- KUMAR, R. Separability of agricultural cover types in spectral p0173 A80-49100 channels and wavelength regions
- KUO. J. T. Detection of hidden mineral deposits by airborne spectral analysis of forest canopies
- [PB80-193881] p0193 N80-32845 KUPBIANOV, V. V.
- Satellite data for the solution of problems of land hydrology p0202 A80-51282 KUSKOV, A. P.
- The Mesozoic and Cenozoic depressions of the Baikalo-Amur region from the interpretation of space p0189 A80-49654 photographs

L

LANDGREBE, D. A.

B-6

vol lah ng by supervised probabilistic relaxation · [E80-10267] p0216 N80-29814

- Remote sensing research studies [E80-10117] p0176 N80-30823
- LAPADO, R. Image transformation study
- [AD-A086070] p0216 N80-29828 ARDEN D R Crustal deformation at very long baseline interferometry
- sites due to seasonal air-mass and ground wate p0186 N80-28809 variations LATHAM, A. R.
- Heat capacity mapping mission project HCM-051 p0198 N80-30850 [E80-10278]
- LAVROVA, N. P. Results of the complex processing of photographs take from the Salvut space stations p0212 A80-53004 LAWLOR, D.
- Use of soil moisture information in yield models [E80-10302] p0177 N80-30869
- LAWRENCE, M. W. Heat capacity mapping mission project HCM-051 [E80-10278] p0198 N80-30850
- LAY, F. Space law - A new proposal D0227 A80-45575
- LECHEVALLIER. M. Volcanic material from Mount St Helens in stratosphere over Europe p0182 A80-54074
- LECHI, G. Study of geological structure of Sicily and other Italian areas [E80-10299]
- p0192 N80-30866 LEE, D. C. L.
- Evaluating the reforested area to successful by automatic analysis of LANDSAT imagery p0176 N80-30841 [E80-10258]
- Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo [E80-10261] p0177 N80-30844
- LEGECKIS, R.
- Modulation of sea surface radar cross section by surface stress - Wind speed and temperature effects Gulf Stream p0196 A80-51415 LEHN, G.
- Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407
- LEIGH, L. S. Applied Remote Sensing Program (ARSP) [E80-10330]
- p0178 N80-32821 LEMASTER E.W.
- Light reflectance, transmittance, and utilization within a vegetative canopy [F80-10282] p0177 NB0-30851
- LEMING. T. D. Comparison of surface wind stress measurements -
- Airborne radar scatterometer versus sonic anemor p0196 A80-51407
- LENEUE N
- Inventory, mapping and evaluation of the agricultural potential of soils - Status of studies and needs p0175 A80-50877 sensing LENNINGTON, R. K.
- An exploratory study to develop a cluster-based area estimation procedure p0177 N80-30863 [E80-10295]
- Evaluating the use of analyst labels in maximum likelihood cluster proportion estimation [E80-10303]
- p0219 N80-30870 Evaluation of Bayesian sequential proportion estimation
- using analyst labels [E80-10304] p0219 N80-30871 As-built design specification for equiprobability ellipses representation of CLASSY clusters
- [E80-10320] p0221 N80-32812 LEONHART, L S.
- LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau p0183 N80-31867 [RHO-BWI-SA-43] LEPRIEUR. C.
- Automatic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888 LEROY, M. L.
- Infrared-temperature variability in a large agricultural field p0178 N80-32822
- [E80-10331] LESCHACK, L. A.
- Correlation of under-ice roughness with satellite and airborne thermal infrared data [AD-A085512] D0198 N80-30880
- LIANG, T. Cornell University remote sensing program
- [E80-10280] 00227 N80-29823 LIPA, B.
- Methods for the extraction of long-period ocean wave parameters from narrow beam HF radar p0195 A80-46095 LIPPENS, C.
- Volcanic material from Mount St Helens in p0182 A80-54074 stratosphere over Europe LOVELAND, T. R.
- The Columbia River and Tributaries Irrigation Withdrawals Analysis Project - Feasibility analysis and future plans p0174 A80-49141

PERSONAL AUTHOR INDEX

LUCHT, L. A. M.

- The use of radiation temperature to detect water-stress in sugarcane crop [INPE-1767-TDL/028] p0179 N80-33839
- Thermal balance of soils [INPE-1859-RPE/210] p0180 N80-33841
- LUKASHEVICH, E. L. Spacecraft trajectories for the remote sensin earth p0223 A80-49662
- LUMMAUX, J. C. The use of topology concepts for supervised and
- p0210 A80-50891 unsupervised classifications LUSIS, M. A.
- Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269 LYON, R. J. P.
- Geological and geothermal data use investigations for application Explorer mission-A (heat capacity mapping mission) [E80-10279] p0192 N80-29822

Μ

MACDORAN P. F.

- Satellite Emission Radio Interferometric Earth Surveying (SERIES) MAETZLER, C.
- Microwave emission properties of snow for monitoring p0203 A80-51297 hydrological parameters MALILA, W. A.
- An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [E80-10314] p0178 N80-32809
- ARCOLONGO, B.
- Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid pozoz A80-51284 Perspectives of remote sensing applications to the study climates
- of hydric balance in the EEC countries and to the evaluation of ground water resources p0204 A80-51305 MARINI, A.
- Study of geological structure of Sicily and other Italian [£80-10299] p0192 N80-30866
- MARTIN, L
- Image transformation study [AD-A086070] p0216 N80-29828 MARTINKO, E. A
- The application of remote sensing to resource management and environmental quality programs in
- Kansas [E80-10337] n0183 N80-32825 MARTSOLF, J. D.

MASCARENHAS, N. D. A.

[INPE-1768-RPE/154]

[E80-10257]

MATHIS, J. J., JR.

[NASA-TM-81831]

MATIIASEVICH. L. M.

nhotography

HCMM data

[E80-10229]

[F80-10269]

MATVEEVA. G. V.

MCCARLEY, D. K.

[E80-10190]

Imagery Verifi [E80-10240]

As-built

(FIELDSTAT)

[E80-10252]

[F80-10254]

MCCLAIN, C. R.

estuarine current studies

and tracking system software [E80-10197]

MATSH. S. E.

MATSON, M.

1966-79

esources

crosswise textural characteristics

spectrometer ozone remote sensor:

Satellite temperature monitoring and prediction system p0211 A80-51943

Classification of multispectral images according to

A method for edge detection in images of natural

In situ ozone data for evaluation of the laser absorption

Geologic application of thermal inertia imaging using

Eurasian snow cover extent - The NOAA satellite record,

Applications of HCMM data to soil moisture snow and

Mapping a geologicostructural scheme of the Kola peninsula from satellite imagery p0211 A80-52053

Functional design specification for enhancement of the

As-built design for enhancement of the automatic status

Preliminary design specification for the LANDSAT

Verification and Extraction System (LIVES)

Detail design specification for enhancement of the automatic status and tracking system software

Ocean chlorophyll studies from a U-2 aircraft platform

design specification for field statistics

tomatic status and tracking system software

irginia urban plume study summer field program

Photometric problems, solved by means

D0218 N80-30840

p0222 N80-33840

1979 southeastern

p0183 N80-33928

n0209 A80-49657

p0192 N80-29798

p0203 A80-51295

n0205 N80-29816

p0211 A80-52053

p0214 N80-28788

n0214 N80-28794

p0216 N80-29809

p0217 N80-30835

n0217 N80-30837

p0195 A80-45004

PERSONAL AUTHOR INDEX

MCCRAY, B.

- Modifications to the CLASY program p0213 N80-28782 [E80-10181]
- MCDONALD, A. K. Satellite observations of a nutrient upwelling off the c
- p0195 A80-45015 of California MCDOUGAL D. S.
- In situ ozone data for evaluation of the laser absorption 1979 southeastern spectrometer ozone remote sensor: Virginia urban plume study summer field program [NASA-TM-81831] p0183 N80-33928 [NASA-TM-81831]
- MCGINNIS, D. F. Applications of HCMM data to soil moisture snow and estuarine current studies
- [E80-10269] o0205 N80-29816 MCGUIRK, D.
- Image transformation study o0216 N80-29828 [AD-A086070] MCKAY, D. P.
- As-built design specification for Boundary Detection And Registration Program (BDARP1) p0215 N80-29794 [E80-10217]
- As-built design specification for Boundary Detection And Registration Program (BDARP1) n0217 N80-30824
- [E80-10216] MCLEISH, W. Synthetic aperture radar imaging of ocean waves -
- Comparison with wave measurements p0196 A80-51411
- MCLLRATH, T. J. Eluorescence lidar p0181 A80-48908
- MCMURTREY, J. E., III Remote sensing of total dry-matter accumulation in
- inter whe [E80-10235] p0176 N80-29804 MCNARY, C. A
- Segmentation-based boundary modeling for natural rrain scenes p0209 A80-44297 terrain scenes MELLEY, M. L.
- Applications of statistics to thematic mapping p0186 A80-53051
- MENDLOWITZ M.A. Program di CAMDATA1.FTN MARQTY1.FTN. documentations:
- [E80-10182] p0213 N80-28783 Program documentation: MARQUIS2.FTN
- [E80-10220] p0215 N80-29796 Statistical Outlier Detection (SOD): A computer program
- for detecting outliers in data [E80-10275] p0218 N80-30848
- MENDONCA, F. J. Use of LANDSAT data for estimating the area of sugar ane in the state of Sao Paulo
- [E80-10260] p0177 N80-30843 Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo [E80-10261]
- p0177 N80-30844 MENENTI, M. Defining relationships between surface characteristics
- and actual evaporation rate [E80-10335] p0207 N80-33834
- MENYUK, N. Remote sensing of NO using a differential absorption
- p0182 A80-52332 MERBILL W.M. Simulation of reservoir and lake sedir
- [PB80-182801] p0206 N80-31867 MEYLAN, P.
- ILAN, P. Soil moisture estimation by correlated ground-based and easat microwave observation p0202 A80-51287 Seasat microwave observation MILLARD, J. P.
- Infrared-temperature variability in a large agricultural field p0178 N80-32822 [E80-10331]
- MILLER. L. D. A hill-sliding strategy for initialization of Gaussian clusters
- in the multidimensional space p0219 N80-31072 [NASA-TM-80721] MILLER, S. H.
- Geologic application of thermal-inertia mapping from atellite
- [E80-10230] p0192 N80-29799 MILLER, W. F. Application of remote sensing to state and regional
- [E80-10338] p0183 N80-32826
- MINTER R. T. User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote
- sensing system [E80-10188] D0214 N80-29780 MIOSGA, G.
- Concept of a research aircraft for remote sensing, using an integrated sensor/data system [DGLR PAPER 80-051] p0227 A80-46300
- MISHIN, I. V. Optical spatial-frequency characteristic of the atmosphere
- its applications p0212 A80-52061 MOBLEY, F. F. Magsat - A new satellite to survey the earth's ma
- p0223 A80-51233 field MONGET, J.-M.
- The cartography of Chize forest st through remote p0175 A80-50900 sensing

- MOORE, D. G.
- HCMM energy budget data as a model input for assessing regions of high potential groundwater pollution [E80-10310] p0206 N80-32806
- MOORE, R. K. Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618
- MOREIRA-NORDEMANN, L. M. Geochemical balance of the Salgado River basin [INPE-1849-RPE/206] p0206 N80p0206 N80-32834
- Thermal balance of soils [INPE-1859-RPE/210] p0180_N80-33841
- MORIMOTO, T. Study of the atmospheric effects on the radiation detected by the sensor (ERTS/LANDSAT) aboard orbiting platforms
- 1680-10259] p0218 N80-30842 MOROZOVA, L. A.
- An automated aerial-photographic information-search p0186 A80-54023 MOROZOVA, L I.
- The appearance of the Main Ural Fault in a cloud field n space photographs p0189 A80-49664 MORRIS W. D
- Turbid water measurements of remote sensin penetration depth at visible and near-infrared wavelengt remote sensing p0207 N80-33927 [NASA-TM-81843] MORZIER, C.
- Soil moisture estimation by correlated ground-based and asat microwave observation p0202 A80-51287 MOSIN. S. T.
- A description of a system of programs for mathematically processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft [NASA-TM-76208] p02
- p0220 N80-31856 MOSKOWITZ, M.
- US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft, San Joaquin Experimental Range [PB80-169295] p0192 N80-28852
- MOUAT, D. A.
- Applied Remote Sensing Program (ARSP) [E80-10330] p0175 p0178 N80-32821 MROCZYNSKI R P
- Forest resource information system, phase 3 [E80-10242] p0176 f p0176 N80-30825 MUASHER, M. J.
- A multispectral data simulation technique [E80-10311] n022 p0221 N80-33830 MUELLER, J. L
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490 Phytoplankton pigments from the Nimbus-7 Coastal Zone
- Color Scanner Comparisons with surface measurements p0197 A80-51491 MUENCH, S. H.
- Development of techniques to specify cloudiness and rainfall rate using GOES imagery data o0206_N80-33064 [AD-A084757]
- MULEY, M. V. Remote sensing of water resources in Panch Mahals
- p0202 A80-51286 district MURALIKRISHNA, I. V.
- Landsat application to the study of coastal processes p0203 A80-51292 MYSAK. L A.
- Dynamical interpretation of satellite res off Vancouver Island p0195 A80-46315 MYULLER, K.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857
 - Ν

NAERT. B.

- Inventory, mapping and evaluation of the agricultural potential of soils - Status of studies and needs of remote ensina p0175 A80-50877 NAIK, S. D.
- Remote sensing of water resources in Panch Mahals p0202 A80-51286 NARAIN, A.
- Assessment of cyclone-caused damage region using remotely sensed data 00204 A80-51301 NASRETDINOV, K. K.
- Ontimal conditions for determining the coordinates of the earth's center of mass p0186 A80-54021
- NEEDHAM, B. H. The availability of U.S. environmental satellite data to p0197 A80-53683 the marine technology community NEMEC. J.
- Space observations for water resources be developed p0 rces - A potential to p0201 A80-51279 NESTOR, D. A.
- Satellite observations of a nutrient upwelling off the coast p0195 A80-45015 of California NEWBURNE, R.
- Evaluation of remote sensing techniques on selected forest sites in Florida [E80-10296]
- p0177 N80-32805 NEWTON, R. W
- Microwave radiometer measurements of soil moisture content p0176 A80-53890

Development and evaluation of scatterometer data processing alg [E80-10266] algorithms p0216 N80-29813

PATIL S. A.

- NIEMANN, B. J., JR. Monitoring the use of riverways with aerial photography:
- The development, testing, and evaluation of a computer assisted methodology [AD-A086471] p0182 N80-30877
- NIKOLAEVA, E. M. Results of the complex processing of photographs taken p0212 A80-53004
- from the Salyut space stations NILSSON, C. S.
- Heat capacity mapping mission project HCM-05 p0198 N80-30850 [E80-10278]
- NOBLE, V. E. On the inference of oceanic currents or eddies by
- spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature)
- [AD-A088082] n0199_N80-33076 NORDEMANN, D.
- Geochemical balance of the Salgado River basin [INPE-1849-RPE/206] p0206 N80-32834
- NOSTREYS, R. W. Report on active and planned spacecraft and vneriments
- [NASA-TM-80905] D0227 N80-31420 NOVAES, R. A.
- Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo
- [E80-10261] p0177 N80-30844 NOVAKOVSKII, B. A.
- Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner images p0212 A80-52064
- NUGENT, R.
 - User manual for the Earth observations Division R and D to OLPARS dot data conversion [E80-10236] p0216 N80-29805

0

Geologic application of thermal-inertia mapping from

Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield [INPE-1838-RPE/199] p0193 N80-33842

Magsat - A new satellite to survey the earth's magnetic

The Federal Plan for Meteorological Services and

A telemechanical system for hydrophysical studies in the cean p0223 A80-45766

Geologic application of thermal inertia imaging using HCMM data

Geologic application of thermal inertia imaging using

Fracture mapping of the Narmada-Tapti basin using

PARADELLA, W. R. Digital filtering of LANDSAT images as a visual aid

A hill-sliding strategy for initialization of Gaussian clusters in the multidimensional space

Conversion of nitrogen oxide gases to nitrate particles

technique in geological photointerpretation [INPE-1823-RPE/189] p01

Applied Remote Sensing Program (ARSP) [E80-10330] n0178

Assessment of cyclone-caused damage

Radar backscatter study of sea ice [AD-A087032]

region using remotely sensed data

Ρ

p0200 N80-34048

p0192 N80-29799

p0198 N80-30618

p0223 A80-51233

00228 N80-34041

p0192 N80-29798

p0192 N80-29800

p0190 A80-51082

p0193 N80-33843

p0219 N80-31072

p0178 N80-32821

p0181 A80-48534

p0198 N80-30618

p0204 A80-51301

in Krishna delta

B-7

OBERHOLTZER, J. D. Assessment of the role of remote sensing in the study of inland and coastal waters

Radar backscatter study of sea ice

Supporting Research, fiscal year 1981 (PB80-199482)

[NASA-TM-81881]

OFFIELD, T. W.

[E80-10230]

ONSTOTT, R. G.

OUSLEY, G. W.

PALEVICH, L. G.

[E80-10229]

HCMM data

[E80-10231]

Landsat imagery

[NASA-TM-80721]

oil refinery plumes

PANDEY, S. N.

PARK, J. K.

PARTON, M. C.

PARUNGO, F. P

PATEL J. S.

PATIL S. A.

ocean

PALEY, H. N.

field

OWEN, T. B.

[AD-A087032]

OHARA, T.

PAWKA. S. S.

- Radar observations of wave transformations in the vicinity of islands p0196 A80-51408 Comparisons between wave directional spectra from SAR and pressure sensor arrays n0196 A80-51409
- PAYNE R W The integrated analysis procedure for identification of spring small grains and barley

[E80-10274] p0177 N80-30847 PEREIRA. C. S.

- Coastal currents: Study of a model applied to the coast of Rio Grande do Sul latitude 29 deg south to 35 deg [INPE-1841-RPE/201] n0200 N80-33844
- PEREVOZHIKOVA, V. A.
- Mapping a geologicostructural scheme of the Kola peninsula from satellite imagery p0211 A80-52053 PESTRE. C.
- The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous p0201 A80-50899
- PETERSON, C. Forest resource information system phase 3 [E80-10242] p0176 N80-30825
- PETROV. V. IA An automated aerial-photographic information-search system D0186 480-54023
- PHILIPPE, M.
- Thermal fronts in the Mediterrahean according to NOAA satellite radiometer data /September 1977-February 979/ p0195 A80-48750 1979/ PHILIPSON, W. R.
- Cornell University remote sensing program [E80-10280] p0222 p0227 N80-29823 PHILLIPS T G
- Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS) [E80-10180] p0213 N80-28781
- PHILPOT, W. D. Remote sensing of coastal environme nt and reso p0202 A80-51281
- PIRARD, T.
- Brazil in space p0227_A80-52691 PITTS D F AgRISTARS cropping practices and crop characteristics
- hased on 1979 ESCS observations [E80-10292] p0177 N80-30860
- POISSON M The cartography of Chize forest through remote ensing p0175 A80-50900 sensing
- POLHEMUS, J. T. The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in pest manageme
- INASA-CR-163589] p0178 N80-32830 PORACSKY, J.
- Irrigation mapping in western Kansas using Landsat. I -ey parameters p0174 A80-49142 Key parameters PORE, M. D.
- A discriminant approach to parameter estimation in the linear model with unknown variance-covariance r [E80-10192] 00214 NR0-2 p0214 N80-28789
- A labeling technology for LANDSAT imagery E80-10293] p0219 N80-30861 [E80-10293] POULAIN, J.
- Basic topographic mapping Renewal and revision p0185 A80-50897
- POUNDER, E. Seasat. Volume 2: Flight systems [NASA-CR-163571] p0199 N80-32829
- POUNDS, D. P. Recommendations and Comments concerning documentation on the microwave active spectrometer systems p0213 N80-28787 [E80-10187]
- PRELAT, A. E. Geological and geothermal data use investigations for
- application Explorer mission-A (heat capacity mapping [E80-10279] p0192 N80-29822
- PRITCHARD, W. L China space report / Based on observations made during an invited tour with an AIAA delegation, November 1979/ p0227 A80-53350
- PROKACHEVA, V. G. Satellite data for the solution of problems of land hydrology p0202 A80-51282
- PUESCHEL, R. F. Conversion of nitrogen oxide gases to nitrate particle
- in oil refinery plumes p0181 A80-48534

Q

QUATTROCHI, D. A

B-8

Application of remote sensing to state and regional [E80-10338] p0183 N80-32826

- RAGAN. R. M.
- Computer-aided watershed analyses using remote sensing based regional information systems

R

p0204 A80-51299 RAINA, B. N

- Landsat exploration of Himalayan and Peninsular regions /Remote sensing and mineral exploration - Progress report of work done in India/: I.G.C.P. Project 143 n0190 A80-51091
- RAMACHANORAN T V
- AMACHANDRAN, T. V. Geological ground-truths and Landsat imagery interpretation for parts of Karnataka State /India/ p0190 A80-51080 RANGO, A
- Remote sensing applications in hydrometeorology p0202 A80-51283
- RASMUSSEN. P Use of soil moisture information in [E80-10302] vield models p0177 N80-30869 REBILLARD, P
- L-band radar and geology Some results in south-east of France p0191 A80-51095 REED R K
- Direct measurement of recirculation Stream p0195 A80-46316 REETZ, H.
- Use of soil moisture information in vield models [E80-10302] p0177 N80-30869
- REICH, R. Evaluation of remote sensing techniques on selected forest sites in Florida [E80-10296]
- o0177 N80-32805 REICHARDT, K. L.
- Applied Remote Sensing Program (ARSP) [E80-10330] p017/ p0178 N80-32821 RICE, W. C.
- Interactive digital image processing investigation, phase
- p0222 N80-33848 AD-A087518 RICH F I
- Soil moisture in relation to geologic structure and lithology, northern California [F80-10298] p0192 N80-30865
- RICHARDS, J. A Pixel labeling by supervised probabilistic relaxatio [E80-10267] p0216 N80-
- p0216 N80-29814 RIEPMA, H. W.
- Observed short-time temperature variations and tidal current constants in the North Sea south east of the Dogger Bank / Comparison of two seasons/ p0197 A80-54060 RIOS. A.
- Design specification for merge of BTREAD, Phase 1 and Phase 2 accuracy assessment programs [E80-10255] D0217 N80-30838
- RIVERAU, J.-C. Landsat imagery in oil exploration -Siv years of
- p0189 A80-50880 experience RODRIGUEZ, R. M.
- specification LARSYS Final design specification for modification/Fisher F-distribution thresholding [E80-10210] p0215 N80-29789
- ROGALA, J. P The use of satellite imagery for mapping - The study of p0175 A80-50903 soil moisture
- ROSENFIELD, G. H. Applications of statistics to thematic mapping p0186 A80-53051
- ROSENKRANZ, W. A.
- Recommendations and comments concerning documentation on the microwave active spectrometer systems
- [E80-10187] o0213 N80-28787 ROSS, D.
- Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements p0196 A80-51411
- ROUSE, J. W., JR. Microwave radiometer measurements of soil moists
- p0176 A80-53890 content ROWAN, L. C.
- sensing and mineral exploration: Proceedings of the Workshop, Bangalore, India, May 29-June 9, 1979 00189 A80-51076 ROWLAND, J. K.
- Final design specification for EOD-LARSYS/data transformation processor modification [E80-10211] p0215 N80-29790
- ROZANOV, L N. Characteristics of the representation of tectonic faults on space photographs p0189 A80-49663 RUSSELL, O. R.
- Remote sensing for tunnel siting studies DO189 A80-48975

- S
- SAGDEEV, R. Z. Utilization of space for scientific and e in the USSR in 1978 p p0227 A80-53148

SAHAI, B.

- Remote sensing of water resources in Panch Mahals district p0202 A80-51286 SALOMONSON, V. V.
- The contribution of space observations to water resources management: Proceedings of the Symposium, Bangalore, India, May 29-June 9, 1979 p0201 A80-51278 D0201 A80.51278 The utility of Landsat-D for water-resources studies p0205 A80-51309
- SALZMAN J
- Quantitative interpretation of Great Lakes remote se akes remote sensing p0201 A80-45005 data SANTANA, C. E.
- Platform antennas for data collection [INPE-1820-RPE/186] p0221 N80-33647
- SAUERWEIN, C. H. Applied Remote Sensing Program (ARSP) [E80-10330] p017 p0178 N80-32821
- SAXTON, K. Use of soil moisture information in yield models [E80-10302] p0177 N80
- p0177 N80-30869 SCHANDA, E. Soil moisture estimation by correlated ground-based and
- D0202 A80-51287 Seasat microwave observation Microwave emission properties of snow for monitoring p0203 A80-51297 hydrological parameters SCHERTLER, R. J.
- Assessment of the role of remote sensing in the study of inland and coastal waters
- [NASA-TM-81881] 00200 N80-34048 SCHOWENGERDT, R. A.
- Applied Remote Sensing Program (ARSP) [E80-10330] 0017 p0178 N80-32821 SCHUBERT, J. S.
- Quantitative monitoring of sediment levels in fresh lakes from Landsat p0203 A80-51291 SCHUCHARDT, J. M.
- A 94/183 GHz multichannel radiometer for Convair
- flights [NASA-CR-160032] n0225 N80-33047 SCHULER. W.
- Conceptual study of a European remote sensing satellite ith combined optical and microwave payload D0224 N80-29407 [BMFT-FB-W-79-18] SCHWARZ. G.
- Terrain analyst synthesizer station [AD-A087370] p0187 N80-31860
- SCHWINGENDORF, S. Forest resource information system, phase 3

applications [NASA-CR-163363]

SERVAT, E.

SESTAK, M. L

[E80-10281]

[E80-10276]

Evaluation

SEVASTIANOV, V. I.

Andhra Pradesh, India

from satellite imagery

A case history in Tamilnadu. India

Digital LANDSAT data analysis of Tennesse [E80-10130]

Remote sensing application in groundwater surv

SEVUGAN CHETTY, A.

exploration in India

and pressure sensor arrays

SHIMABUKURO, Y. E.

in the state of Sao Paulo [E80-10261]

areas in Brazil [INPE-1794-RPE/166]

[F80-10258]

Comparison with wave measurements

by automatic analysis of LANDSAT image

SHAHROKHI, F

SHARMA S. K.

SHEMDIN, O. H.

of islands

SETTI D N

- 0176 N80-30825 [E80-10242] SEEBER. G.
- rm and buoy positioning experiments in the North Sea via Doppler satellite techniques p0197 A80-53691 SEIDMAN, J. B. Satellite remote sensing facility for oceanograhic

Inventory, mapping and evaluation of the agricultural

Composition and assembly of a spectral data base for

User's guide for the Yield Estimation Subsystem Data Management System (YESDAMS)

asbestos-barytes belt of south-western Cuddapah basin

ASTIANOV, V. I. Geological analysis of the Urals-Oman superlineament p0211 A80-52052

Use of Landsat data products for geological mapping -case history in Tamilnadu, India p0191 A80-51090

Radar observations of wave transformations in the vicinity

Comparisons between wave directional spectra from SAR

Synthetic aperture radar imaging of ocean waves

Evaluating the reforested area for the municipality of Buri

Utilization of LANDSAT data to inventory the sugar cane

The use of LANDSAT data for evaluation and

characterization of deforested pastureland and reforested

of MSS imagery over part of the

nd soybean multicrop segments

potential of soils - Status of studies and needs of remote sensing p0175 A80-50877

p0197 N80-28847

p0176 N80-29824

p0218 N80-30849

p0191 A80-51089

p0212 N80-28768

p0202 A80-51280

p0196 A80-51408

p0196 A80-51409

p0196 A80-51411

p0176 N80-30841

p0177 N80-30844

p0179 N80-32836

PERSONAL AUTHOR INDEX

SHIPMAN, J. S.

- Interactive digital image processing investigation, phase
- AD-A087518 p0222 N80-33848 SHOOK, D. F.
- Quantitative interpretation of Great Lakes remote sensin o0201 A80-45005 data
- SHUCHMAN, R. A. Synthetic aperture radar imaging of ocean waves -
- Comparison with wave measurements D0196 A80-51411 SHULMINA, M. P
- Investigation of the accuracy of transposition of landmarks and contour points to small-scale aerial ph plotographs p0212 A80-53005
- SHUR. L. A Ontical methods for the study of biocenoses on land and sea p0201 A80-49656
- SIDKO, A. F Optical methods for the study of biocenoses on land p0201 A80-49656 and sea
- SIDKO, F. IA. Optical methods for the study of biocenoses on land p0201 A80-49656 and sea
- SIEGEL, H. J A multiprocessor implementation of a contextual image
- processing algorithm [E80-10313] p0221 N80-32808
- SIJMONS, K. Computer-assisted production of multi-coloured maps D0209 A80-49521
- SILVESTRI, A.
- Image transformation study [AD-A086070] p0216 N80-29828 SIMONS, D. B.
- A hill-sliding strategy for initialization of Gaussian clusters in the multidi sional space [NASA-TM-80721] p0219 N80-31072
- SINGH, K. P. Application of Landsat imagery to ground water studies
- in parts of Punjab and Haryana states, India p0203 A80-51290
- CAR, J. K. Interfacing with SEO technology A case study in p0190 A80-51086 SIRCAR, J. K. geological application SKATERSHCHIKOV & V
- The use of space photographic data for the study and mapping of anthropogenic landscapes p0186 A80-54025
- SKLIAROV, V. E. The three-dimensional structure of the frontal zone of the Gulf Stream from synchronous satellite and ship data n0196 A80-49651
- SLEMONS, C.
- As-built design specification for the Yield Estimation Subsystem (YES) monthly yield data base and supporting programs [F80-10218] p0215 N80-29795
- SMITH. B. Program on stimulating operational private sector use
- of Earth observation satellite data [E80-10233] p0227 N80-29802
- SMITH & W A multiprocessor implementation of a contextual image
- processing algorithm [E80-10313] p0221 N80-32808 SMITH. C.
- Forest resource information system, phase 3 p0176 N80-30825 [E80-10242]
- SMITH, D. L As-built design specification for LACIE phase 3 automatic status and tracking system
- [E80-10175] p0213 N80-28776 Detailed design specification for the automatic status
- and tracking system modifications for LACIE procedure 1 [E80-10243] p0217 N80-30826 p0217 N80-30826 Operator's guide for LACIE phase 3 automatic status
- and tracking system [E80-10284] p0218 N80-30852
- SMITH, J. A. Simulation of solar radiation absorption i
- canonies p0173 A80-46451 SNELSON, F. F., JR.
- A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center, Volume 3, part 1; Ichthyological survey of lagoonal waters [NASA-CR-163122-VOL-3-PT-1]
- p0197 N80-28939 A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy Space Center. Volume 3, part 2: Ichthyological studies, sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2]
- p0198 N80-28940 SOKOLOV, V. I. Optical methods for the study of biocenoses on lar
- and sea p0201 A80-49656 SOLOMON, J. L.
- Application of remote sensing to state and regional problems [E80-10338] p0183 N80-32826
- SONA, A. sensors for remote sensing
- [CISE-N-190] o0225 N80-31863

- SONNEMBURG, C. R.
- Classification of multispectral images according to rosswise textural characteristics [E80-10257] p0218 N80-30840
- SPEIRER, R. A. Development of a method to detect geologic faults and other linear features from LANDSAT in p0193 N80-32844 [PB80-189665]
- SPIRIDONOV, IU. G. Practical aspects of radiative correction of m
- p0211 A80-52060 video information . SPIRIDONOV, KH. B. Measurement results and conclusions on the spectral
- reflective coefficients of volcanites, s, granitoides and p0191 A80-51093 SRINIVASAN. V.
- Use of Landsat data products for geolo A case history in Tamilnadu, India p01 p0191 A80-51090 SRIVASTAVA G. S.
- Problems of snow cover assess An approach u remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India p0203 AB0-51294 SRIVASTAVA, V. C.
- Tectonics and lineament patterns of the Vindhyan bas used on Landsat imagery data p0190 A80-5108 p0190 A80-51084 STANCZUK, D. T.
- Remote sensing for tunnel siting studi p0189 A80-48975
- STEFANOVIC. P Computer-assisted production of multi p0209 A80-49521
- STEIN, R. Program on stimulating operational private sector use of Earth observation satellite data
- [E80-10233] p0227 N80-29802 STEPANOVA, G. I. A method for mapping soil reflectan
- p0175 A80-49655 STEPHAN J G
- LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau [RHO-BWI-SA-43] p0183 N80-31862
- STEVENS, R. D. S. Airborne sulfur dioxide to sulfate oxidation studies he INCO 381M chimney plume p0182 A80-53269
- STEVENS. W. A. EOD systems and facilities workload requirements
- forecast [E80-10277] p0176 N80-29821 STEWART, J.
- Draft user procedures: Software wheat yield predictions/foreign equivalent test [E80-10287] p0218 N80-30855
- STEWART, R. W. Development of a pulsed 9.5 micron lidar for region
- p0181 A80-48909 scale O3 measurement STOIBER, R. E. An investigation of vegetation and other Earth
- resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT. 2: Remote sensing of volcanic emissions [FRO-10312] D0225 N80-32807
- STOLZ, A.
- Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and ground water and ground water p0186 N80-28809 variations STRAHLER, A. H.
- Use of collateral information to improve LANDSAT classification accuracies [E80-10268] p0176 N80-29815
- STRATIGOS, J. A. A 94/183 GHz multichannel radiometer for Convair
- flights [NASA-CR-160032] p0225 N80-33047
- STROWD, W. Additions and corrections to the bibliography of geologic
- studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980 [RHO-BWI-C-68] p0192 N80-32013
- STRUVE H Remote sensing procedures for detecting and monitoring
- various activities regulated by the Mobile District p0206 N80-31973 [AD-A087584] SUKHININ, A. I.
- Evaluation of the fire hazard of taiga forests from thermal radio emission p0175 A80-49652 SUSHKEVICH, T. A.
- Optical spatial-frequency characteristic of the atm and its applications p0212 A80-52061 SUSPLUGAS, B.
- A study of the needs of French government agencies in p0181 A80-50882 remote sensing mapping SVEHLA, R. A.
- Quantitative interpretation of Great akes remote sensing p0201 A80-45005 data SVELTO, F.
- Sensors for remote sensing [CISE-N-190] p0225 N80-31863 SVELTO, V. Sensors for remote sensing [CISE-N-190]
- p0225 N80-31863 SVENTEK, IU. V.
- Analytical geographic gridding of natural objects from aerial and satellite multispectral scanner images p0212 A80-52064

SWAIN, P. H.

Pixel labeling by supervised probabilistic relaxation [E80-10267] p0216 N80-29814

TRAGANZA, E. D.

- A multiprocessor implementation of a contextual image processing algorithm [E80-10313] p0221 N80-32808
- A multispectral data simulation technique [E80-10311] p0221 N80-33830
- SWAMINATHAN, V. L Use of Landsat data products for geological mapping
- A case history in Tamilnadu, India p0191 A80-51090 SWIFT, C. T.
- Microwave radiometric aircraft observations of the Fabry-Perot interference fringes of an ice-water system p0195 A80-44232
- SWIFT, R. N. Oil film thickness measurement using airborne laser-induced water Raman backscatter
- n0197 A80-52331 SYDOR, M.
 - Remote sensing of particulate concentrations in wate p0201 A80-46450

т

TALUKDAR, S. N.

TELES, J.

TELFER. D. J.

TERRELL, G.

TERRELL, G. A.

[E80-10303]

TEWARI, B. S.

THELIN, G. P.

THOME, P. G.

Gulf Stream

THOMSEN, A. G.

TISHCHENKO, A. P.

video information

TOWNSHEND, J. R. G.

TRAGANZA F D

TKHAI, M. N.

TINNEY, L

the High Plains

[NASA-TM-82215]

- Application of remote sensing techniques to petroleum exploration in India p0191 A80-51088 TAMILARASAN, V.
- Use of Landsat data products for geological mapping A case history in Tamilnadu, India p0191 A80-51090 Remote sensing of water resources in Panch Mahals
- p0202 A80-51286 district Evaluation of hydrogeologic conditions in Ponnaivar River
- basin, South India using remotely sensed data p0203 A80-51288 TANG, C. L
- Observation of wavelike motion of the Gaspe Current p0195 A80-46309
- TARDIN. A. T. Utilization of LANDSAT data to inventory the sugar cane
- in the state of Sao Paulo [E80-10261] D0177 N80-30844 TEAGUE. C. C.
- Radar observations of wave transformat nations in the vicinity p0196 A80-51408 of islands TELEKI, P. G.

Comparison with wave measurements

Satellite monitoring of sea surface poll [E80-10329] p0

in parts of Punjab and Haryana states, India

A watershed information system

A method for mapping soil reflectance

and aerial protography of Western Uzbekista

Satellite observations of a nutrient upw of California

Applications Pilot Test (APT) [E80-10324]

irrigation cropland maps for water use determ

Sampling of rectangular regions [E80-10272]

Synthetic aperture radar imaging of ocean waves -

The Landsat-D/Global Positioning System experiment [AIAA PAPER 80-1678] p0209 A80-46522

Evaluating the use of analyst labels in maximum likelihood cluster proportion estimation

Application of Landsat imagery to ground water studies

Development and application of Landsat-derived

The coordinated federal program for the application of

space technology to crustal dynamics and earthquake

THOMPSON, T. W. Modulation of sea surface radar cross section by surface

stress - Wind speed and temperature effects across the

Irrigated lands assessment for water management

Practical aspects of radiative correction of multispectral deo information p0211 A80-52060

Analysis of the results of an interpretation of satellite

Unsupervised classification of MSS Landsat data for

mapping spatially complex vegetation p0173 A80-47744 The potential of Landsat-3 RBV images for thematic mapping p0210 A80-50894

p0196 A80-51411

pollution p0199 N80-32820

n0176 N80-29819

D0219 N80-30870

p0203 A80-51290

n0175 A80-49144

p0187 N80-33999

p0196 A80-51415

p0207 N80-33825

p0178 N80-32815

p0175 A80-49655

p0211 A80-52055

lling off the coast

B-9

p0195 A80-45015

TRAGNI, F.

Implementation specification document for merge of BTREAD, phase 1, and phase 2 accuracy assessment orograms

[E80-10285]	p0218 N80-30853
TRAIZET, M.	

- Automatic mapping of snow cover by means of Landsat Application to the central Pyrenees p0185 A80-50888
- TRENCHARD, M. H. Composition and assembly of a spectral data base for
- corn and soybean multicrop segments [E80-10281] o0176 N80-29824 TROGUS, W.
- Conceptual study of a European remote sensing satellite with combined optical and microwave payload p0224 N80-29407 [BMFT-FB-W-79-18]
- TSUCHIYA, K. Earth observation systems in Japan p0205 A80-51310 TSURUTANI, B.
- Substorm warnings An ISEE-3 real time data system p0209 A80-46225
- TUCKER, C. J. Remote sensing of total dry-matter accumulation in winter wheat [E80-10235] p0176 N80-29804
- TURNER, J. F., JR. Evaluation of remote hydrologic data-acquisition systems. west-central Florida [PB80-176951] p0205 N80-29832
- TUTEVICH, V. N. A telemechanical system for hydrophysical studies in th
- ocean p0223 A80-45766

U

- ULABY, F. T. Vegetation clutter model p0173 A80-44262 ULBRICHT, K. A.
- Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research
- [DFVLR-FB-80-03] p0220 N80-31865 UNGAR, S. G.
- Thematic mapper studies band correlation analysis [NASA-TM-80716] p0216 N80-2 p0216 N80-29825 USACHEV, V. F.
- Satellite data for the solution of problems of land hydrology p0202 A80-51282
- USIKOV, D. A. Allowance for light scattering in the atmosphere in the processing of space photographs of the earth's surface
- p0210 A80-49658 A description of a system of programs for mathematically processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft
- [NASA-TM-76208] p0220 N80-31856 USOVA, V. V. Results of the complex processing of photographs taker
- p0212 A80-53004 from the Salyut space stations UVADEV. L. I.
- Mapping a geologicostructural scheme of the Kola eninsula from satellite imagery p0211 A80-52053 peninsula from satellite imagery

V

VACCARI, C

B-10

- Use of satellite imagery for the derivation of the hydrogeologic characteristics of a test area in semiarid climates p0202 A80-51284 VALENDIK, E. N.
- Evaluation of the fire hazard of taiga forests from their thermal radio emission p0175 A80-49652 VANDERBILT, V. C.
- A model of plant canopy polarization response [E80-10336] p0179 N8 p0179 N80-33835 VANZYL A. S.
- Bonne's projection of Meteosat image [CSIR-SR-FIS-201] p0 p0222 N80-33837 VASILEV, L N.
- Determination of the spectral characteristics of soils and p0211 A80-52059 vegetation
- VASIUTINA, L.G. The Mesozoic and Cenozoic depressions of the Baikalo-Amur region from the interpretation of space p0189 A80-49654 photographs VELTEN, E.
- Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407 VENEZIANI. P.
- Remote sensing applied to the prospecting of geothermal anomaly in Caldas Novas County, State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837 VENKATARAMAN. G.
- Evaluation of hydrogeologic conditions in Ponnaiyar River basin, South India using remotely sensed data p0203 A80-51288
- VERGER, F. The geomorphology of Mont-Saint-Michel Bay studied from the remote sensing of instantaneous shorelin p0201 A80-50899

- The cartography of Chize forest through remote sensinn p0175 A80-50900 VESECKY. J. F.
- Radar observations of wave transformations in the vicinit of islands p0196 A80-51408 VET. R. J.
- Airborne sulfur dioxide to sulfate oxidation studies of the INCO 381M chimney plume p0182 A80-53269 VITELLARO J A
- Project development plan for the LANDSAT Imagery Verification and Extraction System (LIVES) p0216 N80-29807 [E80-10238]
- Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES) [E80-10239] p0216 N80-29808
- EOD systems and facilities workload requirements orecast [E80-10277] p0176 N80-29821
- VITHAYATHIL, F.
- Program on stimulating operational private sector use Earth observation satellite data [F80-10233] D0227 N80-29802 VOHRA. C. P.
- Problems of snow cover assessment An approach using remote sensing techniques in a pilot project in the Beas river basin, Himachal Pradesh, India p0203 A80-51294
- VOLTER. V.
- Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft [NASA-TM-76234] p0225 N80-31857 VOSTRIAKOVA, N. V
- The use of space data for the prediction of mountain-rive flooding in Siberia p0201 A80-4965: p0201 A80-49653

W

- WARNER, K.
- Program on stimulating operational private sector use of Earth observation satellite data (E80-10233) p0227 N80-29802
- WARREN, P. L Applied Remote Sensing Program [E80-10330] (ABSP)
- p0178 N80-32821 WARZECHA, L. W.
- Landsat-D Overview and implications p0224 A80-53609 WATSON. K.
- Geologic application of thermal-inertia mapping from satellite
- [F80-10230] p0192 N80-29799 WEECKSTEEN G
- Review of BRGM research activities in geological remote sensing and medium-term perspectives p0189 A80-50881
- WENDE, M. E.
- Impact of cell size on inventory and mapping errors in a cellular geographic information system [F80-10315] p0221 N80-33831
- WEHMANEN, O. A. As-built design specification for scatter plots for direct wheat
- [E80-10250] p0217 N80-30833 WEINHAUS, F.
- Image transformation study [AD-A086070] p0216 N80-29828 WEISSMAN, D. E.
- Modulation of sea surface radar cross section by surface stress Wind speed and temperature effects across the p0196 A80-51415 Gulf Stream WESTPHAL M
- Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407
- WHITE, W. P. As-built specification for CCit6A processor program [E80-10168] pO212 N80-28769
- As-built specification for CCIT7 proces [E80-10209] cessor program p0215 N80-29788
- WHITLOCK, C. H. Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelength remote sensing
- [NASA-TM-81843] p0207 N80-33927 WIEGAND, C. L.
- Use of soil moisture information in vield models [E80-10302] p0177 N80-30869
- WIESNER, D. R. Eurasian snow cover extent - The NOAA satellite record, 1966-79 p0203 A80-51295 p0203 A80-51295
- WIESNET D. R. Satellite studies of fresh-water ice me Erie p0205 A80-53611
- Applications of HCMM data to soil moisture snow and estuarine current studies p0205 N80-29816 [F80-10269]
- WILHEIT, T. T. Microwave radiometric determination of oceanographic
- meteorological parameters p0223 A80-51579 WILLIAMS, K. specification for the Yield Estimation As built design
- Subsystem (YES) operational Robertson phenological model [E80-10170] p0212 N80-28771

As-built design specification for the Brazil and China monthly data bases

- [E80-10172] p0213 N80-28773 configuration control procedures manual [E80-10186]
- As-built design specification for historical daily data bases or testing advanced models
- p0214 N80-28795 [F80-10198] [580-10198] pozition for areas added to the monthly bases of Texas, Minnesota and USSR
- [E80-10241] p0216 N80-29810 As-built design specification for the India monthly data
- [E80-10264] p0216 N80-29811 As-built design specification for phase 3 model areas added to the monthly data base of the US
- [E80-10263] p0218 N80-30846 WILLIAMS, K. F.
- Detailed design specification for the Yield Estimation Subsystem Data Management System (YESDAMS) 10180] p0213 N80-28781
- WILLIAMS T H L
- Irrigation mapping in western Kansas using Landsat. II Practices and problems p0174 A80-49143 - Practices and problems Application of Landsat imagery to ground water studies in parts of Punjab and Haryana states, India
- p0203 A80-51290 WILLS, B. E.
- As-built design specification for EOD-LARSYS procedure
- [E80-10174] D0213 N80-28775 Design specification for LARSYS procedure 1 [E80-10199] p0214 N80-28796
- User documentation EOD-LARSYS Earth Observations Division version of the Laboratory for Applications of Remote
- sensing system [E80-10188] n0214 N80-29780
- Design specification for color coded spectral plots [E80-10245] p0217 N80-30828 WILMET, J.
- Spatial filtering of Landsat data for urban cartograph p0185 A80-50892 WILSON, C. L
- Remotely sensed data processing techniques, present and p0209 A80-49138 future
- WILSON E. L. As-built design specification for Metro data edit program
- [E80-10201] p0214 N80-29781 WILSON, L
- Satellite monitoring of sea surface pollution [E80-10329] p0199 N80-32820
- WILSON, W. H. Nimbus-7 coastal zone color scanner - System description and initial imagery p0197 A80-51490 WINTER R

Evaluation of Landsat image data for the extraction of

p0185 A80-50902

D0177 N80-30860

p0207 N80-33927

p0209 A80-46522

p0205_N80-29832

p0195 A80-45004

p0211 A80-52051

p0186 A80-54023

p0223 A80-45766

land use information and its presentation in thematic

AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations

WITTE, W. G. Turbid water measurements of remote sensing penetration depth at visible and near-infrared wavelength

The Landsat-D/Global Positioning System experir [AIAA PAPER 80-1678] _____02209 A80-46

Evaluation of remote hydrologic data-acquisition systems, rest-central Florida

Soil moisture estimation by correlated ground-based and Seasat microwave observation p0202 A80-51287

γ

Ocean chlorophyll studies from a U-2 aircraft platform

Ζ

New data on the geological structure of the

An automated aerial-photographic information-search

A photogrammetric method of processing space potographs p0185 A80-46967

A telemechanical system for hydrophysical studies in

Verkhoiany-Kolyma fold region from an analysis of satellite

WISE M A

[E80-10292]

[NASA-TM-81843]

WOODEN, W. H., II

WOODHAM, W. M.

[PB80-176951]

WYSSEN, D.

YODER, J. A.

ZABELIN, V. A.

TV images

ZHUKOV, V. M.

ZHURKIN, I. G.

photographs

system

ocean

ZHUCHENKO, A. G.

PERSONAL AUTHOR INDEX

 ZILIOLI, E.

 Study of geological structure of Sicily and other Italian areas

 [E80-10299]

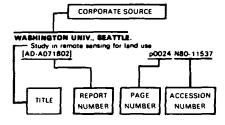
 p0192 N80-30866

areas [E80-10299] p0192 N80-30866 ZIMAN. IA. L Imaging in many frequency bands p0212 A80-52062 ZIMAN. Y. Raduga experiment: Multizonal photographing the Earth from the Soyu-22 spacecraft [NASA-TM-76234] p0225 N80-31857 ZOLOTUKHIN, V. G. Allowance for light scattering in the atmosphere in the processing on unified series (YeS) computers photographic images of the Earth taken from spacecraft [NASA-TM-76208] p0220 N80-31856 ZUBCHENKO, E. S. The use of space data for the mapping of coastal areas p0185 A80-45297

CORPORATE SOURCE INDEX

Earth Resources/ A Continuing Bibliography (Issue 28)

Typical Corporate Source Index Listing



The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document.

Δ

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB. MASS.

- Development of techniques to specify cloudiness and rainfall rate using GOES imagery data [AD-A084757] p0206 N80-33064
- APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV.,
- LAUREL, MD. Magsat A new satellite to survey the earth's magnetic field p0223 A80-51233
- APPLIED SCIENCE ASSOCIATES, INC., APEX, N. C. Radar altimeter mean return waveforms from near-normal-incidence ocean surface scattering p0224 A80-53891
- Wallops waveform analysis of SEASAT-1 radar altimeter data [NASA-CR-156869] p0198 N80-29637
- ARIZONA UNIV., TUCSON. Polar nephelometer for atmospheric particulate studie
- p0182 A80-52346 Applied Remote Sensing Program (ARSP) [E80-10330] p0178 p0178 N80-32821
- ARMY ENGINEER TOPOGRAPHIC LABS., FORT
- BELVOIR, VA. Errors in automatic pass point mensuration using digital techniques
- p0220 N80-31859 [AD-A087443] Terrain analyst synthesizer station [AD-A087370]
- AD-A087370) p0187 N80-31860 ARMY ENGINEER WATERWAYS EXPERIMENT
- STATION, VICKSBURG, MISS. Remote sensing procedures for detecting and monitoring various activities regulated by the Mobile District
- AD-A087584] DO206 N80-31973 AUTOMATION INDUSTRIES, INC., SILVER SPRING, MD.
- Environmental data for sites in the National Solar Data [SOLAR/0010-80/02] p0220 N80-31975
 - В
- BRAZILIAN INST. FOR FORESTRY DEVELOPMENT, SAO JOSE DOS CAMPOS. The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested
- areas in Brazil BUREAU OF MINES, DENVER, COLO. Development of a mathematic
- Development of a method to detect geologic faults and other linear features from LANDSAT images [PB80-189665] p0193 N80-32844
- [PB80-189665] BUREAU OF MINES AND GEOLOGY, MOSCOW, IDAHO.
- Additions and corrections to the bibliography of geologic studies, Columbia Plateau (Columbia River Basalt) and adjacent areas, in Idaho, 1980
- [RHO-BWI-C-68] p0192 N80-32013

С

CALIFORNIA INST. OF TECH., PASADENA. Degradation of picture quality by speckle in coherent apping systems p0217 N80-30821 CALIFORNIA UNIV., BERKELEY

- irrigated lands assessment for water management Applications Pilot Test (APT)
- [E80-10324] D0178 N80-32815 Application of remote sensing to selected problems within the state of California
- p0183 N80-32817 [E80-10326]
- Development of AI procedures for dealing with the effects of episodal events on crop temporal spectral response and development of AI guidelines for corn and soybean labeling [E80-10327] p0178 N80-32818
- CALIFORNIA UNIV., LA JOLLA. Radar observations of wave transformations in the vicinity
- of islands p0196 A80-51408 Comparisons between wave directional spectra from SAR
- nd pressure sensor arrays p0196 A80-51409 CALIFORNIA UNIV., SANTA BARBARA. Use of collateral information to improve LANDSAT
- classification accuracies [E80-10268] p0176 N80-29815
- CENTRO INFORMAZIONI STUDI ESPERIENZE, MILAN (ITALY).
- Sensors for remote sensing
- [CISE-N-190] p0225 N80-31863 COLORADO STATE UNIV., FORT COLLINS. Simulation of solar radiation absorption in
- p0173 A80-46451 canopies COLORADO UNIV. AT BOULDER.
- A multi-step method for avalanche zone recognition and analysis p0193 N80-33824
- COLUMBIA UNIV., NEW YORK. Detection of hidden mineral deposits by airborne spectral analysis of forest canopies
- [PB80-193881] p0193 N80-32845 COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
- Operational remote sensing legislation
- [GPO-45-048] p0228 N80-34294 Operational remote sensing legislation, part 2 [GPO-52-581] p0228 NS
- p0228 N80-34295 COMPUTER SCIENCES CORP., SILVER SPRING, MD. Nimbus-7 coastal zone color scanner - System desc and initial imagery p0197 A80-51490
- CONSIGLIO NAZIONALE DELLE RICERCHE, MILAN (ITALY).
- Study of geological structure of Sicily and other Italian areas [E80-10299] p0192 N80-30866
- CORNELL UNIV., ITHACA, N. Y.
- Cornell University remote sensing program [E80-10280] p0227 N80-29823 COUNCIL ON ENVIRONMENTAL QUALITY.
- COUNCIL ON ENVIRONMENT WASHINGTON, D.C. The global 2000 report to the president. Entering the p0228 N80-32295 p0228 N80-32295 The global 2000 report to the president. Entering the twenty-first century. Volume 2: The technical report p0228 N80-32296

D

- DARTMOUTH COLL, HANOVER, N.H. An investigation of vegetation and other Earth resource/feature parameters using LANDSAT and other remote sensing data. 1: LANDSAT, 2: Remote sensing of volcanic emissions p0225 N80-32807 [E80-10312]
- DEFENSE MAPPING AGENCY, WASHINGTON, D.C. The coordinated federal program for the application of space technology to crustal dynamics and earthquake
- [NASA-TM-82215] p0187 N80-33999 DEFENSE MAPPING AGENCY AEROSPACE CENTER,
- ST. LOUIS, MO.
- Digital image technology 1980: Emerging production notications [AD-A085163] p0214 N80-28851

DEFENSE MAPPING AGENCY HYDROGRAPHIC AND TOPOGRAPHIC CENTER WASHINGTON D C Application of thematic mapping techniques in terrain

anatysis	
[AD-A089061]	p0222 N80-33847

- DEPARTMENT OF AGRICULTURE, WESLACO, TEX. Using 70-mm aerial photography to identify rangeland tes p0175 A80-53056 sites
- DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT,
- OBERPFAFFENHOFEN (WEST GERMANY). Conceptual study of a European remote sensing satellite
- with combined optical and microwave payload [8MFT-FB-W-79-18] p0224 / p0224 N80-29407
- Comparative experimental study on the use of original and compressed multispectral LANDSAT data for applied research p0220 N80-31865
- [DFVLR-FB-80-03] DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN
- (WEST GERMANY). Conceptual study of a European remote sensing satellite with combined optical and microwave payload [BMFT-FB-W-79-18] p0224 N80-29407

Ε

- EASTMAN KODAK CO., ROCHESTER, N. Y.
- Advanced solid state Earth resources satellite study p0224 N80-29801 [E80-10232] EDGERTON, GERMESHAUSEN AND GRIER, INC.,
- SUNNYVALE, CALIF.
- Aerial gamma ray and magnetic survey: Raton Basin project. The Raton and Santa Fe quadrangles of New Mexico p0192 N80-30881
- [GJBX-9(80)-VOL-2] EG AND G WASHINGTON ANALYTICAL SERVICES
- CENTER, INC., POCOMOKE CITY, MD. Oil film thickness measurement laser-induced water Raman backscatter using airborne p0197 A80-52331
- ELECTROMAGNETIC SYSTEMS LABS., INC., SUNNYVALE, CALIF.
- Image transformation study [AD-A086070] p0216 N80-29828 ENVIRONMENTAL RESEARCH AND TECHNOLOGY,
- INC., CONCORD, MASS. Investigation of the application of HCMM thermal data
- to snow hydrology p0205 N80-30864 [E80-10297]
- ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARROR
 - Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements p0196 A80-51411
- Analysis of [E80-10308] of scanner data for crop inventories p0219 N80-30874
- An algorithm for estimating crop calendar shifts of spring small grains using LANDSAT spectral data [E80-10314] p0178 N80-32809

F

- FLORIDA UNIV., GAINESVILLE.
 - Satellite temperature monitoring and prediction system p0211 A80-51943
- Florida water resources [E80-10246] p0205 N80-30829
- Florida water resources. Executive summary p0205 N80-30830 [E80-10247]
- Evaluation of remote sensing techniques on selected forest sites in Florida [E80-10296] p0177 N80-32805
- FREIBURG UNIV. (WEST GERMANY).
 - The influence of topographic structures on night-time surface temperatures: Evaluation of a satellite thermal image of the upper Rhine plain and the surrounding
 - [E80- 10228] p0179 N80-33829

JANUARY 1981

GEOLOGICAL SURVEY, DENVER, COLO.

G

GEOLOGICAL SURVEY, DENVER, COLO. Geologic application of thermal-inertia mapping from

satellite 10230] p0192 N80-29799 GEOLOGICAL SURVEY, RESTON, VA

- Synthetic aperture rader imaging of ocean waves Comparison with wave measurements
- p0196 A80-51411 US Geological Survey sources of photographs and images of biosphere reserves taken from spacecraft and aircraft, San Joaquin Experimental Range
- [PB80-169295] p0192 N80-28852 GEOLOGICAL SURVEY, TALLAHASSEE, FLA Evaluation of remote hydrologic data-acquisition systems,
- est-central Florida [PB80-176951] p0205 N80-29832 GEOLOGICAL SURVEY, WASHINGTON, D. C.
- The coordinated federal program for the application of space technology to crustal dynamics and earthquake esearch [NASA-TM-82215] p0187 N80-33999
- GEORGIA INST. OF TECH., ATLANTA. A 94/183 GHz multichannel radiometer for Convair
- [NASA-CR-160032] p0225 N80-33047

Н

HOFSTRA UNIV., HEMPSTEAD, N. Y.

Modulation of sea surface radar cross section by surface stress - Wind speed and temperature effects ecross the Gulf Stream p0196 A80-51415

1

IBM FEDERAL SYSTEMS CENTER, GAITHERSBURG MD

. Interactive digital image processing investigation, phase

[AD-A087518] p0222 N80-33848 INSTITUTE FOR LAND AND WATER MANAGEMENT

- RESEARCH, WAGENINGEN (NETHERLANDS). Defining relationships between surface characteristics and actual evaporation rate
- [E80-10335] p0207 N80-338 INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE p0207 N80-33834 DOS CAMPOS (BRAZIL).

Classification of multispectral images according to crosswise textural characteristics

- p0218 N80-30840 [E80-10257] Evaluating the reforested area for the municipality of Buri automatic analysis of LANDSAT image [E80-10258]
- p0176 N80-30841 Study of the atmospheric effects on the radiation detected by the sensor aboard orbiting platforms (ERTS/LANDSAT)
- [E80-10259] p0218 N80-30842 Use of LANDSAT data for estimating the area of sugar

the state of Sao Paulo p0177 N80-30843 [E80-10260]

Utilization of LANDSAT data to inventory the sugar cane in the state of Sao Paulo [E80-10261] p0177 N80-30844

Collection, processing, and distribution of remote sensing data from Brazilian Receiving Station [INPE-1784-RPE/156] p0221 N80-32832

- Planning and execution of a photographic mission over
- a wheat producing region in Rio Gran [INPE-1793-RPE/165] pt p0179 N80-32833
- Characterization of Cerrado vegetation using automatically classified LANDSAT MSS data [INPE-1790-RPE/162] p0179 N80-32835
- The use of LANDSAT data for evaluation and characterization of deforested pastureland and reforested areas in Brazil
- [INPE-1794-RPE/166] p0179 N80-32836 Remote sensing applied to the prospecting of geothermal anomaly in Caldas Novas County, State of Goias, Brazil [INPE-1792-RPE/164] p0193 N80-32837
- Platform antennas for data collection [INPE-1820-RPE/186] p0221 N80-33647
- The use of radiation temperature to detect water-stress in sugarcane crop [INPE-1767-TDL/028] p0179 N80-33839
- A method for edge detection in images of natural
- [INPE-1768-RPE/154] p0222 N80-33840 Thermal balance of soils
- [INPE-1859-RPE/210] p0180 N80-33841 Contributions of LANDSAT imagery to the geological mapping of the Rio do Grande Sul Shield [INPE-1838-RPE/199] p0193 N80-33842
- Digital filtering of LANDSAT images as a visual aid technique in geological [INPE-1823-RPE/189] gical photointerpretation
- p0193 N80-33843 Coastal currents: Study of a model applied to the coast of Rio Grande do Sul latitude 29 deg south to 35 deg south
- [INPE-1841-RPE/201] p0200 N80-33844

cal balance of the Salgado River basin p0206 N80-32834 [INPE-1849-RPE/206] INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS,

ROME (ITALY). The 7th WMO Executive Committe Inter-Government Panel Session on the First GARP Global Experiment [GARP-SPEC-35] p0219 N80-31012

J

- JET PROPULSION LAB., CALIFORNIA INST. OF TECH. PASADENA.
 - Substorm warnings An ISEE-3 real time data system p0209 A80-46225
- Spaceborne imaging radar Geologic and oceanographic nlications p0223 A80-47480 applications Uranium Spectral discrimination of alteration
- p0189 A80-49524 phenomena in sediments Radar observations of wave transformations in the vicinity
- of islands p0196 A80-51408 Comparisons between wave directional spectra from SAR
- p0196 A80-51409 and pressure sensor arrays Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements
- p0196 A80-51411 Modulation of sea surface radar cross section by surface Wind speed and temperature effects across
- stress Win Gulf Stream p0196 A80-51415 Satellite Emission Radio Interferometric Earth Surveying
- p0186 N80-28838 (SERIES) Satellite remote sensing facility for oceanograhic nlication
- [NASA-CR-163363] p0197 N80-28847
- Geologic application of thermal inertia imaging using HCMM data [E80-10229] p0192 N80-29798
- Geologic application of thermal inertia imaging using HCMM d
- p0192 N80-29800 [E80-10231] Mapping urbanized area expansion through digital image
- processing of LANDSAT and conventional data p0182 N80-30868 [E80-10301]
- Seasat. Volume 2: Flight systems [NASA-CR-163571] p0199 N80-32829 JOHNS HOPKINS UNIV., BALTIMORE, MD. A watershed information system p0207 N80-33825
- JOINT RESEARCH CENTRE OF THE EUROPEAN COMMUNITIES, ISPRA (ITALY).
- HCMM satellite follow-on investigation no. 025: Soil moisture and heat budget evaluation in selected European zones of agricultural and environmental interest (TELLUS [E80-10332] p0178 N80-32823
- Further developments of the TELL-US model. 1: An implicit finite difference scheme for the numerical approximation of the ground heat flux. 2: A simple algorithm for estimating the actual and potential evapotranspiration of vegetated surfaces from one remotely nsed surface temperature near the daily maximum p0178 N80-32824 [E80-10333]

κ

- KANSAS STATE UNIV., MANHATTAN.
- Use of soil moisture information in yie [E80-10302] p0177 N80-30869
- KANSAS UNIV., LAWRENCE.
- Radar backscatter study of sea ice [AD-A087032] p0198 N80-30618
- KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
- Vegetation clutter model p0173 A80-44262 The application of remote sensing to resource nanagement and environmental quality programs in Kansas
- [E80-10337] p0183_N80-32825 KANSAS WATER RESOURCES RESEARCH INST.
- MANHATTAN.
- nulation of reservoir and lake sedimentation [PB80-182801] oO206 N80-31867

1

- LANCASTER UNIV. (ENGLAND),
- Satellite monitoring of sea surface pollution [E80-10329] p0199 N80-32820 LESCHACK ASSOCIATES LTD., SILVER SPRING, MD. Correlation of under-ice roughness with satellite and airborne thermal infrared data
- AD-4085512 p0198 N80-30880 LOCKHEED ELECTRONICS CO., HOUSTON, TEX.
- As-built specification for CCit6A processor program [E80-10168] p0212 N80-28769 As-built design specification for LACIE formatted dot
- ards in EOD-LARSYS [E80-10169] p0212 N80-28770

CORPORATE SOURCE INDEX

As-built design specification for the Yield Estimation Subsystem (YES) operational Robertson phenological [E80-10170]

- p0212 N80-28771 As-built design specification for the I-100 tape read consolidation program (FULOI)
- [E80-10171] p0213 N80-28772 As-built design specification for the Brazil and China
- onthly data bases [E80-10172] p0213 N80-28773 Final design specification for EOD-LARSYS/statistics and
- data transformation processors modification [E80-10173] p0213 N80-28774
- As-built design specification for EOD-LARSYS procedure [E80-10174] n0213 N80-28775
- As-built design specification for LACIE phase 3 automatic status and tracking system
- Design specification for LARSYS procedure 1 follow-on [E80-10176] p0213 N80-28776 Design specification for EOD-LARSYS/statistics and data
- transformation processors modification [E80-10177] p0213 N80-28778
- [E80-10177] Program documentation: Final design specification for dot data base update deck conversion program (DOTDEC) [E80-10178] p0213 N80-28779 p0213 N80-28779 Final design specification for ERIPS fields data base deck
- [E80-10179] p0213 N80-28780 Detailed design specification for the Yield Estimation
- bsystem Data Management System (YESDAMS) p0213 N80-28781 [E80-10180] Modifications to the CLASY progra
- [E80-10181] p0213 N80-28782 Program do CAMDATA1.FTN documentations: MARQTY1.FTN,
- p0213 N80-28783 [E80-10182] Design specification for dot data base update deck
- conversion program (DOTDEC) p0213 N80-28784 [E80-10183]
- As-built design specification for Production Film Converter Gains And Biases program (PFCGAB) [E80-10184] p0213 N p0213 N80-28785
- LACIE/phase 3 Adjustable Crop Calendar (ACC) configuration control procedures manual pO213 N80-28786
- [E80-10186] Recommendations and comments concerning documentation on the microwave active spectrometer
- systems p0213 N80-28787 [E80-10187]
- Functional design specification for enhancement of the tomatic status and tracking system softw p0214 N80-28788 [E80-10190] A discriminant approach to parameter estimation in the

linear model with unknown variance-covariance matrix

LACIE field measurements data acquisition summary port, 1975 - 1976 crop year

(LACIE) phase 3 PDP 11/45 automatic status and tracking

A statistical test procedure for detecting multiple outliers

As-built design specification of the CAMS/CAS interface

As-built design for enhancement of the automatic status

As-built design specification for historical daily data bases

As-built design specification for PDP 11/45 accuracy

User documentation EOD-LARSYS Earth Observations

As-built design specification for Metro data edit

As-built design specification of the CAM/CAS interface tape report generation program for LACIE 7

As-built design specification of the CAMS/CAS interface

Design specification for equiprobable blocks density

As-built design specification for the CAMS image-100

Volume 1: System design

Division version of the Laboratory for Applications of Remote

tape report generation program for LACIE 6A

Design specification for LARSYS procedure 1

Large Area Crop Inventory Experiment

[E80-10192]

[E80-10193]

[680-10194]

in a data set

[E80-10195]

[E80-10196]

[E80-10198]

[E80-10199]

[E80-10200]

[F80-10188]

[E80-10201]

[E80-10203]

[E80-10205]

[E80-10206]

[E80-10207]

whrid system.

tape report generation program [E80-10204]

multi-temporal Bayes classifier

timatory/classifier/dot selector

Design specification

ssessment system

sing system

and tracking system software [E80-10197]

for testing advanced models

system

User's guide:

p0214 N80-28789

n0214 N80-28790

p0214 N80-28791

p0214 N80-28792

p0214 N80-28793

p0214 N80-28794

p0214 N80-28795

p0214 N80-28796

o0214 N80-28797

p0214 N80-29780

p0214 N80-29781

n0214 N80-29782

p0215 N80-29783

p0215 N80-29784

p0215 N80-29785

p0215 N80-29786

for secondary error sources

As-built design specification for the CAMS image-100 hybrid system. Volume 2: Detailed flow charts and program listings [E80-10208] D0215 N80-29787 As-built specification for CCIT7 processor program

p0215 N80-29788 [E80-10209] Final design specification for modification/Fisher F-distribution thresholding LARSYS p0215 N80-29789

[E80-10210] Final design specification for EOD-LARSYS/data ansformation processor modification p0215 N80-29790 [E80-10211]

Final design specification for EOD-LARSYS procedure [E80-10213] p0215 N80-29791

Program documentation: As-built design specification for Generalized Linear Model Analysis Of Variance program GIMAOV

[E80-10214] p0215 N80-29792 Design specification for LACIE formatted dot cards in EOD-LARSYS

[E80-10215] p0215 N80-29793 As-built design specification for Soundary Detection And

Registration Program (BDARP1) [E80-10217] p0215 N80-29794 As-built design specification for the Yield Estimation Subsystem (YES) monthly yield data base and supporting

programs [EBO-10218] p0215 N80-29795 Program documentation: MARQUIS2.FTN [E80-10220] p0215

p0215 N80-29796 Operational changes for the Kansas State University

p0176 N80-29797 [E80-10223] Design specific image data files ecification for a merging program for formatted

p0216 N80-29803 [E80-10234] Project development plan for the LANDSAT Imagery Verification and Extraction System (LIVES)

p0216 N80-29807 [E80-10238] Test plan for the LANDSAT Imagery Verification and Extraction System (LIVES)

10239] p0216 N80-29808 Preliminary design specification for the LANDSAT

Imagery Verification and Extraction System (LIVES) [E80-10240] p0216 N80-3 p0216 N80-29809

As-built design specification for areas added to the monthly bases of Texas, Minnesota and USSR [E80-10241] p0216 N80-29810

As-built design specification for the India monthly data [E80-10264] p0216 N80-29811

Design specification for a list processing system [E80-10265] p0216 N80-29812

EOD systems and facilities workload requirements forecast

[E80-10277] p0176 N80-29821 As-built design specification for Boundary Detection And Registration Program (BDARP1)

[E80-10216] p0217 N80-30824 Detailed design specification for the automatic status and tracking system modifications for LACIE procedure 1 [E80-10243] p0217 N80-30826

Pretiminary user guide for the program GTDDM (Ground Truth Dot Dump)

p0217 N80-30827 [E80-10244] Design specification for color coded spectral plots

[E80-10245] p0217 N80-30828 Implementation specification for Large Area Crop Inventory Experiment (LACIE) phase 3 automatic status and tracking system

[E80-10249] p0217 N80-30832 As-built design specification for scatter plots for direct

wheat [E80-10250] p0217 N80-30833 Classification with spectral-spatial-temporal archetypes

[E80-10251] p0217 N80-30834 design specification for field As-built (FIELDSTAT) statistics

p0217 N80-30835 [E80-10252] As-built design specification for CLASY program

nodification p0217 N80-30836 [E80-10253]

Detail design specification for enhancement of the utomatic status and tracking system software 80-10254] p0217 N80-30837 [E80-10254]

Design specification for merge of BTREAD, Phase 1 and hase 2 accuracy assessment programs p0217 N80-30838 [E80-10255]

User's guide Large Area Crop Inventory Experiment (LACIE) phase 3 PDP 11/45 automatic status and tracking

[E80-10256] p0217 N80-30839 As-built design specification Patterson-Pitt-Thadani minimum loss classifier for the

p0218 N80-30845 [E80-10262] As-built design specification for phase 3 model areas

added to the monthly data base of the US p0218 N80-30846 [E80-10263] User's guide for the Yield Estimation Subsystem Data

Management System (YESDAMS) p0218 N80-30849 [E80-10276] Operator's guide for LACIE phase 3 automatic status

and tracking system [E80-10284] p0218 N80-30852

Implementation specification document for merge of BTREAD, phase 1, and phase 2 accuracy assessment programs F80-102851 p0218 N80-30853

Design specification for ERIPS fields data base deck [E80-10286] p0218_N80-30854

Draft user procedures: Software wheat yield redictions/foreign equivalent test [E80-10287] p0218 N80-30855

As-built design specification for the CMAS image-100 hybrid system. Volume 2: Detailed flow charts and program listings, part 1 [E80-10289] p0218 N80-30857

As-built design specification for the CAMS image-100 /brid system. Volume 3: Utilities and shared hybrid system. ubroutines

p0218 N80-30858

[E80-10290]

As-built design specification of the CAMS/CAS interface tape report generation program for LACIE 8 [E80-10306] p021 p0219 N80-30872

As-built specification for CLASSY conversion p0219 N80-30873 [F80-10307]

Seasat-A land applications data processing plan 80-10317] p0221 N80-32810 [E80-10317]

As-built design specification for CCIT8 processor

program [E80-10323] p0221 N80-32814 As-built design specification for a list processing

[E80-10325] p0221 N80-32816

LOCKHEED ELECTRONICS CO., INC., LAS VEGAS,

. Multispectral techniques for remote monitoring of diment in water: A feasibility investigatio [PB80-198500] p0207 N80-33849

LOCKHEED ENGINEERING AND MANAGEMENT

SERVICES CO., INC., HOUSTON, TEX. User manual for the Earth observations Division R and D to OLPARS dot data conversion [E80-10236] p0216 N80-29805

Sampling of rectangular regions [E80-10272] n0176 N80-29819

Some approaches to optimal cluster labeling of aerospace agery

[E80-10273] p0216 N80-29820 Composition and assembly of a spectral data base for

n and soybean multicrop segments [E80-10281] p0176 N80-29824

High Density Tape Reformatting System/LANDSAT magery verification and Extraction System (HDTRS/LIVES) ighput analysis thro

[E80-10248] p0217 N80-30831

The integrated analysis procedure for identification of spring small grains and barley [E80-10274] p0177 N80-30847

Statistical Outlier Detection (SOD): A computer program for detecting outliers in data [E80-10275]

p0218 N80-30848 Estimation of probabilities of label imperfections and

correction of mislabels [E80-10288] p0218 N80-30856

A labeling technology for LANDSAT imagery [E80-10293] p0219 N p0219 N80-30861

Maximal analysis labeling procedu e (preliminary) [E80-10294] p0219 N80-30862

An exploratory study to develop a cluster-based area estimation procedure [E80-10295]

p0177 N80-30863 Evaluating the use of analyst labels in maximum likelihood

cluster proportion estimation [E80-10303] p0219 N80-30870

Evaluation of Bayesian sequential proportion estimation using analyst labels [E80-10304] p0219 N80-30871

High Density Tape Reformatting System/LANDSAT Imagery Verification and Extraction System (HDTRS/LIVES) ction test throughout analysis

[E80-10319] p0221 N80-32811 As-built design specification for equiprobability ellipses epresentation of CLASSY clusters

[E80-10320] p0221 N80-32812 Operation plan for the High Density Tape/LANDSAT

Imagery Verification and Extraction System (HDT/LIVES) data processing support [E80-10322] p0221 N80-32813

Utilization of spectral-spatial information in the lassification of imagery data [E80-10321] o0222 N80-33832

LOS ALAMOS SCIENTIFIC LAB., N. MEX. Substorm warnings - An ISEE-3 real time data system

p0209 A80-46225 LOUISIANA STATE UNIV. AND A&M COLL, BATON ROUGE.

A quantitative evaluation of LANDSAT for monitoring ended sediments in a fluvial channel

o0206 N80-33823

Μ

MARTIN MARIETTA AEROSPACE, DENVER, COLO. The applicability of remote sensing to Earth biological problems. Part 2: The potential of remote sensing in pest management [NASA-CR-163589]

p0178 N80-32830 MARYLAND UNIV., COLLEGE PARK.

Fluorescence lidar p0181 A80-48908 MIAMI UNIV. CORAL GABLES FLA

Nimbus-7 coastal zone color scanner - System description and initial imagery D0197 A80-51490 Phytoplankton pigments from the N nbus 7 Coastal Zone Color Scanner - Comparisons with surface measurements p0197 A80-51491

MIAMI UNIV., FLA.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE

Investigations of medium wavelength magnetic anomalies in the eastern Pacific using Magsat data p0199 N80-33833 [E80-10334]

MINNESOTA UNIV., DULUTH. Remote sensing of particulate concentrations in wate

p0201 A80-46450 MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.

Application of remote sensing to state and regional problems [E80-10338] p0183 N80-32826

MISSOURI UNIV. -COLUMBIA.

Microwave radiometer measurements of soil moisture patent p0176 A80-53890 content

MONTANA UNIV., MISSOULA. Grizzly bear habitat analysis. Section 3: LANDSAT-1 nultispectral imagery and computer analysis of grizzly bear habitat

p0177 N80-30867 [NASA-CR-163382]

Ν

NATIONAL AERONAUTIC ASSOCIATION, WASHINGTON, D. C. NASA plan for international crustal dynamics studies [NASA-TM-82214] p0187 N80-34000 NATIONAL AERONAUTICS AND SPACE

ADMINISTRATION, WASHINGTON, D. C.

A review of future remote sensing satellite capabilities p0174 A80-49139 NASA oceanic processes program: Status report, fiscal

vear 1980 [NASA-TM-80233] o0198 N80-29005 A description of a system of programs for mathematically processing on unified series (YeS) computers photographic

Raduga experiment: Multizonal photographing the Earth from the Soyuz-22 spacecraft

ASA-TM-76234] The United States space observation policy p0228 N80-33425

Private sector involvement in civil space remote sensing. Volume 1: Report

Private sector involvement in civil space remote sensing.

The coordinated federal program for the application of

Infrared-temperature variability in a large agricultural

Ocean chlorophyll studies from a U-2 aircraft platform

Simulation of solar radiation absorption in vegetation

The Landsat-D/Global Positioning System experiment

(IAA PAPER 80-1678) p0209 A80-46522 Unsupervised classification of MSS Landsat data for

Development of a pulsed 9.5 micron lidar for regional ale O3 measurement p0181 A80-48909

ale 03 measurement point interest inter

Magsat - A new satellite to survey the earth's magnetic

The utility of Landsat-D for water-resources studies p0205 A80-51309

Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner - Comparisons with surface measurements

Remote sensing applications in hydrometeorology

Nimbus-7 coastal zone color scanner

and meteorological parameters Polar nephelometer for atmospheric

Microwave radiometric determination of

mapping spatially complex vegetation p0173 A80-47744

space technology to crustal dynamics and earthquake

ATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER,

ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

NATIONAL AERONAUTICS AND SPACE

p0220 N80-31856

n0228 N80-33845

p0228 N80-33846

o0187 N80-33999

p0178 N80-32822

p0195 A80-45004

p0173 A80-46451

p0223 A80-51233

n0202 A80-51283

- System description p0197 A80-51490

p0197 A80-51491

on of oceanographic p0223 A80-51579

D0182 A80-52346

C-3

particulate et

the Earth taken from spacecraf

[NASA-TM-76208]

[NASA-TM-76234]

[NASA-TM-76373]

[NASA-TM-82206]

research [NASA-TM-82215]

MOFFETT FIELD, CALIF.

[AIAA PAPER 80-1678]

scale O3 measurement

and initial imagery

mapping

field

field

[E80-10331]

Volume 2: Appendices [NASA-TM-82207]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B.

NASA geodetic applications of the Mark 3 VLBI n0186 N80-28841 system Remote sensing of total dry-matter accumulation in

- winter wheat p0176_N80-29804 [E80-10235]
- Use of LANDSAT data for river and lake ice engineering
- [E80-10237] p0205 N80-29806 Thematic mapper studies band correlation analysis ASA-TM-80716] p0216 N80-29825
- [NASA-TM-80716] The contribution of the diffuse light component to the
- topographic effect on remotely sensed data [NASA-TM-80728] p018 p0186 N80-30876 A hill-sliding strategy for initialization of Gaussian clusters
- in the multidimensional space [NASA-TM-80721] p0219 N80-31072
- Report on active and planned spacecraft and experime p0227 N80-31420 [NASA-TM-80905]
- Using LANDSAT digital data for estimating green p0178 N80-32819
- [E80-10328] On extracting brightness temperature maps from scanning radiometer data [NASA-TM-81989]
- p0221 N80-32838 NATIONAL AERONAUTICS AND SPACE
- ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
- AgRISTARS cropping practices and crop characteristics based on 1979 ESCS observations [E80-10292] o0177 N80-30860
- NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.
- The environmental program at Kennedy Space Center
- Baseline to monitoring p0181 A80-51935 Satellite temperature monitoring and prediction system p0211 A80-51943
- Aerial color infrared photography applications to p0175 A80-51944 citriculture

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA. Microwave radiometric aircraft observations of the

- Fabry-Perot interference fringes of an ice-water system p0195 A80-44232
- Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemometer p0196 A80-51407
- The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth
- [NASA-TM-81847] p0224 N80-28637
- Turbid water measurements of remote sensing enetration depth at visible and near-infrared wavelength [NASA-TM-81843] p0207 N80-33927
- In situ ozone data for evaluation of the laser absorption spectrometer ozone remote sensor: 1979 southeastern Virginia urban plume study summer field program [NASA-TM-81831] p0183 N80-33928 [NASA-TM-81831]
- Assessment of the role of remote sensing in the study of inland and coastal waters
- [NASA-TM-81881] p0200 N80-34048 NATIONAL AFRONAUTICS AND SPACE

ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

- Quantitative interpretation of Great Lakes remote sensin data p0201 A80-45005

- data p0201 A80-45005 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS FLIGHT CENTER, WALLOPS ISLAND, VA. Oil film thickness measurement using airborne laser-induced water Raman backscatter
- p0197 A80-52331 NATIONAL ENVIRONMENTAL SATELLITE SERVICE,
- WASHINGTON, D. C. Modulation of sea surface radar cross section by surface
- Wind speed and temperature effects Gulf Stream p0196 A80-51415
- Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490
- Phytoplankton pigments from the Nimbus-7 Coastal Zone Color Scanner Comparisons with surface measurements p0197 A80-51491
- Applications of HCMM data to soil moisture snow and estuarine current studies
- p0205 N80-29816 [E80-10269] Satellite activities of NOAA, 1979 p0220 N80-31429
- NATIONAL MARINE FISHERIES SERVICE, BAY SAINT LOUIS, MISS.
- Comparison of surface wind stress measurements -Airborne radar scatterometer versus sonic anemomete p0196 A80-51407
- NATIONAL OCEANIC AND ATMOSPHERIC
- ADMINISTRATION, MIAMI, FLA.

C-4

Synthetic aperture radar imaging of ocean waves -Comparison with wave measurements p0196 A80-51411

- NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH. Nimbus-7 coastal zone color scanner System description and initial imagery p0197 A80-51490

NATIONAL OCEANIC AND ATMOSPHERIC

- ADMINISTRATION, WASHINGTON, D. C. The coordinated federal program for the application of space technology to crustal dynamics and earthquake search
- [NASA-TM-82215] p0187 N80-33999 The Federal Plan for Meteorological Services and
- Supporting Research, fiscal year 1981 [PB80-199482] p0228 N80-34041 NATIONAL PHYSICAL RESEARCH LAB., PRETORIA
- (SOUTH AFRICA).
- Bonne's projection of Meteosat images [CSIR-SR-FIS-201] p0222 N80-33837
- NATIONAL SCIENCE FOUNDATION, WASHINGTON, D. C.
- The coordinated federal program for the application of space technology to crustal dynamics and earthquake research
- NASA-TM-82215] p0187 N80-33999 NATIONAL TECHNICAL INFORMATION SERVICE.
- SPRINGFIELD, VA.
- Remote sensing of the ocean: Physical, chemical, and geologic properties. Citations from the NTIS data base [PB80-811235] p0198 N80-30884 Remote sensing of the ocean: Dynamics. Citations from
- the NTIS data base [PB80-811243] p0199 N80-30885
- Ocean wave sensing. Citations from the NTIS data [P880-812878] p0200 N80-34053
- NAVAL RESEARCH LAB., WASHINGTON, D. C.
- Passive 19.3 GHz radiometer and aerosol data from the North Sea during MARSEN I, September October 1979 [AD-A088229] p0199 N80-33068 On the inference of oceanic currents or eddies by
- spaceborne altimetry through the dynamic method for the determination of three dimensional density (temperature) field
- [AD-A088082] p0199 N80-33076 NEBRASKA UNIV., LINCOLN.
- Identifying and locating land irrigated by center-pivot Identifying and locating level imagery irrigation systems using satellite imagery p0174 A80-49140
- NEW SOUTH WALES UNIV., SYDNEY (AUSTRALIA). Crustal deformation at very long baseline interferometry sites due to seasonal air-mass and ground water variations p0186 N80-28809
- NORTH CAROLINA UNIV. AT CHAPEL HILL The Gulf Stream Meanders experiment: Current meter,
- atmospheric, and sea level data report for the mooring period [AD-A088069] p0199 N80-33077

O

- OHIO STATE UNIV., COLUMBUS,
- Improvement of the Earth's gravity field from terrestrial nd satellite_data [E80-10271] p0186 N80-29818
- OLD DOMINION UNIV., NORFOLK, VA.
- The development of a stepped frequency microwave radiometer and its application to remote sensing of the Earth p0224 N80-30822

Ρ

- PAN AMERICAN UNIV., EDINBURG, TEX. Light reflectance, transmittance, and utilization within a
- vegetative canopy [F80-10282] p0177 N80-30851
- PHOENIX CORP., MCLEAN, VA. Improved definition of crustal anomalies for Magsat data
- [F80-10270] p0192 N80-29817 PURDUE UNIV., LAFAYETTE, IND.
- Pixel labeling by supervised probabilistic relaxation [E80-10267] p0216 N80-2 p0216 N80-29814
- Remote sensing research studies [E80-10117] p0176 N80-30823 Forest resource information system, phase 3
- [E80-10242] n0176 N80-30825 A multiprocessor implementation of a contextual image algorithm
- processing alg [E80-10313] p0221 N80-32808 A multispectral data simulation technique [E80-10311] p02
- 0221 N80-33830 A model of plant canopy polarization response ano 103361 p0179 N80-33835 [F80-10336]

R

- RAND CORP., SANTA MONICA, CALIF.
- Anomalous snowfall caused by natural-draft cooling towers [RAND/N-1479-DOE] p0206 N80-32024
- READING UNIV. (ENGLAND).
- The potential of Landsat-3 RBV images for thematic apping p0210 A80-50894 mapping

REMOTE SENSING INST., BROOKINGS, S. DAK.

CORPORATE SOURCE INDEX

HCMM energy budget data as a model input for assessing egions of high potential groundwater pollution p0206 N80-32806 [E80-10310] ROCKWELL INTERNATIONAL CORP., RICHLAND,

- WASH.
- LANDSAT data as a basis for regional environmental assessment within the Columbia Plateau [RHO-BWI-SA-43] p0183 N80-31862 [RHO-BWI-SA-43] p0183 N80-31862 ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION, FORT COLLINS, COLO.
- Remote sensing of wildland resources: A state-of-the-art eview
- p0177 N80-30882 [PB80-184609] ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
- A study of LANDSAT multispectral scanner data [RAE-TR-80018] p0220 N80-3 p0220 N80-31864 ROYAL AUSTRALIAN NAVY RESEARCH LAB.,
- EDGECLIFF. Heat capacity mapping mission project HCM-051
- [EB0-10278] p0198 N80-30850

Ocean chlorophyll studies from a U-2 aircraft platform

p0195 A80-45004

p0195 A80-45004

p0221 N80-33831

p0196 A80-51408

p0192_N80-29822

p0192 N80-30865

p0212 N80-28768

p0216 N80-29813

p0199 N80-32050

p0199 N80-33077

p0197 N80-28939

p0198 N80-28940

p0183 N80-31969

p0183 N80-31970

S

SCIENCE SYSTEMS AND APPLICATIONS, INC. LANHAM, MD.

SCRIPPS INSTITUTION OF OCEANOGRAPHY, SAN

GA.

E80-10315

[E80-10279]

[E80-10298]

of islands

STANFORD UNIV., CALIF.

lithology, northern California

processing algorithms [E80-10266]

[NASA-CR-163516]

microwave remote sensors

[AD-A088069]

of lagoonal waters

[NASA-CR-163122-VOL-3-PT-1]

Marine turtle studies

[NASA-CR-163122-VOL-4-PT-1]

and endangered forms [NASA-CR-163122-VOL-4-PT-2]

neriod

DIEGO, CALIF. Nimbus-7 coastal zone color scanner - System description

and initial imagery p0197 A80-51490 SKIDAWAY INST. OF OCEANOGRAPHY, SAVANNAH,

Ocean chlorophyll studies from a U-2 aircraft platfo

SOUTH DAKOTA STATE UNIV., BROOKINGS, Impact of cell size on inventory and mapping errors in

Radar observations of wave transformations in the vicinity

Geological and geothermal data use investigations for

Soil moisture in relation to geologic structure and

Т

TEXAS AAM UNIV., COLLEGE STATION. Nimbus-7 coastal zone color scanner - System description

Nimbus-/ Uusana and initial imagery p019/ Ab0-9----Microwave radiometer measurements of soil moisture p0176 A80-53880

Altimetry data over trenches and island-arcs and convection in the mantle

The Gulf Stream Meanders experiment: Current meter.

Development of a soil moisture model for use with passive acrowave remote sensors p0179 N80-33828

U

A continuation of base-line studies for environmentally monitoring space transportation systems at John F. Kennedy

Space Center. Volume 3, part 1: Ichthyological survey

A continuation of base-line studies for environmentally

monitoring space transportation systems at John F. Kennedy

Space Center. Volume 3, part 2: Ichthyological studies, sailfin molly reproduction study [NASA-CR-163122-VOL-3-PT-2] p0198 N80-28940

A continuation of base-line studies for environmentally

monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part

A continuation of base-line studies for environmentally monitoring Space Transportation Systems (STS) at John

F. Kennedy Space Center. Volume 4: Threatened and endangered species of the Kennedy Space Center. Part

2: Threatened and endangered birds and other threatened

UNIVERSITY OF CENTRAL FLORIDA, ORLANDO.

atmospheric, and sea level data report for the mooring

Development and evaluation of scatterometer data

TENNESSEE UNIV. SPACE INST., TULLAHOMA. Digital LANDSAT data analysis of Tennessee [E80-10130] p0212 N80-

application Explorer mission-A (heat capacity mapping

a cellular geographic information system

V

VIRGINIA DEPT. OF HIGHWAYS AND TRANSPORTATION, RICHMOND. Aerotriangulation control of large scale photography from small scale photography [PB80-161524] p0224 N80-28853

W

 WASHINGTON UNIV., ST. LOUIS, MO.

 Program on stimulating operational private sector use of Earth observation satellite data [E80-10233]

 p0227 N80-29802

 WISCONSIN UNIV. - MADISON.

 Monitoring the use of riverways with aerial photography:

 The development. testing, and evaluation of a computer assisted methodology [AD-A086471]

 P0182 N80-30877

 WORLD METEOROLOGICAL ORGANIZATION.

 GENEVA (SWITZERLAND).

 The 7th WMO Executive Committe Inter-Government Panel Session on the First GARP Global Experiment [GARP-SPEC-35]

 p0219 N80-31012

Ζ

ZENTRALSTELLE FUER GEO-PHOTOGRAMMETRIE UND FERNERKUNDUNG, MUNICH (WEST GERMANY).

ERMANY). Application Explorer Mission-A heat capacity mapping mission [E80-10309] p0219 N80-30875

ZURICH UNIV. (SWITZERLAND). Snow mapping from space platforms

p0203 A80-51293

ZURICH UNIV. (SWITZERLAND).

يرابع المراجع العاجم

э

CONTRACT NUMBER INDEX

Earth Resources/ A Continuing Bibliography (Issue 28)

JANUARY 1981

	_							
Typical Contract N	umber							N80-30831
Index Listing								N80-30847
Index Listing					N80-28770			N80-30848
				p0213	N80-28772			N80-30856 N80-30861
				p0213	N80-28773			N80-30862
					N80-28774		p0177	N80-30863
					N80-28775			N80-30870
NASW-2800	0038 N80-11532				N80-28776			N80-30871 N80-32811
					N80-28777			N80-32812
					N80-28778 N80-28779			N80-32813
					N80-28780			N80-32814
CONTRACT PAGE	ACCESSION	r i i i i i i i i i i i i i i i i i i i			N80-28781			N80-32816 N80-33832
NUMBER NUMBER	NUMBER				N80-28782	NAS9-15918		N80-32830
					N80-28783 N80-28784	NAS10-8986	p0197	N80-28939
Listings in this index are arrange	ad alobaoumeri.				N80-28785			N80-28940
					N80-28786			N80-31969 N80-31970
cally by contract number. Unde					N80-28787 N80-28788	NAS10-9348		
number, the accession numbers	denoting docu-				N80-28789		p0205	N80-30830
ments that have been produced	d as a result of				N80-28790	NAS10-9466		N80-32805
research done under that contra	ict are arranged	Ì			N80-28791	NCC5-11	00225	N80-32807
in ascending order with the A					N80-28792 N80-28793	NGL-03-002-313	p0178	N80-32821
-		}			N80-28794	NGL-15-005-112	p0173	A80-49100
numbers appearing first. The ac				p0214	N80-28795	NGL-17-004-024		
denotes the number by which	the citation is				N80-28796	NG L-24-005-263		N80-32825
identified in the abstract section	 Preceding the 			p0214	N80-28797 N80-29780	NGL-25-001-054		
accession number is the page nu	umber on which				N80-29781	NGL-28-004-020	p0174	A80-49140
the citation may be found.		3			N80-29782	NGL-33-010-171	p0227	N80-29823
		1			N80-29783	NGL-42-003-007 NGR-36-008-161		
					N80-29784 N80-29785	NOAA-03-78-801-119		A80-46095
AF PROJ. 6670 p					N80-29786	NSF DAR-78-16320		N80-32845
ARPA ORDER 3854 p				p0215	N80-29787	NSF OCE-79-06710		
BMFT-MTK-0057					N80-29788	NSG-2207		N80-32815 N80-29815
DA PROJ. 4A7-62707-A-855 p	0187 N80-31860				N80-29789 N80-29790	NSG-5315		A80-48908
DAAG29-78-G-0045					N80-29791	NSG-7220		
DAAK70-77-C-0166					N80-29792	NSG-9015		N80-30851
DACW25-79-C-0008					N80-29793	N00014-75-C-0208 N00014-75-C-0300	n0196	A80-52346 A80-51409
DE-AC01-79CS-30027 p					N80-29794 N80-29795	N00014-75-C-0356		
DE-AC02-77RL-01030					N80-29796	N00014-76-C-0757	p0198	N80-30880
DE-AC03-76EV-01191 p DE-AC06-77RL-01030 p					N80-29797	N00014-76-C-1105		
DI-14-31-0001-4085					N80-29803	N00014-77-C-0354 N00014-77-G-0047		A80-46315
DOT-FH-11-8598					N80-29807 N80-29808	OSURF PROJ. 783210		N80-29818
EPA-R-805667-01-1 p					N80-29809	PROJ. AGRISTARS	p0216	N80-29814
EPA-68-03-2153 p ESTEC-3569/78-NL-HP(SC) p					N80-29810			N80-29819 N80-29820
EY-76-C-13-1664	0192 N80-30881				N80-29811			N80-29824
F33615-77-C-1227 p	0209 A80-44297				N80-29812 N80-29821			N80-30823
JPL-954672 p MDA903-80-C-0108 p	0196 A80-51409				N80-30824			N80-30847
NAG5-94	0199 N80-32050				N80-30826	· · · · · · ·		NB0-30848 NB0-30856
NASA ORDER RD-1182 p	0199 N80-32820				N80-30827			N80-30860
NASA ORDER S-53876-G	0175 A80-53056				N80-30832 N80-30833			N80-30861
NASW-3198 p	0220 N80-31856 0225 N80-31857				N80-30834			N80-30862
	0228 N80-33425				N80-30835			N80-30863 N80-30869
NASW-3331 P					N80-30836			N80-30870
NASW-3375 p	0224 N80-29801				N80-30837 N80-30838		p0219	N80-30871
NAS5-22963 p	0197 A80-51490 0197 A80-51491			p0217	N80-30839			N80-30874
NAS5-24206 P					N80-30845			N80-32808 N80-32809
NAS5-24232 P	0192 N80-29822				N80-30846			N80-32818
NAS5-24479 P	0192 N80-30865				N80-30849 N80-30852		p0221	N80-33830
NAS5-24480					N80-30853			N80-33832
NAS5-25882	0224 A80-53891			p0218	N80-30855	PROJ. TELLUS		N80-32823 N80-32824
F	x0198 N80-29637				N80-30857	W05270500		
NAS7-100					N80-30858 N80-30872	146-20-10-07	p0183	N80-33928
	0223 A80-47480 0189 A80-49524				N80-30873	146-40-01-01		
, F	0196 A80-51408			p0221	N80-32810	506-61-63-01		N80-34048 N80-28637
	0196 A80-51409					691-04-20	p0178	N80-32822
	0196 A80-51415 0186 N80-28838		······			691-09-02-01	p0207	N80-33927
	0186 N80-28838			p0176	N80-30823			
	0192 N80-29798				N80-32808			
	0192 N80-29800				N80-33830			
	0182 N80-30868 0199 N80-32829	NAS9-15476						
NAS8-33218 P					N80-32809			
NAS9-12200 p	0217 N80-30828	NAS9-15800						
F	0218 N80-30854				N80-29819 N80-29820			
NAS9-13904	0176 A80-53890				N80-29820 N80-29824	}		
NAS9-14565	20170 H00-32010	•		p0170		•		

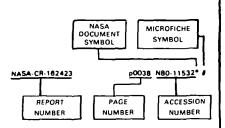
REPORT/ACCESSION NUMBER INDEX

Earth Resources/ A Continuing Bibliography (Issue 28)

JANUARY 1981

Typical Report/Accession Number

Index Listing



Listings in this index are arranged alphanumerically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-8283	p0178	N80-32822* #
AD-A084757	p0206	N80-33064 #
AD-A085163	p0214	N80-28851 #
AD-A085512	p0198	N80-30880 #
AD-A086070	p0218	N80-29828 #
AD-A086471	p0182	N80-30877 #
AD-A087032	p0198	N80-30618 #
AD-A087370	p0187	N80-31860 #
AD-A087443	p0220	N80-31859 #
AD-A087518	p0222	N80-33848 🗍
AD-A087584	p0206	N80-31973 #
AD-A088069	p0199	N80-33077 #
AD-A088082	p0199	N80-33076 #
AD-A088229	p0199	N80-33068 #
AD-A089061	p0222	N80-33847 #
AFGL-ERP-681	p0206	N80-33064 ∦
AFGL-TR-79-0255	p0206	N8D-33064 #
AIAA PAPER 80-1678	p0209	A80-46522* #
AR-LO-00425	p0219	N80-30861* #
AR-10-00407	p0176	N80-29824* #
BM-RI-8413	p0193	N80-32844 👭
BMFT-FB-W-79-18	p0224	N80-29407 #
BR73767	p0220	N80-31864 #
CISE-N-190	p0225	N80-31863 #
COM-73-11676		N80-30884 # N80-30885 #
CONF-800577-1	p0183	N80-31862 #
CONTRIB-215	p0206	N80-31867 #
CRINC/RSL-TR-331-14	p0198	N80-30618 #
CSIR-SR-FIS-201	pO222	N80-33837 #
D-254	p0225	N80-31857* #
DFVLR-FB-80-03	p0220	N80-31865 🛔
DGLR PAPER 80-051	p0227	A80-46300 #
EPA-600/4-80-019	p0207	N80-33849 🛔
ERIM-132400-39-P ERIM-132400-41-T		N80-30874* # N80-32809* #

ESA-CR(P)-1343	. p0220 N80-31865	E80-10260	p0177 N80-30843*
	•	E80-10261	
ESL-PR-339 ETL-0221	. p0216 N80-29828 /	E80-10262	
ETL-0231	. p0222 N80-33848 🛔 . p0187 N80-31860 🛔	E80-10263	p0218 N80-30846*
ETL-0232	p0220 N80-31859 🖁	E80-10264	p0216 N80-29811*
E80-10117	. p0176 N80-30823* #	E80-10265	
E80-10130	. p0212 N80-28768* 🕯	E80-10266	
E80-10169	p0212 N80-28769* # p0212 N80-28769* #	E80-10267 E80-10268	
E80-10170	. p0212 N80-28771* 🕯	E80-10269	p0205 N80-29816*
E80-10171	. p0213 N80-28772* 🕯	E80-10270	p0192 N80-29817*
E80-10172	. p0213 N80-28773*#	E80-10271	p0186 N80-29818*
E80-10174	p0213 N80-28775* #	E80-10272	
E80-10175	. p0213 N80-28776* #	E80-10274	p0177 N80-30847*
E80-10177	p0213 N80-28778*	E80-10275	p0218 N80-30848*
E80-10178	p0213 N80-28779* #	E80-10276 E80-10277	
E80-10179 E80-10180	p0213 N80-28780* # p0213 N80-28781* #	E80-10278	p0198 N80-30850*
E80-10181	p0213 N80-28782* 🖁	E80-10279 E80-10280	p0192 N80-29822*
E80-10182 E80-10183	p0213 N80-28783*	E80-10281	p0176 N80-29824*
E80-10184		E80-10282	p0177 N80-30851*
E80-10186	p0213 N80-28786* #	E80-10284	p0218 N80-30852*
E80-10187 E80-10188	p0213 N80-28787*	E80-10286	p0218 N80-30854*
E80-10190	p0214 N80-28788* #	E80-10287	p0218 N80-30855*
E80-10192	p0214 N80-28789* 🖁	E80-10288	p0216 N80-30856* p0218 N80-30857*
E80-10193 E80-10194		E80-10290	p0218 N80-30858*
80-10195	p0214 N80-28792* #	E80-10292 E80-10293	p0177 N80-30860*
E80-10196	p0214 N80-28793* #	E80-10293	
E80-10197		E80-10295	p0177 N80-30863*
E80-10199	p0214 N80-28796* #	E80-10296 E80-10297	p0177 N80-32805*
E80-10200		E80-10298	p0192 N80-30865*
80-10201	p0214 N80-29781* #	E80-10299	
80-10204	p0215 N80-29783* #	E80-10300	
80-10205 80-10206	p0215 N80-29784* #	E80-10302	p0177 N80-30869*
80-10207	0215 N80-29786* #	E80-10303	p0219 N80-30870*
80-10208	p0215 N80-29787* #	E80-10304 E80-10306	p0219 N80-30871* p0219 N80-30872*
80-10209 80-10210	p0215 N80-29788 #	E80-10307	p0219 N80-30873*
80-10211	p0215 N80-29790* #	E80-10308	
80-10213	p0215 N80-29791* #	E80-10310	p0206 N80-32806*
80-10215	p0215 N80-29792* #	E80-10311	p0221 N80-33830*
80-10216	p0217 N80-30824* #	E80-10312 E80-10313	p0225 N80-32807*
80-10217 80-10218	p0215 N80-29794* #	E80-10314	
80-10220	p0215 N80-29796* #	E80-10315	p0221 N80-33831*
80-10223		E80-10315 E80-10317 E80-10319	p0221 N80-32810
80-10228	p01/9 N80-33829* # p0192 N80-29798* #	E80-10320	pU221 N80-32812*;
80-10230	pO192 N80-29799* #	E80-10321 E80-10322	p0222 N80-33832*
80-10231	p0192 N80-29800* #	E80-10323	p0221 N80-32814*
80-10232 80-10233	p0227 N80-29802* #	E80-10324	p0178 N80-32815*
80-10234	p0216 N80-29803* #	E80-10325 E80-10326	p0221 N80-32816* : p0183 N80-32817*
80-10235 80-10236	p0176 N80-29804* #	E80-10327	p0178 N80-32818*
80-10237	p0205 N80-29806* #	E80-10328 E80-10329	p0178 N80-32819*
80-10238	p0216 N80-29807* #	E80-10330	p0178 N80-32821*
80-10239	p0216 N80-29808 #	E80-10331	p0178 N80-32822*
80-10241	p0216 N80-29810* #	E80-10332	p0178 N80-32823*
80-10242 80-10243	p0176 N80-30825* #	E80-10334	p0199 N80-33833*
80-10244	p0217 N80-30827* #	E80-10335	p0207 N80-33834*
80-10245	p0217 N80-30828* #	E80-10336	
80-10246 80-10247	p0205 N80-30829* #	E80-10338	p0183 N80-32826*
80-10248	p0217 N80-30831* #	FC-LO-00700	-0310 890 300434
80-10249	p0217 N80-30832* #		poz 17 nov-30802*
80-10250	puz17 N80-30833* #	FC-LO-451	
80-10252	D0217 NR0-30834" #	FC-L0-00432	p0218 N80-30848*
80-10253	p0217 N80-30836* #	FCM-80-3	p0228 N80-34041
80-10254	p0217 N80-30837* #		
80-10255	p0217 N80-30838* #	FHWA/VA-79/1	
80-10256		FR-2-PT-2	p0178 N80-32830*
	pv∠ia NaU-3U840" #	1	
80-10258	00176 N80.30841* #	FSGTR-RM-71	0177 NPC 20003

REPORT/ACCESSION NUMBER INDEX

		,			
GARP-SPEC-35	00219 N80-31012 #	JSC-14546	n0217 N80-30833* #	160-12691	-0217 NOO 20024# #
GARF-3FEC-35	p0213 100-31012 #	JSC-14554		LEC-12691 LEC-12696	
GJBX-9(80)-VOL-2	p0192 N80-30881 #			LEC-12743	
		JSC-14556		LEC-12804	
GPO-45-048	p0228 N80-34294 #	JSC-14577		LEC-12822	n0217 N80-30833* #
GPO-52-581		JSC-14578	p0216 N80-29808* #	LEC-12833	p0217 N80-30838* #
		JSC-14579	p0216 N80-29807* #	LEC-12838	p0216 N80-29809* #
INPE-1635-RPE/094	p0176 N80-30841* #	JSC-14594	p0214 N80-28792* #	LEC-12856	p0216 N80-29807* #
INPE-1668-NTE/157		JSC-14607	p0218 N80-30855* #	LEC-12857	p0216 N80-29808* #
INPE-1689-TDL/021		JSC-14663		LEC-12910	p0214 N80-28792* #
INPE-1713-TDL/023		JSC-14704		LEC-12975	p0218 N80-30855* #
INPE-1734-RPE/134	p0218 N80-30840* #	JSC-16335		LEC-13076	p0221 N80-32816* #
INPE-1767-TDL/028	p0179 N80-33839 #	JSC-16341		LEC-13077	p0221 N80-32814* #
INPE-1768-RPE/154	p0222 N80-33840 👭	JSC-16346	n0718 N80-30848* #		
INPE-1784-RPE/156	p0221 N80-32832 #	JSC-16353	p0177 N80-30860* #	LEMSCO-14250	p0176 N80-29824* #
INPE-1790-RPE/162	p0179 N80-32835 #	JSC-16355	p0216 N80-29820* #	LEMSCO-14310	p0222 N80-33832* #
INPE-1792-RPE/164		JSC-16358	p0177 N80-30863* #	LEMSCO-14355	
INPE-1793-RPE/165		JSC-16360	p0177 N80-30847* #	LEMSCO-14356	
INPE-1794-RPE/166		JSC-16361	p0219 N80-30871* #	LEMSCO-14357	p0219 N80-30861*#
INPE-1820-RPE/186	p0221 N80-33647 #	JSC-16362	p0176 N80-29819* #	LEMSCO-14385	
INPE-1823-RPE/189	p0193 N80-33843 #	JSC-16399	p0219 N80-30862*#	LEMSCO-14548	p0217 N80-30831* #
INPE-1838-RPE/199	DU193 N80-33842 #	JSC-16538	p0219 N80-30870*#	LEMSCO-14594	p0218 N80-30848* #
INPE-1841-RPE/201	-0200 NB0-33844 #	JSC-16665		LEMSCO-14597 LEMSCO-14670	-0122 NO0 200024 //
INPE-1849-RPE/206 INPE-1859-RPE/210	0180 NB0 32834 #	JSC-16703		LEMSCO-14670	-0110 NB0-30863* #
INFE-1855-NFE/210	p0180 1080-33841 #	JSC-16718	pO221 N80-32811* #	LEMSCO-14872	0176 N80-30870 #
INTERNAL-TM-3/80	-0108 NEO 20850* #	JSC-16967	pO217 N80-30831*#	LEMSCO-14848	
111E1114E 111-3/00	porso (100-30030 #			LEMSCO-15019	p0221 N80-32812* #
ISBN-0-7988-1656-2	00222 N80.33837 #	KSC-TR-51-2-VOL-3-PT-1		LEMSCO-15039	D0221 N80-32811* #
	, , , , , , , , , , , , , , , , , , ,	KSC-TR-51-2-VOL-3-PT-2			
JPL-PUB-79-113	p0182 N80-30868* #	KSC-TR-51-3 KSC-TR-51-3-SUMM		LEX-12085	p0215 N80-29792* #
JPL-PUB-80-38-VOL-2		Nac-18-91-3-30MIM	pozos (180-30830" #		
JPL-PUB-80-40		LARS-CR-041880	00176 NR0-30925* #	MCR-80-610-PT-2	p0178 N80-32830* #
			perro 100-00020 #		
JSC-11401-REV-A		LARS-TR-070980	p0221 N80-33830* #	NASA-CR-154634	
JSC-11838			· · · · · · · · · · · · · · · · · · ·	NASA-CR-154634-SUMM	
JSC-11848-REV-A		LARS-022580	p0216 N80-29814*#	NASA-CR-154635	
JSC-11851		LARS-070180	p0221 N80-32808* #	NASA-CR-156869	
JSC-11864		LARS-120279		NASA-CR-160032	p0225 N80-33047* #
JSC-11882				NASA-CR-160551	
JSC-12504-REV-4		LEC-3984-REV-4	p0214 N80-29780* #	NASA-CR-160577 NASA-CR-160593	-0210 NB0-29613 #
JSC-12535-REV-A		LEC-8675-REV-A	p0217 N80-30832* #	NASA-CR-160595	
JSC-12537		LEC-9882	p0215 N80-29783* #	NASA-CR-160597	
JSC-12560		LEC-9888		NASA-CR-160598	
JSC-12574		LEC-9924		NASA-CR-160599	
JSC-12582		LEC-9925-REV-A		NASA-CR-160617	
JSC-12602		LEC-9963	0215 N80-29789* #	NASA-CR-160618	p0217 N80-30832* #
JSC-12655		LEC-9978	D0214 N80-28750 #	NASA-CR-160619	p0215 N80-29783*#
JSC-12656	p0213 N80-28779* #	LEC-10034		NASA-CR-160620	p0214 N80-29781*#
JSC-12708		LEC-10148		NASA-CR-160621	
JSC-12709		LEC-10148-REV-A		NASA-CR-160622	p0215 N80-29796*#
JSC-12729		LEC-10253		NASA-CR-160623	
JSC-12742		LEC-10353	p0216 N80-29810* #	NASA-CR-160624	
JSC-12743-REV-A		LEC-10354	p0218 N80-30846* #	NASA-CR-160625	
JSC-12881		LEC-10417		NASA-CR-160626 NASA-CR-160627	-0213 NB0-28775* #
JSC-12885 JSC-12891-REV-A		LEC-10419-REV-A	p0213 N80-28776* #	NASA-CR-160628	
JSC-12892		LEC-10481	p0213 N80-28782* #	NASA-CR-160629	
JSC-12917		LEC-10522		NASA-CR-160630	
JSC-12941		LEC-10529		NASA-CR-160631	
JSC-12946		LEC-10532		NASA-CR-160632	
JSC-12950		LEC-10572-REV-A LEC-10573		NASA-CR-160633	
JSC-12958		LEC-10662		NASA-CR-160634	p0217 N80-30837* #
JSC-12963	p0213 N80-28786* #	LEC-10002	p0213 N80-28787* #	NASA-CR-160635	p0215 N80-29791*#
JSC-13030-VOL-1	p0215 N80-29786* #	LEC-10743		NASA-CR-160636	p0215 N80-29784* #
JSC-13030-VOL-2-PT-1	p0218 N80-30857*#	LEC-10775		NASA-CR-160637	
JSC-13030-VOL-2-PT-2		LEC-10790		NASA-CR-160638	
JSC-13030-VOL-3		LEC-10800	p0213 N80-28786* 🗍	NASA-CR-160639	
JSC-13036		LEC-10822-VOL-1	p0215 N80-29786* #	NASA-CR-160640	
JSC-13055		LEC-10822-VOL-2-PT-1	p0218 N80-30857*#	NASA-CR-160641	
JSC-13064		LEC-10822-VOL-2-PT-2	p0215 N80-29787* #	NASA-CR-160642	
JSC-13110 JSC-13142	0214 NOU-28/88* #	LEC-10822-VOL-3	p0218 N80-30858* #	NASA-CR-160643 NASA-CR-160644	
JSC-13142		LEC-10960	pU213 N80-28780* #	NASA-CR-160644	
JSC-13144		LEC-10969	p0213 N80-28779♥ #	NASA-CR-160646	
JSC-13145		LEC-11074	0215 NBU-29794* #	NASA-CR-160647	
JSC-13665		LEC-11092		NASA-CR-160648	
JSC-13666-REV-A	p0214 N80-28797* #	LEC-11110		NASA-CR-160649	
JSC-13723	p0176 N80-29824* #	LEC-11292		NASA-CR-160650	p0212 N80-28770*#
JSC-13789	p0217 N80-30837* #	LEC-11292	p0213 NR0 28775*	NASA-CR-160651	p0217 N80-30824*#
JSC-13813	p0176 N80-29797* #	LEC-11298		NASA-CR-160664	p0217 N80-30831*#
JSC-13817	p0215 N80-29791* #	LEC-11357		NASA-CR-160665	
JSC-13822	p0213 N80-28785* #	LEC-11358-REV-A		NASA-CR-160666	p0216 N80-29805* #
JSC-13823	p0215 N80-29784* #	LEC-11393	p0176 N80-29797* #	NASA-CR-160667	
JSC-13824	p0215 N80-29785* #	LEC-11512	p0217 N80-30837* #	NASA-CR-160669	
JSC-13837	0210 N80-29793* #	LEC-11618	p0215 N80-29791* #	NASA-CR-160670 NASA-CR-160671	DOLID NOU-JU852"#
JSC-13894 JSC-13917	n0214 N80 20792* #	LEC-11676		NASA-CR-160671	n0213 N80-28776* 4
JSC-13917		LEC-11677		NASA-CR-160672	p0213 NB0-28782* 4
JSC-13945		LEC-11678		NASA-CR-160674	p0217 N80-30826* #
JSC-13966	p0217 N80-30824* #	LEC-11703		NASA-CR-160675	p0214 N80-28795* #
JSC-13972		LEC-11882		NASA-CR-160676	p0214 N80-28789* #
JSC-13985		LEC-12022		NASA-CR-160677	p0213 N80-28773*#
JSC-13986		LEC-12030	n0217 N80-20274* #	NASA-CR-160678	p0215 N80-29790*#
JSC-14238				NASA-CR-160679	p0213 N80-28787* #
JSC-14246	p0218 N80-30845* #	LEC-12154		NASA-CR-160680	p0212 N80-28771* 🖡
JSC-14277		LEC-12184		NASA-CR-160681	
JSC-14289		LEC-12185		NASA-CR-160682	
JSC-14269		LEC-12285	p0218 N80-30845* #	NASA-CR-160683	
JSC-14368		LEC-12303	p0212 N80 28769* #	NASA-CR-160683	
		LEC-12348	p0218 N80-30853*#		
JSC-14456		LEC-12373	p0216 N80-29803*#	NASA-CR-160685	
JSC-14457				NASA-CR-160686	UUZ 17 NOU-30833" #
100 11175		LEC-12376	p0213 N80-28783* #		
JSC-14475	p0219 N80-30873* #	LEC-12518	p0215 N80-29788* #	NASA-CR-160687	p0218 N80-30855* 🖁
JSC-14475 JSC-14487	p0219 N80-30873* #	LEC-12376 LEC-12518 LEC-12636	p0215 N80-29788* #		p0218 N80-30855* 🖁

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REPORT/ACCESSION NUMBER INDEX

NASA-CR-160690	p0216	N80-29820* #	NASA-TM-81843
NASA-CR-160697	p0216	N80-29814* #	NASA-TM-81847
NASA-CR-160698	p0219	N80-30874* #	NASA-TM-81881
NASA-CR-160704	p0218	N80-30856* #	NASA-TM-81989 NASA-TM-82206
NASA-CR-160706	p0217	N80-30828* #	NASA-TM-82206
NASA-CR-160707			NASA-TM-82214
NASA-CR-160708		N80-29821* #	NASA-TM-82215
NASA-CR-160709		N80-30857* #	
NASA-CR-160710		N80-30849* #	NOAA-80051901
NASA-CR-160711	p0217	N80-30836* 🗍	NO1 NO 4220
NASA-CR-160712		N80-30845* #	NRL-MR-4273 NRL-MR-4285
NASA-CR-160713	p0218	N80-30853* #	MAC-MIN-9200
NASA-CR-160714 NASA-CR-160715	p0216 p0217	N80-29803* # N80-30827* #	NSF/RA-800041
NASA-CR-160716	p0217		· ·
NASA-CR-160717	p0216	N80-29812* #	NSSDC/WDC-A-R/S
NASA-CR-160718	p0217	N80-30838* #	NTIC/DC 70/0500
NASA-CR-160719	p0216	N80-29809* #	NTIS/PS-78/0560 NTIS/PS-78/0563
NASA-CR-160720	p0216	N80-29807* #	NTIS/PS-78/0564
NASA-CR-160721 NASA-CR-160722	p0216 p0217	N80-29808* # N80-30839* #	NTIS/PS-79/0585
NASA-CR-160725	p0176		NTIS/PS-79/0586
NASA-CR-160726	p0176	N80-29824* #	NTIS/PS-79/0663 .
NASA-CR-160727	p0177	N80-30847* #	OWNET B 038 KANKS
NASA-CR-160728		N80-30848* #	OWRT-B-036-KAN(1
NASA-CR-160729	p0177	N80-30863* #	PB80-161524
NASA-CR-160730 NASA-CR-160733	p0176 p0178		PB80-169295
NASA-CR-160735	p0221	N80-32811* #	PB80-176951
NASA-CR-160736		N80-32813* #	PB80-182801
NASA-CR-160737	p0222	N80-33832* #	PB80-184609
NASA-CR-160738	p0221	N80-32814* #	PB80-189665 PB80-193881
NASA-CR-160739		N80-32816* # N80-32812* #	PB80-198500
NASA-CR-160740 NASA-CR-160749		N80-30869* #	PB80-199482
NASA-CR-160750		N80-30872* #	PB80-811235
NASA-CR-160751	p0219	N80-30873* #	PB80-811243
NASA-CR-160753	p0219	N80-30871* #	PB80-812878
NASA-CR-160754	p0219	N80-30870* #	PR-2
NASA-CR-160762 NASA-CR-161424	p0178 p0212		PR-3
NASA-CR-163122-VOL-3-PT-1	p0197	N80-28939* #	PR-336
NASA-CR-163122-VOL-3-PT-2	p0198	N80-28940* #	
NASA-CR-163122-VOL-4-PT-1	p0183		QR-3
NASA-CR-163122-VOL-4-PT-2 NASA-CR-163334	p0183 p0192		RAE-SPACE-574
NASA-CR-163335			
NASA-CR-163336		N80-29800* #	RAE-TR-80018
NASA-CR-163337		N80-29801* #	RAND/N-1479-DOE
NASA-CR-163338 NASA-CR-163340		N80-29802* # N80-29815* #	
NASA-CR-163341			RC-00221
NASA-CR-163342		N80-29817* #	DCDT 2 15/DC1
NASA-CR-163343		N80-29818* #	REPT-2-15/DF1 REPT-80F4508
NASA-CR-163344 NASA-CR-163345		N80-30850* # N80-29822* #	NET 1-001 4000
NASA-CR-163346		N80-29823* #	RHO-BWI-C-68
NASA-CR-163347		N80-30851* #	
NASA-CR-163350		N80-32806* #	RHO-BWI-SA-43
NASA-CR-163351 NASA-CR-163352		N80-30864* # N80-30865* #	RSC-3337
NASA-CR-163353		N80-30866* #	
NASA-CR-163355		N80-30868* #	SAPR-12
NASA-CR-163363		N80-28847* # N80-30841* #	SASR-1
NASA-CR-163365 NASA-CR-163366	p0176 p0218	N80-30841*# N80-30842*#	
NASA-CR-163367	p0177	N80-30843* #	SATR-1
NASA-CR-163368	p0177	N80-30844* #	SDSU-RSI-79-03
NASA-CR-163369	p0218	N80-30840* #	SDSU-RSI-79-03 SDSU-RSI-80-07
NASA-CR-163378 NASA-CR-163379	p0219 p0221	N80-30875* # N80-33830* #	
NASA-CR-163382	00177	N80-30867* #	SM-MO-00462
NASA-CR-163401	p0225	N80-32807* #	· · · · ·
NASA-CR-163401 NASA-CR-163402 NASA-CR-163403	p0221	N80-32808* #	SOLAR/0010-80/02
NASA-CR-163403	p0221	N80-33831* #	SR-89-00434
NASA-CR-163405	D0183	N80-32817* #	
NASA-CR-163412	p0199	N80-33833* #	SR-EO-00459
NASA-CR-163415	p0199	N80-32820* #	SR-JO-00438
NASA-CR-163416	p0178	NBO-32821* #	311-30-00438
NASA-CR-163417	p0183	NBU-32825" #	SR-LO-00419
NASA-CR-163444	p0179	N80-33835*	SR-LO-00427 SR-LO-00442
NASA-CR-163516	p0199	N80-32050* 🗿	SR-LO-00442
NASA-CR-163539	p0178	N80-32823* #	SR-LO-00453 SR-LO-00456
NASA-CR-163540	p0178	N80-32824* #	311 20 00430
NASA-CR-163541	D0179	N80-33829* #	SR-L000440
NASA-CR-163571	p0199	N80-32829* #	SR-L000460
NASA-CR-163403 NASA-CR-163404 NASA-CR-163405 NASA-CR-163405 NASA-CR-163412 NASA-CR-163415 NASA-CR-163416 NASA-CR-163418 NASA-CR-163418 NASA-CR-163418 NASA-CR-163541 NASA-CR-163539 NASA-CR-163541 NASA-CR-163541 NASA-CR-163543 NASA-CR-163543 NASA-CR-163543	p0178	N80-32830* #	SR-PO-00454
NACA TH 20000	-0300	NOO 210508 F	SR-PO-00454
NASA-IM-76208	p0220 p0225	N80-31855*#	SR-PO-00474
NASA-TM-76373	p0228	N80-33425* #	
NASA-TM-80233	p0198	N80-29005* #	SR-P9-00414
NASA-TM-80631	p0176	N80-29804* #	SSL-SER-20-ISSUE-
NASA-1M-80586	p0205	N80-29806* #	SSL-SER-20-ISSUE-
NASA-TM-80710	p0219	N80-31072* #	SSL-SER-21-ISSUE-
NASA-TM-80727	p0178	N80-32819* #	000 000 000000
NASA-TM-80728	p0186	N80-30876* 🛔	TAMU-REF-80-7-T
NASA-TM-76208 NASA-TM-76234 NASA-TM-76373 NASA-TM-80233 NASA-TM-80631 NASA-TM-80686 NASA-TM-80766 NASA-TM-80721 NASA-TM-80721 NASA-TM-80728 NASA-TM-80728 NASA-TM-80905 NASA-TM-80105	p0227	N80-31420* #	
NASA-TM-81105 NASA-TM-81222			TR-2
NASA-TM-81222	p0183	N80-33928* #	

TM-81843 pc TM-81847 pc TM-81847 pc TM-81847 pc TM-81847 pc TM-818481 pc TM-81899 pc TM-82206 pc TM-82214 pc TM-82215 pc 880051901 pc R-4285 pc C/WDC-A-R/S-80-06 pc PS-78/0563 pc PS-78/0563 pc PS-78/0563 pc PS-79/0663 pc PS-78/0788 pc PS-78/0788 pc PS-78/0788 pc PS-78/0788 pc PS-78/0788 pc PS-78/0788	2226 0187 0228 0199 0199 0199 0199 0199 0199 0227 0200 0198 0199 0220 0200 02206 02224 0192 02006 02224 0192 02006 02224	N80-34000* N80-33099* N80-34041 N80-33076 N80-32845 N80-32845 N80-34053 N80-34053 N80-30885 N80-30885 N80-30885 N80-30885 N80-31867 N80-28853	n#####################################	TR-51-2-VOL-4 USGS/WRD/W USGS/WRI-79 WES-TR-EL-80 W80-05010
Immediate pc TM-82214 pc TM-82215 pc 80051901 pc IR-42215 pc IR-4285 pc C/WDC-A-R/S-80-06 pc PS-78/0560 pc PS-78/0563 pc PS-78/0564 pc PS-79/0585 pc PS-7	2226 0187 0228 0199 0199 0199 0199 0199 0199 0227 0200 0198 0199 0220 0200 02206 02224 0192 02006 02224 0192 02006 02224	N80-34000* N80-33099* N80-34041 N80-33076 N80-32845 N80-32845 N80-34053 N80-34053 N80-30885 N80-30885 N80-30885 N80-30885 N80-31867 N80-28853	医根苯 择 并帮 并 并并并并并并	USGS/WRI-79 WES-TR-EL-80
Immediate pc TM-82214 pc TM-82215 pc 80051901 pc IR-42215 pc IR-4285 pc C/WDC-A-R/S-80-06 pc PS-78/0560 pc PS-78/0563 pc PS-78/0564 pc PS-79/0585 pc PS-7	2226 0187 0228 0199 0199 0199 0199 0199 0199 0227 0200 0198 0199 0220 0200 02206 02224 0192 02006 02224 0192 02006 02224	N80-34000* N80-33099* N80-34041 N80-33076 N80-32845 N80-32845 N80-34053 N80-34053 N80-30885 N80-30885 N80-30885 N80-30885 N80-31867 N80-28853	医根苯二羟基苯基基苯基基苯基	WES-TR-EL-80
Immediate pc TM-82214 pc TM-82215 pc 80051901 pc IR-42215 pc IR-4285 pc C/WDC-A-R/S-80-06 pc PS-78/0560 pc PS-78/0563 pc PS-78/0564 pc PS-79/0585 pc PS-7	2226 0187 0228 0199 0199 0199 0199 0199 0199 0227 0200 0198 0199 0220 0200 02206 02224 0192 02006 02224 0192 02006 02224	N80-34000* N80-33099* N80-34041 N80-33076 N80-32845 N80-32845 N80-34053 N80-34053 N80-30885 N80-30885 N80-30885 N80-30885 N80-31867 N80-28853	医根苯二羟基苯基基苯基基苯基	WES-TR-EL-80
IM-82213 pL -80051901 pC -80051901 pC IR-4273 pC IR-4285 pC IR-4285 pC C/WDC-A-R/S-80-06 pC PS-78/0563 pC PS-78/0563 pC PS-79/0585 pC PS-79/0585 pC PS-79/0585 pC PS-79/0603 pC 161524 pC 189295 pC 176951 pC 193881 pC 5 pC 5 pC 5 pC 5 pC 5 pC 65 pC 70 pC 5 pC 70 pC 717355 pC 76 <td>02228 0199 0199 0193 02227 0200 0198 0199 0200 0206 0224 0192 0206 0226 0206 0226 0192 0206 0206 0206 0207 0193</td> <td>NB0-33959 NB0-33076 NB0-33076 NB0-33068 NB0-32845 NB0-31420* NB0-34053 NB0-30885 NB0-30885 NB0-30885 NB0-30885 NB0-31867 NB0-28853</td> <td>* # ## # # #######</td> <td></td>	02228 0199 0199 0193 02227 0200 0198 0199 0200 0206 0224 0192 0206 0226 0206 0226 0192 0206 0206 0206 0207 0193	NB0-33959 NB0-33076 NB0-33076 NB0-33068 NB0-32845 NB0-31420* NB0-34053 NB0-30885 NB0-30885 NB0-30885 NB0-30885 NB0-31867 NB0-28853	* # ## # # #######	
IR-4273 pc IR-4285 pc IR-4285 pc IR-4285 pc IA-800041 pc C/WDC-A-R/S-80-06 pc PS:78/0560 pc PS:78/0563 pc PS:79/0585 pc PS:79/0586 pc PS:79/0585 pc PS:79/0663 pc I61524 pc I62801 pc I82801 pc I83865 pc P3:78/0565 pc P3:78/0566 pc P4:00 pc I82801 pc I82801 pc P3:81243 pc B1243 pc	0199 0193 0227 0200 0198 0199 0198 0199 0200 0226 0224 0192 0206 0224 0192 0206 0177 0193	N80-33076 N80-32845 N80-31420* N80-34053 N80-30884 N80-30885 N80-30885 N80-30885 N80-30885 N80-30885 N80-31867 N80-28853	萨普 带 带 带带带带带	W80-05010
IR-4285 pC IA-800041 pC C/WDC-A-R/S-80-06 pC PS-78/0563 pC PS-78/0563 pC PS-78/0563 pC PS-78/0563 pC PS-79/0585 pC PS-79/0683 pC PS-79/0683 pC PS-79/0683 pC PS-79/0683 pC I81524 pC I80905 pC I818260 pC P3888 pC B1243 pC B1243 pC B12478 pC PACE-574 pC PACE-574 pC IN-1479-DOE pC 221 pC WI-C-68 pC WI-SA-43 pC	0199 0193 0227 0200 0198 0199 0198 0199 0198 0199 0200 0206 0224 0192 0206 0224 0192 0206 0206 0224	NB0-33068 NB0-32845 NB0-31420* NB0-34053 NB0-30885 NB0-30885 NB0-34053 NB0-31867 NB0-28853	# # # ######	
C/WDC-A-R/S-80-06	0227 0200 0198 0199 0198 0199 0200 0206 0224 0192 0205 0206 0177 0193	N80-31420* N80-34053 N80-30884 N80-30885 N80-30885 N80-30885 N80-30885 N80-34053 N80-31867 N80-28853		
PS-78/0560 pc PS-78/0563 pc PS-78/0563 pc PS-78/0585 pc PS-79/0586 pc PS-79/0586 pc PS-79/0663 pc	0200 0198 0199 0198 0199 0200 0206 0224 0192 0205 0206 0177 0193	N80-34053 N80-30884 N80-30885 N80-30885 N80-30885 N80-34053 N80-31867 N80-28853	₩₩₩₩₩₩	
PS-78/0563 pc PS-78/0564 pc PS-78/0585 pc PS-79/0686 pc PS-79/0683 pc PS-79/0683 pc I61524 pc I62295 pc I82801 pc I82801 pc I84609 pc I89665 pc I93881 pc I93882 pc I83605 pc I93883 pc I1235 pc B12478 pc B12878 pc S12878 <	0198 0199 0198 0199 0200 0206 0224 0192 0205 0206 0177 0193	N80-30884 N80-30885 N80-30885 N80-30885 N80-34053 N80-31867 N80-28853	***	
PS-78/0564 pc PS-79/0585 pc PS-79/0585 pc PS-79/0585 pc PS-79/0585 pc PS-79/0586 pc PS-79/0583 pc 161524 pc 161524 pc 176951 pc 182801 pc 193881 pc 193881 pc 193882 pc 193883 pc 811243 pc 812878 pc PACE-574 pc R-80018 pc /N-1479-DOE pc 221 pc WI-C-68 pc WI-SA-43 pc	0199 0198 0199 0200 0206 0224 0192 0205 0206 0177 0193	N80-30885 N80-30884 N80-30885 N80-34053 N80-31867 N80-28853	***	
PS-79/0585 pc PS-79/0586 pc PS-79/0563 pc PS-79/0663 pc PS-79/0663 pc 161524 pc 161524 pc 169295 pc 176951 pc 182801 pc 182801 pc 184609 pc 193881 pc 193850 pc 193850 pc 193850 pc 193850 pc 193850 pc 193850 pc 193850 pc 5 pc	0198 0199 0200 0206 0224 0192 0205 0206 0177 0193	N80-30884 N80-30885 N80-34053 N80-31867 N80-28853	Ħ	1
PS-79/0663 pd -B-036-KAN(1) pd 161524 pd 169295 pd 182801 pd 18380 pd 193850 pd 1	0200 0206 0224 0192 0205 0206 0177 0193	N80-34053 N80-31867 N80-28853	Ħ	1
161524 pd 169295 pd 176951 pd 182801 pd 184609 pd 193881 pd 193852 pd 193853 pd 193854 pd 193855 pd 193854 pd 193855 pd 193856 pd 193857 pd 193858 pd 5 pd 5 pd 6 pd 7 pd 8-80018 pd 221 pd 221 pd 3074508 pd 337 pd	0224 0192 0205 0206 0177 0193	N80-28853	#	
169295 pd 176951 pd 182801 pd 184609 pd 193850 pd 5 pd 6 pd 7 pd 812878 pd 90 pd 812878 pd 90 pd 7 pd 90 pd 91 pd 92 pd 92 pd	0192 0205 0206 0177 0193			
176951 pc 176951 pc 182801 pc 182801 pc 184609 pc 189665 pc 193831 pc 193835 pc 1938361 pc 193837 pc 1938381 pc 193837 pc 1938381 pc 812335 pc 811243 pc 812878 pc 5 pc 65 pc 70 pc 812878 pc 812878 pc 812878 pc 812878 pc 92 pc 812878 pc 92 pc 93 pc 9337 pc	0205 0206 0177 0193	NBO.28852	Ħ	
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1. Report No. NASA SP-7041(28)	2. Government Access	ion No.	3. Recipient's Catalog	No.
4. Title and Subtitle	<u> </u>		5. Report Date January 1981	<u></u>
EARTH RESOURCES A Continuing Bibliography (I	ssue 28)		6. Performing Organiz	ation Code
7. Author(s)			8. Performing Organiza	ation Report No.
			10. Work Unit No.	
9. Performing Organization Name and Address				
National Aeronautics and Spa Washington, D. C. 20546	ce Administratic	n	11. Contract or Grant	No.
			13. Type of Report an	d Period Covered
12. Sponsoring Agency Name and Address		_		
			 Sponsoring Agency 	Code
15. Supplementary Notes		<u></u> <u></u>		
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16. Abstract				
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17. Key Words (Suggested by Author(s))		18. Distribution Statement		
Bibliographies Earth Resources Remote Sensors		Unclassifie	ed - Unlimited	
19. Security Classif. (of this report)	20. Security Classif. (c	of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	-	122	\$10.50 HC

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