Pecora XI SYMPOSIUM

Satellite Land Remote Sensing:
Current Programs and a Look to the Future

May 5-7, 1987

Holiday Inn City Centre
Sioux Falls, South Dakota

PROGRAM

Pecora XI SYMPOSIUM

Sponsored by:

- The United States Geological Survey
- The National Oceanic and Atmospheric Administration
- The National Aeronautics and Space Administration

With Support From:

- The Earth Observation Satellite Company

And In Cooperation With:

- The American Society for Photogrammetry and Remote Sensing

NASA
National Aeronautics and Space Administration

OVERVIEW

The Pecora Memorial Symposia were established in 1975 to honor the late Dr. William T. Pecora for his contributions to the development of a national program for satellite investigations of Earth resources. Dr. Pecora served as Director of the U.S. Geological Survey and later as Under Secretary of the Department of the Interior. The Pecora Symposia are forums for the transfer of satellite land remote sensing data from the research and development community to the operational user community and for discussions on policies and issues by domestic and international governments and private industry.

The Pecora XI Symposium, *Satellite Land Remote Sensing — Current Programs and a Look to the Future,* features discussions of satellite remote sensing policy and issues by figures of authority from the White House, Congress, the Department of State, the Department of Commerce, the Department of the Interior, the United Nations, private remote-sensing companies, and universities. Also, papers on satellite remote sensing applications, data processing, and sensor systems will be presented by scientists and resource managers from United States and international organizations during both oral and poster sessions. Representatives from leading research, development, and commercial organizations in the United States, Europe, Japan and India, will discuss future remote sensing system plans and programs.

Pecora XI will also feature an open, provocative discussion of user perspectives on current programs by a panel of experts from all sectors of the user community. During this session, the audience will be encouraged to participate and express their views.

PECORA XI BANQUET SPEAKER

SECRETARY ELIZABETH DOLE

Secretary of Transportation Elizabeth Hanford Dole will highlight the Pecora XI Symposium as speaker at the Pecora Awards Banquet on Wednesday evening. Her presence is indicative of high-level Administration interest in this international symposium and the issues that will be addressed. Included in her remarks will be Administration policies and issues relating to the Nation's space activities and launch-capability concerns.

Tuesday, May 5, 1987

8:30 a.m. - Welcome and Opening Remarks

Satellite Land Remote Sensing: Policies and Issues

9:00 a.m. - 4:30 p.m.

An in-depth discussion of major issues currently facing the satellite land remote sensing community, presented by senior policy makers representing a variety of governmental, private sector, and international points of view.

- Dr. Dallas Peck, *Director, U.S. Geological Survey*
- Dr. William P. Raney, *Special Assistant to Associate Administrator for the Space Station, National Aeronautics and Space Administration*
- Mr. Thomas N. Pyke, Jr., *Assistant Administrator for Environmental Satellite, Data and Information Service, National Oceanic and Atmospheric Administration*
- Mr. Radford Byerly, *Subcommittee on Space Science and Applications, U.S. House of Representatives*
- Dr. Adigun Ade Abiodun, *Outer Space Affairs Division, United Nations*

12:00 Noon
Keynote Luncheon - Starlite Room, 10th Floor
NASA Astronaut
Dr. Anthony W. England, Speaker

1:30 p.m. - Policies and Issues *(Continued)*

- Mr. Isaak Gillam, *Assistant Administrator, Office of Commercial Programs, National Aeronautics and Space Administration*
- Mr. Mark E. Brender, *Assignment Editor, ABC News*
- Dr. Lisle A. Rose, *Space Applications and Remote Sensing Officer, Department of State*
- Mr. C.P. Williams, *President, EOSAT*
- Dr. Michel Curtois, *Head of Applications Direction, CNES*
- Dr. Francis Bretherton, *National Center for Atmospheric Research (NCAR)*

POSTER SESSION/WINE AND CHEESE ICE BREAKER

6:00 p.m. - 7:00 p.m.

Starlite Room, 10th Floor

Chairperson: William H. Anderson, TGS Technology, Inc.

- A Color Communication Scheme for Digital Imagery, *A. Acosta, U.S. Geological Survey*
- Utilization of a Multilayer Database for Geological Mapping and Exploration in Eastern Nova Scotia, *M.S. Akhavi and W.P. Jones, Nova Scotia College of Geographic Sciences*
- Image Map Production Using Landsat Thematic Mapper Data on an Interactive Digital Image Manipulation System (IDIMS), *M. Brennan, R. Colomb, J. Gundy, and J. Hammack, Defense Mapping Agency*
- Digital Processing Techniques and Film Density Calibration for Printing Image Data, *P.S. Chavez, Jr., J.A. McSweeney, and D.R. Binnie, U.S. Geological Survey*
- Use of Satellite Thermal Infrared Telemetry in Soil Moisture and Rainfall Mapping, *R.L. Chilson and W. Hein, South Dakota State University, J. Tunheim, Eastern Washington University*
- Spatial and Digital Correlation of Multisensor Data Using the NASA Large Format Camera, *W.J. Cox and C. Lucas, Autometric Inc.*
- The Use of AVHRR Data for Developing and Validating a Microwave Sea Ice Concentration Algorithm, *J. D'Aguanno and R.M. Carey, NOAA/NESDIS*
- Using Landsat TM Data as an Aid for Detailed Soil Survey in Kenya, *V.P. D'Costa, University of Nairobi, C.J. Johannsen and M.F. Baumgardner, Purdue University*
- Remotely Sensed Data Model for Sediment Yield, *O.P. Dubey, University of Roorkee, India*
- Modelling with Remote Sensing Data for Efficient Ground Water Management, *O.P. Dubey, Sriniwas, A.K. Awasthi, University of Roorkee, India*
- BIA Image Interpretation Techniques for Vegetation Mapping Using Thematic Mapper False Color Composites, *T.R. Feagan and R.A. McKinley, TGS Technology, Inc., T.C. English and W.J. Bonner, Jr., Bureau of Indian Affairs, R.H. Haas, TGS Technology, Inc.*
- Data Integration Using Color Space Transforms, *J.W. Feuquay, TGS Technology, Inc.*
- Hydrologic Lineament Mapping of Crystalline Bedrock Fracture Zones Using Landsat and SLAR Imagery with Geophysical Confirmation, *J.J. Fisher and R.K. Frohlich, University of Rhode Island*

POSTER SESSION *(Continued)*

- Producing Alaska Interim Land Cover Maps from Landsat Digital and Ancillary Data, *K. Fitzpatrick-Lins and E.F. Doughty, U.S. Geological Survey, M. Shasby, T.R. Loveland, and S. Benjamin, TGS Technology, Inc.*
- A Joint NOAA-USGS Study to Evaluate Satellite Assessment of Land Surface Features and Climatic Variables, *K.P. Gallo and J.D. Tarpley, NOAA/NESDIS, S.M. Howard, TGS Technology, Inc., D.G. Moore, U.S. Geological Survey*
- River Ice Mapping with Landsat and Video Imagery, *L.W. Gatto, S.F. Daly, and K.L. Carey, CRREL*
- Using a Microcomputer to Plot Landsat and SPOT Scene Boundaries as a Purchasing Aid, *F.J. Gunther, Computer Sciences Corporation*
- The Future of Remote Sensing in U.S. Crop Estimating Programs, *R.C. Hale and M.B. Yost, U.S. Department of Agriculture*
- A Conceptual Method for Monitoring Locust Habitat, *S.M. Howard, TGS Technology, Inc., D.G. Moore, U.S. Geological Survey, T.R. Loveland and D.O. Ohlen, TGS Technology, Inc., K.P. Gallo, NOAA/NESDIS, J. Olsson, U.S. Agency for International Development*
- Weather Satellites for Forest Monitoring? A Test of NOAA NDVI in the Sudan and Guinea Zones of Sub-Sahara West-Africa, *S. Langaas, University of Oslo*
- An Evaluation of Thematic Mapper Data for Forest Cover Mapping in Northern Wisconsin *R.G. Lathrop, Jr., T.M. Lillesand, and B.S. Yandell, University of Wisconsin*
- Investigation of Soil Feature Extraction Methods from Thematic Mapper Data in Southern Wisconsin, *K. Lee, G.B. Lee, and E.J. Tyler, University of Wisconsin*
- Landsat Thematic Mapper World Data Base, *R. Ludwig and R. Kumar, Science Applications Research*
- Temporal Cloud Cover Maps of Landsat Thematic Mapper Data Acquisitions, *R. Ludwig and R. Kumar, Science Applications Research*
- The Evaluation and Modeling of Pronghorn Antelope Habitat in Kansas, *E.A. Martinko, L.T. McKinney, and L.M. Caron, University of Kansas*
- Image Restoration Techniques as Applied to Landsat MSS and TM Data, *D.J. Meyer, TGS Technology, Inc.*
- Geologic Interpretations of Seasat-A Radar Images of a Portion of the Southern Appalachian Plateau: Virginia, Kentucky, West Virginia, *J. Muskat, The Earth Technology Corporation*
- Remote Sensing Technology as Used in Regional Geological Reconnaissance of the Gabun-Paracale Mining Project, *A.A. Navarro, Gabun-Paracale Mining Co., Inc.*

POSTER SESSION *(Continued)*

- A Remote Sensing Approach for Predicting Water Demand in Irrigated Areas of Western Kansas, *M.D. Nellis, Kansas State University*
- Testing of Thematic Mapper Color Photographic Enhancements, *D.M. Nelson, TGS Technology, Inc.*
- Remote Sensing of Natural Resources in Zimbabwe: Woodland Cover Monitoring in the Communal Lands, *F.K. Odoom, Zimbabwe Forestry Commission*
- Global Visions in a Flat World: Streamlining Local Permits and Watershed Analysis with Multi-layered Image Based Resource Information, *J.C. Ruth, System International*
- Use of Automated Spatial Data Systems in Fuel Management Decisionmaking , *L.A. Salazar, U.S. Forest Service*
- Study of Dynamic Geomorphology Based Upon Image Interpretation and Morphometry for a Part of Precambrian Terrain, M.P., India, *K. Sarkar, S.M. Dutta, A.M. Rakshit, Geological Survey of India*
- Use of Landsat Thematic Mapper Data for Classification of Forest Lands in Northern Louisiana, *K.B. Teuber, U.S. Forest Service*
- Processing of Archival Landsat Imagery to Document Pyramid Lake Algae Blooms, *J.P. Verdin, Bureau of Reclamation, L. L. Sims, Advanced Sciences Incorporated, D.L. Galat, Arizona State University*
- Status of the Worldwide Landsat Archive, 1986, *H.W. Warriner, NOAA/NESDIS*

Wednesday, May 6, 1987

APPLICATIONS OF SATELLITE REMOTE SENSING IN THE BIOSCIENCES

International Ballroom West

Co-chairpersons: Kevin P. Gallo, NOAA
Chris J. Johannsen, Purdue University

8:30 a.m. Introduction to Session

8:40 a.m. The Unique Contribution of AVHRR Data for Measuring and Understanding Global Processes: Large Scale Deforestation in the Amazon Basin, *J.-P. Malingreau, The Joint Research Center of the European Communities, and C.J. Tucker, NASA, Goddard Space Flight Center*

Wednesday *(Continued)*

9:00 a.m. Current U.S. Agency for International Development Needs for the Famine and Early Warning System (FEWS), *D. Reilly and J. Olsson, U.S. Agency for International Development*

9:20 a.m. The Utility of AVHRR Data for Monitoring Large-Scale Temporal Changes in Great Lakes Water Quality, *J.R. Vande Castle and T.M. Lillesand, University of Wisconsin-Madison*

9:40 a.m. Sensitivity of Vegetation Index Estimates to Proposed AVHRR Filter Changes, *C.G. Justus, Georgia Institute of Technology*

10:00 a.m. Coffee Break

10:20 a.m. Computerized PATREC Assessment of Landsat Derived Land Cover Data to Aid Planning of Pheasant Management in Missouri, *T.L. Haithcoat, University of Missouri-Columbia, and D.L. Hallett, Missouri Department of Conservation*

10:40 a.m. The Relationship of Forest Productivity to Landsat Thematic Mapper Data and Supplemental Terrain Information, *E.A. Cook and L.R. Iverson, Illinois Natural History Survey, and R.L. Graham, Oak Ridge National Laboratory*

11:00 a.m. Monitoring Agricultural Productivity in Developing Nations Utilizing Landsat Data and GIS Technology, *D.J. Wheeler and A.A. Jayasekara, Utah State University*

11:20 a.m. Range Site Reflectance Characteristics Measured by Landsat MSS and Color Infrared Low Altitude Aerial Photography in South Dakota Mixed Prairie, *W. Weaver, H.G. Fisser, J.K. Lewis, and R.W. Marrs, USDA/SRS*

11:40 a.m. International Satellite Land-Surface Climatology Project (ISLSCP), *R. Murphy, NASA, Land Processes Branch*

12:00 noon Closing

Concurrent Session

APPLICATIONS AND DEVELOPMENTS IN GEOLOGIC REMOTE SENSING

International Ballroom East

Co-chairpersons: **Michel T. Halbouty, Houston, Texas**
G. Bryan Bailey, USGS/EROS

8:30 a.m. Introduction to Session

8:40 a.m. Mapping in the Oman Ophiolite with Thematic Mapper Data, *M. Abrams, Jet Propulsion Laboratory*

9:00 a.m. Hydrocarbon Microseepage Detection Using Remote Sensing Techniques, *M. Settle, J. McKeon, and M. Crawford, ARCO Oil and Gas Company*

9:20 a.m. Mapping Contact Metamorphic Aureoles in Extremadura, Spain, Using Landsat Thematic Mapper Images, *L.C. Rowan, U.S. Geological Survey, C. Anton-Pacheco, Institute of Geology and Mines of Spain, D.W. Brickey and M.J. Kingston, U.S. Geological Survey, and A. Payas, Institute of Geology and Mines of Spain*

9:40 a.m. Application of Combined Landsat Thematic Mapper and Airborne Thermal Infrared Multispectral Scanner Data to Lithologic Mapping in Nevada, *M.H. Podwysocki, W.J. Ehmann, and D.W. Brickey, U.S. Geological Survey*

10:00 a.m. Coffee Break

10:20 a.m. Application of SPOT Data to Geological Investigations in Nevada, *J.V. Taranik and M.X. Borengasser, University of Nevada-Reno*

10:40 a.m. SPOT Capability in Geological Mapping: The Rift Valley Case, *J. Chorowicz, G. Vidal, and P.P. Rudant, Pierre et Marie Curie University, Paris, and J.C. Rivereau, SPOT Image, Toulouse*

11:00 a.m. New Techniques for the Quantification and Modelling of Remotely Sensed Alteration and Linear Features in Mineral Resource Assessment Studies, *C.M. Trautwein and L.C. Rowan, U.S. Geological Survey*

11:20 a.m. AVIRIS: The New Future in Geologic Remote Sensing, *A.F. H. Goetz, University of Colorado*

11:40 a.m. Closing

CURRENT REMOTE SENSING TOPICS AND INITIATIVES

International Ballroom West

Co-chairpersons: **Peggy Harwood, NOAA**
Bill Bishop, SAIC

1:30 p.m. Introduction to Session

1:40 p.m. Landsat Data Distribution Trends from 1973 through 1986, *R.A. Pohl, U.S. Geological Survey*

2:00 p.m. Creation of the National Archive for Land Satellite Remotely Sensed Data, *C. Sheffield and O.R. Russell, Earth Satellite Corporation, and P. Harwood, NOAA/NESDIS*

PECORA XI CALENDAR

Monday, May 4, 1987

8-10 p.m.	Registration

Tuesday, May 5, 1987

7:00 a.m.	Registration
8:30 a.m.	Welcoming Remarks
9:00 a.m.	Satellite Land Remote Sensing: Policies and Issues
12:00 noon	Keynote Luncheon - Starlite Room, 10th Floor NASA Astronaut - Dr. Anthony W. England Speaker
1:30 p.m.	Exhibits will open at 1:30 on Tuesday. They will be open from 8:30 - 5:30 on Wednesday, and from 8:30 - 1:30 on Thursday
1:30 p.m.	Policy and Issues (continued)
6:00 p.m.	Poster Session with Wine and Cheese Ice Breaker Starlite Room, 10th Floor

Wednesday, May 6, 1987

8:30 a.m.	•Applications of Satellite Remote Sensing in the Biosciences •Applications and Developments in Geologic Remote Sensing *(Concurrent Sessions)*
12:00 noon	Lunch
1:30 p.m.	•Remote Sensing Selected Topics •Technique Development and Data Processing *(Concurrent Sessions)*
6:00 p.m.	Reception - Holidome Terrace
7:00 p.m.	Pecora Symposium Award Banquet - Starlite Room Secretary of Transportation - Elizabeth Dole Featured Speaker

Thursday, May 7, 1987

8:30 a.m.	Future Remote Sensing Plans and Programs
12:00 noon	Lunch
1:30 p.m.	Forum and Discussion: User Perspectives on Current Programs
4:00 p.m.	Closing Remarks

Friday, May 8, 1987

9:00 a.m.	EROS Data Center Tour

EROS DATA CENTER TOURS

The EROS Data Center, operated by the U.S. Geological Survey's National Mapping Division for the Department of the Interior, is a national data reception, processing and research facility for remotely sensed data and other forms of earth-science geographic information. While investigations include advanced remote sensing applications, much of the Center's current research effort deals with designing and operating computerized geographic information systems. The EROS archives hold over 2,000,000 worldwide scenes of the Earth acquired by Landsat satellites and over 5,000,000 aerial photographs of U.S. sites.

Buses for guided tours of the EROS Data Center will leave the Holiday Inn at 2 p.m. on Wednesday and Thursday, May 6 and 7, and at 9 a.m. on Friday, May 8. Free bus transportation will be furnished. The EROS Data Center is located 16 miles northeast of Sioux Falls. Tour sign-up sheets will be at the Registration Table.

THURSDAY *(Continued)*

FORUM AND DISCUSSION:
USER PERSPECTIVES ON CURRENT PROGRAMS

1:30 p.m. - 4:00 p.m.

Moderators: Allen H. Watkins, USGS/EROS
W. John Hussey, NOAA/NESDIS

A panel discussion and forum for audience participation on current satellite land remote sensing programs and speculation on possible future scenarios and discussion of the pros and cons of alternative courses of action.

Invited Participants:

- Mr. Pierre Bescond, *President, SPOT Image Corporation*
- Dr. William P. Bishop, *Science Applications International Corporation (SAIC)*
- Mr. Radford Byerly, *Subcommittee on Space Science and Applications, U.S. House of Representatives*
- Mr. Michel Halbouty, *The Halbouty Center*
- Dr. Frederick B. Henderson, III, *President, The Geosat Committee, Inc.*
- Mr. Peter Perkins, *Science, Technology and Space Subcommittee, U.S. Senate*
- Mr. Thomas N. Pyke, Jr., *Assistant Administrator for Environmental Satellite, Data and Information Services, NOAA/NESDIS*
- Dr. James V. Taranik, *Cooperative Institute for Aerospace Science and Terrestrial Applications, Mackay School of Mines, University of Nevada-Reno*
- Dr. S. G. (Shelby) Tilford, *Director, Earth Science and Applications Division, NASA*
- Dr. Ray Watts, *Deputy Assistant Director for Research, USGS*
- Mr. C. P. Williams, *President, EOSAT*

PECORA XI COMMITTEE

Honorary Chairman, Senator Larry Pressler, SD

William C. Draeger, *USGS/EROS*
Peggy Harwood, *NOAA*
Miriam Baltuck, *NASA*
Richard Mroczynski, *EOSAT*
William D. French, *ASPRS*
Donald G. Orr, *USGS/EROS*
G. Bryan Bailey, *USGS/EROS*
Kevin Gallo, *NOAA/EROS*
Raymond A. Byrnes, *EOSAT*
G.O. Richards, *TGS/EROS*
Tim Smith, *TGS/EROS*
Ron Beck, *TGS/EROS*
Lee McManus, *TGS/EROS*
Phyllis G. Wiepking, *USGS/EROS*
Howard W. Warriner, *NOAA/EROS*
William H. Anderson, *TGS/EROS*

EXHIBITS

The Exhibits Hall will officially open at 1:30 p.m. on Tuesday, May 5 and all exhibits will remain in place until 1:30 p.m. on Thursday, May 7. Coffee and rolls will be served in the Exhibits Hall during breaks in the program.

Exhibitors:

- American Society for Photogrammetry and Remote Sensing
- Earth Observation Satellite Company (EOSAT)
- Eastman Kodak Company
- ERDAS, Inc.
- National Aeronautics and Space Administration (NASA)
- National Oceanic and Atmospheric Administration (NOAA)
- SPOT Image Corporation
- STX, Inc.
- Technology Application Center
- Terra-Mar Resource Information Services, Inc.
- The GEOSAT Committee
- U.S. Geological Survey

REGISTRATION

On-site registration is $150. This fee includes sessions and exhibits attendance, poster session/ice breaker, luncheon, banquet, and a copy of proceedings. On-site student registrations are $20. Student registration includes sessions/exhibits and poster session/ice breaker. Spouse tickets for the ice breaker, luncheon and banquet may be purchased for $35.

The registration desk will be open Monday, May 4 from 8 to 10 p.m. and on Tuesday, May 5 at 7 a.m.

PROCEEDINGS

Pecora XI Proceedings will be published by the American Society for Photogrammetry and Remote Sensing after the symposium. Each participant who has paid full registration fee will receive one bound copy of the proceedings. Additional copies may be purchased directly from ASPRS. Camera-ready copy of all manuscripts must be submitted to the Pecora XI Technical Program Committee during the Symposium in order to be included in the proceedings.

Wednesday *(Continued)*

2:20 p.m. Aerospace Science and Terrestrial Applications in Nevada: A New NOAA Cooperative Institute in Mineral Resources Applications, *J.V. Taranik, University of Nevada-Reno*

2:40 p.m. The Cooperative Institute for Remote Sensing of Biogeophysical Processes, *J. Spiller, University of New Hampshire, and R.W. Birnie, Dartmouth College*

3:00 p.m. Coffee Break

3:20 p.m. NOAA Cooperative Institute for Applied Remote Sensing in Energy Resources, *F. Henderson on behalf of University of Oklahoma*

3:40 p.m. Ohio State University's Center for Mapping and NASA Center for Commercial Development of Space, *D. Way, Ohio State University*

4:00 p.m. ITD SRSC Remote Sensing Commercialization Strategy, *C.F. Schueler, Institute for Technology Development, NSTL*

4:20 p.m. NASA/Industry Relationship for Commercial Remote Sensing, *P.M. Maughan, Space Development Services*

4:40 p.m. Remote Sensing and the Law — Balancing the Need to Know and Privacy Rights, *M.S. Talbett, University of Indiana/Purdue University at Indianapolis*

5:00 p.m. Closing

Concurrent Session

TECHNIQUE DEVELOPMENT AND DATA PROCESSING

International Ballroom East

Chairperson: Richard Mroczynski, EOSAT

1:30 p.m. Introduction to Session

1:40 p.m. Semi-automated Training Sample Selection for Classification of High Resolution Multispectral Imagery, M.P. Buchheim and T.M. Lillesand, University of Wisconsin-Madison

2:00 p.m. Characterization of Landscape Complexity in Digital Satellite Images, *J.W. Merchant, University of Kansas*

2:20 p.m. A Paradigm of an Expert System Prototype for Semantic and Syntactic Land-Use/Cover Classification, *T. Chu, University of Kansas*

2:40 p.m. Multi-frequency Image Analysis: Beyond the Per-point Classifier, *S.C. Ahearn, University of Minnesota*

3:00 p.m. Coffee Break

3:20 p.m. Multi-temporal Application of the Tasseled Cap Transformation for General Land Cover Classification, *Y. Lu, NASA/Goddard Space Flight Center, M.H. Story and D.A. Klemas, Science Applications Research*

3:40 p.m. Dynamic Method for Search of Control Points for the Registration of Two Pictures, *H. Maitre, Ecole Nationale Superieure des Telecommunications, Paris, France, and A. Anglade, Etablissement Technique Central de l'Armement, Arcueil, France*

4:00 p.m. Overview of the Land Analysis System (LAS), *B.K. Quirk, TGS Technology, Inc., and L.R. Oleson, U.S. Geological Survey*

4:20 p.m. Closing

7:00 p.m. Pecora Symposium Award Banquet
Secretary of Transportation - **Elizabeth Dole**, Featured Speaker

Thursday, May 7, 1987

FUTURE REMOTE SENSING SYSTEM PLANS AND PROGRAMS

8:30 a.m. - 12:00 p.m.

Chairperson: Howard Warriner, NOAA

- Landsat Program Status, *W.J. Hussey, NOAA*
- Landsat Status and Future, *C.P. Williams, EOSAT*
- NASA's Advanced Plans for Land Remote Sensing, *S. Tilford, NASA*

Coffee Break

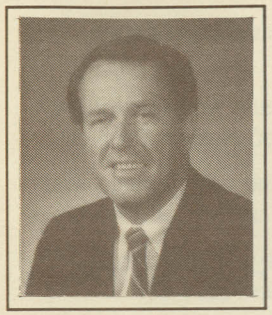
- Indian Remote Sensing Satellite (IRS-1): A Step Ahead, Indian Space Programme, *K.N. Joshi, N.S. Rathore, and V.B. Bhatt, Birla Institute of Scientific Research, India*
- Current and Future Earth Observation Programs in Japan, *Y. Horikawa, NASDA*
- The SPOT Program: Commercialization of Remote Sensing, *P. Bescond, SPOT Image Corporation*
- The SPOT 4 Program, *M. Arnaud, CNES*

THE WILLIAM T. PECORA AWARD

THE WILLIAM T. PECORA AWARD, presented annually in recognition of outstanding contributions of individuals or groups toward the understanding of the Earth by means of remote sensing, is sponsored jointly by the National Aeronautics and Space Administration and the Department of the Interior. The award was established in 1974 to honor the memory of Dr. William T. Pecora, former Director of the U.S. Geological Survey, and later, Undersecretary, Department of the Interior. Dr. Pecora was a motivating force behind the establishment of Earth resource sensing from space. He was a government leader with broad vision and deep appreciation for the use of satellite programs in continually inventorying and managing our national resources.

Dr. William T. Pecora

1986 William T. Pecora Award Citation - Allen H. Watkins



The Department of the Interior and the National Aeronautics and Space Administration present the 1986 William T. Pecora Award to Allen H. Watkins.

Allen H. Watkins has made exceptional contributions to the field of remote sensing, to the processing, archiving, and distribution of remotely-sensed data, and to the development of applications of these data that have been of appreciable value to a broad range of scientific studies. He first served as a manager for the National Aeronautics and Space Administration's Johnson Space Center from 1962 to 1973 in various key offices, and since 1973, as the Chief of the Earth Resources Observation Systems (EROS) Data Center of the Geological Survey. In this latter role he has developed the EROS Data Center into a world-renowned facility to which literally thousands of earth-science specialists, both national and international in origin, have come to receive training in remote sensing and spatial data analysis techniques.

His ability to develop research directions and to attract and retain the personnel best able to produce significant results has further enhanced the reputation of the Center. For example, the Landsat EROS Digital Image Processing System (EDIPS) that greatly improved processing efficiency and the quality of Landsat data was developed in-house. Advanced capabilities have also been developed to digitally mosaic and combine Landsat, meteorological satellite, cartographic, and other forms of digital data. The design, development, and demonstration of low-cost digital data analytical systems have been carried out at the Center. These systems are being used in Interior field offices and are the prototype for a new generation of spatial data processing systems, currently under development by both the public and private sectors.

On the international scene, Mr. Watkins in cooperation with other concerned Federal agencies and various foreign governments, continues to be instrumental in establishing policies for Landsat data processing, analysis, and distribution that have a broad and sweeping impact. The communication and coordination required to respond to the increase in Landsat ground stations, worldwide, has been greatly facilitated by Mr. Watkins' active role in the Landsat program. On the national scene, Mr. Watkins has employed his exceptional interpersonal skills and great strengths as a negotiator to serve as the principal representative of the Department of the Interior on major intra-Governmental committees. He was deeply involved in the successful implementation of the transfer of management responsibility for the Landsat Program from NASA to NOAA. More recently he has been involved in the successful deliberations which resulted in the transfer of Landsat system operations to the private sector.

In recognition of the great breadth and depth of Mr. Watkins' achievements in fostering the use of remote sensing in the solution of national and international problems, the Department of the Interior and the National Aeronautics and Space Administration, take great pleasure in presenting the William T. Pecora Award to Mr. Allen H. Watkins.

WILLIAM T. PECORA AWARD - PREVIOUS RECIPIENTS

1974 William A. Fischer, U.S. Geological Survey, Department of the Interior

1975 William Nordberg, National Aeronautics and Space Administration, and Carlos Brockmann, Director of the LANDSAT-Bolivia Project

1976 Awarded jointly: Environmental Research Institute of Michigan and Laboratory for Applications of Remote Sensing of Purdue University

1977 Robert N. Colwell, School of Forestry, University of California, Berkeley and Michel T. Halbouty, Consulting Geologist and Petroleum Engineer, The Halbouty Center

1978 David S. Johnson, National Environmental Satellite Service, Department of Commerce

1979 John M. DeNoyer, U.S. Geological Survey, Department of the Interior, and Virginia T. Norwood, Senior Scientist, Hughes Aircraft Company

1980 Verner E. Suomi, Professor of Meteorology, University of Wisconsin

1981 Leonard Jaffe, National Aeronautics and Space Administration, and James R. Anderson (posthumously), U.S. Geological Survey, Department of the Interior

1982 Alexander F.H. Goetz, National Aeronautics and Space Administration, and Lawrence C. Rowan, U.S. Geological Survey, Department of the Interior

1983 Floyd F. Sabins, Jr., Senior Research Associate, Chevron Oil Field Research Company

1984 Archibald B. Park, GLOBEX, Inc.

1985 Charles Elachi, Jet Propulsion Laboratory