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THAILAND NATIONAL PROGRAMME

OF THE

EARTH RESOURCES TECHNOLOGY SATELLITE

Sanga Sabhasri

Secretary-General

National Research Council

Bangkok 9, Thailand

May 1976

First Type II Progress Report to NASA

National Research Council
196 Phaholyothin Road, Bangkhen
Bangkok 9
Thailand

Goddard Space Flight Center
Greenbelt
Maryland 20771
U.S.A.

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First Type II Progress Report to NASA

1. Title of Investigation: The Thailand National Program of the Earth Resources Technology Satellite (ERTS-B)

2. Proposal Number: G28080

3. Principal Investigator: Dr. Sanga Sabhasri, Secretary-General, National Research Council of Thailand

4. Reporting Date: May 10th 1975

5. Objective: The overall objective of the Thailand National Program is to produce, based on satellite data, up-to-date and accurate information required for planning for development and management of natural resources at the national level. The Landsat-2 program is Landsat-1 follow-on program with refinements and revised objectives derived from experience with Landsat-1 data.

6. Summary of Accomplishments:

(1) As part of a project agreement between the Government of Thailand and the U.S. Operations Missions to Thailand (USOM), one Thai scientist from the Land Development Department of the Ministry of Agriculture and Cooperatives was enrolled at Purdue University starting from January 1976 for a Master of Science Degree majoring in remote sensing. She will chiefly be trained at the Laboratory for Applications of Remote Sensing (LARS).

(2) The National Research Council of Thailand and USOM with the assistance of U.S. Geological Survey (USGS) and the cooperation of the Applied Scientific Research Corporation of Thailand (ASRCT) conducted a Seminar/Workshop on the Applications of Remote Sensing during January-February 1976. The first part or the Basic Part, was held during January 5-9, 1976 and was intended for those who had had no previous experience in remote sensing. It consisted mostly of lectures given in Thai and slide shows of the basic principles of remote sensing data gathering and analysis. The lecturers were chief investigators in various disciplines in the government agencies and from the Mekong Secretariat. The second was a combination of seminar and workshop and the language of instruction was English. The lecturers were experts from the U.S. such as NASA, U.S.G.S. and University of New Mexico. Thai chief investigators acted as co-instructors. The first week was devoted to seminars in which the lecturers gave an overview of past accomplishments and tried to locate areas of interest of the students. The second and third weeks were in the form of workshops in four disciplines, namely: satellite technology; agriculture/land use; cartography; and geology/hydrology. The details of the seminars/workshops are:

Workshop during 5-9 January 1976 (Basic Part)

participants	97	persons
observers	16	persons
total	113	persons
from	25	agencies
number of lecturers 11 from	11	agencies

Seminar during 26-30 January 1976

participants	57	persons
observers	49	persons
total	106	persons
from	27	agencies
number of lecturers	11	

Workshop during 2-13 February 1976 (Advanced Part)

1st Discipline (Agriculture/Land Use)

number of participants:	21 from 10 agencies
number of observers:	7 from 4 agencies

2nd Discipline (Satellite Technology)

number of participants:	15 from 9 agencies
number of observers:	2 from 1 agency

3rd Discipline (Cartography)

number of participants:	17 from 13 agencies
number of observers:	6 from 6 agencies

4th Discipline (Geology/Hydrology)

number of participants:	14 from 10 agencies
number of observers:	8 from 7 agencies

During the Advanced Workshop, a ground truth trip was made to Khao Yai National Park and Sakaerat Experiment Station to compare conditions on the ground with satellite imagery.

(3) A request from NRC through the National Economic and Social Development Board (NESDB) and the Department of Technical and Economic Cooperation (DTEC) to the United Nations Development Program (UNDP) for assistance in conducting a feasibility study on the establishment of a Landsat data receiving station in Thailand was modified by UNDP and ESCAP (Economic and Social Commission for Asia and the Pacific) to become a study on the whole ESCAP region. A team led by Dr. Hempenius from the International Training Center (ITC), Netherlands

visited several countries in the region, including Thailand, to assess the technical capability, user demand, economic conditions and other factors for the need for such facility. The study is being concluded and a report is expected soon.

(4) The construction of the new building designed by the Thailand National Remote Sensing Program (TNRSP) in the NRC compound which will house the Program was started in December 1975. The construction is according to schedule and the building is expected to be ready for TNRSP to move in around the end of 1976.

(5) The computer center at Asian Institute of Technology (AIT) has completed the installation of IBM 370/145 and the initial gray scale printout of a Landsat CCT was successful in April 1976. Ground truth collection assisted by TNRSP and provision of CCT's by NASA to TNRSP will enable computer processing and analysis to be achieved in Thailand. The first attempt would be to classify rice from weeds in the Rangsit area immediately north of Bangkok.

(6) The research project on estimating rice planting acreage from Landsat-2 data with grants from AID through ERIM and executed by the Division of Agricultural Economics of the Ministry of Agriculture and Cooperatives has completed the ground truth survey assisted by NRC/ASRCT and the interpretation phase is now underway.

(7) Major research projects completed are as follows:

(a) Study on Locating Hill Tribe Villages from Landsat Imagery

Landsat imagery was used to locate hill tribe villages in the northern part of Thailand. The coordinates of the villages were supplied by Dr. Lucien M. Hanks and his wife, Dr. Jane Hanks, both anthropologists from Cornell University. The results of the photo-interpretation were further checked by ground truth surveys of the area. It is concluded that small white specks on Landsat imagery correspond to hill tribe villages. The smallest identifiable one has an area of about 2 acres and 10-25 houses if the village is on barren ground and the surrounding background gives high contrast to the white spot which is the hill tribe village. However, if the village has trees growing in the area, then the smallest identifiable one must have 30-100 houses depending on which hilltribe the village belongs to. Moreover, the combination of Landsat-1 and Landsat-2 imagery makes it possible to identify changes such as areas under shifting cultivation.

(b) Study on Land Use and Forest of Northeast Thailand Using IBM Computer Processed Color Composite Print and Ground Truth Survey

The IBM processed color composite print was furnished by the World Bank and has NASA ID E-1094-03000 on 25 Oct. 1972 (Worldwide nominal scene #Path 137, Row 48 or Thailand nominal scene 3-4). The results of

the ground truth surveys of more than 100 test points showed that 8 land use categories can be mapped with high accuracy. The report of the study is being printed.

(c) Land Use and Forest Mapping Using Skylab EREP Data

Three locations under EREP passes were chosen for study and verified by field check. The results showed that S-190B Earth Terrain Camera is best for land use and forest mapping. Several forest types and land use patterns can be mapped with high accuracy tracks as small as 2 meters in width were also visible. The new map thus derived showed many new features not present in the existing 1:50,000 map which is several years old. The report of this study is expected to be available soon.

(8) Since December, 1975, the existing Working Sub-committee of the National Coordinating Committee for Thailand National Remote Sensing Program was reorganized into four new Working Sub-Committees as follows:

(a) W.S.C. on Planning and Monitoring

(b) W.S.C. on Automatic Data Processing and Ground Truth Collection.

(c) W.S.C. on Agriculture, Forestry and Land Use

(d) W.S.C. on Geology, Hydrology, Oceanography and Environment

Each W.S.C. contains no more than 15 members as opposed to 26 of the old system. Monthly meeting is held to coordinate and discuss the on-going projects.

(9) The Thailand National Remote Sensing Program made prints at 1:500,000 scale from 70 mm negative transparencies for Committee for Coordination of Offshore Prospecting (CCOP) to be used in the workshop on transects held in January 1976. 300 prints were made in 2 weeks and this is the most substantial assistance ever provided to outside agencies. The quality of prints are as good as those furnished by EROS Data Center.

(10) Dr. Sman Vardhanabuti, Coordinator of the Program, participated in the Workshop on Remote Sensing organized by UN and the Indonesian Government in November, 1975.

(11) Mr. Jim McCord, Chief, Photoreproduction, EROS Data Center, was invited by Thailand Program through USOM financial assistance to assist in the photoreproduction work and to give advice on the future processing of black and white and color data products and data handling procedures. The quality of the products were subsequently upgraded and several of his recommendations were put into operation.

(12) Dr. Wolf Drewes of the World Bank visited the laboratory in May and held discussions with user agencies of the Thailand Program. Possibilities of using Landsat CCT for resources study of the Chao Phya basin as part of the existing World Bank Loan Program were discussed and more detail work will follow.

7. Problems Encountered

(1) Some negative transparencies received from NASA contained scratches and the enlargement from these negative were not useable.

(2) The frequency of Landsat-2 MSS coverage over Thailand have not been as many as in Landsat-1. The lack of such data and the longer time interval of data coverage, especially in the planting seasor between May and November, has decelerated user agencies' interest and hampered some investigations. During the planting season for this year more coverage at every cycle is recommended.

8. Significant Results Obtained

(1) Study on locating hill tribe villages from Landsat imagery was successful and exceeded the initial expectations. The report of the study was subsequently submitted to the National Research Council to compete in the annual best research result award competition. The implications of the research results are self-evident.

(2) The cooperation by the TNRSP to CCOP in making Landsat prints is a major step forward by the National Research Council to render cooperation to international agencies and other countries. With the completion of the new building, larger extent of cooperation will become possible.

(3) The results of the study on land use and forest mapping using Skylab data demonstrated the capability and feasibility of large-scale mapping with high accuracy. Such data would be very useful for development planning and management.

9. Operating Procedures, Publications, Recommendations

(1) List of Publications

- ERTS-1 Imagery Obtained from NASA and from EROS Data Center, Working Unit, Thailand National Remote Sensing Program, Data Note 750311

- Forest Inventory of East Thailand Using ERTS-1 Imagery and Ground Truth Survey, Thailand National Remote Sensing Program, Technical Note 750227

- Distribution of Mangrove Forest as Revealed by the Earth Resources Technology Satellite (ERTS-1) Imagery, Technical Report 751003

- Application of ERTS-1 Imagery in Forestry, written by Dr. Chamni Boonyopas and Boonchana Klankamsorn (in Thai), Royal Forestry Department, and edited (in English) by Suvit Vibulsresth and Krongsin Boonboothara, Thailand National Remote Sensing Program, 24 pp.

- Study on Locating Hill Tribe Villages from Landsat Imagery, by Dr. Boon Indrambarya and Nissai Sriplung, Thailand National Remote Sensing Program, Technical Report 760430

- Remote Sensing for Natural Resources Survey, by Suvit Vibulsresth, Assistant Coordinator, Thailand National Remote Sensing Program, presented at the Fifth Meeting of the Association for Science Cooperation in Asia (ASCA), Bangkok, Thailand, April 19-21, 1976, paper no. ASCA-5-M-WP-08

(2) Recommendations

Negative transparencies shipped to investigators should contain no scratches. If NASA would pay closer attention to this aspect it would certainly help the investigators a great deal.

We would also recommend that NASA should advise the international community including Thailand about NASA's policy concerning future program beyond the current participation. Such information would assist policy planners and scientists in our country in the planning of earth resources survey activities in the next 3 to 5 years.

A Principal Investigator Meeting should be convened in the next six months to evaluate current programs and to plan for the future.

(3) Appreciation

The Thailand National Remote Sensing Program is very grateful to NASA for generously increasing the cost of data shipment from the original limit of $1500 to $2300, $3300 and finally to $4300. The increased amount includes 5 scenes of CCT's for computer analysis. We have not yet received the CCT's but would appreciate it if early shipment could be made.

Thailand also appreciate NASA's quick response to our request for taking MSS data over Thailand in early November 1975 during the worst flood in Thailand in the past 30 years. Such data are being analyzed and the report will be sent to NASA as soon as it is completed.