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Aerolab/EREP Report for the period of July 1973 to June 1974.
Project SR-397 Contract # NAS 9-13301

Activities during the subject reporting period were concerned principally with the acquisition and processing of data from the SL-2 mission (EREP pass #7) over the Lake Monroe, Indiana test site. No data from SL-3 were acquired and data from SL-4 is not complete enough for analysis. Products from the S-190A and B, and S-191 sensors were used in the analysis along with data from ERTS and supporting aircraft flights and ground observation teams. Data from the S-191 sensor will be used in future analysis.

(A) Overall Status

During the reporting period the SL-2 S190A&B photography, 4 seconds of interim S192 data, and the interim S191 data from pass #7 over the Lake Monroe test site were received. The S190A&B photography from passes 42 and 51 flown during the SL-3 mission was received but is of little use because of clouds. For the SL-4 mission the S190A photography was received for pass 90 over Ft. Wayne.

The S190A & the S192 data from the SL-2 mission have been processed. The S192 interim (unfiltered) data has been reformatted for LARSYS and has been analyzed. The S190 black and white multiband frames over the Lake Monroe test site was digitized by Mead Technology Corp. and the four bands have been registered. The S190A color IR frame over Lake Monroe was also separated, digitized and reformatted for use by LARSYS.

The S191 data from SL-2 was not processed because of warnings from JSC. that the data was no good.

To date the analysis has been a comparison of the S192 MSS data, the ERTS MSS data, the digitized b&w multiband photography and the digitized multiemulsion color IR photography. At the present time the results of the analysis are being written in a paper for presentation at the A.A.S. conference in Los Angeles. Further intensive analysis has been delayed until the filtered data sets have been received.

(B) Scientific Recommendations

It is recommended that the S192 data be easily available in a variety of states (raw, filtered, line straightened, conical

(E74-10661) [ACQUISITION AND PROCESSING OF DATA FROM THE SL-2 MISSION (EREP PASS NO. 7) OVER THE LAKE MONROE, INDIANA TEST SITE] Yearly Report, Jul. 1973 - (Purdue Univ.) 4 p HC \$4.00 CSCL 05B

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etc.) for detailed sensor studies. Also detailed information on calibration procedures and algorithms used on specific data be made available and notice of changes made or of problems found with procedures that may affect the data received by the principle investigator.

(C) Expected Accomplishments

On receipt of the filtered SL-2 S192 data over the Lake Monroe test sight, an analysis similar to that of the unfiltered S192 data set already completed will be done for comparison of the two data sets. Other accomplishments will depend upon the data received.

(D) Results

The results of the analysis to date have been reported in a paper submitted for the A.A.S. conference in Los Angeles in August. A comparison of the four sensors mentioned previously was done in a land-use analysis of the Lake Monroe area, principally Lawrence County, Indiana using nine land-use classes-Residential, Commercial, Extractive, Soil, Grass, Deciduous Forest, Coniferous Forest, River, & Lake.

The analysis was done using the "best" four channels of the S192 MSS and also using the four channels which are most similar to the ERTS MSS. All four channels of the ERTS MSS were used, as was all four channels of the digitized black and white multiband photography data set, and all three channels of the digitized multiemulsion color IR data set. The classification performance results are given in Table 1.

The "best" four channels of Skylab gave comparable results to the ERTS MSS. It also appears that the inability to register the b&w multiband photography exactly and an indistinct boundary around Lake Monroe in the infrared bands affected the classification performance of the b&w multiband data set. The anomaly is in the 2nd generation transparencies that we have in house. It appears that the anomaly may have been introduced by flare in a lens system or in duplication product processing.

A study was also done to try to obtain a comparison of the noise between the ERTS MSS and the Skylab MSS. The details of how the figures were obtained are given in the A.A.S. paper. The ERTS MSS appears to have less noise than the Skylab MSS. See Table 2.

Table 1
CLASSIFICATION PERFORMANCE RESULTS
 (PERCENT CORRECT)
 SKYLAB MSS

Class	SKYLAB MSS		ERTS MSS	Color IR	4 Band
	3,7,8,11	3,5,6,8			B&W
Residential	97	81	97	91	84
Com-Ind.	73	33	61	76	46
Extractive	51	59	61	32	34
Soil	87	78	83	67	78
Grass	95	86	93	82	69
Wood-Decid.	81	80	86	84	77
Coniferous	99	68	95	85	43
River	87	27	77	16	64
Lake	89	86	86	98	93
Overall (by points)	87	80	88	83	76
Class Average	84	66	82	70	65

Table 2
DATA QUALITY MEASURES
 OBTAINED FROM A PORTION OF LAKE MONROE
 SKYLAB MSS (S192)

Channel	Mean	Std. Dev.	Data Spread*(x10 ⁻³)
2	98.93	6.41	65.
3	53.34	3.39	64.
4	44.85	3.95	88.
5	36.35	3.47	95.
6	34.73	4.63	133.
7	42.86	1.90	44.
8	38.68	3.64	94.
9	33.21	2.79	84.
10	49.43	4.11	83.
11	44.57	1.84	41.
12	3.46	3.92	1,111.

ERTS MSS			
1	66.00	1.58	24.
2	43.26	1.54	36.
3	32.16	2.58	80.
4	19.80	2.56	130.

*Std. Dev./Mean

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(E) Travel Summary and Plans

A trip to the Ribeyre Island test site was made in August, 1973 in preparation of the test site during SL-3; however, the site was never flown. Two trips were made to Bloomington, Indiana for consultation with the Bloomington Municipal Planning Department. Also travel to southern Tippecanoe County was made to plan a pass during SL-3. The pass was never flown.

Future travel is planned to JSC. for the Principle Investigators Data Meeting in July and to Los Angeles for the A.A.S conference in August.

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