

Special Sessions (SS)

Joint Board of Remote Sensing Activities (JOBRESA) and National Aeronautics and Space Administration (NASA)

Session BM-RSA Special Panel Discussion

"Effect of the Impacts of Changes in Landsat-7 Data Policy upon the Remote Sensing Communities"

August 09, 1992, 10:30-12:00

Session Reporter: Sky Chamard

Chairpersons: *G. Konecny* (Germany) & *K. Green* (USA)

Panel Members: **Lisa Shaffer** (NASA), **Pete Didishein** (US House of Representatives, Science and Space Committee), **Jack Estes** (University of California), **Kass Green** (Pacific Meridian), **Clark Nelson** (SPOT Image), **Edward H. Backus** (Conservation International), **Dr Arturo Silvestrini** (EOSAT)

Three key points were addressed: (1) Landsat 7 must be launched in order to maintain the continuity of Earth resource and global change monitoring; (2) stable costing of Landsat and SPOT data sets is required; price discounts should be devised for universities and other non-value added commercial users; and (3) continuing research in space imagery products is necessary in order to develop useful applications thereby increasing demand and ultimately reducing cost to the purchaser.

The session panel members and members of the audience agreed on the space program being useful but it needs pricing agreement. It was pointed out that SPOT and Landsat data on a hectare basis are still much less expensive than other image acquisition systems.

The price of SPOT/Landsat data is too expensive for many developing countries to use, but still may be the only way they will be able to assess their resources. Canada does work with developing countries, providing them the needed product, and expects reimbursement as data provides results in income to the country. The panel agreed that price of the product does affect use. No suggested policy was agreed upon.

INTERCOMMISSION WORKING GROUP I/IV

Session SS-04 - International Cooperation for Remote Sensing Satellites

August 5, 1992, 13:30-15:00

Session Reporter: *J. L. Aquirre*

Chairman: *Dr. Gottfried Konecny* (Germany)

Adigun Ade Abiodun (United Nations) - **Opportunities and Limitations on Internationalization of Remote Sensing**

Three key points were addressed: (1) Motivation for international cooperation, (2) establishment of an international consortium, and (3) participation of developing countries.

Problems affecting large areas (volcanic eruptions, pollution, deforestation, etc.) are the main motivation for international cooperation in this field. A proposal for an international remote sensing satellite system should address satellite complementarity, a managing consortium with a limit for the percent of shares any country could have, and a task force to determine feasibility. The participation of developing countries, including training of specialists, is essential.

Russell Koffler (U.S.A.) - **The Role of CEOS (Committee on Earth Observations Satellites) in the Coordination of International Remote Sensing Activities.**

Four key points were addressed: (1) International standards in remote sensing, (2) data formats, (3) directory interchange, and (4) sensor calibration and validation.

The structure, terms of reference, and activities of CEOS are described, detailing the role of its permanent and ad-hoc Working Groups.

John McDonald (Canada) - **An Operational Information System**

His key point was on critical issues in the design and establishment of a satellite-based information system.

Information is vital for sustained development, which must balance environmental health versus economic health. The required information should define the processing systems, the sensing instruments, and, finally, the spacecrafts and orbits. Normally things happen the other way around. It is also common that system designs privilege the scientific user to the detriment of the operational user, or vice-versa. Effective radiometric calibration and geocoding of processed imagery are essential for operational use. A reliable, worldwide Digital Elevation Model is a basic requirement.

Shelby Tilford (U.S.A.) - **The Role of CEOS in Mission to Planet Earth**

Two key points were addressed: (1) International coordination and (2) program planning.

Joining several agencies responsible for space programs, CEOS promotes systems complementarity and cooperation. The roles of and interactions (including cash flow) among the different players in an integrated, large-scale remote sensing program (operational user, information delivery system, scientific user, knowledge database, archive, receiving system, sensors, and spacecraft) are analyzed.

Jan-Peter Müller (U.K.) - **Global Mapping Products for the EOS Programme**

One key point was addressed: Effort areas for an effective exploitation of the EOS data.

Requirements, capabilities, and limitations of global mapping products are discussed. Four major areas

towards which to dedicate efforts are topographic maps, image maps, land-cover maps, and digital maps. Need for use of a unified datum is emphasized.

Donald L. Light (U.S.A.) - An International Opportunity for an Orbital Imaging System

Three key points were addressed: (1) System concepts, (2) technical characteristics, and (3) international mechanisms.

The outline of a proposal for an international imaging system is presented. Usefulness at 1:50,000 scale is taken as a requirement and a 150 Mb/s downlink rates as an upper limit, leading to the definition of compatible pixel size, orbital height, repeat cycle, and swath width. Membership should be open to all nations, with investment proportional to GNP and data provided at fair cost. Need of close coordination with Mission to Planet Earth and other international programs is stressed.

V. Liebig (Germany) - New Satellite Data with High Ground Resolution from the Space Complex MIR and other Platforms.

One key point was addressed: Russian satellites and cameras as inexpensive alternatives.

An overview is presented about different analog camera models employed in the Russian space program. The available products and organizations distributing them are covered.

COMMISSION V

Session SS-03 - Dimensional Inspection and Quality Control in the Manufacturing Industry: Requirements, Techniques, Perspectives

August 4, 1992, 15:30-17:00

Session Reporter: H. G. Maas

Chairman: Dr. Armin W. Gruen (Switzerland)

Panel Members:

A. Gruen, Switzerland (Academia)

H. Haggren, Finland (Academia)

S. El-Hakim, Canada (Government R&D)

Th. Luhmann, Switzerland (System Manufacturer)

C. Fraser, USA (System Manufacturer)

R. Ryan, USA (Aircraft Industry)

A. Dumond, France (Services)

Introduction by C. Fraser:

There has been a considerable growth of close range photogrammetry in the past few years in the fields of services, technology transfer, development of systems, and in the aircraft, car, and ship industries.

The session was opened by a 15-minute presentation by **R. Ryan** on high precision photogrammetry in the aircraft industry. He divided his presentation into three parts:

1. Potential measurement tasks.

2. Technologies before the introduction of photogrammetry.
3. Systems

Measurement tasks performed by photogrammetry in the aircraft industry are inspection, fit check, contour measurement, reverse engineering, and deformation studies. Photogrammetry was originally introduced for the purpose of checking structural tools. Before the introduction of photogrammetry, tasks were performed using "classical" surveying tools (theodolites, tapes, and levels) which were found to be operator sensitive and sensitive to vibrations. The benefits of photogrammetry can be seen in the improved accuracy, higher portability, and faster data acquisition. Photogrammetric data acquisition does not require a stable platform and is a non-contact method. It is also very well suited for the capture of dynamic events. The object size is unlimited and the upload of the data to CAD systems is easy. Results are objective and reliable. Industrial photogrammetry provides a versatile and economic tool for highly accurate 3D measurements of aircraft structures and tooling used to manufacture an airplane.

A. Gruen opened the panel discussion with two questions:

1. Technology status: What is available (hardware, software, systems)? What can be measured today?
2. What are the requirements of users?

H. Haggren: We have the tools we need, but we do not have the knowledge of how to use them for the special tasks. We can measure signalized points, but if we have to measure the whole object we are in trouble. The industry needs an accuracy of 1:70,000.

Th. Luhmann: Good computers and image processing techniques are available, but there is a lack on the sensor side; high resolution cameras are much too expensive. The theodolite is also a very important and well-proven tool. A lot of algorithms are available, which do their jobs well; user interfaces are also available. Problems can be seen in the complexity of systems, the maintenance, and the high costs of software development. An accuracy of 1:50,000 to 1:100,000 should be aimed at.

S. El-Hakim: Sufficient hardware is available except for high resolution cameras which are too expensive, but which might become cheaper with HDTV. Good algorithms for calibration matching and 3D coordinate computations are available. However, there is a lack of good, automated procedures for the measurement of surfaces and edges which are not well defined.

A. Dumond: Data Processing can easily be automated, but data capture still requires human experience.

C. Fraser: The digital world has not yet been accepted. The minimum accuracy requirement is 1:50,000. One can't say this is what I have - What can you do with it?

Questions from the audience:

H. Beyer: At what price and for which application can you use a 4k by 4k sensor?

Th. Luhmann: For applications for which there is no alternative, photogrammetric systems may be expensive. For applications where we have to compete with, e.g., coordinate measurement machines, a camera should cost less than \$5,000.

W. Foerstner: How do you predict the availability of image features which can be used instead of targets?

C. Fraser: Feature extraction may be possible for some surface measurement tasks, but a lot of industrial applications require discrete points.

A. Gruen: This is a really important task: do away with signalization, maybe even with structured light, and use only natural features: that would increase acceptance.

S. El-Hakim: This will be possible only if object models are present.

A. Gruen: What do users expect from systems in terms of performance and cost? What are factory floor constraints and administrative aspects? Who is the user? --an expert, an engineer, or a high-school graduate?

H. Haggren: Make systems desirable to users by a step-by-step procedure, do not cause new trouble in the production process. The situation is different if you have a real new application.

Th. Luhmann: Users would like to have complete systems, including analysis, interfaces, etc. from one vendor. The price/performance ratio has to be competitive, including maintenance and education. Systems must be robust and safe to meet the environmental conditions in industry. These constraints are often unknown to photogrammetrists. Photogrammetry has to be made understandable to the user.

S. El-Hakim: We have to be at least as accurate as a coordinate measuring machine or a theodolite and, at the same time, as reliable but much faster and cheaper.

R. Ryan: Users need the highest accuracy and the highest speed in a turnkey system at lowest cost. Some industries would pay almost anything for such a system. Users need a system that covers a broad spectrum and replaces many other systems that fill small niches.

C. Fraser: With off-line systems, we can be a bit more forgiving than with on-line systems. On-line systems have to be made more robust.

Questions from the audience:

A. Legac: What about standards on quality control of systems?

W. Foerstner: Where are the critical points in our systems?

H. Haggren: We are taught to use the traditional techniques for traditional problems. That is the main problem. We do not see the ideal solution for the modern problems.

D. Brown: In the real world, you are faced with obstacles, you have to live with poor geometry, etc. You need 1:300,000 accuracy under ideal conditions to be sure to achieve the required 1:50,000 accuracy under real conditions.

A. Gruen: One point instead of a long conclusion: What do you expect from the near future? Are we looking into a rosy immediate future?

D. Fritsch: We are now in a transition phase, and we have to keep in mind other techniques like structured light.

A. Gruen: If the user cannot work with a system, he will not use it. We have to distinguish between the extremely high precision systems and the truly digital systems, which are much faster. There are a lot of applications which do not require extreme accuracies. It disturbs me that there have not been many developments in this field in the last four years. We should not promise too much but suggest realistic systems.

COMMISSION V

Session SS-06 - Photogrammetry Records the World's Heritage

August 7, 1992, 15:30-17:00

Session Reporter: R. W. A. Dallas

Chairs: Ross W. A. Dallas (United Kingdom) and Dr. John Badekas (Greece)

Herb Stovel (Canada) - Recording: Unrealized Potential for Heritage Conservation

Three key points were addressed: (1) Recording and monitoring of heritage sites, (2) the role of ICOMOS (International Council for Monuments and Sites), and (3) close involvement of photogrammetrists is needed.

The value of recording of historic sites and monuments is growing, especially as we recognize a monitoring role. However, "recorders" (including photogrammetrists) must commit themselves more by becoming involved in value judgements on their results, or they will not move beyond the technician role.

Peter Waldhäusl (Austria) - Defining the Future of Architectural Photogrammetry

Three key points were addressed: (1) The method is well proven but too slow, (2) there is a continual loss of historic fabric, and (3) the right ideas for promotion of photogrammetry are needed.

The value of photogrammetry is well proven, but, after 100 years, only one to two percent of monuments have been recorded. Photogrammetrists must find better ways of speeding up the applications. Eight themes which must be explored/developed if architectural photogrammetry is to become more universal were provided.

Antonio Cheli (Argentina) - Some Cases of Architectural Photogrammetry done in Central and South America

Three key points were addressed: (1) Applications in South America, (2) development of Center for Recording at the University of La Plata, and (3) there is enormous potential in South America.

The author describes his work in South America to bring the techniques of architectural photogrammetry to a wider audience. He describes how he has built up the Center for Documentation at the University of La Plata, by examples from several South American countries.

R. W. A. Dallas (United Kingdom), M. Carbone -
World Heritage Sites -- Photogrammetric Records

Three key points were addressed: (1) Description of typical World Heritage Sites, (2) the importance of this group of monuments, and (3) problems of scale of the task.

World Heritage Sites will be a new concept to many photogrammetrists. These are the most important historic and natural sites in the world. Recording and monitoring them in many ways encapsulates the problems of recording all sites in the world of architectural and historical interest.

COMMISSION VI

Session SS-08 - International Technical Cooperation:
How to Promote Remote Sensing in Developing Countries

August 12, 1992, 13:30-15:00

Chairman: Dr. Shunji Murai (Japan)

Bruce C. Forster (Australia) - **How to Promote Remote Sensing -- The Asian Experience**

Three key points were addressed: (1) A national inventory of remote sensing applications and users is critical for optimum transfer of remote sensing technology, (2) the Asian Association on Remote Sensing has been a major contributor to the promotion of remote sensing in Asia, and (3) the Asian experience is a good model for other regions.

The annual conference of the Asian Association on Remote Sensing uses a planning session to discuss ways and means of promoting remote sensing in Asia. A summary of the problems and solutions applicable to Asia, derived from meetings over the past decade, was provided.

Shunji Murai (Japan) - **Regional Activities on Remote Sensing in Asia**

Three key points were addressed: (1) Greater emphasis should be placed on training at the PhD level, (2) assistance in research organization is important, and (3) PC based training modules and other materials should be developed.

A brief history of the Asian Association on Remote Sensing was given, followed by the Association's current activities and the forthcoming conference in Mongolia. It was suggested that in education more PhD level persons were required, that training materials such as PC based training was necessary, and that research persons who have obtained PhDs overseas should be assisted in the organization of their research.

Bulusu L. Deekshatulu (India) - **How to Promote Remote Sensing -- Indian Experience**

Three key points were addressed: (1) Critical factors for success are an emphasis on national development, issue based applications, and predictive models; (2) training is very important and must be considered as an

add on to other discipline areas; and (3) future directions include microwave, GIS, expert systems, and resource management models.

A brief history of the Indian remote sensing experience was presented. This in particular stressed the need for a national approach and providing solutions to real problems. A great many examples of successful applications were listed. The future direction of the national programs were briefly addressed. Training was stressed as being very important at all levels, from schools to universities.

Dr. Paibul Ruangsirj (Thailand) - **Activities of National Research Council of Thailand**

Three key points were addressed: (1) Thailand is a regional provider of data, (2) lack of data is major problem of the region, and (3) the Thai receiving station is being upgraded this year.

A background to Thailand's involvement in remote sensing from 1972 to the present was given. The establishment of a receiving station in 1980 and its subregional upgrade and planned future upgrades make Thailand a major regional provider of data. The structure of the Thai national center and its relationship with other departments was over viewed. Thailand has the fifth largest sales of satellite remote sensing data in the world.

John van Genderen (Netherlands) - **Activities of ITC in Developing Countries**

Three key points were addressed: (1) ITC is shifting from technician training to Masters and PhD training, (2) ITC will place greater emphasis on research, and (3) new courses are being developed.

A summary of the education, research, and consulting activities of ITC since the Kyoto conference was presented. There has been a shift from technical level training to higher level PhD and masters training. Technician training is being more directed to in-country self-learning packages. New courses with environmental bias have been developed, and a strong institutional research program is being developed. Consulting projects on all continents have been undertaken.

G. Weill (France) - **Les Conditions de Succes de la Cooperation Technique et du Tranfert de Technologie**

Three key points were addressed: (1) GDTA and ITC to collaborate with Nigeria and Kenya in training; (2) updating of staff and equipment in the 1991-1995 period; and (3) operational projects and on-the-job training in the 1993-1998 period.

Collaboration by GDTA, EEC, and ITC with remote sensing national organizations in Kenya and Nigeria was outlined. In particular, the collaboration intends to provide more informed decision makers, to train specialist at various levels, and to upgrade selected centers to the state-of-the-art in remote sensing. The program is a concentrated, long term effort to address problems in Africa.

INTERCOMMISSION WORKING GROUP VII/I

Session SS-05 - Early Warning Systems and Monitoring Natural Disaster

August 6, 1992, 15:30-17:00

Session Reporter: R. Ryerson

Chairman: Dr. Leo Sayn-Wittgenstein (Canada)

Manu Omakupt (Thailand) - Application of Remote Sensing and GIS for Renewable Resources Damaged by Typhoon "Gay": Chumphon Province

Three key points were addressed: (1) Remote sensing is a tool for inventory of damage from disaster, (2) GIS is a tool for decision making in land-use planning, and (3) integration of RS/GIS is essential for development planning.

Remote Sensing saves time and money, makes work more visible, allows for better decisions, and reduces risk. This was demonstrated through the study of before/after images for the very destructive typhoon Gay in November 1989, and through the description of mitigation actions taken.

Arthur P. Cracknell (United Kingdom), S. B. Mansor - Detection of Sub-Surface Coal Fires Using Landsat Thematic Mapper Data

Three key points were addressed: (1) It is assumed that thermal anomalies appear above coal fires, (2) these can be detected with surface and airborne thermal data, and (3) Landsat Thematic Mapping thermal bands were used to identify fires.

The work begins by assuming that a thermal anomaly will appear above a coal fire. Typically, ground or airborne methods are used operationally. The objective is to evaluate the use of satellite imagery to do the same. NOAA AVHRR and Landsat were used.

Masataka Takagi (Japan), S. Murai, T. Akiyama - Generation of Land Disaster Risk Map from Landsat TM and DTM Data

Three key points were addressed: (1) It is suggested that slope stability maps could be made from remote sensing and DTMs; such maps would contribute to the prediction of land slides; (2) Landsat TM, DTMs, and geologic maps provide the inputs; and (3) accurate maps resulted.

Getulio T. Batista (Brazil), C. J. Tucker - Assessment of AVHRR Data for Deforestation Estimation in the Amazon Basin

Three key points were addressed: (1) Deforestation is important and thus alternate methods to monitor it must be investigated, (2) Landsat TM 3/4/5 at 1:250,000-scale yielded excellent results with visual interpretation, and (3) AVHRR digitally classified yielded separations of Savannah and undisturbed forest at 1:5,000,000-scale.

Experimental results suggest that AVHRR tends to overestimate deforestation by up to 20 percent compared to Landsat TM because of mixed pixel effects along

boundaries. Landsat TM results and field verification could be used to calibrate results.

Tibor Dobos (Hungary) - Ecological and Economical Evaluation of Condition of Environment

A number of different data groups are needed for effective environmental management and planning. A model for such planning was given.

U. Dreiser (Germany) - Mapping of Desert Locust Habitats Using Remote Sensing Techniques

Three key points were addressed: (1) Locusts are a serious problem in Africa in terms of crop damage; (2) Landsat was evaluated using a variety of techniques, including maximum-likelihood classification, vegetation indices, and enhancements; and (3) potential maps could be produced. Actual locust locations require more detail of an ancillary nature from weather satellite data, etc.

Following this pilot study, operational mapping has begun in Mali and Mauritania.

COMMISSION VII

Session SS-07 - The International Geosphere/Biosphere Program

August 10, 1992, 15:30-17:00

Session Reporter: J. Clevers

Chairman: Dr. Ishiaque S. Rasool (France)

Piers J. Sellers (USA) - Remote Sensing for the Modeling of the Land Biosphere

Three key points were addressed: (1) Global process models of the biosphere/atmosphere interaction are important for understanding climate changes, (2) an important step is linking biophysical models to general circulation models, and (3) remote sensing may be important for upscaling and validation.

An important part of modeling the physical climate system is the biophysical modeling. The most important processes for the latter are photosynthesis and evaporation, which are water and temperature driven. Subsequently, the biophysical models are linked to general circulation models. Two problems arise in this linking: (1) Is the scaling up of biophysical models from leaf and plant level to the global scale valid? (2) What tools do we have to measure the final global effects? The validity of the upscaling is confirmed in large field experiments, such as FIFE. Satellite remote sensing may offer the required tools for verification.

S. Ishiaque Rasool (France) - IGBP — The Scientific Issues

Three key points were addressed: (1) The main goal of the IGBP is to help in the understanding of the Ocean-Biosphere-Atmosphere interaction, (2) remote sensing will play an important role in helping to obtain long-term measurements of the relevant parameters on a global scale, and (3) major cycles determining the

climate are the hydrological and biogeochemical (carbon) cycle.

Besides natural fluctuations in our climate system, man-made changes are becoming more and more important. Major changes concern the increase in CO₂ and the decrease in the amount of ozone. The main question is what their effect on the global climate will be. Remote sensing may help in measuring those changes, such as a global temperature and a global sea-level change. The main systems to be studied are the ocean and the terrestrial ecosystem and the atmospheric chemistry. The IGBP is trying to help in the understanding the ocean-biosphere-atmosphere interaction.

James A. Yoder (USA) - Space Observations for Studying Ocean Biosphere

Three key points were addressed: (1) Remote sensing may be used to derive information on ocean chlorophyll (ocean color), (2) ocean primary production may be estimated from phytoplankton chlorophyll, and (3) remote sensing may yield additional information for calculating this primary production.

An important item for studying climate changes is the ocean biosphere. Satellite data (e.g., the Ocean Color Coastal Zone Scanner) offers us information on the spatial variability of phytoplankton pigments, which may be used for deriving information on primary production of the global sea-surface. The latter requires:

1. equations describing the photosynthesis - light relation;
2. incident solar irradiation (e.g., from ISCC Project and spectral models);
3. depth of the surface mixed layer, which depends on sea-surface temperature (AVHRR) and winds (ERS-1); and
4. phytoplankton chlorophyll field (3D), which may be obtained from RS in 2D (e.g., SeaWiFS, MODIS, MERIS) whereas the third dimension must be obtained from *in situ* measurements.

JOBRESA

Session SS-02 - "Remote Sensing at the Crossroads" — Panel Discussion

August 3, 1992, 15:30-17:00

Session Reporter: R. P. da Cunha

Chairman: Dr. Roberto Pereira da Cunha (Brazil)

Remote Sensing at the Crossroads was a session of JOBRESA (Joint Board of Remote Sensing Agencies) which envisaged review/status of the current perspectives/future of remote sensing.

The session started with the introductory remarks of the chairman, who made provocative statements regarding the future of remote sensing with respect to current government/private sector participation and data policy.

The first invited speaker, **Dr. Gérard Brachet** (SPOT Image, France), explained the current situation of SPOT Image, stating that currently it was facing a very good situation and that he himself could not see that remote sensing was at the crossroads.

The following speaker, **Ms. Lisa Robock Shaffer** (NASA, USA), presented the current NASA (EOSDIS) policy on data. She explained the U.S. Land Remote Sensing Commercialization Act and current on-going modifications. She stressed that the NASA EOSDIS policy will follow the cost-recovery approach. Ms. Shaffer provided very illustrative hand-outs which nicely covered her presentation.

The third speaker, **Dr. Adigun Ade Abiodun** from the U.N. Outer Space Affairs Division, stressed fundamentally the educational needs for remote sensing as opposed to training. Dr. Abiodun mentioned that there was more need for education of specialists and said that in the past years only training has been offered to students rather than a formal/long term education.

Finally, with the intervention of **Dr. Z. D. Kalensky** from FAO, a discussion on the participation of the users on data policy distribution dominated the session.

The chairman of the session, at the end of the presentations, made a brief review and noticed that there was no consensus on the proposals regarding the continuation of remote sensing in the next decade. Thereafter, opportunity was offered for the audience to comment on or debate the presentations. This resulted in a very lively discussion arena which helped to reach the goals of the session proposed, which was to provoke a discussion between panelists and the audience.

International Union of Forestry Research Organizations (IUFRO) and ISPRS -- Session I

Session SS-11 - Automation of Aerial Interpretation in Resource Inventories

August 8, 1992, 08:30-10:00

Session Reporter: Roger Hoffer

Chairman: Dr. Roger Hoffer (USA)



Phillip F. Kern (USA) - Digital Stereophotos for Forestry Applications

Three key points were addressed: (1) Digital storage capabilities have been a key element in enabling digital stereophotos; (2) stereo display, high precision scanners, and board level image processing capabilities are other key new technologies; and (3) digital terrain models and subsequent orthophoto production have been key output products.

The session provided an excellent tutorial summary of current technology capabilities.

Klaus Franke (Germany), Rolf-Peter Mark - New Zeiss Interpretation Instruments for Photo-Interpretation

Three key points were addressed: (1) The Photopret, Visopret 10, and Visopret 20 are the three new photointerpretation instruments; (2) Visopret software has a wide range of applications and is easy to use; and (3) data management and orientation, the driver for mapping software, and digital mapping are the three uses of the Visopret software.

The new equipment, and especially the software, offers many excellent capabilities.

Romauld Kaczynski (Poland) - Analysis of possibility of color distinction on the colour tests taken by multispectral camera using ERDAS system

Three key points were addressed: (1) Thirty-two NBS color test chips were photographed in four bands and the photos were digitized; (2) ERDAS software was used to classify the digitized color test chips, achieving a correct classification for 30 of the 32 chips; and (3) a minimum spectral euclidian distance between two classes needs to be >10.

Four bands of photographic data were successfully digitized and used to classify NBS color chips, achieving a correct classification for 30 of the 32 chips.

IUFRO/ISPRS Session II

Session SS-12 - Summary of World Forest Watch

August 8, 1992, 10:30-12:00

Session Reporter: Sherry Chou Chen

Chairmen: Dr. Roberto P. da Cunha (Brazil) and Dr. Jean Paul Malingreau (Italy)



C. Justice - Satellite Monitoring of Tropical Forest - a Commentary on Current Status and Institutional Roles

Three key points were addressed: (1) Current obstacles to satellite based global forest monitoring; (2) what kind of system needed for global forest monitoring; and (3) recommendations to space agencies, research institutes, and international communities.

The diversity of information needs from local, national, and global viewpoints was clearly presented. Current status of national forest and space agencies, the current obstacles to satellite based monitoring such as data problems, institutional problems, and technology obstacles were discussed. Recommendations and specifications of a broad monitoring system (i.e., wall-to-wall assessment, appropriate scale, adequate frequency to show forest transformations, spatial database, trend prediction, accuracy assessment, integration into a GIS forest information system, resulting information easily assessed in a timely fashion were given.

About 100 participants attended this session.

H. Gyde Lund (USA) - How to Watch the Forests. IUFRO Guides For World Forest Monitoring

The functions of IUFRO were presented in the beginning of his speech. The need for global forest

monitoring is stressed. National projects of US Forest Service were presented, and the IUFRO's guideline for national forest study is looking at all land use, not just forest coverage.

S. Murai (Japan) - Vegetation Mapping of Indo-China Peninsula using MOS-1 and NOAA data

One key point was addressed: Vegetation mapping using high and low spatial resolution satellite data.

Four hundred and five MOS-1 scenes were combined with NOAA data of grid cell sizes of 10" to 100", respectively, to monitor vegetation of the Indo-China Peninsula. Both MOS-1 and AVHRR data may be used as "ground truthing" to extract vegetation information. Three broad classes were mapped; bare soil, forest, and grassland of this whole peninsula, and tabular information, was provided for Laos, Vietnam, Thailand, and Cambodia.

F. Hegyi (Canada) - Integrating Airborne and Space Borne Digital Data into a Geographic Information System for Forest Monitoring

Based on the British Columbia Forest Inventory project the experience of integrating space borne and airborne data for forest monitoring was discussed. More and more the conventional multistage sampling approach is replaced by segmentation, expert system and (AIS) artificial intelligence.

Diogines Alves (Brazil) - PRODES: The Brazilian Deforestation Mapping Project

One key point was addressed: Wall-to-wall deforestation mapping using TM color imagery.

Project development stages and technical detail of this wall-to-wall Brazilian deforestation mapping using TM 1:250,000-scale color images were presented.

IUFRO/ISPRS - Session III

Session SS-13 - Remote Sensing Applications in Resource Inventories

August 8, 1992, 13:30-15:00

Session Reporter: Katarina Johnsson

Chairman: Dr. David Goodenough (Canada)



Frank Hegyi (Canada), Paul Pilon, Penny Walker - Replacing Aerial Photo Interpretation in Resource Inventories with Integrated Airborne Digital Data and Geographic Information Systems.

Two key points were addressed: (1) Visualization through video and digital aerial photographs is important for decision makers; this is possible in an integrated GIS; and (2) digital aerial photographs can be obtained through scanning or registration with digital CCD cameras.

We are moving towards an integrated GIS, where database photographs are one layer of information, i.e., geometrically registered (orthophoto) photographs combined with multispectral images. For example, 3D

visualization of clear-cuts or regeneration of forest is currently used operationally.

David L. Evans - (USA), L. Schoelerman, T. Melvin - Integration of Vegetation Information derived from Landsat Thematic Mapper Data into a National Forest GIS.

Two key points were addressed: (1) Landsat data becomes a vegetation map after multispectral classification; and (2) combined analysis of a classified map and the old forest-stand map in a GIS flags areas of disagreement and provides a more detailed description of the forest polygons.

Both data layers have errors and misclassifications. However, the combined information is helpful for the people out in the field.

Donald G. Leckie - (Canada) - Airborne Linear Array Imagers for Forestry Applications

Two key points were addressed: (1) Requirements and specifications for airborne imagery for forest applications are spatial resolution, spectral resolution, swath width, hardware, software, etc.; and (2) applications from airborne imagery are forest inventory update, forest mapping, and forest damage assessment.

Specifications were given for the various types of applications. Costs were compared to traditional techniques.

