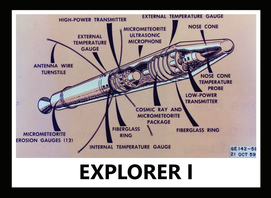
PROJECT EROS
AN EARTH RESOURCES OBSERVATION SATELLITE PROGRAM

THE INSPIRATION

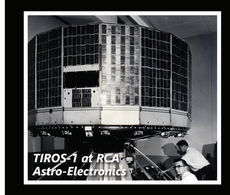
The late 1950s and early 1960s were defined by a series of impressive space age achievements. The first US Satellite, Explorer I, was launched on January 31, 1958. TIROS-1 (Television Infrared Observation Satellite Program), which was launched on April 1, 1960, became the first weather satellite to send TV cloud-cover pictures of the Earth from space. Projects Mercury (1959-1963), Gemini (1964-1966), and Apollo (1967-1972) became the first three human spaceflight programs. Although the first three human spaceflight programs superbly achieved their space exploration objectives, they produced some significant experimental results and observations that translated into an improved understanding of the Earth. Of particular note were the photographs taken by astronauts during the Gemini IV mission as part of the Synoptic Terrain Photography Experiment.

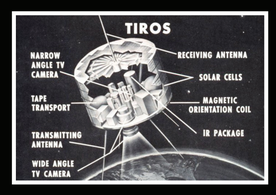

Explorer I Team
January 31, 1958



EXPLORER I


Explorer I Launch
January 31, 1958


TIROS-1 at RCA Astro-Electronics




First TIROS-1 Image
April 1, 1960


Gemini IV Mission
Ed White - First American Spacewalk
June 3, 1965


Gemini IV Mission
Nile Delta
June 4, 1965


Gemini IV Mission
Gulf of California
June 5, 1965

THE KEY PLAYERS

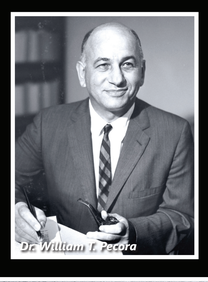
William A. Fischer, an internationally recognized photogeologist who worked for the USGS, was involved in some of the early civilian remote sensing efforts. He was an advocate of using aerial photography and radar photography to support geologic investigations. In 1962, he attended the first Symposium on Remote Sensing of Environment, whereby the potential applications of remote sensing in Earth sciences were discussed. Fischer became familiar with the Earth photographs taken by the Mercury, Gemini, and Apollo astronauts, and he quickly understood the potential value of an Earth observing satellite system. Under his direction, the USGS compiled photomosaics with some of these photographs. He used his expertise in photointerpretation to create geologic terrain maps, land-use planning maps, and tectonic maps.

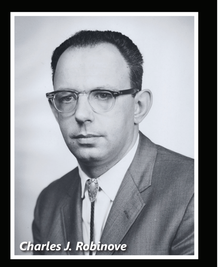
In 1961, Fischer began collaborating with Charles J. Robinove, an exceptional hydrologist at the USGS, to assess the use of airborne thermal infrared imagery in measuring surface water temperature and groundwater discharge. Robinove was an early advocate of using remote sensing to support hydrogeographic and hydrogeologic investigations. He was adamant that remote sensing technologies could contribute to improved resource surveys, especially in remote locations where there was inadequate information. In 1965, Robinove became Chief of the Office of Remote Sensing in the Water Resources Division where he coordinated a large number of empirical studies that proved the potential value of an Earth observing satellite system.

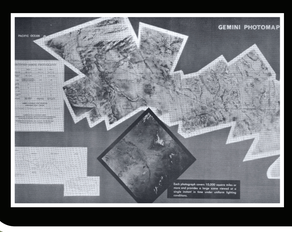
Fischer and Robinove presented their research findings to Dr. William T. Pecora, then Director of the USGS, and suggested that the USGS develop their own Earth observation satellite system. Pecora was an accomplished geologist and a visionary leader who led the USGS with distinction and honor. As Chief Geologist and Director, he recognized that conventional methods of acquiring environmental data were not providing information as rapidly as needed. He believed that aircraft and spacecraft could gather valuable data in a timely, effective, and economic manner. Accordingly, he actively supported research in photogeology and remote sensing. Pecora agreed with Fischer and Robinove and stated that "The course seems clear; we must make and execute bold plans to gather data on the Earth's resources, and assess, inventory, and disseminate this data in order to alleviate resource problems common to all nations."

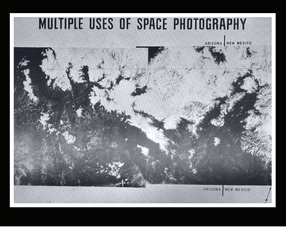
USGS science for a changing world

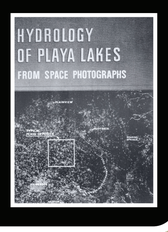

William A. Fischer


Dr. William T. Pecora


Charles J. Robinove



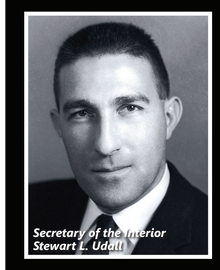




THE PRESS RELEASE

With the backing of Fischer and Robinove, Pecora proceeded to make bold plans by approaching Stewart L. Udall, the Secretary of the Interior. Udall was an enthusiastic conservationist, politician, lawyer, author, and scholar who had an immense impact of American environmental stewardship. During his appointment, he aggressively promoted the expansion of federal lands and the enactment of environmental legislation. Since Udall was passionate about land and environmental conservation, he favored the idea of a civilian Earth observing satellite system that would support the improved management of natural resources. Therefore, on September 21, 1966, Udall issued a press release announcing ***Project EROS: An Earth Resources Observation Satellite Program***. During the announcement, Udall stated that "EROS is a program aimed at gathering facts about the natural resources of Earth from Earth-orbiting satellites carrying sophisticated remote sensing observation instruments."

Following the announcement, political protest by NASA and defense agencies ensued because it was a complete surprise and the idea of constructing a civilian Earth-observation satellite was not necessarily a government priority. This ended up being a bold move since the USGS did not exactly have the technical expertise or funds to start its own satellite program. However, it did serve as a political strategy to accelerate the development of a collaborative program with NASA.


Secretary of the Interior
Stewart L. Udall

UNITED STATES
DEPARTMENT of the INTERIOR
**********************news release

OFFICE OF THE SECRETARY — Forrester 343-4646

For release: SEPTEMBER 21, 1966

EARTH'S RESOURCES TO BE STUDIED FROM SPACE

Project EROS was announced today by Secretary of the Interior Stewart L. Udall. EROS (Earth Resources Observation Satellites) is a program aimed at gathering facts about the natural resources of the earth from earth-orbiting satellites carrying sophisticated remote sensing

COURIER-POST, Camden, N. J., Wednesday, September 21, 1966

Eros Satellite Due To Map Resources Of Entire Planet

By EDMUND B. LAMBETH
Courier-Post Bureau

WASHINGTON—Interior Secretary Stewart Udall announced plans yesterday to build a satellite that by 1969 will begin monitoring the natural resources of the Earth.

Dubbed Project EROS (Earth Resources Observation Satellites), the program aimed at gathering facts about the earth's natural resources from earth-oribting stellites was announced tonight by the Interior Department.

Secretary Stewart L. Udall, in announcing Project Eros (Earth Resources Observation Satellites), said there is urgent need to apply space technology toward the solution of "many pressing natural resources problems being compounded by population and industrial growth."

Feasibility Experiments

"Facts on the distribution of needed minerals, our water supply and the scope of coverage envisioned for EROS.

Beginning Seen

EROS is the outgrowth of extensive experiments by Interior, the National Aeronautics and

Project EROS To Explore Earth's Natural Resources

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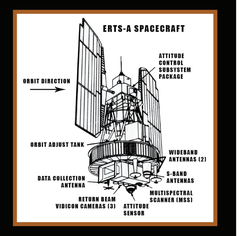
cora, director of the Geological Survey, to head the program.

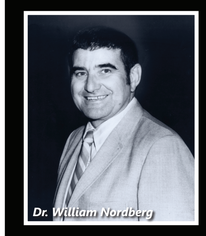
Pecora described space-sensing of the earth as "the ability to 'see' more easily beneath the water and forest or soil cover, and the ability to view areas of the earth repetitively at various times and seasons. Another basic advantage is the fact that comparable observations can be made all over the earth.

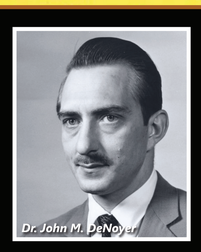
"We visualize EROS as an evolutionary program," Pecora continued, "beginning with television cameras flown in an orbit that

THE ERTS SATELLITE SYSTEM

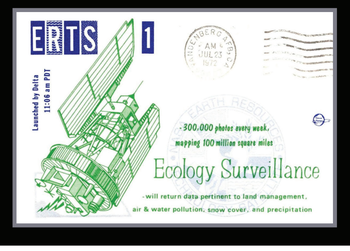
Following the unexpected press release, NASA responded to the Interior Department and proclaimed that they would develop an Earth Resources Technology Satellite (ERTS). NASA initiated the ERTS mission in 1967, and the Goddard Space Flight Center commenced a preliminary design study to assess sensor, data storage, and data transmission technologies. In October of 1968, a full-scale design and development phase for ERTS was approved and started. Dr. William Nordberg, a physicist and meteorologist from Austria, became the ERTS Project Scientist. Nordberg was a member of the early TIROS weather satellite team and he served as Nimbus Project Scientist. With his previous experience, Nordberg successfully coordinated the design and build of the ERTS spacecraft and sensors. In 1969, Dr. John M. DeNoyer, a geophysicist who has previously worked for the USGS, was hired by NASA to serve as the Director of the Earth Observations Programs and to oversee the development of ERTS. The first satellite in the program was named ERTS-A. The spacecraft design was based on the Nimbus meteorological satellites, and two types of sensors, including a Return Beam Vidicon (RBV) and a Multispectral Scanner System (MSS), were chosen.




Dr. William Nordberg


Dr. John M. DeNoyer


ERTS-A

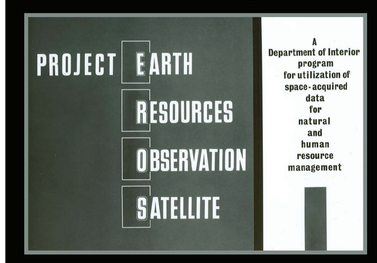


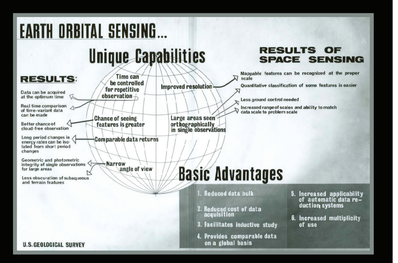

ERTS-A Launch
July 23, 1972

THE EROS PROGRAM

The EROS Program was formally established in 1967 by Secretarial Order as a cooperative program between the USGS, NASA, other agencies, and academic institutions. The EROS Program was created with three major objectives in mind:

- To provide unclassified remote sensing data collected by Earth-orbital satellites to facilitate the assessment of land and water resources.
- To design specific data collection systems, to distribute data to users, and to make uses of the data in resource studies and planning.
- To cooperate with NASA to build, launch, and operate and an Earth resources satellite and to follow on with improved and modified satellites as required by the operational needs of resource programs.





"The goals of Project EROS are to place into orbit around the Earth a sun-synchronous remote-sensing satellite for obtaining terrain information of value to many disciplines and for fulfilling many of the responsibilities of the Department of the Interior. This satellite, which will contain several multispectral television cameras, is visualized as an initial step in the evolving program of space-flight technology applied to natural resource development, conservation, and management."

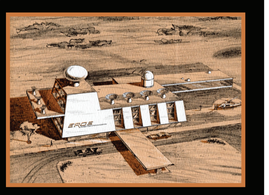

Stewart L. Udall and Dr. William T. Pecora at NASA, April 6, 1967

THE EROS DATA CENTER

After the build of ERTS was initiated, it was quickly realized that a facility would be required to house, process, interpret, distribute, and archive the remotely sensed data. It was determined that the facility needed to be constructed in a central location where it could receive transmissions directly from a satellite passing over the conterminous United States. A study indicated that it should be located within an area approximately elliptical in shape in a location somewhere between Topeka, Kansas, and slightly beyond Sioux Falls, South Dakota. On March 31, 1970, a site located 16 miles northeast of Sioux Falls was selected for the new facility, which was to be called the EROS Data Center.

The state of South Dakota, namely Senator Karl Mundt, was extremely active in influencing the decision to locate the EROS Data Center near Sioux Falls. Senator Mundt coordinated with the Sioux Falls Development Foundation to purchase the site and to construct the EROS Data Center. In fact, a full-scale fund-raising campaign called Operation Ground Shot was launched in order to quickly procure the funds to purchase the land. After the campaign, the Sioux Falls Development Foundation donated the land to the United States government and constructed the facility under a 20-year lease-purchase agreement. On August 7, 1973, the Karl E. Mundt Federal Building at the EROS Data Center was dedicated. The EROS Data Center became fully operational on January 1, 1974.


EROS SITE SELECTION



DEPARTMENT of the INTERIOR
news release

GEOLOGICAL SURVEY — Forrester (202) 343-4646

For release Nov 15, 1971

EROS DATA CENTER MASTER PLAN APPROVED

Acceptance of a master plan concept of the EROS (Earth Resources Observation Systems) program Data Center site to be located 12 miles north of

DEPARTMENT of the INTERIOR
news release

GEOLOGICAL SURVEY — Forrester (202) 343-4646

For Release Friday, April 14, 1972

GROUND-BREAKING SCHEDULED TODAY FOR EARTH RESOURCES SATELLITE DATA CENTER.

Ground-breaking ceremonies will be held today at Sioux Falls, South Dakota, for construction of a major facility in the use of remote sensor data to be obtained from aircraft and spacecraft for purposes of resources


Senator Karl E. Mundt

DEDICATION
KARL E. MUNDT
FEDERAL BUILDING
EROS DATA CENTER
Tuesday, August 7, 1973
PROGRAM

EROS Data Center, 1973

This material is based upon work supported by the USGS under Grant/Cooperative Agreement No. GI8AP00077. Poster by Ellie Leydsman McGinty, UtahView State Coordinator. UtahView is hosted by Utah State University in Logan, Utah.