

# The Center Scene

Spring 1987



*About 350 employees, officials, and guests watched as a new antenna was lifted atop the EROS Data Center on April 3. This antenna receives data directly from NOAA weather satellites; the data will be used in a variety of research and operational land remote sensing applications.*

## EROS RECEIVES NEW ANTENNA

A new antenna to receive data from orbiting meteorological satellites was installed at the EROS Data Center on Friday, April 3, 1987. A 150-foot double boom crane lifted the 10-foot-diameter, one-ton antenna atop the main building. The antenna and pedestal rise about 17 feet above the building.

This antenna is part of a new reception and processing system installed at the EROS Data Center for Advanced Very High Resolution Radiometer (AVHRR) data from National Oceanic and Atmospheric Administration (NOAA) satellites. The NOAA satellite data will be used in land science applications and will complement Landsat data currently processed at the Center.

While Landsat data arrive at EROS by way of a communications satellite relay, AVHRR data are transmitted directly from the NOAA 9 and NOAA

10 satellites and will provide daily coverage of the United States, excluding Alaska and Hawaii. This new reception and processing system will ensure that data needed to support Federal earth science research and land management programs are routinely available within 24 hours of satellite overpass. (Landsat provides repetitive coverage on a 16-day cycle, with a 2-30 day delay.)

One of the primary land applications of AVHRR data is for mapping fire fuel types. These maps aid state and Federal land managers in predicting the probability of fires from lightning strikes by providing vegetation fire fuel information. Monitoring vegetation condition and trends over large areas is another widespread use of AVHRR data. A new and exciting application is producing image maps of entire countries and (or) continents.

Each single pass of the satellite over the Western Hemisphere provides coverage of a 1,491-mile-swath from Canada to Mexico. Circling the Earth from 517.6 miles above its surface, the satellite completes 14 orbits each day.

## Pecora XI Symposium

Nearly 300 attendees participated in the Eleventh William T. Pecora Memorial Symposium held May 5 through 7 in Sioux Falls, South Dakota. The symposium, "Satellite Land Remote Sensing: Current Programs and a Look to the Future," focused on policies and issues with perspectives on commercialization of satellite land remote sensing programs. A comprehensive program of applications was presented in concurrent sessions on May 6. Allen H. Watkins, Chief of the USGS EROS Data Center, was presented the 1986 William T. Pecora Award. Dr. Dallas Peck, Director of the USGS, made the presentation on behalf of the Department of the Interior and Dr. William P. Raney represented NASA.



*Elizabeth Dole*

Secretary of Transportation Elizabeth Dole was featured speaker at the Award Banquet and NASA Astronaut Dr. Anthony England spoke at the keynote luncheon.



## UP FRONT

A very sincere "Thank you" to everyone who made Pecora XI a great success! I know that you are aware that this year's symposium was

very important to the future of satellite land remote sensing and to the future of the EROS Data Center. It was our opportunity to demonstrate our expertise, our capabilities, and our challenges to persons in high level policy positions — persons who will be making decisions about the civil satellite remote sensing program and about the EROS Data Center. I am proud and grateful that you helped to make the most of this opportunity. The dedicated efforts of the EROS staff, in every branch and section of our facility as well as those of the symposium committee, made this meeting one to be proud of.

Of course, receiving the Pecora Award was a proud experience for me. I am particularly honored because this award is presented by the two agencies to which I have devoted my entire professional life — NASA (12 years) and the Department of the Interior (14 years). In actual fact, however, this award really belongs to each of you, the managers, scientists, engineers, technicians, secretaries, maintenance workers, cafeteria cooks, and security guards, who have as I said at the awards banquet "made Bill Pecora's dream their life for the past 14 years." People all over the country and throughout the world fully recognize that the award was earned by the hard, dedicated, and professional work of all of you. It is well deserved! You have worked to give the EROS Data Center its reputation as a world-renowned center of excellence.

Again, I thank you.

*Allen H. Watkins*

## Workstations

by Jay W. Feuquay

Significant advances have been made in microprocessors, data communications, user interfaces, and displays. These new developments have been brought together in the form of the workstation. Recently, a task group was formed at EDC to study how workstations could best serve our needs. The group studies two questions: (1) "What is a workstation?" and (2) "What can workstations do for EDC?"

A workstation is a small computer that incorporates the Five M's: (1) Millions of instructions per second (MIPS), (2) Mega-pixels of display memory (screen resolution of at least 1024 \* 1024), (3) Multi-tasking operating system, (4) Mouse (for graphic interface), and (5) Megabit-per-second communications with other computers. More generally, a workstation is a computer small enough to fit in your office, but powerful enough to do a significant amount of work—a machine that incorporates graphics and can communicate easily with other computers.

### Two Classes of Workstations

Currently, EDC employs two classes of workstations. We have four Sun workstations that meet the Five M's criteria, and we have some PC-type systems that conform to the more general definition.

Just as there are two classes of workstations (more expensive high-end systems such as the Suns and the less costly, less powerful PC workstations) there are two schools of thought on how workstations should be used. One philosophy is that since workstations are so powerful and expensive, you should hang specialized peripherals on them, put them in a central location and have people sign up to use them, thereby maximizing the use of those pieces of gear. The other view is that since workstations are so cheap, you should put one in every office so that everyone can have access to the organization's computing resources whenever they need them, thereby maximizing the productivity of the employee. The Sun workstations have been outfitted with color displays, big disks, and lots of memory—all of which would be inappropriate in an office environment. While on the low-end, many

people are already doing their own "distributed processing" by running spreadsheets, data base managers, and producing reports on PC's.

### Benefits to EDC

What workstations, with their strong emphasis on communications, will bring to EDC is the ability to manage projects that require the resources of multiple systems. Users will be able to start processes on remote machines without having to interrupt the task that they are running on their local workstations. They can keep an eye on these remote jobs and then use the results of a function run on one computer as input to a job on another system.

EROS will be keeping a close watch on industry developments that will increase the power and utility of PC workstations. Already such advances as the introduction of Intel 80386-based PC's has narrowed the gap between high and low end systems; we continue to look for new ways for EDC's workstations to increase productivity and enhance creativity.

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## EMPLOYEES ASSOCIATION

The EDC Employees Association (EDCEA) has a new slate of officers:

**Jerry Smith**, President  
**Doug Hollaren**, Vice President  
**Ron Schultz**, Secretary  
**Ray Teske**, Treasurer

The new officers and representatives are already in the midst of or in the planning stage for a number of projects and events. Bake sales, new cook books, a picture post card, new T-shirts and sweatshirts, and stamp sales are only a few of the fundraisers planned. Funraiser events that are in the works include a Hobby Day, Fishing Derby, PC Club, Corn Club, Archery Club, summer picnic, and the Christmas party. The new officers are off to an enthusiastic year but if they are going to succeed in all of their efforts, they will need the cooperation of all employees. Support your EDCEA! Finally, a real vote of appreciation to the 1986 officers who also did a superb job — thanks, *Steve Covington, Tim Smith, Carol Nelson, and Char Johnson.*

## SERVING COMMUNITY YOUTH

**Lawrence "Bud" Youngren** served as a judge at the 33rd Annual Eastern South Dakota Science and Engineering Fair for High School Students held at South Dakota State University. More than 100 students from across the state participated.

**Ronald Beck** shared the stage with Kevin Falon, South Dakota's Teacher in Space Finalist, at the Hugh O'Brian Youth Foundation South Dakota Leadership Seminar. Nearly 150 high school sophomores from schools throughout the state attended the seminar.

**Jim Sturdevant** and **Phyllis Wiepking** each spent a "Fantastic Friday" afternoon conducting classes on EROS and remote sensing for elementary students in two of the city's schools. This enrichment program was planned by children who selected the topics that they wanted to learn about.

**Bill Anderson** served as a judge for the Flandreau school's Science Fair.



*Allen H. Watkins, center, was presented the nation's highest space award, the Pecora Memorial Award, at ceremonies held at the Pecora Award Banquet on May 6. Sharing the podium with him are, from left, Senator Larry Pressler, Secretary of Transportation Elizabeth Dole, Dr. William P. Raney, NASA, and Dr. Dallas Peck, Director of the U.S. Geological Survey.*

## EROS CHIEF RECEIVES TOP SPACE AWARD

**Allen H. Watkins**, Chief of the EROS Data Center, was named recipient of the 1986 William T. Pecora Award for his contributions in the field of satellite imaging of the Earth. The award was presented at ceremonies held May 6 during the Eleventh William T. Pecora Memorial Symposium. Secretary of Transportation Elizabeth Dole was the featured speaker at the Pecora Award Banquet.

The prestigious international award is presented annually by the Department of the Interior and the National Aeronautics and Space Administration (NASA) in recognition of outstanding contributions toward the understanding of the Earth by means of satellite remote sensing. 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 of the Department of the Interior. Dr. Pecora played a major role in this country's satellite remote sensing program.

Watkins' citation reads in part:

"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 has developed the EROS Data Center into a world-renowned facility to which thousands of earth-science specialists, both national and international, have come to receive training in remote sensing and 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.

"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."

Watkins, a native of Virginia, was graduated from Virginia Polytechnic Institute with a degree in engineering. He and his wife, Rhonda, live in Sioux Falls. They have four children, Jillian, John, Shannon, and Shawn.

Watkins held managerial positions at the NASA Johnson Space Center during the early days of Manned Space Flight. He has been Chief of the EROS Data Center since its opening in 1973.

# A LOOK AT THE TECHNIQUE DEVELOPMENT AND APPLICATIONS BRANCH

(Last in a Series)

by Dave Carnegie

## Alaska Field Office

The EROS Data Center's Field Office is collocated with other offices of the National Mapping Division (NMD) (Alaska Office, National Cartographic Information Center, Public Inquiries Office), the Water Resources Division (WRD), and the Branch of Alaskan Geology (BAG), on the Alaska Pacific University campus, in Anchorage, Alaska. The Field Office operates and maintains an IDIMS image processing system and a MicroVAX II with LAS and ARC/INFO software. The Field Office's computer room is also home for WRD's Prime computer. The mission of the Field Office is to assist other divisions within the U.S. Geological Survey (USGS) and other government agencies to analyze remotely sensed data and develop and manipulate digital geographic information system (GIS) data bases. In carrying out this mission, the Field Office staff: (1) enter into cooperative projects with other government agencies; (2) provide image analysis and data base development services upon request; (3) allow other qualified government personnel to utilize the Field Office computer systems for their operational analysis projects; and (4) maintain a digital archive containing (a) Landsat computer compatible tapes; (b) digital elevation model data; (c) land cover classifications; and (d) selected advanced very high resolution radiometer (AVHRR) data.

## Cooperative Projects

The Field Office staff are presently working on a cooperative project with BAG personnel to develop a minerals GIS for the Alaska Peninsula. EROS is providing training, use of the MicroVAX II, and digitizing services. BAG personnel are learning to use ARC/INFO and preparing the minerals data layers for entry into the GIS.

## Operational Users

Both the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) have personnel who regularly use IDIMS to produce land cover classifications for their ongo-

ing management responsibilities. USFS personnel are close to completing land cover classifications for the entire southeast Alaska (30 million acres). Their project requires portions of 21 Landsat scenes. The USFS will use this data to compile statewide statistics on land cover types and forest biomass. The BLM personnel are using IDIMS to prepare land cover classifications for areas in which they have responsibility for assessing environmental impacts associated with oil and gas leasing.

## Analytical Services

Field Office personnel are in the process of completing land cover classifications for 14 of 16 National Wildlife Refuges (NWR) for the U.S. Fish and Wildlife Service (USFWS). Within the past year land cover and terrain maps were produced for the two largest NWR's, namely Yukon Delta and the Arctic NWR (each refuge is 20-million acres). Data from the Arctic NWR have been used in the environmental impact statement that assesses whether or not oil and gas drilling should occur in the Arctic Coastal Plain. In addition to land cover and terrain data, the Field Office provides lake inventory data bases for most of the refuges.

## Alaska Interim Land Cover Map Program

During the 7 years EROS has been in Alaska, IDIMS has been used by Field Office personnel and other government agencies to produce land cover classification for over 245 million acres (that's two-thirds of the State). As a result, NMD has endorsed an interim mapping program to convert existing land cover data to a standardized statewide land cover map legend. Land cover maps for six 1:250,000-scale quadrangles have been completed and an evaluation is in progress. Approximately 75 additional land cover maps would be produced by the Field Office during the next 5 years, pending a favorable evaluation by agencies in Alaska and the Director's approval to commit funding.

## Summary

The Field Office staff is a small (six persons) but dedicated staff committed to utilizing computer-aided image processing and digital data base development technology to assist other divisions within the USGS and other government agencies to meet their information collection and resource management requirements in Alaska. To do this, Field Office staff rely heavily upon the EROS Data Center (EDC) for support. For example, EDC provides (a) regular maintenance support for much of the Field Office computer equipment; (b) operational digitizing in support of data base development; (c) photographic and Application output products and maps; (d) image mapping support; and (e) technical advice and consultation, and administrative support.

The success the Field Office has experienced in Alaska in transferring the image processing and GIS technology to government users is a tribute to EROS's commitment to the technology and the teamwork between the Field Office and EDC personnel.

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## FEDERAL WOMEN'S PROGRAM

The Federal Women's Program EDC Chapter offers a varied selection of Lunch and Learn topics to all EDC employees.

Recent programs included:

"What to Do When Mom's Not Home", by the Minnehaha County Extension Office "The South Dakota Women's Advocacy Network," by County Commissioner Candy Hanson "Premenstrual Syndrome (PMS)," by Ann Holms, R.N. Practitioner, "The Carroll Institute—Services for the Alcohol and Drug Dependent," by Marta Brosz, Executive Director, Carroll Institute

Plans are being formulated for another Adult Education Fair to be held this summer.

## MAP SEPARATES TRACKING SYSTEM

by Mary Jungling

The Map Separates Tracking System (MSTS) is a computerized system developed at EDC that provides capabilities for inventorying and tracking map separates among the four mapping centers of the National Mapping Division (NMD) — Rocky Mountain, Mid-Continent, Eastern, and Western. The hardware configuration for the system consists of an Altos micro computer at each site and various bar code printers and readers ("bar code" is the coded bar such as we see on grocery items). The bar code printers and readers provide for labeling and retrieving, respectively, the inventory. In the fall of 1984, the Division initiated development for a system that would be uniform because each of the sites utilize a different system for inventorying their maps and, subsequently, encountered difficulties when transferring maps.

Map separates are the original work ups and configurations used to develop maps. One separate or plate may contain road information, another water bodies, and yet another contours. Cartographers at the sites may revise a map or may overlay various maps to develop a map with specific requirements. As the cartographers request maps from their site and other sites, it is necessary to have an inventory to know what is available in order to register its location. Ordering capabilities and availability status are necessary for the customers who request maps.

The ordering requirement was one of the reasons for EDC's involvement in this project. Currently, the INORAC software handles the ordering capabilities; EDC developed this software and is currently developing the INORAC replacement software, DORRAN. Because EDC had this experience and the ability to most quickly divert staff to develop the system and because this project was a high priority within the Division, the Division designated EDC for the project. The initial efforts of the EDC staff began in the fall of 1984; Roya Bakke and Rich Lee visited the sites to assess their present operations and to develop a design that was applicable for all sites. In November of 1985, they presented the final design review to the map-

ping centers; and then in April, 1986, actual development of the code began. Throughout the development of the software, the software staff met with National Cartographic Information Center (NCIC) personnel to coordinate the project. They also conducted a two-week training session for system administrators and data base managers in December of 1986; in May, 1987, the staff traveled to the sites to train additional people. The system, as originally designed, is complete; by the end of the summer, the staff plans to have completed the installation of the systems.

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## Employed Moms' Kids Do Well

"We now have solid evidence that working moms of school-age children can feel good, not guilty, about what they're doing," says Dr. Helen K. Cleminshaw, director of the Center for Family Studies at the University of Akron and a member of a research team that studied grade-school children from 38 states.

The study, led by project director John Guidabaldi of Kent State University, concluded that whether or not a child's mother was employed had little influence on most aspects of a child's performance. In fact, children of employed mothers tended to do better in school and be more self-reliant.

"If you're thinking about returning to work now that your kids are in school, these findings should reassure you," says Dr. Cleminshaw.

In another study, which monitored a sample of middle-class children through their first seven years, Dr. Adele E. Gottfried of California State University, Northridge, and Dr. Allen Gottfried of University of Southern California Medical School, also concluded that children suffered no negative effects when their mothers worked. They discovered that other factors such as birth order, home environment, and socio-economic class all had more effect on children.

*(Reprinted in the Central Region EEO Newsletter from February 1987 Women's Week Magazine)*

## CHAMPIONS NAMED IN CRIBBAGE TOURNAMENTS

by K.C. Webde

Cribbage tournaments have helped to make wintertime lunch hours at the Data Center interesting and enjoyable. Once again, the EDC tournaments have come to a close and champions have been named. In the EDCEA cribbage tournament, **Brent Lowell** took the honors in singles play while **Bryan Radspinner** and **Curt van Oort** won in doubles play for the second consecutive year. Second place finishers in both singles and doubles were **Loren Koepsell**, **Rick Wiese**, and **Don Schriever**. In Technique Development and Applications Branch play, **Tom Loveland** won his fourth cribbage title, with second place going to **Stu Doescher**.

Our congratulations to all of you!

#### AWARDS

*Dave Meyer*, Technique Development and Applications Branch, was the recipient of a special achievement award for his outstanding work in image restoration techniques that he was responsible for developing at EDC, and that have resulted in the generation of superior quality products.

*Albert Brown*, Alaska Field Office, received an award for excellence in the performance of his duties, specifically for the accomplishment of indexing and archiving 55,000 aerial photographs dating back to 1926 and for his work with the Committee on Natural Resource Management.

*Kent Hegge* and *Rick Vandernick*, Data Production and Distribution Branch, were honored for their roles in producing the Customer Service Reference Manual, which has proven to be a valuable tool and which reflects their dedication, hard work, and perseverance to a job well done.

by *Mary Jungling*

Challenging, adventuresome, exciting, relaxing, peaceful, three-dimensional exhilaration are some of the words used by persons at the Data Center who enjoy flying as a hobby. For Lawrence "Bud" Youngren, the Assistant Production Program Manager for NOAA at EDC, flying has been much more than a hobby in his life. Bud has his commercial license and 12,000 flying hours logged to his credit. His flying adventures began as a youth, flying with the Civil Air Patrol and later winning a flight scholarship as a CAP cadet in 1947. These earlier years of flying presented an era of flight that will probably never be revisited, Bud says. It was adventuresome—taking off for a two-day trip to wherever, landing your plane in the countryside, fixing a meal over a little sterno stove, and then flying on your way again. Exaggerating this freedom was the plane he flew, a Piper J-3 Cub. It had an open window on the left and a fold-down door that allowed the wind to blow through at 85 miles per hour. Is it any wonder it remains his favorite flying machine?

His youthful activities also included a stint working for Joe Foss, Commander of the Air National Guard, and Duke Corning, Adjutant General of the South Dakota National Guard. Following this, Bud worked his way through two college degrees by working as a flight instructor and weather modification program manager. His next flying experience, working as a weather research test pilot for the South Dakota School of Mines in 1968 through 1970, proved to be the "most unusual" flying endeavor in his career. He flew an armored-plated T-28 (one-of-a-kind) ex-Air Force airplane into thunderstorms that towered to 60,000 feet to search out hailstone formation zones. Being the first to fly this remodeled plane was a dangerous "frontier" challenge in weather research.

Working with weather modification for 15 years included a variety of projects that covered most areas of the United States; it also included assignments in Spain, the Philippines, the Caribbean, Mexico, and North Africa. Bud's last project in weather modification was an assign-

ment in Libya under the Khadafy regime. Because of the military preparedness within the country, flying arrangements were very stringent most of the time and flying areas were confined. In one case, Bud made some miscalculations in navigation and upon landing was informed that surface-to-air missiles had been targeted on his aircraft. An emergency escape flight plan was always in mind should political conditions warrant a hurried exit from the country.

Upon receiving a directive from President Reagan for all American citizens to leave Libya in 1981, Bud returned to the U.S. and worked as a weather forecaster at the Minneapolis Air Route Traffic Control Center before joining the Data Center. Bud continues to be involved with flying activities that include search and rescue missions, accident prevention counseling, and just pure pleasure flying.

Other EDCers who share the thrill of flying include John Allen, Bill Anderson, Steve Covington, Mark Erickson, Robin Hermanson, Ron Lietzow, Margaret Mayers, Brent Nelson, Russ Pohl, Howard Warriner, and Al Watkins. For some of these, it means owning their own flying machine and for others it is the initial step of beginning flying lessons. But they all would agree that "the sky is the limit."

The Director of the U.S. Geological Survey has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this agency.