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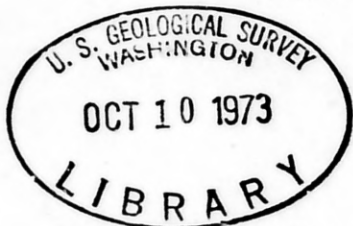
ASIAN SEMINAR AND WORKSHOP ON REMOTE SENSING
held at
UNIVERSITY OF THE PHILIPPINES
DILIMAN, QUEZON CITY, LUZON, REPUBLIC OF THE PHILIPPINES
May 7-18, 1973

by

Stephen J. Gawarecki
U. S. Geological Survey

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This report is preliminary and has
not been edited or reviewed for
conformity with Geological Survey
standards or nomenclature



SEPTEMBER 1973

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U. S. Geological Survey

INTRODUCTION

The First Asian Seminar and Workshop on Remote Sensing was held May 7-18, 1973, at the University of the Philippines, Quezon City, Republic of the Philippines. The seminar was hosted by the Government of the Republic of the Philippines, sponsored by the Philippine National Committee for Mineral Exploration and Survey Operations (NACOMESO), funded by the Office of Science and Technology of the Agency for International Development (AID), U. S. Department of State, and presented by the Office of International Geology, U. S. Geological Survey (USGS), U. S. Department of the Interior.

A total of 51 representatives from 9 countries and one regional organization in southeast Asia attended the seminar. The Republic of the Philippines provided 37 participants and observers; the following countries and organizations were represented as noted: Afghanistan, 1; Burma, 1; Taiwan, 1; Indonesia, 1; Korea, 2; Malaysia, 4; Thailand, 1; Vietnam, 2; and the U. N. Economic Commission for Asia and the Far East (ECAFE), 1. The names of the representatives, their countries, and affiliations are shown in appendix 1. The seminar was designed for a maximum of 30 participants; however, observers were allowed to attend lectures and the workshops where sufficient working materials permitted.

The Asian seminar was part of an international training program conducted by the USGS under AID Participating Agency Service Agreement TA(IC) 2-72; under this Agreement the USGS also conducted a seminar in Bamako, Mali, in April 1973; a 4-week remote-sensing training course at the Department of the Interior Earth Resources Observation Systems (EROS) Data Center, Sioux Falls, South Dakota, in June 1973; and a series of consultative visits involving remote sensing.

The objective of the seminar in Manila was to broaden awareness and understanding of representatives of Asian countries of the interpretation and application of data from the Earth Resources Technology Satellite (ERTS) and related techniques for natural resource inventory and assessment. To cover the broad range of disciplines to which remote-sensing techniques can be applied, specialists were assembled from the fields of agriculture, forestry, cartography, geology, hydrology, geography (land use and demography) oceanography, fishery, and environmental pollution.

The success of the seminar was the result of the excellent cooperation of many organizations and individuals. On behalf of the Geological Survey, and especially the instructors charged with presenting the seminar, the author wishes to thank the officials of the Philippine Bureau of Mines, who, under the leadership of Director Fernando S. Busuego, Jr., and Acting Director Juanito Fernández, planned and

arranged for the logistical requirements of the seminar, including the audio-visual, report-duplication, reception, and transportation needs of the instructors and attendees. Dr. Norberto S. Vila, Director of the Training Center for Applied Geodesy and Photogrammetry at the University of the Philippines, made facilities available for the seminar, as well as reproduction equipment and office space for the instructors, and encouraged participation of his staff.

Dr. Romeo C. Bruce, University of the Philippines, served as an instructor during the seminar in his special field. Messrs. William C. Larson and Thomas E. Johnson and their staff at the USAID Mission in Manila provided effective liaison with the Philippine host agency during the preparatory phase, and assisted in the program and logistics during the seminar. Mr. John C. Fry of the Office of Science and Technology (OST), AID, gave helpful encouragement and advice; Mr. William H. Littlewood, also of OST, and Mr. William A. Fischer, USGS, visited the Philippines and assisted in the preliminary planning. The loan of demonstration equipment by Spectral Data Corporation International Imagery Systems, and Bausch and Lomb, Inc., was greatly appreciated.

PREPARATIONS FOR THE SEMINAR

In September 1972 the Office of Science and Technology announced plans for an Asian Remote Sensing Seminar and workshop, which the Government of the Republic of the Philippines subsequently expressed interest in hosting. William A. Fischer, Senior Scientist, EROS Program, and William H. Littlewood, Associate Director, Office of Science and Technology, AID, visited the Philippines in January 1973 to review the proposed seminar curriculum with Philippine officials and to discuss requirements for facilities and equipment (see appendix 2).

Although the seminar was originally planned for January or February 1973, the Philippine Government indicated a preference for May 1973. Invitations were sent in February 1973, by the host country to the following countries and regional organizations:

Sri Lanka	*Korea
*Afghanistan	Khmer
Nepal	Bangladesh
*Malaysia	*Burma
*China	*Vietnam
Pakistan	Mekong Committee (ECAFE-UN)
Laos	*CCOP (ECAFE-UN)
India	Asian Development Bank
*Indonesia	*Thailand

*Represented at the seminar.

Samples of invitations sent to the countries and to the organizations are shown in appendix 3. The Committee for Coordination of Joint Prospecting for Mineral Resources in Asian Offshore areas (CCOP) sponsored the attendance of a total of five participants from Indonesia, Thailand, Vietnam, Malaysia, and the United Nations (ECAFE). Local USAID missions sponsored 3 participants, 2 from Korea and one from Afghanistan; the Asian Foundation sponsored one from Vietnam; and the remainder, mostly from the Philippines, were sponsored by their respective governments.

The requirement at the seminar for broad application of remote-sensing techniques to as many as 8 distinct disciplines presented the problem of finding four remote-sensing specialists capable of instructing in the techniques and applications in at least 2 disciplines without redundancy. The selected instructors were as follows:

Dr. Romeo C. Bruce
Training Center for Applied
Geodesy and Photogrammetry
College of Engineering
University of the Philippines
Quezon City, Philippines

Dr. Stanley A. Morain
Space Technology Laboratories
University of Kansas
Lawrence, Kansas

Mr. William H. Stevenson, Manager
Fisheries Engineering Laboratory
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Mississippi Test Facility
Bay St. Louis, Mississippi

Dr. John L. Place, Geographic Applications Program
U. S. Geological Survey, Washington, D. C.

Mr. George E. Stoertz, Water Resources Division
U. S. Geological Survey, Washington, D. C.

Dr. Stephen J. Gawarecki, Office of International Geology
U. S. Geological Survey, Washington, D. C.

Dr. Gawarecki assumed direction of the seminar and part of the instructional load in remote sensing theory and geological applications. Mr. Stoertz also instructed in geological applications and covered the hydrology aspects; Dr. Place lectured on the cartographic, land-use, and demographic applications; Mr. Stevenson covered the oceanographic, fisheries, and pollution aspects; and Dr. Morain presented the agriculture and forestry applications. Dr. Bruce reviewed basic photointerpretation and applications of color infrared photography to tropical agriculture.

Among other preparations were the acquisition of publications, technical information, maps, reproduction material, and ERTS positive transparencies and enlargements of the invited countries, for use in the workshops, and arrangements for the use of special viewing equipment.

CONDUCT OF THE SEMINAR

The seminar was held at the Training Center for Geodesy and Photogrammetry, College of Agriculture, University of the Philippines in Quezon City. Five rooms were made available for seminar use: a large 80-seat-capacity air-conditioned lecture hall, 2 small classrooms, a laboratory room with 15 large light tables, and a large conference room. The majority of time was spent in plenary session in the main lecture hall; the workshop sessions that followed were held concurrently in four separate rooms including the lecture hall.

The daily schedule normally started at 9 a.m. and ended at 5 p.m., with a 2-hour lunch period from 12 until 2 p.m., and 15-minute refreshment breaks at 10 a.m. and 3 p.m. Most of the registered participants and the instructors returned daily to their hotel about 2 km away for lunch via transportation provided by the Bureau of Mines. The average seminar day was about 5½ hours long.

At registration the attendees completed a questionnaire on their background and professional interests (See appendix 4). The majority of attendees were in geological sciences (21), followed by cartography-geodesy (14), agricultural sciences (7), forestry (4), oceanography-fisheries (2), and meteorology (1). One observer was a consular official (Burma) with no discipline listed.

The basic plan for presentation of the seminar had the following elements:

1. An overview of remote-sensing principles, techniques, and operational instrumentation.
2. A description of the ERTS Program, including its objectives, data acquisition systems, its products, and their distribution and applications to the disciplines covered in the seminar.
3. A series of demonstrations and practical exercises involving useful technology and scientific principles.
4. Assessment of resource problems and development needs in South-east Asia to which ERTS and other remote-sensing data may be applied.

5. A series of workshops for related disciplines using ERTS and other remote-sensing data for practical interpretation exercises and as vehicles for detailed explanations. The actual schedule followed is shown in appendix 5. The theoretical aspects of the seminar were kept to the minimum required to provide a background knowledge necessary for a reasonable understanding of ERTS and other remote-sensing imagery. In order to present a large amount of material in a relatively short time, slides were effectively used. A textbook titled, "Remote sensing with special reference to agriculture and forestry," published by the National Academy of Sciences was provided to the registered participants to be used as a reference for theory and applications.

Important visual aids and tables were reproduced and distributed to all attendees. Although much basic material was reproduced prior to the seminar, only 40 copies of each item were made, requiring additional copies to be made locally for the excess number of observers.

A description of ERTS technology, its products, and data applications were presented in plenary session. All attendees thus received some understanding of applications in other fields as well as their own. The basis for the ERTS technology presentation was the ERTS Data User's Handbook, from which key pages and illustrations were reproduced and given to the attendees. The applications were covered in plenary session by each instructor in his field of competence. To supplement these presentations, copies of the proceedings of the First ERTS

Symposium and the abstracts of the Second ERTS Symposium were provided for the registered participants. A substantial library of reference books and articles on remote-sensing techniques was made available in the main lecture hall. These books were freely borrowed by the attendees during the seminar and noted for future inclusion in their libraries.

All attendees had an opportunity to participate in a number of technological demonstrations. Using positive 9 by 9 inch black and white ERTS transparencies of their country, each person made a color composite in the color infrared mode. Each spectacular color transparency produced from ERTS channels 4, 5, and 7 was received with much enthusiasm. The process, which uses relatively inexpensive (\$.25 per composite) diazochrome foils in cyan, magenta, and yellow, is simple to perform with widely available diazo (blueprint) equipment and is quite useful in ERTS scene interpretation. A more expensive method of producing color composites was demonstrated with a Spectral Data Corporation multispectral projector/viewer. Small groups of students were shown how to operate this instrument and became acquainted with the use of color additive viewers.

To demonstrate the effects of filters on film response, a 4 by 5 press camera was used with a polaroid film back, and photographs were taken of different colored materials under natural illumination. The effect of each filter on the photograph was immediately seen by the group and the analogous relationship to each ERTS channel presentation became evident.

A convenient method of transferring information from ERTS or other remote-sensing imagery to maps and charts was demonstrated on a Bausch and Lomb Zoom Transfer Scope which was especially designed to accommodate ERTS imagery. All participants were given an opportunity to operate the instrument. The Philippine Bureau of Mines purchased the new model used for the demonstration.

A tape record of low-light-level television (L³TV) of bioluminescence produced by schools of fish was shown which stimulated much interest in all disciplines. This technique shows promise as a means of measuring fish populations.

A short session was held on the assessment of resource problems and development needs in southeast Asia to which remote-sensing data might be applied. A panel consisting of Mr. U Soe K. Khaw (UN-ECAFE), and Drs. Nguyen Duong (Vietnam), Romeo C. Bruce (Philippines), and Jaafar Ahmad (Malaysia) began the discussion, which, under the guidance of W. H. Stevenson, ultimately engaged the audience.

Four workshops were held concurrently in the related fields of geology-hydrology, oceanography-fisheries, cartography-land use studies, and agriculture-forestry. The workshops provided an opportunity for the attendees to work with the remote-sensing data, and to gain some feeling for what can be seen on it and to what degree it could be used in their in their home environment. Enlargements of ERTS imagery of southeast Asian countries were used, as well as other remote-sensing data useful to the discipline groups. At this point it was possible to bring out detailed explanations and work on an individual basis with the participants. The groups ranged in size from three in oceanography-fisheries

to 16 in geology-hydrology. Although all observers did not participate in the workshops, those that were present taxed the distribution of workshop material.

Small but interesting facets to the seminar program were two field trips for the registered participants. The first trip, on Saturday, May 12, was to the Taal caldera, a large volcano about 25 km south of Manila. On the slopes of Mt. Taal, stratified crop stands of pineapple, papaya, and coconut were examined, as well as altitude-related forest changes. At the rim of the caldera the volcanological aspects were observed, including the site of two large eruptions just a few years ago. Returning from the volcano, the group visited the Agricultural Experiment Station of the University of the Philippines at Los Baños and the internationally financed rice experiment station where the high-yield rice strain was developed. The day was punctuated with heavy thundershowers. The next day, the entire group was taken aboard the Philippine Bureau of Fisheries vessel "Researcher" on a tour of Corregidor Island at the entrance to Manila Bay. On the return trip a trawling exercise was held by the ship's crew to demonstrate fish sampling techniques. Unfortunately the trawl caught on a submerged wreck and tore part of the net and one paravane away. Through skillful search and navigation the missing equipment was recovered.

The first trip covered an area that was examined previously on ERTS imagery by all attendees. Both trips combined to provide professional interest for all disciplines covered in the seminar.

EVALUATION AND RECOMMENDATIONS

The bases for an evaluation of the seminar are the responses of the participants and observers to a critique-questionnaire and the personal observations of the instructors (See appendix 6).

Questionnaires were distributed to all participants and to those observers present on May 17th, the day before the end of the seminar. Of 49 registered and 2 unregistered attendees, 33 returned the questionnaires. It is believed that all in the participant group returned the critique sheets and that the discrepancy is in the observer group, where many of the Filipinos were either not present and/or did not submit the forms. All except four of the returns were anonymous. The questionnaire was designed to evaluate the seminar presentation, resulting attitudes, and effectiveness of information transfer. Appendix 6 shows the summary of the answers received and typical comments.

An appraisal of the answers indicates that the First Asian Seminar on Remote Sensing attained its objectives. A large majority of the attendees found that:

- 1) The seminar was an adequate introduction to remote sensing and ERTS data technology and interpretation,
- 2) The instructors gave them an objective appraisal of the potential value of ERTS data, and
- 3) They could adequately justify using ERTS or other remote-sensing data to their superiors on the basis of what was learned at the seminar.

The recommendations of the attendees dealt primarily with the seminar length, content, and conduct. Many felt the session should have been longer, one as much as 8 weeks. If the seminar had been designed for a longer period, it is doubtful that it would have attracted such high-quality participants. Most of the attendees were high enough in their respective organizations that they could not have extended their stay for more than 2 weeks. The next phase in education should be specific discipline training at the EROS Data Center in Sioux Falls, South Dakota, for more detailed studies.

The content recommendations were diverse. Requests for expansion of certain topics, such as more remote-sensing background and data-handling techniques, could only be honored by extending the seminar length. More workshop sessions were desired and rightly so. However, to keep within the time frame, it would be desirable to reduce the number of disciplines covered. One request was that lecture materials (slides) should be imagery embracing Asian countries. To a certain small extent this was done, but state of the art illustrations are not usually found outside the United States. A suggestion, to give a project to a group in their field and correlate it to a trip on the last day, meets with many impracticalities. Weather is not cooperative; it would require expert knowledge of such a project area for anyone to get something of value from such a project, and there would not be enough time and required equipment. As recommended, a seminar for doers and not for administrators is an ideal situation, but those whose English capability is best are those who have studied in the United States

or England in some advanced education capacity, and who are, as a result, found in higher echelons. To get around this, specific discipline-oriented courses could be held in the native language of the host country, to attract the less highly trained personnel.

In seminar conduct there were some expected comments on a need for better organization to minimize duplication of topics. This was due, for the most part, to the fact that the instructors were all together for the first time at the seminar and little time was available to compare carefully overlapping topic areas. The repetition in some cases was probably beneficial.

A suggestion to conduct a seminar specifically for each field has much merit to it and should be strongly considered. Participant in the instruction by selected attendees, as suggested, should also be considered.

The instructors were unanimous in their evaluation of the seminar as an unqualified success, but recognized most of the problems brought out by the attendees. Basic changes in the seminar are therefore recommended as follows:

1. The seminar should be limited to specific disciplines and should not be as encompassing as the First Asian Seminar. If multiple disciplines are necessary, they should be limited to three main categories, such as a) Geology/hydrology, b) Forestry/agriculture/land-use, c) Cartography and related subdisciplines.

2. Time should be provided for the instructors to meet, plan, and organize their respective parts of the seminar while still in the United States.

3. Field trips involving nearby areas covered by ERTS or other sensor data should be opportunities for comparison of data with "ground truth." Use of such areas as project areas during the seminars are not recommended unless local experts can provide intensive preparation and close guidance to the participants.

4. The number of participants should be strictly limited to a fixed number, in order to plan the logistic support necessary for proper information transfer. The excessive number of attendees presented many problems that were not resolvable at the seminar site, such as literature, equipment use, practice, etc. No doubt many felt short-changed with the spreading thin of equipment and personal contact. The workshops were most detrimentally affected because sufficient teacher-student contact was impossible.

5. The number and discipline interests of attendees should be known well in advance (2 months, if possible) in order to get sufficient specific teaching materials.

6. An afternoon somewhere in the middle of the seminar should be used as free time for the attendees to arrange for travel and/or for visits to counterparts in the host country.

The aim of the seminar was to introduce remote-sensing technology to participating countries and to focus specifically on the application of ERTS data to national problems and programs. The seminar probably more than accomplished this aim. As a result of the seminar, representatives of several participating countries began asking about the possibility for more intensive training projects similar to the one held in Thailand in the

beginning of 1973. Korea, Afghanistan, and South Vietnam, in particular, seemed anxious to pursue the use of ERTS data in their national programs, but recognize the need for training their personnel to use available ERTS data effectively.

The participants in the seminar were almost all from middle management while the observers were split between "doers" and administrators. Middle management was reached and impressed and the seeds of progress through remote sensing were planted. It now will require occasional nurturing to keep the plant growing.

REGISTERED PARTICIPANTS

ASIAN SEMINAR AND WORKSHOP ON REMOTE SENSING

7 - 16 MAY 1973

1. DR. JAAFAR AHMAD
Assistant Director
Geological Survey, Malaysia
2. ROSLY ABU BAKAR
Inventory Officer
Forestry Head Office, Malaysia
3. WENG-TSE CHENG
Deputy Chief
Geothermal Res. Division
MRSO, Taiwan
4. NGUYEN DUONG
Assistant Professor
Geophysics Department, Faculty of Science
University of Saigon, Saigon, Vietnam
5. KAP JOON HAN
Forest Research Officer
Forest Resources Survey & Research Center
Office of Forestry, Seoul, Korea
6. WONIK KIM
Photogrammetric Engineer
Seoul, Korea
7. FAZIL RAHIM MOHMAND
President of Design & Analysis of
Central Statistics Office
Prime-Ministry, Kabul, Afghanistan
8. MISS LE-THI NGOC-THANE
Chief of the Laboratory of Photogeology
and Cartography, Dept. of Natural Resources
Saigon, Vietnam
9. SUVIT SAMPATTAVANIJA
Geologist
Department of Mineral Resources
Bangkok, Thailand
10. ADJAF SUDRADJAT
Chief of Photogeological Section of
Geological Survey of Indonesia
Bandung, Indonesia

REGISTERED PARTICIPANTS

(Continued)

11. FELIPE U. FRANCISCO
Chief Petroleum Geologist
Bureau of Mines, Philippines
12. OSCAR CRISPIN
Chief Geologist
Bureau of Mines, Philippines
13. RENATO M. ALICEUSAN
Cameraman
Bureau of Plant Industry, Philippines
14. RENATO G. BINOYA
Forester
Bureau of Forest Development
Philippines
15. PONCIANO C. CICERON
Assistant Chief Cartographer
Bureau of Coast & Geodetic Survey
Philippines
16. BELINO T. EPIC
Senior Forester
Bureau of Forest Development
Philippines
17. GODOFREDO N. IGLESIA
Chief Design Engineer
UPRP-NIA, Philippines
18. LEONARDO LOPEZ
Flight Leader POF
PAF, Philippines
19. HERNANDO B. MARGES
Senior Soil Technologist
Bureau of Soils, Philippines
20. ROMAN MATAVERDE
Chief Geodetic Engineer
Bureau of Lands, Philippines
21. SENEN M. MIRANDA
Assistant Professor
Dept. of Agricultural Engineering
U.P. Los Baños, Philippines

REGISTERED PARTICIPANTS

(Continued)

22. JOSE A. ORDOÑEZ
Supervising Fishery Biologist
Bureau of Fisheries
Philippines
23. ROMEO M. PULANCO
Supervising Geologist
National Power Corporation
Philippines
24. CAPT. JOSE G. SOLIS
Commanding Officer
516 Engr. Base Topo Co.
P.A., Philippines
25. JUAN G. VERACION
Instructor
U.P. Training Center for Applied
Geodesy & Photogrammetry
Philippines
26. MAJ. JOHN B. TAYAMEN
Chief, Real Estate Branch
OTCE, AFP, Philippines

REGISTERED OBSERVERS

ASIAN SEMINAR AND WORKSHOP ON REMOTE SENSING

7 - 18 MAY 1973

1. HOOI CHEW SUN
Deputy Director
Topo Survey, Survey Department
Kuala Lumpur, Malaysia
2. U SOE K. KHAW
Economic Affairs Officer
UN-ECAFE, Bangkok, Thailand
3. U NYEIN MAUNG
Second Secretary
Embassy of Burma
4. KIEW CHIONG TING
Staff Surveyor
Land Survey Department HQ., Kuching
Sarawak, Malaysia
5. CARLOS F. TEODORO
Supervising Geologist II
Bureau of Mines, Philippines
6. JUAN R. ARENAS
Photogrammetrist
Training Center for Applied Geodesy
and Photogrammetry, College of
Engineering, U.P., Philippines
7. RUBEN B. ASPIRAS
Assistant Professor
Department of Soil Science
U.P. Los Baños, Philippines
8. RENATO B. FEIR
Acting Chief
Photogrammetry Section
Bureau of Coast & Geodetic Survey
Philippines
9. MANUEL LLORCA
Supervising Fishery Technologist
Bureau of Fisheries, Philippines
10. ALFREDO L. MACPANTAY
Supervising Geologist II
Bureau of Mines, Philippines
11. PANFILO O. MONTERO
Senior Geologist
Bureau of Mines, Philippines

REGISTERED OBSERVERS
(Continued)

12. ISIDORO B. PILOBELLO
Technical Consultant
Special Projects Office
Malacañang, Philippines
13. FRANCISCO L. RAEUY
Supervising Geodetic Engineer II
Bureau of Lands, Philippines
14. GUILLERMO C. TRINIDAD
Asst. Chief Project Coordinator
DMS, Malacañang, Philippines
15. GREGORIO J. UMADHAY
Associate Professor
U.P., Q.C., Philippines
16. EDUARDO Y. VALLESTEROS
Supervising Geologist I
Bureau of Mines, Philippines
17. NORBERTO S. VILA
Professor of Geodetic Engineering
and Director, Training Center of
Applied Geodesy and Photogrammetry
U.P., Q.C., Philippines
18. JOSE S. LAYSON, JR.
Geologist
Philex Mining Corp., Philippines
19. CAPT. JUNY P. LAPUTT
PMA, Baguio City
Philippines
20. VICTOR S. SERAFICA
Exploration Geologist
Philex Mining Corp., Philippines
21. ROMEL P. JACINTO
Exploration Engineer
Philex Mining Corp., Philippines
22. MARIANO M. MELENDRES, JR.
Chief Geologist
504 Don Santiago Bldg., Taft Ave.
Manila, Philippines
23. JUAN D. SINGSON
Mining Engineer
P. O. Box 1201, MCC Makati
Rizal, Philippines

UNREGISTERED OBSERVERS

1. PUZON, ELVETERIO M.
Geologist
Bureau of Mines, Philippines
2. PENARROYO, ALFREDO
Exploration Geologist
Philex Mining Corp., Philippines

Preliminary List of Material and Service Requirements
for the Remote Sensing Seminar and Workshop
to be held in Manila, the Philippines,
May 7-18, 1973

1. Space and Furniture Requirements

- a. A large room that will seat about 40 persons comfortably and has air conditioning or satisfactory ventilation and shading from direct sunlight. This room will be used for sessions of general interest to all participants.
- b. Additional 3 smaller rooms for presentations of remote sensing aspects of specific disciplines during concurrent sessions. These should be adequately ventilated and shaded also.
- c. Rooms should be capable of being darkened for projection of slides or vuegraphs.
- d. Tables or desks and chairs for about 35 participants in the workshop where use of teaching materials requires room to spread out.
- e. Temporary office space for 4 instructors.
- f. Adequate lighting for all participants and instructors. Ideally a good desk lamp is desirable for each person.

2. Laboratory Equipment - Need use of or access to the following:

- a. Pocket stereoscopes - one for each participant is desirable.
- b. Mirror stereoscopes - about 3 or 4.
- c. Light tables - portatrace type or aerial film viewing table (about 5 or 6).
- d. Magnifying lenses or loupes, about 4 power - one for each participant.
- e. 35 mm. projectors - at least 2, but preferably 3, each with spare bulbs.

- f. 3½ x 4 inches lantern slide projector to be used for regular slides and ERTS image chips (70 mm.) - one is sufficient with some spare bulbs.
 - g. Overhead projector for opaque prints - one with spare bulbs.
 - h. Vue-graph type projector - one with spare bulbs.
 - i. Projection screens - at least 2, but 3 preferred.
 - j. 16 mm. motion picture projector equipped for sound.
 - k. Current converters of adequate wattage where needed for any of the above items.
3. Map Coverage of the Philippines (latest editions and largest scales desirable)
- a. Geological, geophysical and topographic.
 - b. Hydrographic, bathymetric, tidal, wind and current charts.
 - c. Agricultural, forestry and land use maps.
 - d. Any other maps or charts useful to the seminar.
4. Remote Sensor Coverage of Philippine Areas (if possible) - Any color infrared photography, radar and infrared imagery of areas exemplifying agricultural, forest, marine and mineral resources, urban development and geological phenomena (especially volcanic) would be welcome as teaching material.

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14 February 1973

Sir:

I have pleasure in inviting your Organization to send an observer to Manila to participate in the ASIAN SEMINAR AND WORKSHOP ON REMOTE SENSING, May 7 through 18, 1973, to be hosted by the Government of the Republic of the Philippines with the cooperation of the United States Agency for International Development.

The primary purpose of the Seminar is to provide sufficient technical understanding and training to appropriate administrators, policy makers and senior technical personnel so that sound technical assessments might be made by Asian Governments on the potential applications of remote sensing techniques for resource development in their respective countries. Imagery of Asia from ERTS-1 now in orbit and results of aircraft and other satellite surveys are to be used as reference and study materials, along with demonstration of image interpretation techniques and selected equipment used for this purpose.

The Government of the Republic of the Philippines will provide the administrative arrangements and necessary space required for the Seminar, in addition to instruction based on case studies in the Philippines while the United States Agency for International Development will provide specialized instructors and teaching aids for the Seminar which will be conducted in English.

The Seminar will be held at the College of Engineering, University of the Philippines, Diliman, Quezon City, under the direction of the Philippine National Committee for Mineral Exploration and Survey Operations (NACOMESO). Mr. Fernando S. Busuego, Jr., Vice Chairman of NACOMESO and Director, Bureau of Mines, Department of Agriculture and Natural Resources, Manila, will be in charge of arrangements, and should be contacted directly if questions should arise or further detail be desired.

There is no provision for travel and living cost reimbursement for participants.

For planning purposes, it will be necessary to have advance information of who will participate at least one month before the Seminar is to start. Therefore, if the Government of the Republic of the Philippines receives no indication of a candidate from your Organization by April 7, 1973, it will be assumed that there will be no candidate.

A preliminary agenda for the Seminar is attached.

Very truly yours,

MANUEL COLLANTES

Acting Secretary of Foreign Affairs

Enclosure: As stated.

The Executive Secretary

Economic Commission for Asia & the Far East (ECAFE)
Bangkok

(Attention: Mekong Committee)

UNAIC:IC:EFB:VCC

SENT TO: 1) Mekong Committee, ECAFE, Bangkok - 1 observer
2) Asian Development Bank, Manila - 1 "
3) CCOP, ECAFE, Bangkok - 2 observers

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No.

The Department of Foreign Affairs presents its compliments to the Embassy of Malaysia and has the honor to invite the Government of Malaysia to send one or two representatives to Manila to participate in the ASIAN SEMINAR AND WORKSHOP ON REMOTE SENSING, May 7 through 18, 1973, to be hosted by the Government of the Republic of the Philippines with the cooperation of the United States Agency for International Development.

The primary purpose of the Seminar is to provide sufficient technical understanding and training to appropriate administrators, policy makers and senior technical personnel so that sound technical assessments might be made by Asian Governments on the potential applications of remote sensing techniques for resource development in their respective countries. Imagery of Asia from ERTS-1 now in orbit and results of aircraft and other satellite surveys are to be used as reference and study materials, along with demonstration of image interpretation techniques and selected equipment used for this purpose.

The Government of the Republic of the Philippines will provide the administrative arrangements and necessary space required for the Seminar, in addition to instruction based on case studies in the Philippines while the United States Agency for International Development will provide specialized instructors and teaching aids for the Seminar which will be conducted in English.

(CONTINUED NEXT PAGE)

The Seminar will be held at the College of Engineering, University of the Philippines, Diliman, Quezon City, under the direction of the Philippine National Committee for Mineral Exploration and Survey Operations (NACOMESO). Mr. Fernando S. Busuego, Jr., Vice Chairman of NACOMESO and Director, Bureau of Mines, Department of Agriculture and Natural Resources, Manila, will be in charge of arrangements, and should be contacted directly if questions should arise or further detail be desired. As the Seminar will be limited to thirty (30) persons, Governments should indicate priorities among their candidates should it be necessary to restrict attendance.

There is no provision for travel and living cost reimbursement for participants.

For planning purposes, it will be necessary to have advance information of who will participate at least one month before the Seminar is to start. Therefore, if the Government of the Republic of the Philippines receives no indication of candidates from the Government of Malaysia by April 7, 1973, it will be assumed that there will be no candidate.

A preliminary agenda for the Seminar is attached.

The Department of Foreign Affairs avails itself of this opportunity to renew to the Embassy of Malaysia the assurances of its highest consideration.

Manila, 12 February 1973
UNAIC:IC:ADY:EFB:VCC

Sent to: 1) Sri Lanka - 1 or 2 representatives.
2) Afghanistan - 1 or 2 "
3) Nepal - 1 or 2 "
4) Malaysia - 1 or 2 "
5) China - 1 to 3 "
6) Pakistan - 1 to 3 "
7) Laos - 1 to 3 "
8) India - 1 to 3 "
9) Korea - 1 to 3 "
10) Khmer - 1 to 3 "
11) Bangladesh - 1 to 3 "
12) Burma - 1 to 3 "
13) Vietnam - 1 to 3 "

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QUESTIONNAIRE ON PARTICIPANT'S BACKGROUND AND INTERESTS

ASIAN REMOTE SENSING SEMINAR
MANILA, THE PHILIPPINES
May 7-18, 1973

1. NAME IN FULL (underline family name)

2. COUNTRY

3. ORGANIZATION AND POSITION TITLE

4. COMPLETE MAILING ADDRESS

5. SPONSOR (if different from 3)

6. UNIVERSITY OR POST-SECONDARY SCHOOL EDUCATION (indicate Name, Location, Major Subjects, Degrees or Certificates, and dates)

7. WHAT PREVIOUS TRAINING IN REMOTE SENSING, INCLUDING PHOTOINTERPRETATION HAVE YOU HAD? (Indicate course title, where, and dates)

8. WHAT ARE YOUR AREAS (DISCIPLINES) OF INTEREST?

9. ENGLISH LANGUAGE CAPABILITY (Indicate by number highest level of competence: 1- poor, 2-fair, 3-good, or 4-excellent)

- UNDERSTANDING ()
- SPEAKING ()
- READING ()
- WRITING ()

10. IN WHAT WAY, IF ANY, ARE YOU INVOLVED WITH THE EARTH RESOURCES TECHNOLOGY SATELLITE (ERTS) PROGRAM? (Give project title, objectives, and your role in it). IF YOU DO NOT PRESENTLY USE ERTS DATA DO YOU PLAN TO USE IT? HOW?

11. DOES YOUR COUNTRY OR REGIONAL ORGANIZATION HAVE ANY SPECIFIC DEVELOPMENTAL OR RESEARCH PROBLEMS THAT MIGHT USE ERTS OR OTHER REMOTE SENSOR INFORMATION? WHAT ARE THEY?

12. DO YOU PLAN TO PASS ON INFORMATION OBTAINED AT THIS SEMINAR TO OTHERS IN YOUR ORGANIZATION? IF SO HOW?

P R O G R A M M E

ASIAN REMOTE SENSING SEMINAR AND WORKSHOPUNIVERSITY OF THE PHILIPPINESQUEZON CITY, PHILIPPINES

May 7-18, 1973

MAY 7. MONDAY

0900 - Registration

1000 - Opening Ceremonies - Dr. Romeo C. Bruce, M.C.

National Anthem

Opening Addresses:

Honorable Thomas C. Niblock

Director, U.S.A.I.D. to the Republic of the
Philippines

Honorable Arturo R. Tanco, Jr.

Secretary of Agriculture and Natural Resources

1400-1600 - 1) Review of Philippine remote sensing programs
by Dr. Romeo C. Bruce, University of the
Philippines

2) Overview of remote sensing principles

The electromagnetic spectrum - definitions,
units, interactions between energy and matterLecturer: Dr. John L. Place - U.S. Geological
Survey1830-2000 - Cocktail party in honor of participants and observers
Intercontinental Hotel, Makati, RizalMAY 8. TUESDAY

0900-1200 - Basic aerial photointerpretation

The aerial photograph, film and filters, recogni-
tion elementsLecturers: Dr. Romeo C. Bruce and Mr. George E.
Stoertz

1400-1700 - Remote sensing techniques and instrumentation

The visible, ultraviolet, and infrared parts of
the spectrum; multiband photographyLecturers: S. J. Gawarecki, J. L. Place and
G. E. Stoertz - U.S. Geological
Survey

MAY 9, WEDNESDAY

- 0900 - Remote sensing techniques and instrumentation
Active and passive microwave systems
Lecturer: Dr. Stanley A. Morain, University
of Kansas
- 1400 - The Earth Resources Technology Satellite (ERTS)
Program
Technical aspects - Description of MSS, RBV, and
DCS systems; orbital characteristics; scene mar-
ginalia; and investigator aspects - data acquisi-
tion, products and processing, etc.
Lecturers: G. E. Stoertz and J. L. Place

MAY 10, THURSDAY

- 0900 - Sensor data processing and management.
ERTS and other remote sensing data
Lecturers: S. A. Morain, W. H. Stevenson,
J. L. Place, and S. J. Gawarecki
- 1400 - Technology demonstrations
1. Demonstration of diazo foil technique for
making ERTS color composites - by G. E. Stoertz
 2. Demonstration of the effects of filters on
spectral response of film - by S. J. Gawarecki

MAY 11, FRIDAY

- 0900 - ERTS and other sensor data applications in carto-
graphy and geography
Cartographic uses and methods, land use studies,
and demography.
Lecturer: J. L. Place
- 1400 - ERTS and other sensor data applications in ocean-
ography and marine fisheries
Direct and inferred interpretation of photographic
data, multispectral and special sensor techniques,
ERTS and other spacecraft oceanography.
Lecturer: W. H. Stevenson, National Marine
Fisheries Service, National Oceanic
and Atmospheric Administration

MAY 12, SATURDAY

- 0730 - Field trip to Taal Volcano and to Los Baños agri-
cultural area.
Correlation of ERTS and other sensor data with
"ground truth."
Leader: Dr. R. C. Bruce and others

MAY 13. SUNDAY

0630-1800 - Trip to Corregidor Island in Manila Bay aboard Oceanographic vessel "Researcher" with oceanographic exercise on return leg.

Leaders - Philippine Bureau of Fisheries and Bureau of Mines personnel

MAY 14. MONDAY

0900 - ERTS and other sensor data applications in geology, volcanology, and hydrology

Lecturers: G. E. Stoertz and S. J. Gawarecki

1400 - ERTS and other sensor data applications in agriculture and forestry

Lecturer: S. A. Morain

MAY 15. TUESDAY

0900 - Assessment of resource problems and development needs in Southeast Asia - a panel discussion by national and regional organization representatives.

Moderator: W. H. Stevenson

1030 - Planning exercise: How ERTS and other sensor data can be used in participating countries and regional organizations.

Leader: S. A. Morain

1400 - ERTS and other data display and transfer techniques

1) Demonstration of color additive viewer-projector - by J. L. Place

2) Demonstration of zoom transfer scope - by S. J. Gawarecki

3) Practical exercise by participants in producing diazo foil color composites - led by G. E. Stoertz

4) Visual presentation of low light level television tapes as used in fisheries research - by W.H. Stevenson

MAY 16. WEDNESDAY

0900-1700 - Concurrent workshops in all disciplines

Detailed explanations, practical imagery interpretation, planning assistance, etc.

Led by staff

1300-1400 - Special lecture - Color infrared applications in agriculture - Lecturer - Dr. R. C. Bruce

MAY 17. THURSDAY

0900-1700 - Concurrent workshops in all disciplines (cont'd)
Lcd by staff

MAY 18. FRIDAY

- 0800 - 1) Review of sensor systems, principles, and applications - by staff
2) Participation in ERTS-B and later programs- by staff
3) Training opportunities in remote sensing- by staff
4) ERTS film presentation
- 1100 - Closing Ceremonies - vote of thanks and award of certificates.

POST-SEMINAR SURVEY

This seminar, because of its relatively brief duration, could only provide an introduction to ERTS and other remote sensing techniques and data interpretation. With this limitation in mind it would be appreciated if the following questions would be answered to the best of your ability. It is not necessary to identify yourself.

If additional space is necessary use the back of the sheet.

QuestionsAnswers

1. Was the seminar adequate as an introduction to remote sensing in general and ERTS data technology and interpretation in general? Yes, 31 - No, 2
 Comments: "about right," "adequate," "in general, yes," "introduction yes, interpretation inadequate," "yes, adequate for end users "
2. Did the instructors spend too much time on remote sensing techniques other than ERTS? or vice versa? Yes, 9 - No, 23
 Comments: "fairly balanced," "just enough time for each," "both were well presented throughout the seminar period," "too much time on computer processing," "properly apportioned"
3. Did you feel that information on ERTS applications to disciplines other than your own were of any value to you? Qualify your answer. Yes, 31 - No, 2
4. Did the lectures and workshop relate to each other? Yes, 30 - No, 1, Other, 2
 Comments: "very much," "not much," "a lot of repetitions" (sic), "lectures... more useful than workshops"
5. Do you feel that the instructors gave you an objective appraisal of the potential value of ERTS data? Yes, 32 - No, 1
6. Will you be working on a remote sensing project using ERTS or any other sensor data in the near future? Please describe the project briefly. Yes, 16 - No, 7
 Indirectly, 2
 Probably, 2

QuestionsAnswers

7. Do you feel that you could adequately justify using ERTS or other remote sensing data to your superiors on the basis of what you have learned here? Yes, 23 - No, 3
Other, 7

Comments: "I am confident," "to a certain extent," "not to a wide extent," "I doubt it," "I will try," "not sure"

8. Did the seminar arouse in you enough interest in remote sensing to create a desire to obtain further education in remote sensing? Yes, 33 - No, 0

Comments: "suggest next seminar be held in CONUS for availability of their equipment," "particularly in computerizing ERTS data for use in mapping," "yes, definitely," "this should be a must; knowledge acquired here must be developed"

9. Could any of the remote sensing techniques described at the seminar be used to solve problems in your particular department or in your country? How? If your answer is negative, please indicate why. Yes, 31 - No, 1
Other, 1

Comments: "Yes, particularly on the national level....inventory of rice, ...updating geological maps, and in making decisions on economic matters," "survey of swamplands and shore areas can be made possible within shortest possible time," "to be used on a very general basis and still has to be supplemented by other methods."

10. What did you like best about the seminar? Which part of the seminar did you feel was most useful to you? The lectures, the workshop, the field trips, or the instrument and diazo techniques? Summary of each item mentioned:
Lectures, 27
Technology demonstrations, 19
Workshop, 9
Field trip, 1
Parts of each, 1
Free and easy exchange by instructors
11. Outside of the formal seminar activities, did you benefit from an exchange of ideas with participants of other countries? Yes, 29 - No, 2
Little, 1 - Other, 1

Comments: "Very much so," "yes, particularly meeting foreigner engaged in same field as I am and especially the instructor," "to some extent," "no time for exchange of ideas"

Questions

Answers

12. What recommendations, if any, do you have for the conduct of future seminars of similar nature? See a, b, and c below

Recommendations as to:

- a) Length of seminar - "prolong to perhaps a month," "say a duration of one month," "longer period and more detailed lecture as well as workshop," "hope future seminars...long enough to make detailed discussions," "should be 6-8 weeks," "a longer seminar should be conducted," "more hours needed in workshops," "afternoon lectures not be (sic) too long," "for a seminar lasting...ten days only I think the methods of preparation as was done here is adequate."
- b) Seminar content - "give us more background knowledge in remote sensing in future seminars," "more time...to talk about data handling techniques," "more workshops and all participants should go through all disciplines," "more hours needed in workshops," "materials used in lectures should be imagery embracing Asian countries," "each participant or group given a project according to their field then correlate to field trip on last day," "separate ERTS from other airborne techniques," "must be designed for doers and not for administrators."
- c) Seminar conduct - "lecturers' notes (should be) distributed at least one day ahead before each lecture," "discuss how to carry project out from beginning to end," "must be conducted specifically for each field in order to have more concentrated effort," "suggest separate seminars for different fields of interest," "participants with almost the same level of training and experience should be grouped together," "participants should contribute a paper of ERTS studies and applications in their countries," "field trip to visit case study where remote sensing has been successfully applied," "it should be more organized," "duty conferences should be conducted among instructors to avoid duplication of topics," "should make crowd laugh once in a while."