Paper A 21

AGRICULTURAL UTILIZATION OF ERTS-1 DATA IN THAILAND

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I shall take this opportunity to report briefly on recent advances made in three disciplinary areas that are of major importance to Thailand. They are Agriculture, Forestry, and Land Use Classification.

ERTS investigations are currently underway in some six or seven government departments. As has already been reported, a six week intensive training course in remote sensing was given in Bangkok last year, under the auspices of the U.S. Operation Mission to Thailand and the U.S. Geological Survey. Thai scientists and technicians who attended that course have since been working on a variety of ERTS projects in several disciplinary areas.

Preliminary investigations of the ERTS-1 Data have been so successful that the Thai Government has decided to develop a remote sensing data handling and research center, and USOM has agreed to provide additional training and support for a period of two years.

We have in hand more than 379 scenes from the ERTS multispectral scanner. Since the entire country has been covered, in some places as many as nine times, we have a considerable amount of data to work with and can envisage to do much constructive work.

Now I will present some of the current project work by means of 15 figures.

AGRICULTURE

The task of delineating agricultural regions directly from ERTS images is carried out in the Ministry of Agriculture and Cooperatives. A small task force of trained technicians is presently carrying out this work and is evaluating several types of processed data.

Figure 1 shows a partially annotated color enlargement, obtained from the General Electric Company (scale about 1:350,000), which has been checked rather extensively by means of field trips and aircraft flights. It shows the large rice growing region to the north of Bangkok (Bangkok is at lower right) and areas of other crops that can be differentiated by experienced interpreters.

Figure 2 is a computer printout furnished by Purdue LARS. Although it was made by use of an unsupervised clustering processing routine, and by scientists at LARS who are quite unfamiliar with Thailand, it is an accurate and informative representation. This hand colored printout shows inundated rice paddies in blue (October scene), vegetated areas in orange and red, and bare soil and clouds in white. It has been determined that the areas colored orange represent orchard crops quite accurately. The rectangular area, is seen better in the next figure.

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Figure 3 is a large Budhist compound edged by a moat or canal. The center area of the compound is vegetated, and the small area at center right is slightly raised, bare ground with a single large monastery, as shown in Figure 4.

Figure 5 is an Ektachrome view of a part of the compound and the surrounding moat.

Figure 6 is an Ektachrome infrared view from another angle; the area containing the building is at center right. Our investigating teams use these two films routinely, in 35 mm format, in low altitude aerial reconnaissance surveys.

Figure 7 The color print os the Bangkok region is shown again, to point out a very large alluvial fan that had not been identified as such until this ERTS image became available.

Figure 8 shows this alluvial fan as portrayed on the analogue display unit at the University of Kansas in January 1973.

Figure 9 shows a color scene made from two MSS band 7 frames imaged during different months, once (red color) in October 1972, when the Mun river was over its banks, and again (blue color) in January 1973, when the flood water had subsided. This technique of change detection has proven to be an accurate and rapid means of investigating flood patterns and is being used by the Agriculture and Irrigation Departments.

FORESTRY

The Royal Forestry Department is using 1:500,000 scale band 5 and band 7 prints, diazochrome color composites, and existing air photos of 1:50,000 scale to map changes in forest area. This is an important project for Thailand, because it is not possible, with available resources, to patrol all of the remote forest areas - hence they are not effectively protected against illegal destruction of nomadic tribes, farmers needing new land, and unlicensed timber cutters.

Our foresters have measured the decrease in forest area in six of the 72 provinces of the country, since the most recent previous survey. In Chonburi province, where no survey has been made since 1961, evaluation of ERTS images shows a decrease in forest area of more than 23%. The Department will complete a new survey of the entire country in the current fiscal year, a task which requires ten years and many millions of baht if made from new aerial photography.

Figure 10 shows the new forestry map of one region which has been drastically cut back in recent years. It was made in 1973 from 7-8 frames of ERTS images taken in 1972 and 1973.

Figure 11 is a band 5 image of part of this area, and

Figure 12 is a color infrared aerial photo of a partially destroyed forest. The green areas have been slashed down and burned over. Some older burned areas, in pink, have been planted in tapioca and other crops. Some of these areas will soon be more carefully documented, using our four lens aerial camera and four channel multispectral viewer.

Land Use Classification

It is found that existing land use maps of Thailand can be improved and updated with the aid of ERTS images. The Land Development Department is currently using 1:500,000 scale black and white prints, drawing the boundaries directly on the print as illustrated in the following three figures.

Figure 13 showing the Central plain of Thailand.

Figure 14 showing the Northern part of the Central plain.

Figure 15 showing the Mekhong River

Aerial photos and ground data are used to verify vegetation and soil types. The information is then transferred to a base map.

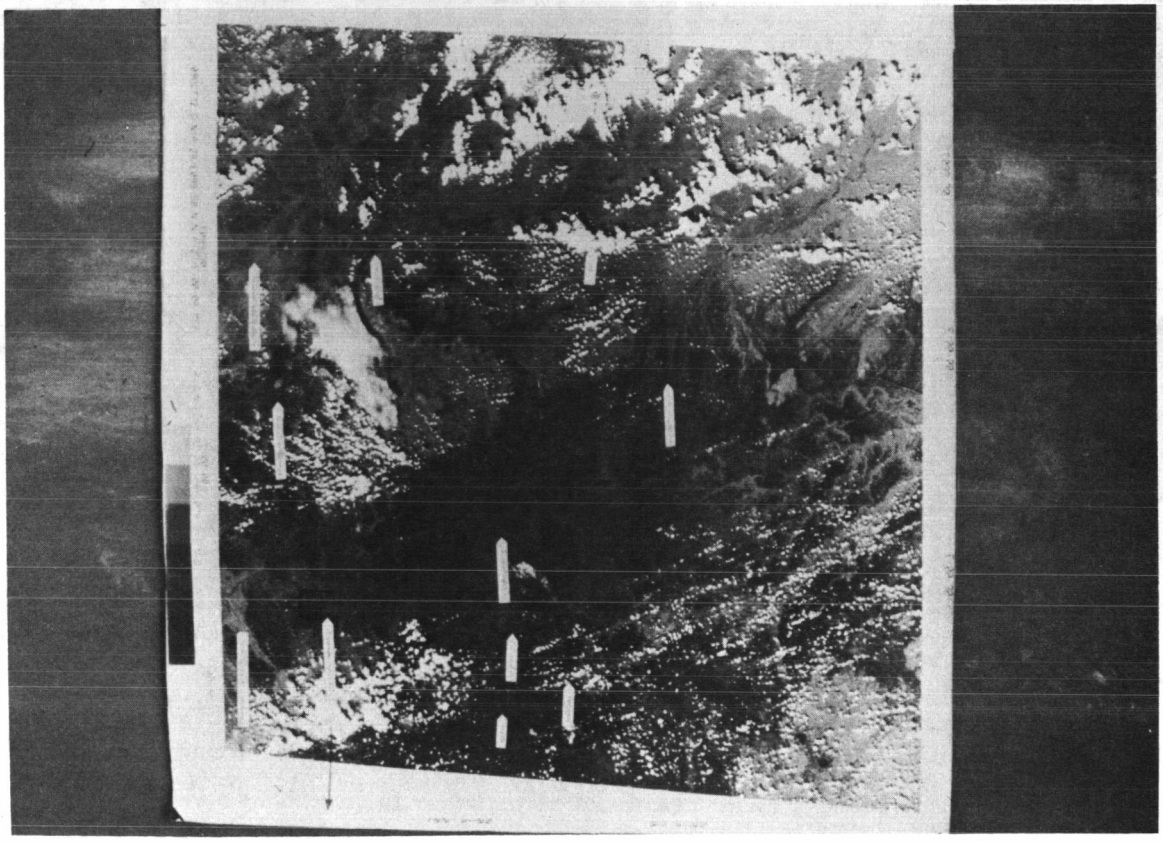


Figure 1

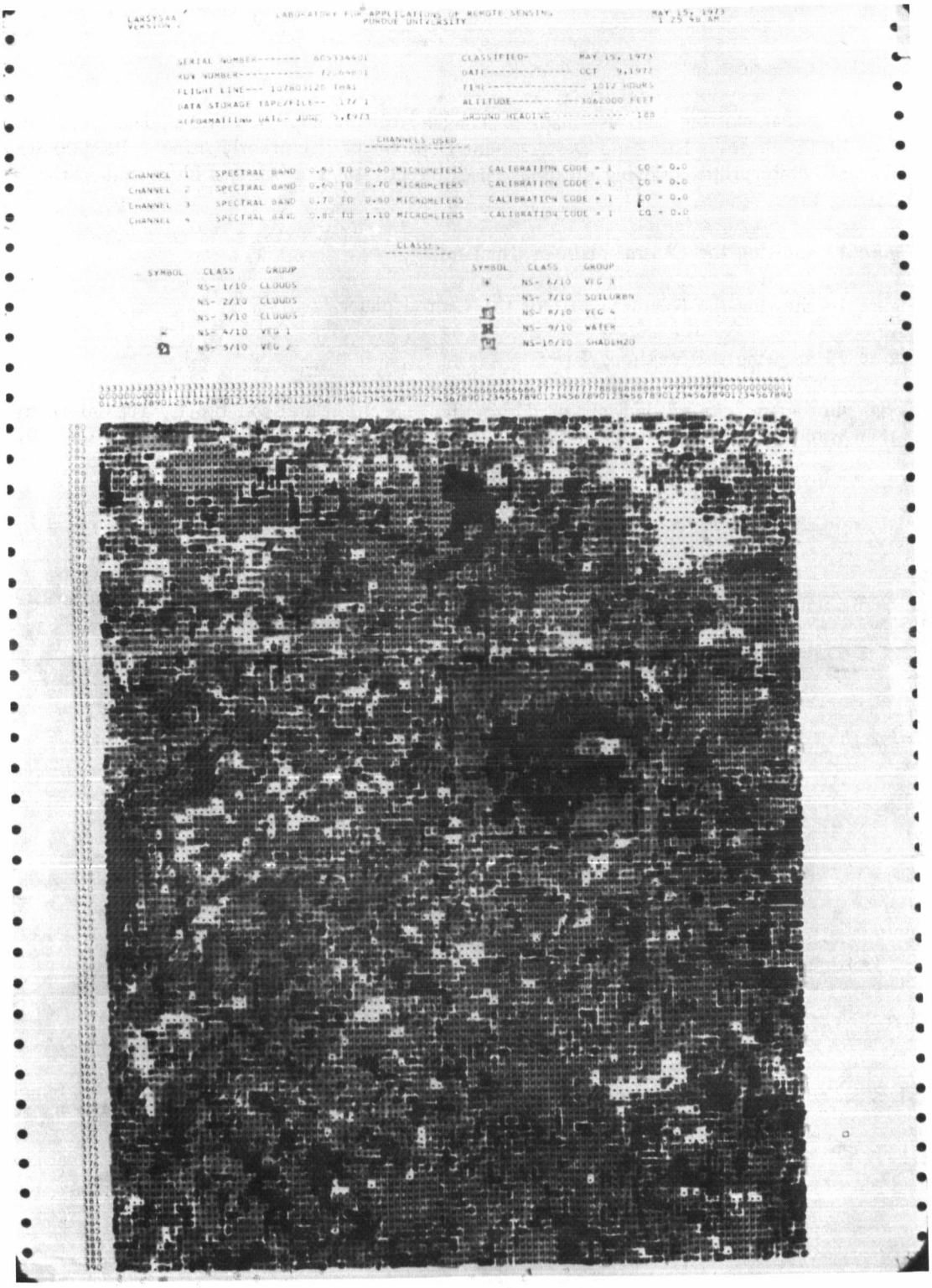
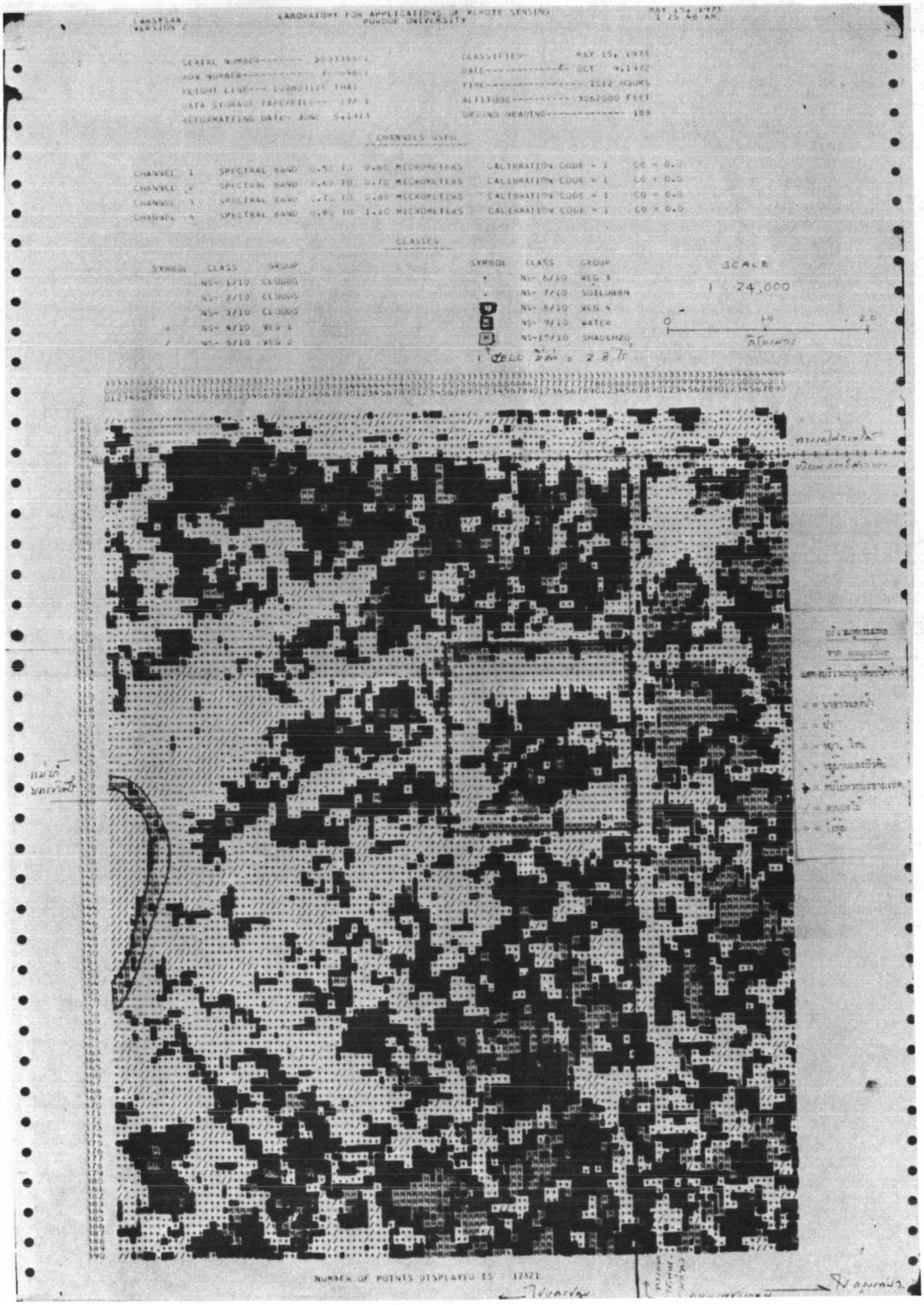

LARSYSAA
VERSION
LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY
MAY 15, 1973
1 25 48 AM
SERIAL NUMBER-------- 805334401
RUN NUMBER---------- 72064801
FLIGHT LINE--- 107803120 THAI
DATA STORAGE TAPE/FILE-- 17/ 1
REFORMATTING DATE- JUNE 5,1973
CLASSIFIED- MAY 15, 1973
DATE---------- OCT 9,1972
TIME---------- 1012 HOURS
ALTITUDE----------3062000 FEET
GROUND HEADING ---------- 188
CHANNELS USED
CHANNEL 1 SPECTRAL BAND 0.50 TO 0.60 MICROMETERS CALIBRATION CODE = 1 CO = 0.0
CHANNEL 2 SPECTRAL BAND 0.60 TO 0.70 MICROMETERS CALIBRATION CODE = 1 CO = 0.0
CHANNEL 3 SPECTRAL BAND 0.70 TO 0.80 MICROMETERS CALIBRATION CODE = 1 CO = 0.0
CHANNEL 4 SPECTRAL BAND 0.80 TO 1.10 MICROMETERS CALIBRATION CODE = 1 CO = 0.0
CLASSES
SYMBOL CLASS GROUP
NS- 1/10 CLOUDS
NS- 2/10 CLOUDS
NS- 3/10 CLOUDS
NS- 4/10 VEG 1
NS- 5/10 VEG 2
SYMBOL CLASS GROUP
NS- 6/10 VEG 3
NS- 7/10 SOILURBN
NS- 8/10 VEG 4
NS- 9/10 WATER
NS-10/10 SHAD&H2O

Figure 2


LABORATORY FOR APPLICATIONS OF REMOTE SENSING
PURDUE UNIVERSITY
CHANNELS USED
CLASSES
SCALE
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NUMBER OF POINTS DISPLAYED IS 12321

Figure 3

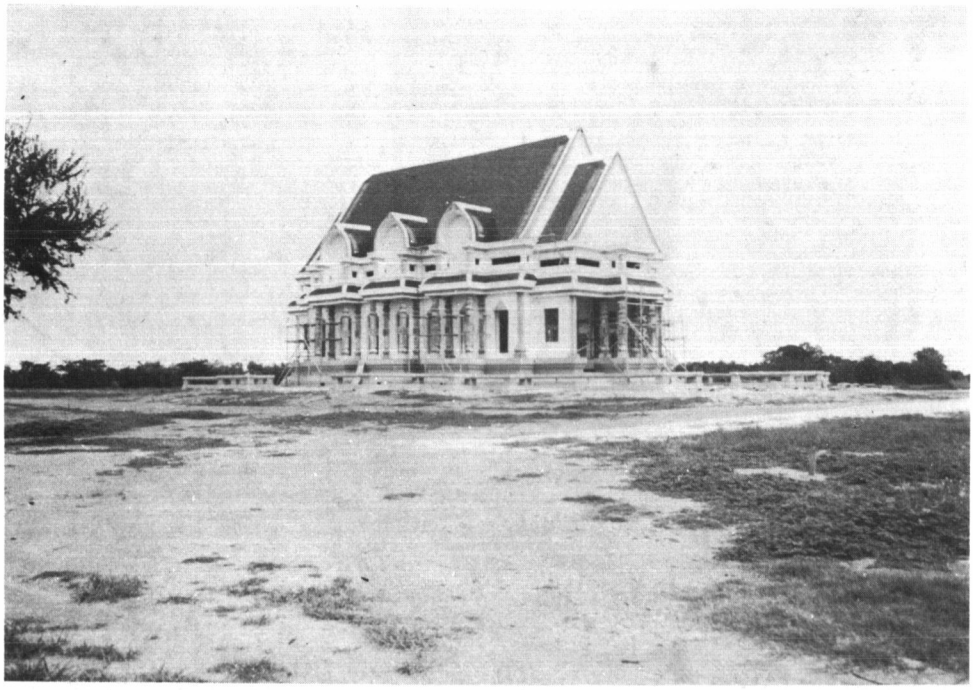


Figure 4

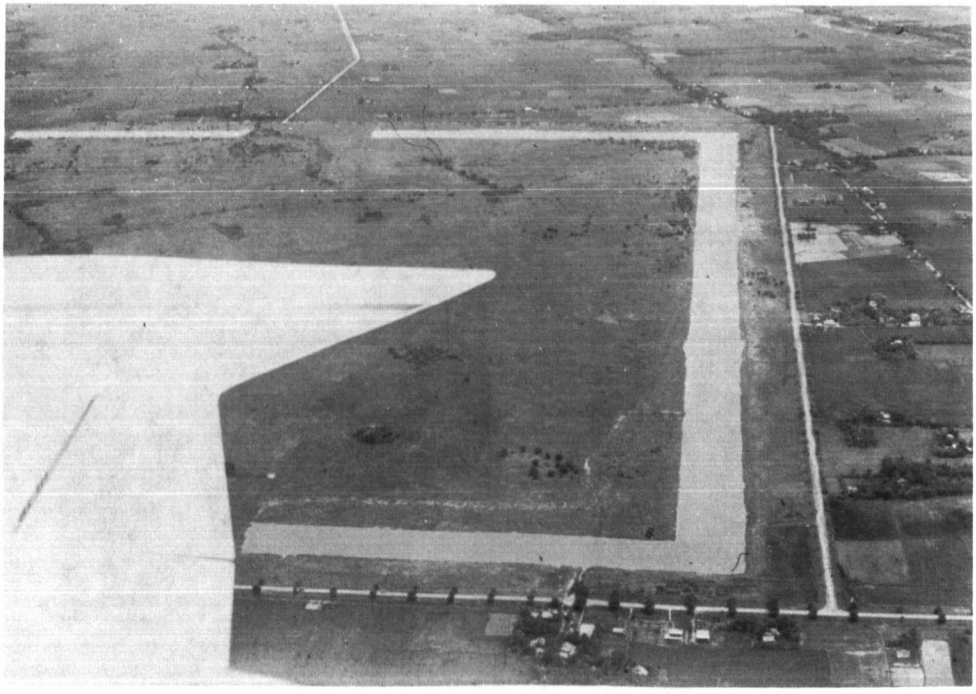


Figure 5

Figure 6

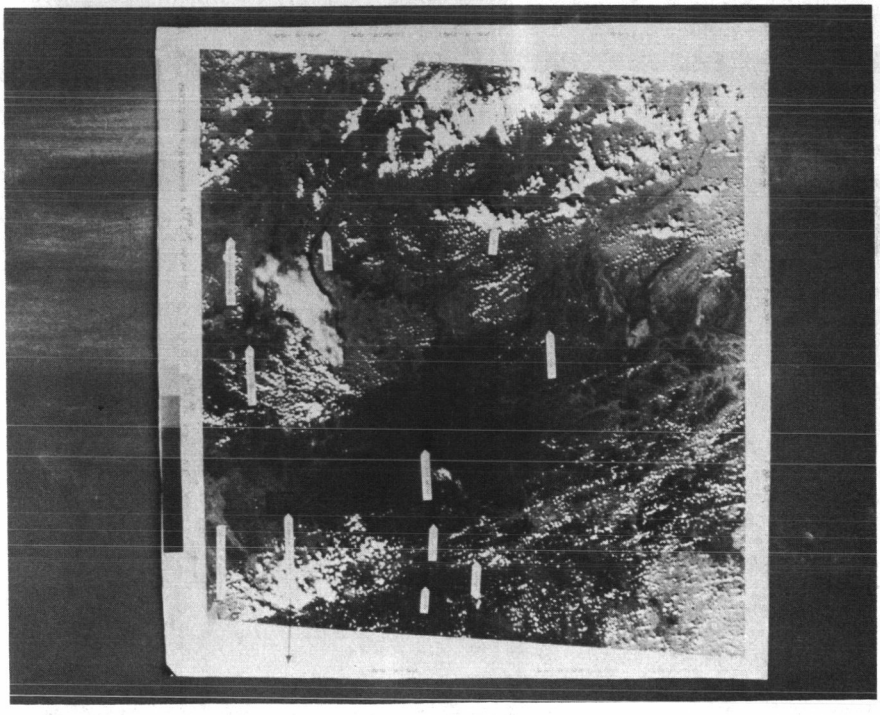


Figure 7

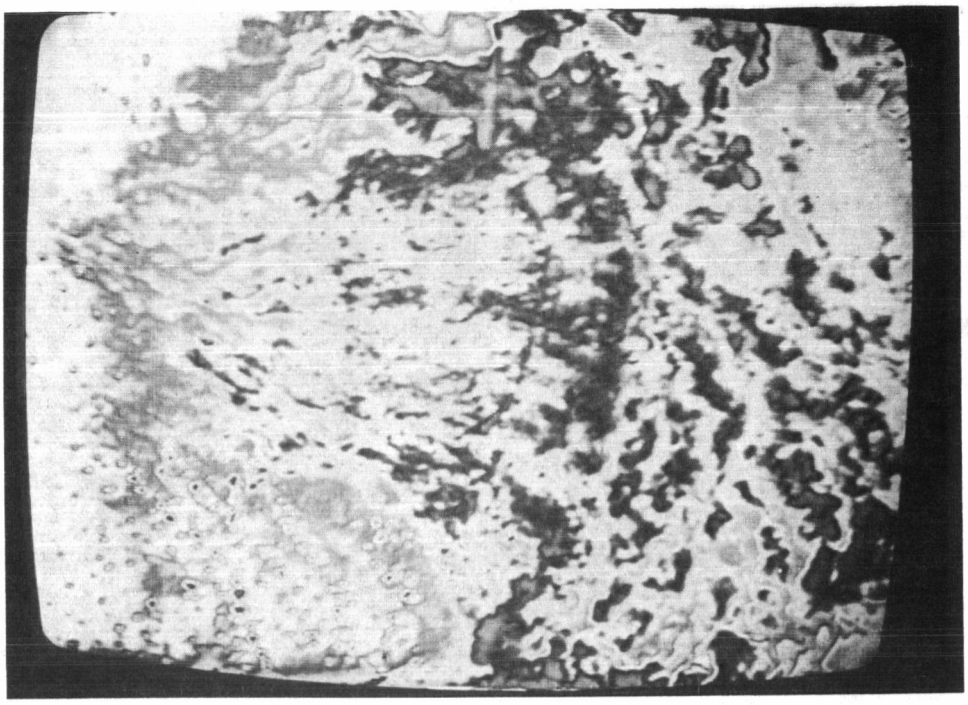


Figure 8

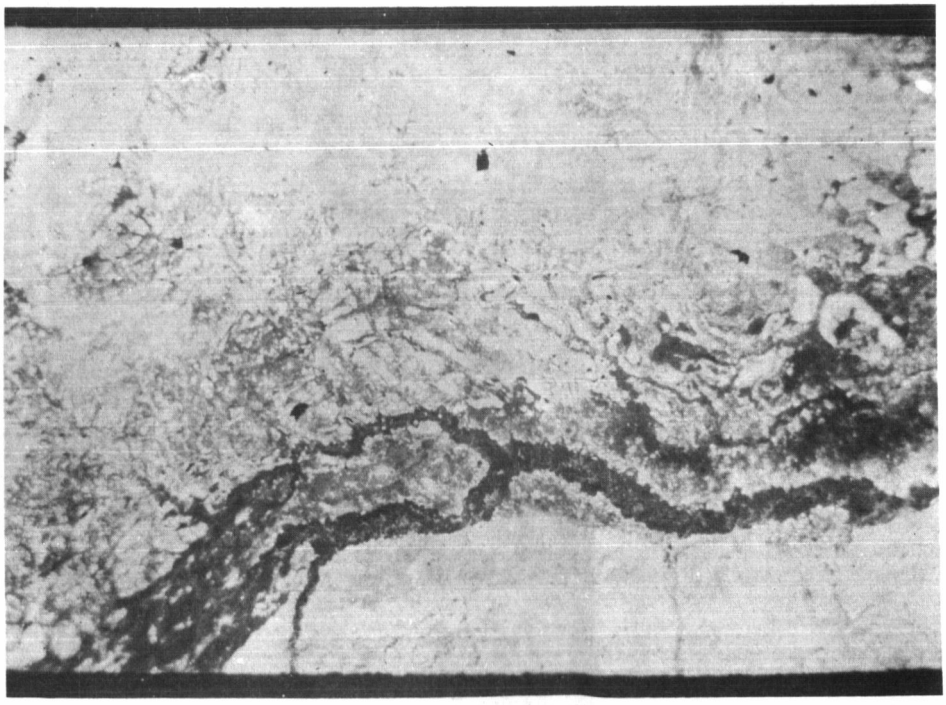


Figure 9

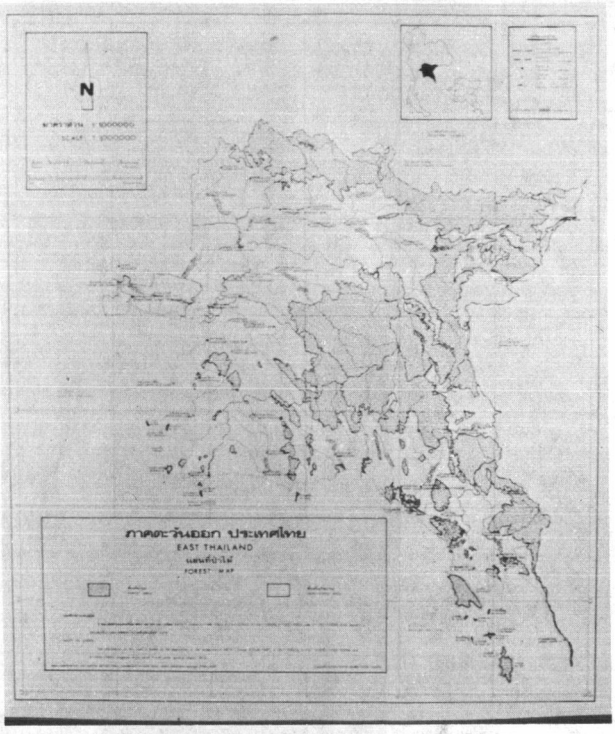
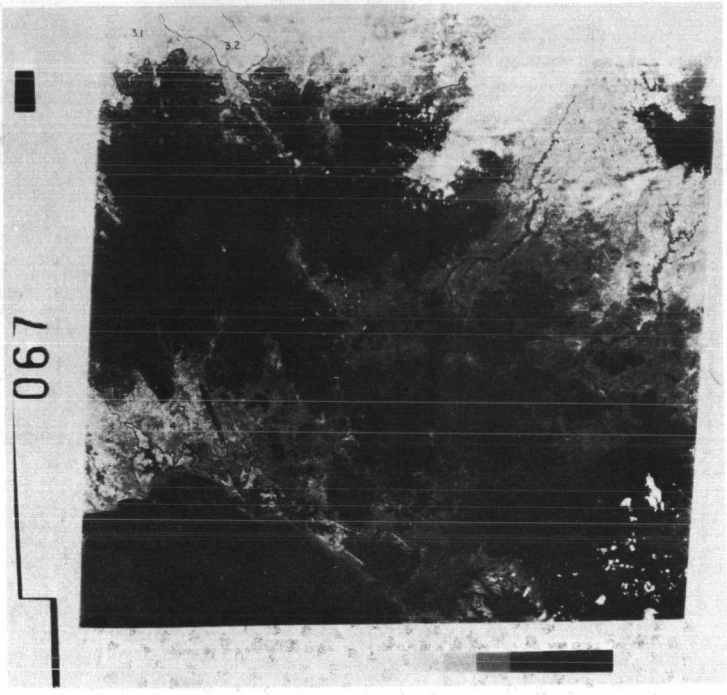


Figure 10



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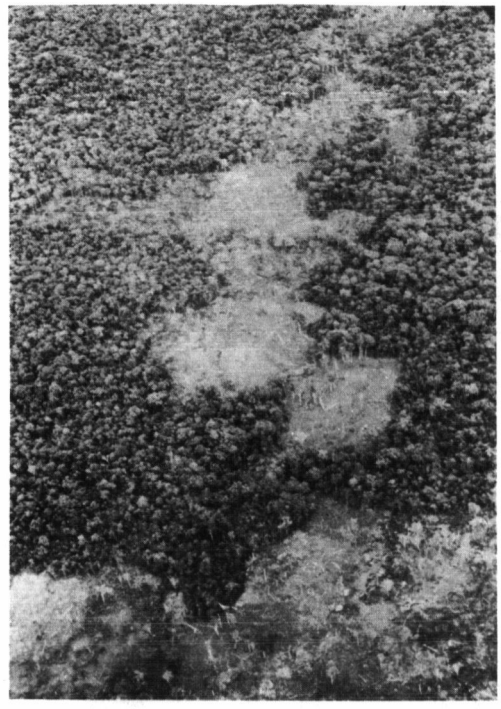

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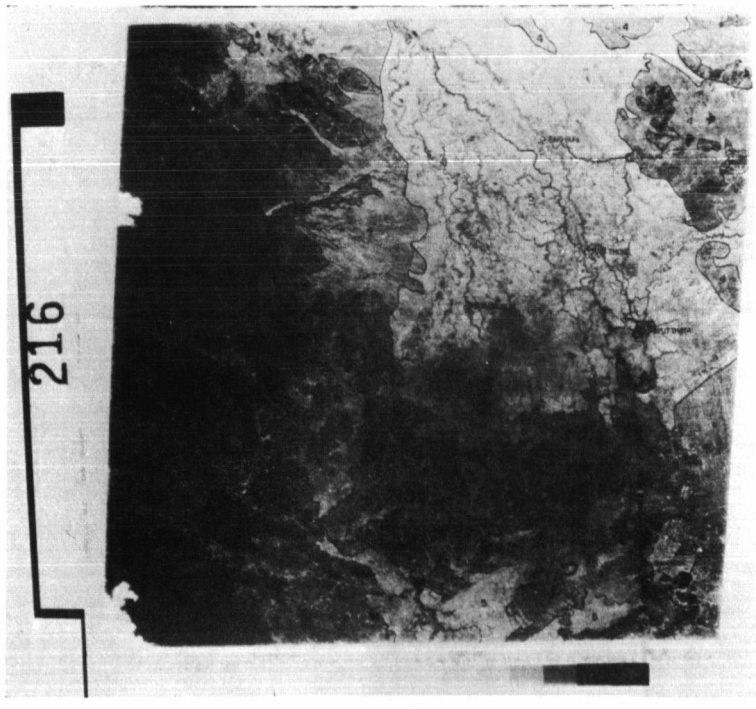

Figure 13

Figure 14

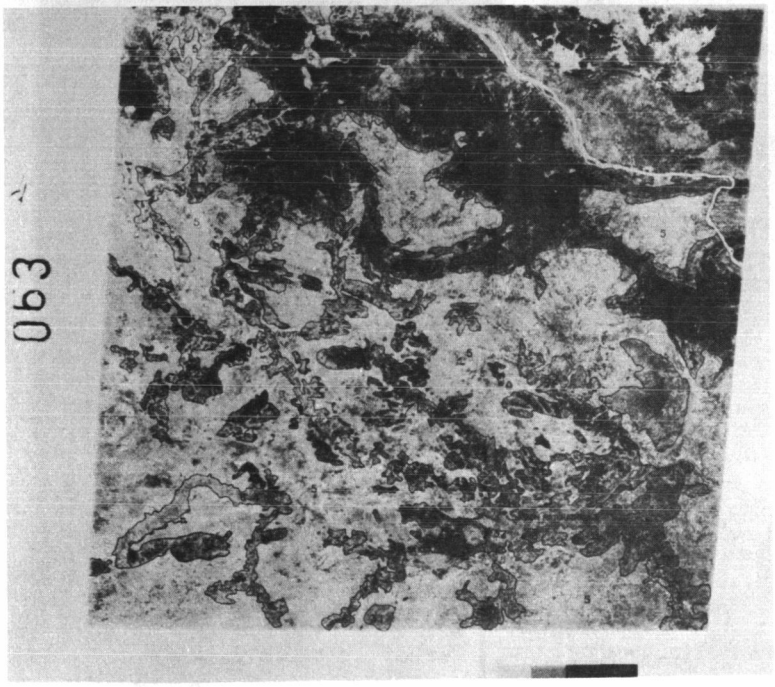

Figure 15