NASA National Aeronautics and Space Administration

GODDARD NEWS

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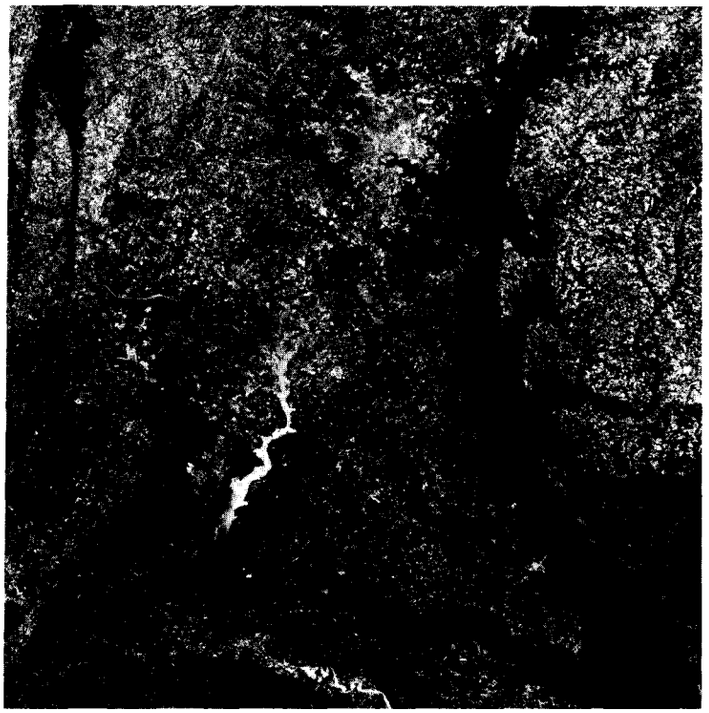


CHESAPEAKE BAY as it appears from 570 miles aloft.

Value of Satellite's "Big Picture" Subject of Chesapeake Bay Conference

The value of the "big picture" look, literally produced by NASA's Landsat satellite, is the subject of a mid-April conference on the application of remote sensing techniques in solving many of the ecological problems of the Chesapeake Bay region.

Sponsored by the University of Maryland in conjunction with NASA and the Environmental Protection Agency (EPA), the conference was held April 12-15 in Berkeley Springs, W. Va.

More than 80 key people attended the conference as invited representatives of State and Regional Planning Agencies, Regulatory Agencies, Universities, and Private Industry concerned with the health of the Bay. Attention focused on the use of satellite, aircraft and other remote sensing techniques in solving many of the Bay's problems associated with land use, resources, and pollution.

The opening address was given by United States Senator, Charles McC. Mathias Jr., from Maryland. Senator Mathias is a long-time advocate of coordinated management of the Bay. He has called for the establishment of a Chesapeake Bay Commission to oversee the many organizations studying Bay ecology.

"The Chesapeake Bay, our nation's largest estuary, could become a dead sea within our lifetime unless we coordinate its stewardship," said Senator Mathias.

A second keynote address was by Daniel J. Snyder, III, EPA Regional Administrator for the east coast states containing the Chesapeake Bay. The EPA has announced a three to five year program devoted to studying and preserving the Bay. Originally proposed by Senator Mathias, this program is slated for an annual budget of $5 million.

"The greater range and area covered by remote sensing instruments carried by the Landsat and aircraft could help us in determining the extent and location of the Bay's non-point source water pollution," said Snyder.

Each Landsat image covers 13,225 square miles, an area equivalent to the combined territory of Maryland, Delaware, and New Hampshire.

Runoff from urban and agricultural areas has been viewed as important a factor to the water quality conditions of the Bay as that from industrial and municipal point discharges. Such non-point source pollution is both difficult to monitor and analyze.

The size of the Chesapeake Bay and the conflicting jurisdictions which have control over it make any monitoring program difficult. Remote sensing through the use of satellites and aircraft make it possible to view the Bay as a unified ecological system.

The Bay is 193 miles long and divided between two states —Maryland and Virginia. Three other states—Delaware, West Virginia, and Pennsylvania—contain tributaries of the Bay which can affect its quality.

"Federal, state, and private agencies do not coordinate their stewardship of the Bay because there is no vehicle for it. They may duplicate each other's efforts without knowing it, or leave some vital danger unopposed. The Bay is an organic whole, an entity. If one part is damaged, all parts are affected," said Senator Mathias.

"The procedure is simple for establishing a commission to oversee and coordinate conservation of the Bay. The Water Resources Planning Act of 1965 contains authority to fund such a commission for up to $750,000 a year. There are seven such commissions across the country today. Membership is drawn from state and federal agencies, with a chairman appointed by the President of the United States," added Senator Mathias.

"There is no time left to grope for solutions. With every year that passes, the Bay is diminished. Some day, unless we intercede, the wear and tear will become terminal. We must join together to insure the health of the Chesapeake Bay, as our legacy to the future," said Senator Mathias.

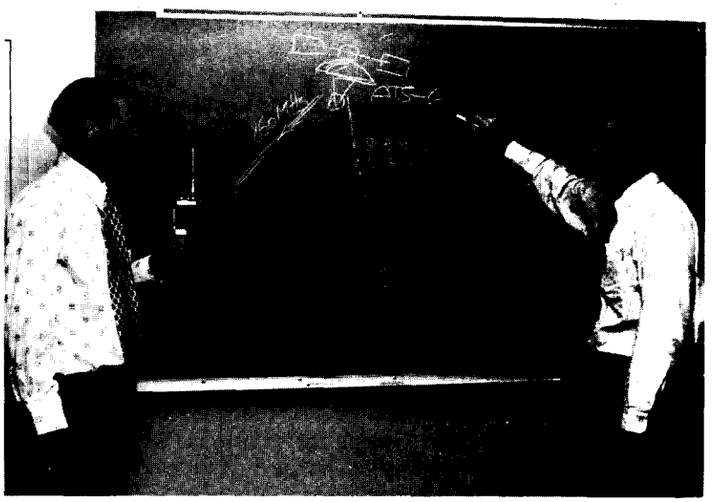
The remote sensing conference on the Bay was held at the Coolfont Conference Center in Berkeley Springs, W. Va. It was organized under the direction of Dr. Dixie Pemberton, Head of the University of Maryland's Inland Environmental Laboratory, Center for Environmental and Estuarine Studies. Support was provided by Goddard and the EPA.

1977 GEWA COUNCIL MEMBERS are from left: (standing) Mike Comberiate, Code 733; Ed Fitch, Code 754; Ron Kolenkiewicz, Code 921; Arlene Peterson, Code 311; John Lovelace, Code 405; Paul Rall, Code 841; and (seated) Bill Mecca, Code 200; George Abid, Code 600; Marc Selig, Code 560; and Chris Bryan, Code 236.

Public Service Communications Satellite

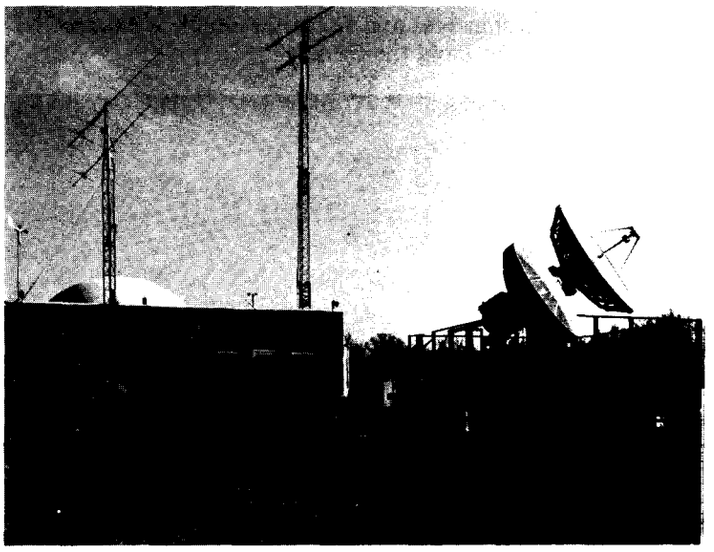
Satellite communications is a thriving worldwide industry which began with GSFC's launch of Syncom in the 1960's Today, live broadcasts of world events have become commonplace and are taken for granted. However, current applications are limited to heavy traffic or what are termed fixed channel assignments between large, complex ground terminals. Applications involving lighter traffic and services directly to individuals are precluded by the cost and complexity of equipment. A logical next step is the development of systems for serving thousands of low cost remote terminals which will open new horizons in satellite communications. GSFC's Communication & Navigation Division (Code 950) is initiating a Public Service Communications Satellite program aimed directly at opening new markets in education, emergency medical services, law enforcement, and public safety. The goal is to develop and demonstrate a commercially viable system capable of serving thousands of remote low cost terminals—including mobile and hand-held equipment.

In support of this goal, a team headed by Dr. James Brown (Code 952) has been conducting a series of tests and demonstrations of advanced communications technology through the use of GSFC's ATS-6 satellite. A hand-held walkie-talkie originally manufactured as a commercial item in the 460 MHz frequency band has been modified for compatibility with the ATS 860 MHz system. High quality voice transmissions have been demonstrated to groups such as the Prince George's County police, and the Joint Congressional Space Appropriations Committee staff. The test configuration consists of a telephone line to the ATS Ground Station at Rosman, North Carolina, followed by transmission at 6 GHz to the satellite. Frequency translation to UHF results in transmission at 860 MHz with sufficient signal power to enable reception by the hand-held unit. Ultimately, two-way communication between user and satellite will eliminate the telephone line demonstration mode. A major goal of the PSCS program is to transfer this type of experimental technology into operational commercial services of tomorrow, beginning with an FY79 new start program.



DR WILLIAM REDISCH (right) Chief of Communications & Navigation Division (Code 950) reviews system test configuration with Mr. Charles E. Cote, Head, Communications & Navigation Systems Applications Branch (Code 952). Mr. Cote is holding the modified walkie-talkie unit.

A COMPLETE CTS earth terminal is shown consisting of a 1.0 meter antenna, the receiver held by the young lady and a conventional TV set.



GSFC'S TELECOMMUNICATIONS Test and Support Complex provides full two-way color television interconnections with the Communications Technology Satellite.

MR. I. Y. GALICINAO (Code 952) initiates voice transmission to satellite, which is received by walkie-talkie.

Sailboat Venture Into Bermuda Triangle Area Evaluates Search and Rescue System

The value of satellites to search and rescue missions for small craft at sea was recently demonstrated by a retired engineer and a Florida family of three who sailed a 10-meter (33-foot) sailboat 965 kilometers (600 miles) through the "Bermuda Triangle" area.

During the 30-day trip, a satellite provided the general location and condition of the voyagers to engineers at NASA's Goddard Space Flight Center in Greenbelt, Md.

Small or medium-sized craft venturing into the open sea usually must rely on marine radio telephone communications. Such systems are limited to about 40 kilometers (25 miles) line-of-sight range. Other, longer range voice radio equipment is subject to static and is often unreliable.

The principal experimenter for the satellite search and rescue test is James L. Baker, a retired NASA engineer from Sherwood Forest, Md. He conducted the extensive tests aboard the sloop "Sirius." Owner Louis Van Houten of Key Biscayne, Florida, piloted the craft with the aid of his wife Roz and son Peter.

NASA's Nimbus-6 meteorological research satellite kept tabs on the four voyagers by monitoring continuous signals from a small transmitter on the sailboat. This battery-powered unit, normally carried by meteorological balloons, automatically sends out a signal once-a-minute for relay to Goddard via the satellite.

Within one hour after the data was received at Goddard, a computerized system printed out information on the sailboat's position. About 40 percent of the sailboat positions, as derived from the satellite data, were within one mile of the true positions. The overall accuracy of the derived positions was within three miles.

From its earth polar orbit, the Nimbus-6 was able to track the sailboat for about three-and-a-half hours around local noon and another similar period of time around local midnight each day.

As part of the test, Baker evaluated a pushbutton distress alarm system which was connected to the onboard transmitter. Simulated distress messages, craft identification, and weather and cruising conditions were relayed successfully via the satellite to Goddard with this device.

The pushbutton unit, developed by Baker under contract to Goddard, is designed to repeat its distress message automatically, once energized. Thus, a crew confronted with a genuine emergency could initiate the distress message and then turn its attention to meeting the emergency.

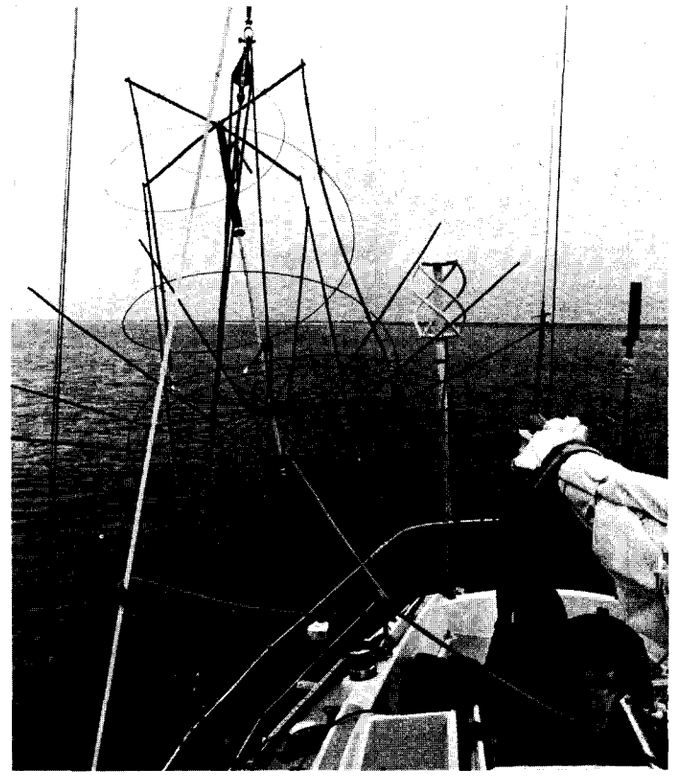
Due to the compactness and lightweight of the transmitter, its battery and antenna, and the pushbutton unit, the entire system could be transferred quickly to a lifeboat if necessary.

Baker coordinated the experiment with Goddard through a NASA communications research satellite, the Applications Technology Satellite-1 (ATS-1). Still in use after more than ten years in orbit, the ATS-1 is positioned in a stationary orbit some 35,680 kilometers (22,300 miles) above the equator south of Hawaii. From here, the satellite commands a view extending from Japan to the Atlantic waters off the U.S. east coast.

For the ship-to-shore communications, Baker used a commercial 20-watt transceiver modified to operate on satellite frequencies. The shipboard antenna was a small and rugged unit designed especially for mobile application.

While south of Nassau, Baker established contact with Japan's Kashima ground station through the ATS-1. This test of the system proved to be the longest communications distance ever covered from a sailboat using a single satellite for relay.

"It was a comfortable feeling for us to know that Goddard had up-to-date information on our position and cruising conditions, particularly since we were in the notorious 'Bermuda Triangle' where many craft have disappeared," said Baker after the voyage.



OWNER LOUIS VAN HOUTEN is shown aboard his 10-meter (33 feet) sailboat the "Sirius" at sea during a 30-day trek into the Bermuda Triangle area off Florida to evaluate the use of satellites for search and rescue of small craft at sea. The sailboat covered 695 kilometers (600 miles) during the test.

To the left of Houten can be seen a variety of antennas used to coordinate the test via satellite with NASA's Goddard Space Flight Center, Greenbelt, Md. On the right rear of the sailboat is another antenna-transmitter unit which continuously emitted a signal which was picked up by NASA's Nimbus-6 satellite whenever it was overhead. These signals were automatically relayed to Goddard where the sailboat's position was automatically calculated.

Bond Drive, 1977

The U.S. Saving Bond Campaign will be conducted from May 16th through June 17th this year. Our goal is for 80% of Goddard employees to take part in the Payroll Savings Plan.

Savings Bonds are one of the safest investments you can make. They are backed by the full faith and credit of the Federal Government and can be replaced if lost, stolen or destroyed.

Buying Bonds through the Payroll Savings Plan is a positive way of saving by having a specified amount deducted from your pay. It is a deferred payment, always yours when you need it.

Please sign up for a $25.00, $50.00, $75.00 or a higher denomination Bond. If you are already buying Bonds, increase your allotment.

You can only win . . . never lose. See your representative and sign up for U.S. Savings Bonds before June 17th. You'll be glad you did.

Search and Rescue

NASA is developing a satellite system to find missing aircraft in remote areas and locate ships at sea in distress.

The system, designed at the Goddard Space Flight Center, would make it possible to determine the site of plane crashes and shipwrecks more precisely (to an accuracy of a mile), and would also make it possible to receive coded data about the nature of an accident, such as whether a vessel was on fire or sinking.

These kind of facts would be of obvious value to search-and-rescue teams who could equip themselves for the crisis at hand before setting out to aid the distressed ship or find the missing plane.

About 350 vessels are lost at sea world-wide each year, according to government figures, with a resultant loss of about 200 lives. In this country, the Air Force initiates more than 200 search-and-rescue missions annually downed aircraft.

Over the past six or seven years, an average of 30 planes have been lost in the United States annually and never found, said Bernard J. Trudell, a 48-year-old engineer who has been directing the Goddard satellite study.

This year, the National Aeronautics and Space Administration has made its first request for money ($5.6 million) for the new satellite system in the Ford administration budget submitted to Congress January 17. However, the concept has been under discussion in the space agency for a number of years.

"It's been an on-and-off thing," Mr. Trudell said.

"This idea has been kicking around a long time and now the time has come," he added. "Technically, it's been ripe for a number of years but now it has user support." He referred to the people and organizations who would use the satellite system when it becomes operative.

ATS-6 Societal Experiments

Geosynchronous Communication Satellites now are such a common place reality that their daily contribution is quite casually accepted by the general public. Live via satellite as a caption on a TV screen goes almost completely unnoticed in daily newscasts. This technology has advanced over the past fifteen years from the first synchronous communications satellite (Syncom series) to where over 100 countries or territories and six continents uses communication satellite services full time. This development has been commercially addressed in the areas of high density traffic and using large, sophisticated earth stations, that provide essentially trunk-line service into the existing terrestrial networks.

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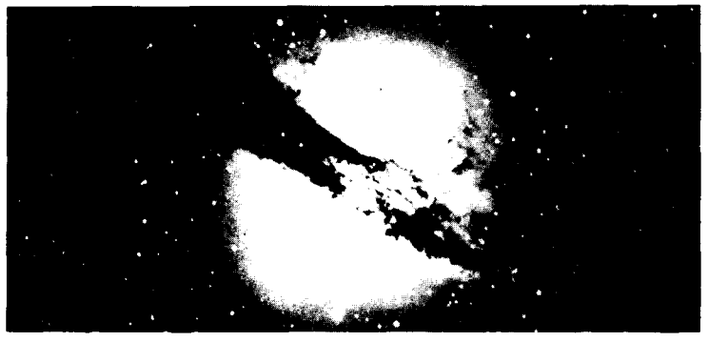
Sounding Rockets Will Study Mysterious Celestial Objects

Some of the most mysterious astronomical objects in the universe were among the observation targets of six NASA rockets launched from Australia during the week of Feb. 16th.

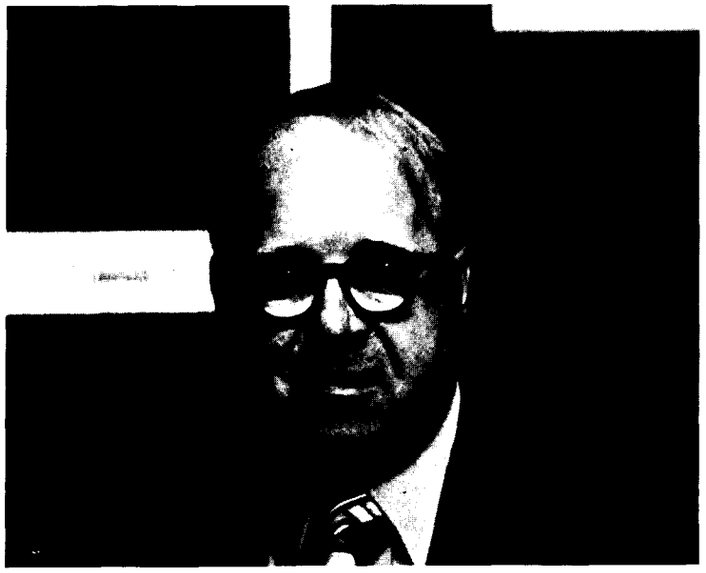
Instruments will be carried aloft from the Woomera Range in Australia aboard 10-meter (32-foot)v-long Aerobee sounding rockets to investigate X-ray stars, hot stars, white dwarfs and exploding galaxies.



Marine Resources Located By Satellites

by Robert Price

Satellite Data may aid in the determination of the location of living Marine Resources. Remote sensing techniques should facilitate the detection of fish species which school at or near the surface. If correlations exist between selected oceanographic parameters, which can be detected from satellites, and the location of fish schools, the commercial fishing industry will be benefitted by providing them with fish school locations. Results by Dr. Andrew Kemmerer of the NOAA National Marine Fisheries Service indicate that such correlations do exist as detected by the Landsat satellite and the location of menhaden fish schools in the Gulf of Mexico.



RONALD K. BROWNING has been named manager for both the Landsat Earth Resources Satellite and the Nimbus Meteorological Research Satellite.