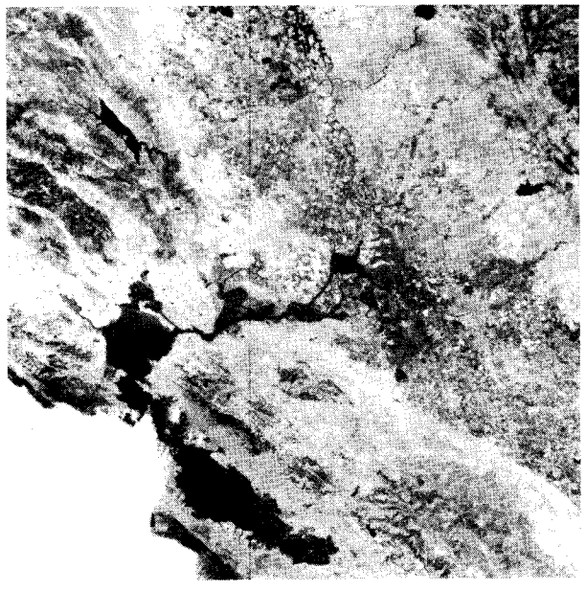
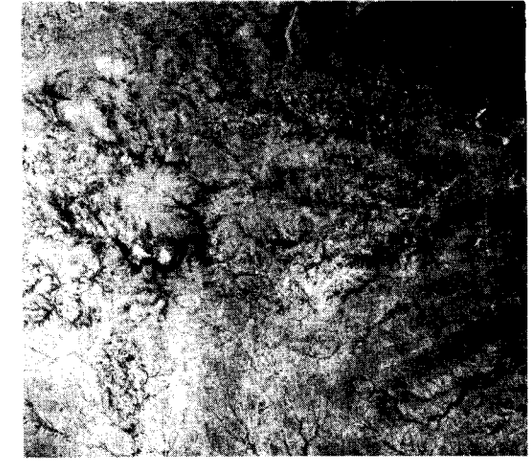
goddard news
August 1972—Vol. 20, No. 5



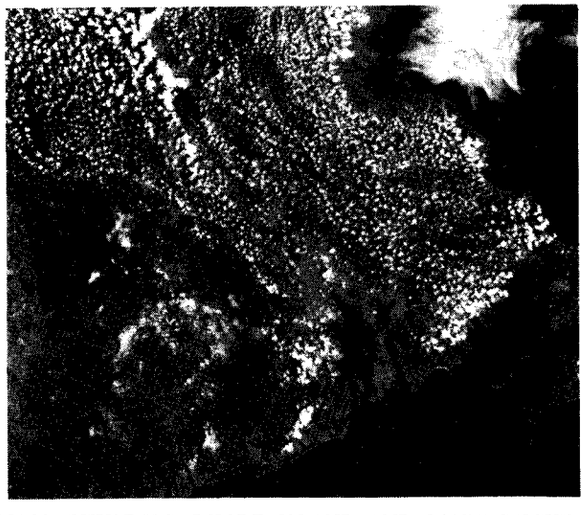
SAN FRANCISCO AREA. This picture from an ERTS color composite shows fog rolling into the San Pablo and San Francisco Bays. Part of the San Andreas fault runs between the fog and bays, and sediment can be seen in both bays. Above the bays to the left is Lake Berryessa. The Sacramento Feather River System runs into the bays from just right of center. In the upper right are the foothills of the Sierra Nevada mountains and Lake Folsom. San Jose is in the bottom, center of the picture.



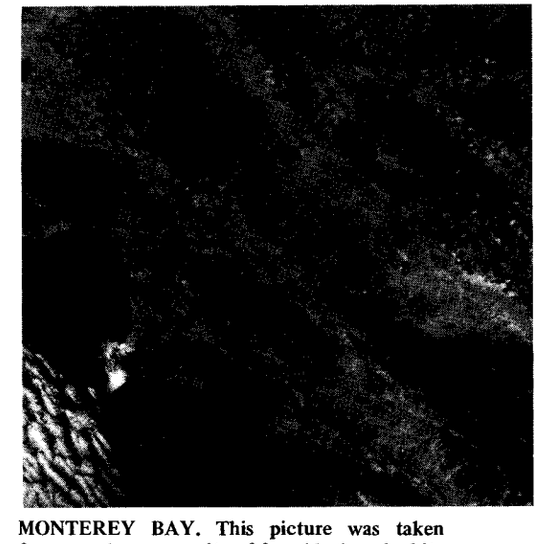
LAKE TEXOMA AND RED RIVER AREA. Taken by ERTS-1 on July 25, the picture shows Lake Texoma (left center) with the Red River along the Texas-Oklahoma border across the entire picture center. The geological formations of the Oauchitas Mountains are clearly visible in the upper right. A band of densely cultivated farmland stretches across the upper center of the picture.

ERTS-1: A New Satellite Views Earth

See also Pages 2, 11, and 12

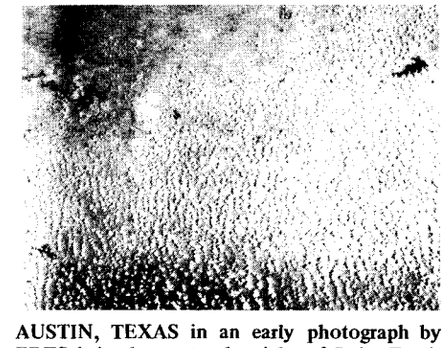


MASSACHUSETTS, RHODE ISLAND AND CONNECTICUT. Three colors – green, red and infrared – were recorded separately by ERTS-1 and then combined to make the color photo from which this picture was taken. In the original color, healthy plants which are bright in the infrared appeared bright red, while young or diseased vegetation appeared light pink. Barren land, cities and industrial areas were green or grey. Clear water was completely black. Areas shown, starting around the coast from the top right, are Boston, Plymouth Bay, Cape Cod and Martha's Vineyard, Buzzards Bay, Narragansett Bay, Block Island, and the Connecticut River.



MONTEREY BAY. This picture was taken from a color composite of four black and white photographs taken by the Multispectral Scanner (MSS) ERTS-1 on July 25. The city of San Jose and the southeastern tip of San Francisco Bay is in the upper left corner. Agricultural fields in the San Joaquin Valley are shown in the upper right; the variations in tones (which were red in the original composite) indicate different crop types and different stages of maturity. The linear feature running from the lower right to the upper left is the famous San Andreas fault.

DALLAS/FORT WORTH, TEXAS. This is one of the first photographs taken by the new Earth Resources Technology Satellite (ERTS-1) from an altitude of about 900 kilometers. Taken by the Return Beam Vidicon camera system (RBV) at about 12:30 p.m. EDT on July 25, it shows the cities of Dallas and Fort Worth at bottom and the Gulf coastal plain at right. The Gulf coastal plain is distinguished by a series of north to north-east trending ridges which are generously forested and show up as broad, curving dark bands. Major cultural features such as roads, airfields, and dams are clearly visible, including even some minor roads.



AUSTIN, TEXAS in an early photograph by ERTS-1 is shown to the right of Lake Travis (far left). The path of the Colorado River, flowing out of the lake and through the city, can be clearly seen as can the Somerville Reservoir at right.

ERTS Launched—

First Pictures Called Excellent

The pictures on Page 1 are some of the early returns from NASA's first Earth Resources Technology Satellite (ERTS-1)

Launched aboard a two-stage Delta Rocket from the Western Test Range (WTR) at 2:06 on July 23, ERTS is now circling the earth once every 103 minutes. Its near-perfect polar orbit, inclined about 99 degrees to the equator, will allow the spacecraft to photograph most of the earth's surface once every 18 days to give mankind its first continuous view from space of the earth's resources and changing environment.

"Everything looks fine – in fact it looks excellent," said Dr. John F. Clark, Goddard Director, from WTR after data indicated that the spacecraft had achieved orbit. "This is probably the most important launch of an unmanned satellite the National Aeronautics and Space Administration has ever made. This mission has more potential to bring direct benefits to the average man than perhaps anything we've done so far in the unmanned space program."

Delta Project Manager Bill Schindler was delighted by the flawless performance of Delta 89. He says, "ERTS must rank as one of the great milestones in space exploration. The confidence shown in the Delta by both NASA and contractors alike was especially gratifying in view of several major vehicle improvements to be flown for the first time on this mission." Improvements to Delta 89 included the use of nine solid-fuel strap-on motors, the new Delta Inertial Guidance System (DIGS), a new second stage engine, and a new S-Band telemetry system. ERTS at 1965 pounds was the heaviest satellite ever launched by a Delta.

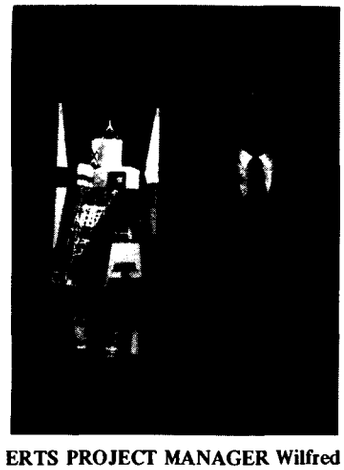
Speaking of the operation of the satellite itself, ERTS Project Manager Wilfred E. Scull says, "Although ERTS-1 has experienced some in-flight anomalies with part of the payload, the launch and early operation of the ERTS-1 observatory equalled or exceeded the anticipated performance. All observatory subsystems and payload items were operated and excellent images, real time and playback from the on-board video recorders, were received and processed through the ERTS Ground Data Handling System.

"The excellent orbit, which required only minor adjustments for the desired repetitive image coverage, and the initial performance of the spacecraft, payload, and the Ground Data Handling System are a direct result of the dedicated and unstinting efforts of a large number of people in the government/industry team. The ERTS/Nimbus Project is grateful for such outstanding support, which is continuing during the investigation of the anomalies."

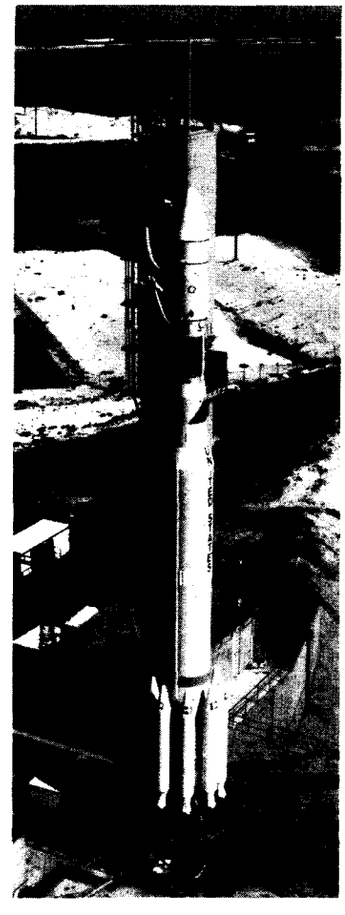
By Tuesday, July 25, less than two days after launch, the first pictures from ERTS showing parts of Texas, Oklahoma and California had been received and processed. One man watching the proceedings at Goddard was Dr. Arch B. Park, Director of NASA's Earth Resources Survey Program, who said at the time, "The satellite is performing beautifully. The pictures we have coming down from both the television camera and the scanner are so good that they exceed our fondest hopes for performance. The quality of the data is just outstanding."

(See Page 11)

FIRST ERTS PHOTOS are reviewed by (from left) Dr. John F. Clark, Goddard Director; Dr. James C. Fletcher, NASA Administrator; and Charles W. Mathews, Associate Administrator of the NASA Office of Applications.



ERTS PROJECT MANAGER Wilfred E. Scull stands beside a model of the first Earth Resources Technology Satellite. The ERTS, patterned after the earlier Nimbus satellites, is the first in a series of R&D spacecraft designed to use remote sensing from orbit to help manage the earth's resources and aid in assessing and understanding the changes taking place in our environment.



DELTA 89 that placed the first Earth Resources Technology Satellite into orbit on July 23 was distinguished by nine strap-on solid propellant rockets and the first use of the Delta Inertial Guidance System (DIGS). Shown here at the Western Test Range shortly before launch, the Delta stood about 110 feet tall, making it the largest vehicle in the series. ERTS at 891 kilograms was the heaviest spacecraft yet launched by a Delta.

As We Go to Press. . .

BULLETIN–A power surge, or transient, was observed in the Return Beam Vidicon Camera system aboard the ERTS-1 on Sunday, August 6. Although the RBV camera system operated normally after the transient occurred, the system was deactivated by ground controllers to permit a thorough systems check.

Spacecraft data on Thursday, August 3 indicated an apparent problem in the #2 tape recorder aboard ERTS-1. That system has been turned off since Thursday, August 3. The spacecraft is presently operational using the Multispectral Scanning System (MSS) to transmit imagery directly to ground stations. Video Tape Recorder #1 is operational and is being used when video data requires tape recording.

Space Shuttle Sortie Symposium Held Here

From July 30 to August 4, Goddard was host to the Space Shuttle Sortie Symposium that was held in the Building 3 Auditorium. About 200 representatives from throughout NASA attended the symposium to discuss payloads, techniques and experiments to be used with sortie missions when the Space Shuttle becomes operational, perhaps by the end of this decade.

The sortie module of the Space Shuttle will be carried in the orbiter cargo bay and will provide a shirtsleeve pressurized environment for scientific and technical investigators in space. It will serve as an orbiting scientific laboratory similar to the present Ames Convair 990 airborn laboratory. Sortie missions will average about 7 days in length.

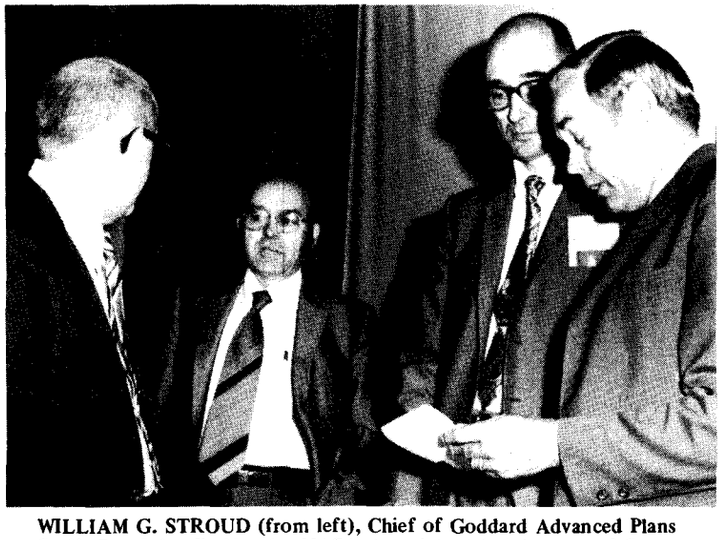
DR. GEORGE M. LOW

For the purpose of the symposium, sortie missions were defined as including missions which employ observations or operations from the shuttle itself, with sub-satellites of the shuttle, or with shuttle-deployed automated spacecraft having unattended lifetimes of less than about one-half year.

The symposium began with a welcoming address by Donald P. Hearth, Goddard Deputy Director; and an agency program overview by Dr. George M. Low, NASA Deputy Administrator. Early sessions were deboted to briefings by shuttle engineers from the Manned Spacecraft Center, the Marshall Space Flight Center, and the Kennedy Space Center. Later sessions included workshop, planning sessions conducted by various user groups representing disciplines in astronomy, physics, meteorology, earth resources, and space technology.

The primary purpose of the meeting was to identify for the user community the characteristics and capabilities of the Space Shuttle Sortie Mode and to allow users to identify their experiment requirements.

The symposium is the first of a series of planned sessions designed to maintain a constant dialogue between shuttle designers and engineers and the user community.



WILLIAM G. STROUD (from left), Chief of Goddard Advanced Plans Staff; Dr. John E. Naugle, NASA Associate Administrator of Space Science; Dr. Leslie H. Meredith, Goddard Deputy Director of Space and Earth Sciences; and Dr. Rodney W. Johnson, Head of the Shuttle Coordination Section in the NASA Office of Space Science; discuss a paper on Space Shuttle capabilities.

Goddard Mourns. . .

Eugene W. Wasielewski, 59, Goddard Associate Director, died July 13 at Suburban Hospital after a long illness.

EUGENE W. WASIELEWSKI

Mr. Wasielewski joined Goddard in October of 1960. He was the principal official for institutional management of the Center and for the operations of Goddard's worldwide tracking and data acquisition network. He provided the primary Goddard interface with industrial organizations.

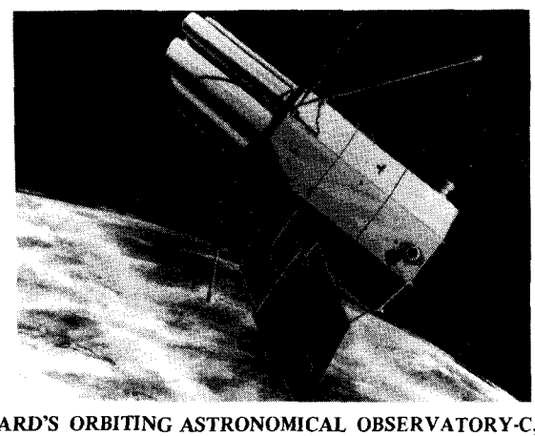
Born in Milwaukee, he held a bachelor's degree in aeronautical and mechanical engineering and a master's degree in engineering mechanics from the University of Michigan.

His career began as a student engineer with the Allis-Chalmers Manufacturing Company. Subsequently he worked in the field of aircraft engines and compressors and carried out the early work in axial-flow compressors which ultimately led to the use of this type of compressor in today's jet engines. For a number of years he was supercharger project engineer for the Fairchild Engine and Airplane Company and executive engineer of the Stratos Division of this company.

From 1944 to 1947 he was associated with the Borg Warner Corporation as chief engineer for superchargers and from 1947 to 1956 he was with the Lewis Laboratory of the National Advisory Committee for Aeronautics where he served as project engineer for the propulsion system laboratory and the 10 x 10 supersonic wind tunnel. Later he was chief of the engine research division and assistant director of the Lewis Laboratory. Before coming to Goddard in 1960 he was employed by the Curtiss-Wright Corporation as chief developer engineer and chief engineer of the South Bend Division.

He was a member of the American Institute of Aeronautics and Astronautics, the American Association for the Advancement of Science, the Society of Automotive Engineers, and the American Ordnance Association.

Mr. Wasielewski leaves his wife Regina, four daughters and one son.



GODDARD'S ORBITING ASTRONOMICAL OBSERVATORY-C, last in the series, is presently scheduled for launch August 21 from Cape Kennedy. Fla. The 4,900-pound spacecraft carries experiments from Princeton University and the University College, London. In orbit, it will be called Copernicus in honor of the Polish astronomer. Its primary telescope is 32 inches in diameter. It will study young stars and interstellar dust with a precision and clarity never before possible. The OAO program has pioneered both the technology and science of space astronomy.

CHARLES H. VERMILLION (left) receives the first NASA WIZARD Award from Dr. George M. Low, NASA Deputy Administrator.

OZRO M. COVINGTON receives a Goddard clock from John T. Mengel, Director of Mission and Data Operations, at a farewell party in his honor at the Goddard Recreation Center. Mr. Covington, formerly Director of Networks, is now Technical Assistant for Tracking and Data Acquisition at the Manned Spacecraft Center. With him at the party are his wife Polly and their daughter.

Chuck Vermillion Receives First WIZARD Award

Recipient of NASA's first "WIZARD Award" was Charles H. Vermillion, an electronic technician in Goddard's Space Applications and Technology Directorate. Dr. George M. Low, NASA Deputy Administrator, placed the attractive award pin on Mr. Vermillion's coat lapel during a special ceremony marking the beginning of a recognition system under the new NASA Aerospace Awareness Program. The award was accompanied by a letter of commendation signed by Dr. Low and citing Mr. Vermillion for his development of a practical and reliable ground station capable of receiving local high quality weather pictures anywhere on earth.

In presenting the award Dr. Low remarked, from first hand experience gained during his trip to South America with some of our astronauts, of the tremendous value received throughout the continent from the pictures provided by the original and more expensive Automatic Picture Transmission System. The goodwill created between the United States and all these countries was in itself worth much of the effort spent on the program. He stated that what Mr. Vermillion had done was to extend the system to many more users all over the world and in such a manner as to be economical to both users and NASA.

The WIZARD is an award for excellence given to employees engaged in NASA's unmanned satellite effort and is patterned after the highly successful "Silver Snoopy" recognition system implemented under the Apollo Program. According to Al Chop, NASA Awareness Coordinator, the WIZARD symbol came into being first because the very name connotes excellence and secondly because a wizard does magical things. This seemed to fit the bill so he contacted Johnny Hart, creator of the "Wizard of Id" comic strip. Johnny was all excited and said "let's go," and that was how the award got started.

The WIZARD symbol is identical to Johnny Hart's "Wizard of Id" and is provided in the form of a tie tac or lapel pin approximately ½ inch high, modeled in sterling silver. The head and foot areas are of burnished silver and are engraved in excellent detail. The body portion is in a black shiny enamel with polished silver lines used for detail.

Among the other persons taking part in the ceremony besides Mr. Vermillion, Dr. Low and Mr. Chop were: Charles W. Mathews, NASA Associate Administrator for Applications; Dr. John E. Naugle, NASA Associate Administrator for Space Science; Dr. John F. Clark, Goddard Director; Bernard Moritz, NASA Deputy Associate Administrator for Organization and Management; Lawrence W. Vogel, Director of the Headquarters Administrative Office; Reuben Prichard, NASA Assistant Director for Aviation Safety.

Key Personnel Changes

In July, **Ozro M Covington** left his post as Goddard Director of Networks to join the staff of the Manned Spacecraft Center in Houston where he is now Technical Assistant for Tracking and Data Acquisition in the office of the Director of Flight Operations. **Tecwyn Roberts**, formerly Mr. Covington's deputy, has been appointed the new Director of Networks.

Other changes in the Networks Directorate Office include the appointment of **H. William Wood**, formerly Chief of the Network Operations Division, to the new post of Associate Director for Operations. **L. R. Stelter**, formerly Chief of the NASA Communications Division, is now Associate Director for Engineering.

Donald L. Schmittling, formerly NASCOM Associate Chief, has replaced Mr. Stelter as Chief of that division, and **Walter LaFleur**, formerly Associate Chief of the Network Facilities and Services Division, has replaced Mr. Wood as Chief of the Network Operations Division.

Goddard Retirements

Fifty-seven men and women retired from the Goddard Staff during the months of April, May, and June. Best wishes to:

April Retirees

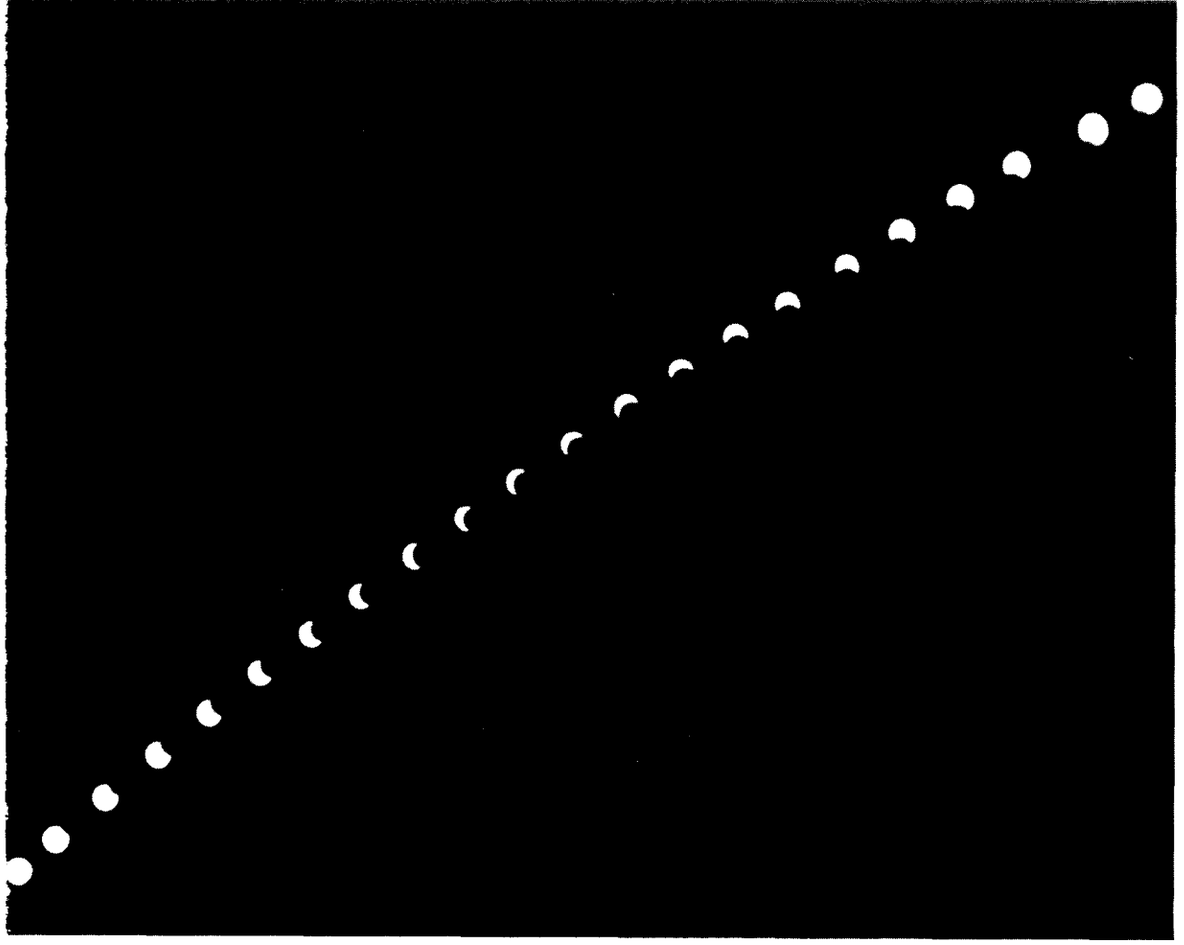
David Fisher
Kasmier J. Kurek
Leonard V. Owens
Edward L. Rosette

May Retirees

Philip C. Swartz
Ernest F. Sorgnit
Alf D. Jansson
Gilman M. Gates
Harry S. Jones

June Retirees

Herbert I. Butler
Sydney E. Bradley
Benjamin Meyer
John Flowers, Jr.
William W. Vetter
Frank A Broedel
Julius C. Sohn
Charles F. Moubray, Jr.
Paul R. Rexroad
Cleonce E. Mierley
Ernest C. Woodhouse
Worthy B. Daggs
Lloyd E. Hightower
William E. Doles
Louis F. Schmadebeck
Benjamin H. Ferer
Dominic J. Amendolair
William L. Jenkins
Alfred N. Zajdel
Keith Lomax
Isabel F. Marshall
Francis M. Stacy
Harry L. Gerwin
J. Carl Seddon
Beatrice R. King
Harold R. Etter
Harry T. O'Toole
Robert J. Mackey, Jr.
Gene J. Delio
Adolph Krasnick
Fred C. Yagerhofer
Robert J. Kelly
John F. O'Connor
Joseph G. Pometto
Clarence E. Pickett
Robert L. Brillante
Emile Zugby
Woodrow W. Wines
Edward L. Staubus
William S. Soar
Joseph C. Boyle
Edith C. Hall
Robert G. Atwood
James P. Strong, Jr.
Philip J. Crossfield
James M. Bridger
Richard Holliday
Ellen C. Johnson



PORTRAIT OF A SOLAR ECLIPSE. Although the solar eclipse of July 10, 1972, was only partial in our area, many Goddard employees noticed the strange dimming of sunlight at quitting time. The eclipse began at 3:34 p.m. and peaked at 4:43 p.m. when 72% of the sun was covered over Washington. Alfred K. Stober of the Laboratory for Optical Astronomy used the opportunity to take this multiple exposure of the event from the lawn of Building 21. To get the picture on a single frame of 35 mm Panatomic-X film, he used an Argus C-3 camera with a 50 mm, f/3.5 lens and a neutral density 5 filter. His exposures were timed six minutes apart with the time at the beginning of the eclipse (top right) varied ± a minute or so to check the sun's path across the film. In the far north the eclipse was complete with the path of totality beginning over Russia and passing over northern Alaska, the middle of the Hudson Bay, the Gaspe Peninsula near Quebec and Nova Scotia before ending in the Northern Atlantic.

Mars Mapping

Mariner 9 Completes

NASA's Mariner 9 has completed the photo mapping of the entire surface of Mars, the Jet Propulsion Laboratory, Pasadena, Calif., has announced.

Final elements needed for a global map were acquired in the playback of 30 pictures on July 10, bringing the total photo count to more than 7,000. No more pictures are expected to be received before mid-October.

Mariner 9, launched May 30, 1971, has been in orbit around Mars since last November 13, circling the planet twice each day. The spacecraft made its 500th circuit of Mars on July 20.

During the next three months, Mariner will provide precision tracking data to test a relativity theory stating that electromagnetic radiation – in this case the spacecraft radio signal – passing close to the Sun will be slowed by the Sun's gravitational field.

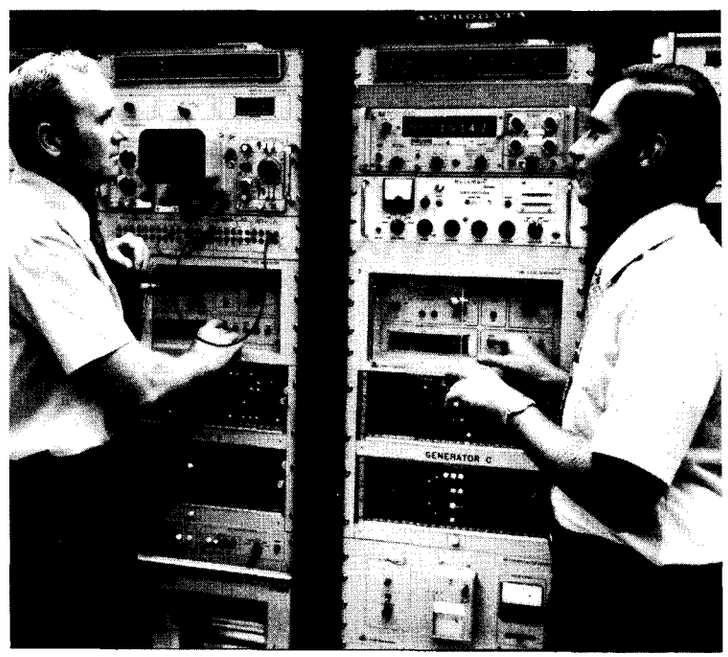
Mars and Earth will be in superior conjunction – on opposite sides of the Sun – September 7. Distance between the two planets will be about 400 million kilometers (250 million miles).

Additional pictures may be taken during very brief sequences – once in August, once in September, and twice in October – and recorded on spacecraft instruments for transmission to Earth in late October. Targets available during this period include the shrinking North Polar Cap, cloud formations, and possible Viking landing sites.

Mars scientists have a keen interest in continuing operation of the spacecraft through October. This is because October 1972 and July 1976 (the scheduled arrival time at Mars for the first Viking spacecraft) are the same season two Martian years apart.

Mariner 9's useful lifetime will be determined by its supply of attitude control gas.

The Leap - Second



JUST A SECOND NOW. At midnight (Greenwich mean time) on June 30, 1972, time keeping facilities throughout the world set their clocks behind one second (designated a leap-second) to conform to the internationally adopted atomic Universal Time Scale (UTC). Jim Perry (left) and Bill Mazur, of the Time Systems Section, are shown retarding by a leap-second the clock located in the Goddard Time Standard Facility in Building 12. The facility supplies accurate time (±2.5 microseconds) to GSFC users. The Spaceflight Tracking and Data Network (STDN) stations made the same leap-second change to their clocks.

Summer Aids Have Sum

Story and layout by San

Summer Aids 1972

Gale P. Adams
Rudine Adgerson
Frances J. Allen
Herbert S. Allen
Roberta L. Allen
Caryl Anderson
Denise R. Baggott
Rodney Blackwell
George Bowens
Mildred P. Bowlding
Timothy Bozer
Donald J. Briscoe
Charles Brooks
Michelle Brown
Richard Brown
Sheila A. Brown
Hazel Butler
Brenda Chase
Olivia Chase
Carl Clark
Zachery Cummings
Willie Cunningham
Esther Daley
Maria Daley
Sandra D. Davis
Robbie Davis
John Deschamps
Sheila Evans
Timothy Fisher
Charles Fletcher
Jacqueline Ford
Everett W. Freeman
Bernice Garner
Gerald Geter
Clifton Green
Lee Griffin
William Hall
Eric Hammond
David Harris
Jacquiline Harris
Sharon Harvey
Ceasar A. Hay
Bobby Haynes
Clyde Henderson
Larry Hodges
Gregory Holston
Patricia Houston
Zita D. Hughes

Over 100 Summer Aids be
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some returnees. All come fro
Washington area.

Goddard's Orientation fo
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and his attitude toward his su
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ceremony in August.

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things. **Janice Ratliff** of the
general office clerical work c
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the best workers he has ever h
Quality Assurance data grou
hardware. She also does keypu

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laboratories. For some of the
actually run a computer. Som
languages such as the APL, F
applying them to the various co

Phyllis Vincent of the Elect
for her division. She is also in t
programs. **William Lew** of the
Division works on the RAE
checking and debugging progr
Data Storage Division works m
She plots and graphs points o
output along with detecting s
also include keypunching and
language.

The Youth Opportunity Ca
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Goddard, is an added activity.
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Summer employment at G
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ra McEachern and Gale Adams

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of mail and do a number of other
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d. **Sheila Brown** is working with the
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Aids, this is the first time they have
are learning the different computer
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nics Division performs keypunching
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the Mariner-Iris satellite computer
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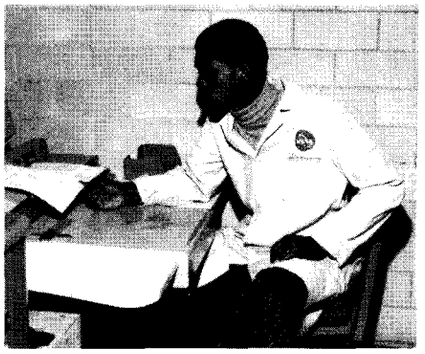
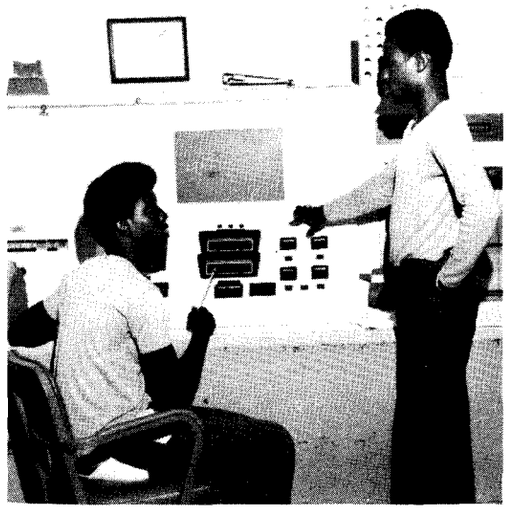
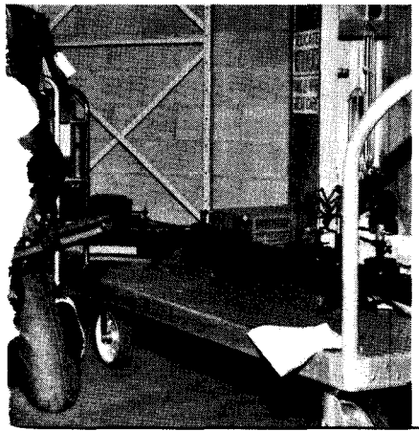






Andre Jackson
Antony Jackson
Cynthia Jackson
Hilary Jackson
Dianne Johnson
Vanessa Jones
Jackie Joyner
Catherine King
Juanita King
William Lew
Donnell Marion
Sandra McEachern
Desiree McNeely
Debra Mitchell
Denise Moore
Venita L. Murphy
Donna Musgrove
Debra Neal
Anthony Nickens
Joyce Peterson
Deborah Powell
Monte Powell
Sabrina Phoenix
Janie L. Ratliff
Sheree Roberts
Patricia Robinson
Quincy Robinson
Kathleen Rogers
Ross Rolark
Gail K. Rotan
Reginald Scales
Joyce Scott
Carla Settles
Valerie Sewell
Brenda Shepherd
Brenda K. Siler
Jo Anne Smith
Pervis Smith
Steven Smith
Carla K. Stephenson
William Turner
Phyllis N. Vincent
Juliette Walker
Leon Wilkerson
Michael Williams
John Williams
Terry Williams
Evora Wilson
Ray Wilson
Katherine Wood
Robert Woodland
James L. Woodley

Civil Service Summer Roster

Over 60 temporary Civil Servants on the 1972 Summer Roster have become an important part of the Goddard work force during June, July and August. As clerk-typists, stenographers, library and engineering technicians, mathematical and technical aids, aerospace technologists, and physical science aids, their jobs are often the same as those of the Center's permanent employees.

For some of the summer employees who have just graduated from high school or are still in college, Goddard provides the chance to try out a government experience before deciding on a permanent career. For others who may be graduate students or teachers, it is a chance to gain additional experience in a chosen field.

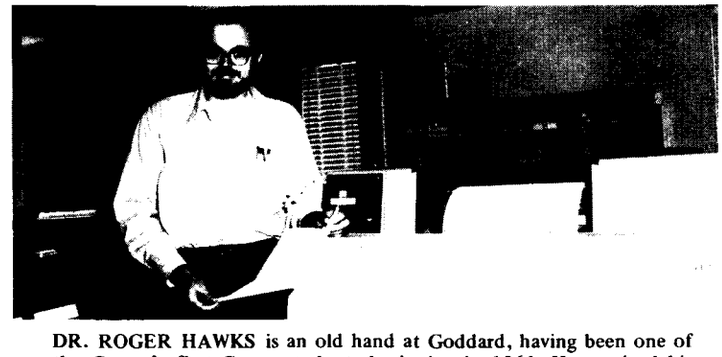
Tony Reyes, coordinator for this year's program, says, "Summer employees are a good source of recruitments since most are outstanding scholars at their respective schools."

On this page are pictures and profiles of five of these young men and women and the jobs they are doing here this summer.

STEPHANIE DIER a clerk-typist in the Accounting Department of the Voucher Examination Section, graduated this past spring from the University of Maryland and will attend the University of Maryland School of Medicine in Baltimore this fall. She is especially interested in psychiatry and ophthalmology. Last summer she worked at Goddard in the Summer Institute for Biomedical Research.

PATRICIA DINNDORF is a senior at Boston University majoring in chemistry. She hopes to attend medical school and specialize in geriatrics. This summer, she is working in the Data Analysis Branch in a job that consists of writing, debugging and running different computer programs as assigned.

DENNIS DEVANEY joined Goddard's summer program in June following his discharge from the U.S. Navy. His job in the Special Programs Office involves acting as a "briefing officer" for individuals and groups of visitors to the Center. He says, "my job provides an opportunity to meet the public and also offers a vantage point from which to gain an overall picture of the GSFC mission." In the fall, he will begin his first year of law school at the Georgetown University Law Center.



DR. ROGER HAWKS is an old hand at Goddard, having been one of the Center's first Co-op students beginning in 1961. He received his Ph.D. in January from the University of Maryland and will start as assistant professor of mechanical engineering at Clarkson College of Technology in Potsdam, New York, this fall. During the summer, his job involves analyzing the motions of a sounding rocket payload-recovery parachute system for the Flight Performance Branch. He says, "It is important to know how the payload behaves while suspended from the parachute so that proper recovery can be achieved. I have developed the equations and computer programs required to study these motions."

Radio Club Cited for Apollo 16 Activity

Tecwyn Roberts, Director of Networks, recently presented certificates honoring all members of the Goddard Amateur Radio Club who took part in the club's Apollo 16 commerative event last April. Club President Bill Scholtz, Vice President Hugh Turnbull and Activities Chairman Ted Jaramillo received the award in behalf of each club member who helped make shortwave contacts with stations all over the globe. Each participating club member later received a copy of the award.

During the Apollo 16 launch, splashdown and other mission highlights, members manned the club station to make 2002 contacts. For each contact made, the club sent out colorful confirmation cards with the new Goddard emblem, the Apollo 16 emblem, and information on the mission and the scope of Goddard's unmanned activities.

The award presented by Mr. Roberts cited each participating club member for "special efforts as a member of the Goddard Amateur Radio Club to make all the world more aware of the United States space program and in particular the Apollo Manned Lunar Landing Missions."

RADIO CLUB MEMBERS hold awards presented by Tec Roberts for the club's participation in the Apollo 16 commemorative event. From left are Club President William Scholtz (call sign W3HXF); Vice President Hugh Turnbull (W3ABC); Tec Roberts, director of Networks; and Activities Chairman Ted Jaramillo (WA3FUM).

BLOODMOBILE NEWS

The exceedingly good turnout for the July Bloodmobile visit has helped bring Goddard's donations up to 618 pints. An additional 282 pints are needed to meet the Center's yearly quota of 900 pints.

Meeting this quota will insure all employees at Goddard and members of their immediate families complete coverage for requested blood. Your donations also help stock the blood banks which are currently very low due to the recent flood disasters.

There will be two more Bloodmobile visits this year in the Building 8 Auditorium on September 6 and November 1. All of us are urged to help. If you cannot give yourself, bring a friend, a member of the family or neighbor. Let's make the quota!!

Gertrude Law, Goddard's Bloodmobile Coordinator, wishes to extend a special note of thanks and appreciation to everyone who gives blood and to the many individuals who continue to donate each time. She may be reached on ext. 4757 for information on the Red Cross Bloodmobile program.

Goddard's Top Blood Donors

13 GALLON CLUB
Clarence B. House

12 GALLON CLUB
Robert M. Porter

7 GALLON CLUB
George B. Hatton

6 GALLON CLUB
Frank J. Trama

5 GALLON CLUB
Ralph Cosme

4 GALLON CLUB
Earl D. Ellis

3 GALLON CLUB
Herbert Mitnick
Carter L. Silcox
Ronald M. Muller

2 GALLON CLUB
James W. Ryan
Joan M. Stockwell
Stanley Corwin
Robert L. Brown

1 GALLON CLUB
Michael A. Calabrese
Virgil M. Morgan
Patrick McClain
Marton D. Menton, Jr.
Donald John Steinmeyer
Allen G. Tucker
Thomas T. Wilheit
Lawrence D. Wing
James E. Zeirega

TENPIN BOWLING. A team named "Bad News Jones" scored 415.5 points out of a possible yearly total of 700 to win the 1971-72 championship of the Goddard "Guys and Dolls" Tenpin Bowling League. Winning team members are (from left) Syd Jones, Glen Sites, and Jim and Carol Marshburn. The team won under a new point system that awards a possible 20 points to the winning team in each three-game match. If you like bowling, the league is now forming its roster for the 1972-73 season. The action will begin on September 7 at Rinaldi's on Kenilworth Avenue at a cost of $3.00 per person per evening. All Goddard or contractor employees and their spouses, or four-member teams, who wish to join may do so by contacting League Secretary Doris Norton on ext. 4395 or League President Fran Federline on ext. 5695.

A Women's Club Invitation

Robby Smith, the newly elected president of the Goddard Women's Club, extends an open invitation to all Goddard women to attend a luncheon and fashion show on September 20 at the Ramada Inn in Lanham. Besides providing a delicious lunch and a preview of fall fashions, the luncheon will give you a chance to view the club in action.

Mrs. Smith says, "We were designed as a social club whose meetings are short. Our activities are held at night for everyone's convenience.

"The club's future events will be varied. In October, Mrs. Polly Curtis, owner of the Wool Shop in College Park, will demonstrate ideas and ways to make your own Christmas gifts. In November, Sandra Brookover, from the Department of Agriculture will speak on how to stretch our food dollar. To start us off on the holiday swing, December will feature a Dinner-Dance. Plans for the second half of the year are not completed, but a few things in store are a wine-tasting party, and a night out for dinner and the theater, to name a few activities."

To join the club, please contact Robby Smith (464-0783) or Myrtle Duck (552-2238) for information.

Women's Club Officers for 1972-73

President	Robby Smith	464-0783
1st Vice President	Alicia Newman	577-8334
2nd Vice President	Lois Slayton	927-1232
Treasurer	Ellen Cygnarowicz	459-5871
Recording Secretary	Mary Kay Gleason	794-7905
Newsletter Editors	Dorothy Aiken	935-5540
	Ruth Looney	422-7753
Nominating Committee	Brenda Cooley	345-1388
	Kay Turney	
	Milla Musen	
	Avis Van Allen	
	Elaine Fowler	
Counselors	Myrtle Duck	552-2238
Historian/Publicity	Janet Barclay	262-1448
Decorations	Eleanor Bell	577-2293
Hospitality	Elaine Fowler	577-4929
Membership	Betty Graalman	261-2766

GREEN THUMB DEPARTMENT Edward Zenker of the Computer Applications Branch managed to grow this eight-foot sunflower in a tub in Room N209 of Building 12 and get it to bloom in a partly shaded window. It is of the "Russian Mammoth" variety that can produce blooms of a foot or more in diameter outside in full sun. The cherry tomato plant has been growing inside for about a year and has produced around 100 tomatoes.

Radiosonde Balloon Flights

By Jack Bufton
Laser Data Systems Branch

A series of radiosonde balloon flights are being conducted through September 1972 at the Goddard Optical Research Facility (GORF) and the Agriculture Research Center Airport on Springfield Road. The flights are intended to measure profiles of small-scale atmospheric turbulence to altitudes above 70,000 feet.

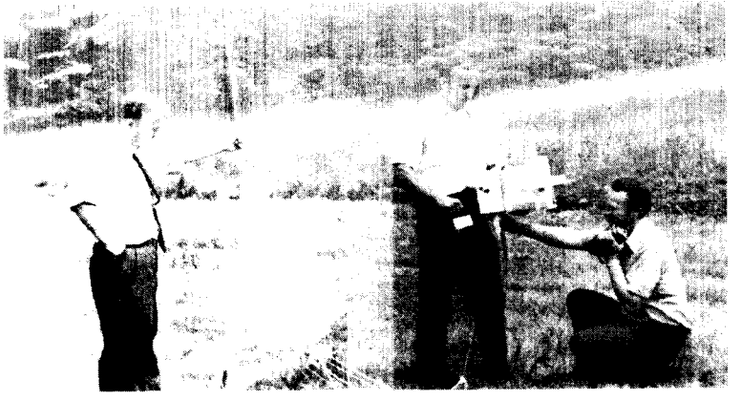
Although similar in balloon size (6 ft. diameter) and telemetry system (1680 MHz) to a standard Weather Service radiosonde system, the Goddard device is specially designed to measure the microthermal structure of turbulence. The special payload, built under contract to Goddard's Laser Data Systems Branch by GTE-Sylvania of Mountain View, California, contains two thermal sensors capable of measuirng temperature variations as small as .004°C and their controlling and data processing electronics. The payload employs extensive use of integrated circuit technology to achieve substantial reductions in size (8 inches square), weight (less than 6 lbs.) and cost (less than $400 in parts).

The project is yielding first-of-a-kind data on the microthermal structure of upper air turbulance. Not only is this data of use to those scientists interested in prediction of optical effects on laser communication and tracking systems, but it will aid meterologists studying the nature and distribution of turbulence. In addition, the small-scale turbulence measured has been shown to be an effective tracer for the large-scale turbulence that endangers commercial and military aviation and is commonly referred to as CAT, clear air turbulence.

The Goddard flights are being conducted with the assistance of on-site contractors from the Bendix Field Engineering Corporation. David A. Grolemund of Bendix is responsible for payload operation and calibration. During an actual launch operation, he assists Technical Officer Jack L. Bufton and Sol H. Genatt, both of the Laser Data Systems Branch, in balloon inflation, final payload calibration, and launch at the ARC airport. William H Schaefer, also of the branch, aids in radio tracking of the balloon at launch and is later joined by Mr. Grolemund. They continue tracking the balloon and receiving turbulence data by telemetry as the balloon payload ascends to near 80,000 feet. At this maximum altitude, an electric timer triggers an explosive cutter that separates payload from balloon.

Data is also received as the payload descends by parachute for a total mission duration of two hours. While the balloon is airborne, simultaneous observations are made of the atmospherically induced twinkling and apparent motion of a bright star near zenith. Stellar observations are made with a photoelectric sensor attached to a 20 inch diameter telescope also located at GORF. Sol Genatt and Jack Bufton conduct these observations. Subsequent data reduction allows correlation of the observed optical effects with the measured turbulence structure. The desired end result will be a practical means to measure and predict the results of atmospheric turbulence on laser communications systems.

WILLIAM H. SCHAEFER assists in visual acquisition and tracking of a radiosonde balloon package during the early minutes of a flight. He is standing next to the small parabolic antenna used for receiving range and data telemetry signals from the balloon payload in flight. The antenna control system and radio receiver are located below the antenna level in the mobile instrumentation van at the Goddard Optical Research Facility.



BALLOON LAUNCH. From left, Sol Genatt, Jack Bufton and William Schaefer, all of the Laser Data Systems Branch, prepare a turbulence sensor balloon payload for launch from the grounds of the Agricultural Research Center Airport. The balloon is out of the picture in the upper left followed by the parachute system and payload.

The radiosonde payloads are considered expendable since the balloons are not maneuverable and depend only on the prevailing winds for flight direction and extent. Often these payloads land in uninhabited areas of the Delmarva Peninsula or the Chesapeake Bay. In the hope that some payloads would eventually be returned, a $25 reward is offered to the finder, and reward notices are attached to the payload just before launch.

There have been several successful recoveries. On the prototype test flight conducted by GTE-Sylvania from Sacramento, California, the payload landed in the Pacific Ocean, floated for four days and was recovered by a Boy Scout troop from San Francisco who found it washed up on shore. Of the two most recent flights from GORF, both have had successful recoveries. One payload was discovered by a housewife in a cornfield near Cordova in Talbot County, Maryland, and the other by a bay fisherman near Rock Hall in Kent County. Both payloads were recovered in good condition and the individuals involved will receive their reward payments.

The Effect of a Brown-Out

By David G. Lewoc

The immediate effect of a brown-out is the reduction of the electrical load at generating plants, which permits the plant to operate without the customary five percent voltage reduction.

Allowing PEPCO to operate without the reduction is a public service; because, while a reduction permits everyone to have electricity, it is extremely hard on motors. You may have noticed your air conditioning system laboring excessively during the recent hot spell. While it is still operating, it is not doing so with maximum efficiency, and is more subject to breaking down. I am sure that the air conditioning repairmen are appreciative of the voltage reduction.

Power companies have two alternatives when the demand is greater than the supply: They may selectively turn off power to certain areas, or they may reduce the voltage. Voltage reduction is the preferred method even though it causes maintenance problems. Goddard experiences no voltage reduction because the automatic tap changers at the substation raise the voltage to the proper level.

We can expect more brown-out type situations this summer, and Goddard is a prime place to reduce electrical power. The brown-out of Monday, July 24, 1972, resulted in a 6.6 percent reduction in power and a 600 ton reduction in air conditioning. The amazing thing about this was that it resulted only from turning off lights and closing blinds. This is about a 90 percent cooperation rate, which is fantastic. The people at Goddard are to be commended for their cooperative spirit.

ERTS . . . From Page 2

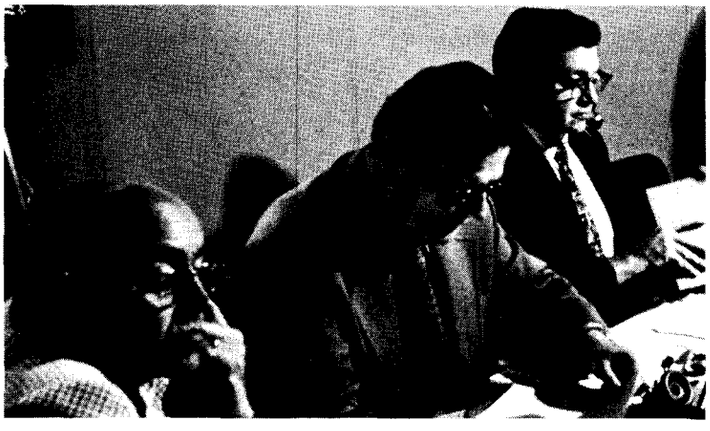
In broad terms, the objectives of the first ERTS mission are: to determine those natural and cultural resources and environmental data which can be acquired best from space; to test and demonstrate a combination of data acquisition procedures and interpretive techniques for application of the data in discipline areas such as agriculture, forestry, geology, geography, hydrology, oceanography and ecology; to determine how repetitive, snyoptic, multispectral observations by spaceborne instruments can be of economic or social value to commercial, scientific, and governmental interests.

Instrumentation on the spacecraft includes: Three Return Beam Vidicon Television Cameras (RBV) which view the same 185 kilometers square area in three different spectral bands – the green, red and near infrared portions of the spectrum. The Multispectral Scanner Subsystem (MSS) which returns images in four spectral bands – the green, red and two near infrared bands. It covers a continuous video strip corresponding to the RBV coverage.

A Data Collection System (DCS) is collecting information from nine remote, unattended instrumented ground platforms and relaying the information to NASA ground stations for delivery to the user. Eventually more than 150 platforms will be in the field. The ground platforms will monitor such things as stream flow, snow depth, soil moisture and volcanic activity.

One of two Wideband Video Tape Recorders (WBVTR), is currently recording data in the form of images from areas outside of the area of direct data reception in North America for later playback to U.S. ground stations.

The three main tracking and data acquisition facilities which can receive video information from ERTS are at Fairbanks, Alaska; Goldstone, California; and Greenbelt, Maryland.



AT THE WESTERN TEST RANGE before the ERTS launch, (from left) Dr. John E. Naugle, NASA Associate Administrator for Space Science; Charles W. Mathews, NASA Associate Administrator for Applications; and Dr. John F. Clark, Goddard Director; monitor the countdown operations in the Mission Director's Center.

LUIS GONZALES (right, standing), ERTS Ground Data Handling System Manager, follows the launch from the ERTS Operations Control center here at Goddard.

AWAITING WORD OF SPACECRAFT SEPARATION at the Western Test Range following the launch of ERTS-1 by Delta 89 are (from left) Wilber B. Huston, ERTS Mission Director; Stanley Weiland, ERTS Deputy Project Manager; and Merland L. Moseson, Goddard Deputy Director of Systems Reliability.

Launch-Time Tours

DR. LAWRENCE W. MORLEY (left), Director of the Remote Sensing Center of the Department of Energy, Mines and Resources in Ottawa, Canada; and Lee Godby, also of the Canadian Center for Remote Sensing, were among the many VIP visitors at Goddard for the launch of ERTS-1.

DR. FRANCO FIORIO, Chairman of the United Nations Working Group of Remote Sensing, views an ERTS display.

U.S. REPRESENTATIVES George P. Miller (with glasses), Ritchard T. Hanna (white coat) and Bob Bergland (far right) toured the Center with five members of Congressman Ken Hechler's Summer Intern Group.

How to Get ERTS Pictures

Many people across the nation and in other countries have seen the ERTS-1 pictures in their newspapers and on television and are asking how they can get copies and how much they cost. The answer—from a number of imagery dissemination centers at the Departments of Interior, Commerce and Agriculture. These centers serve all persons and groups not qualified as ERTS principal investigators to receive the imagery directly from NASA.

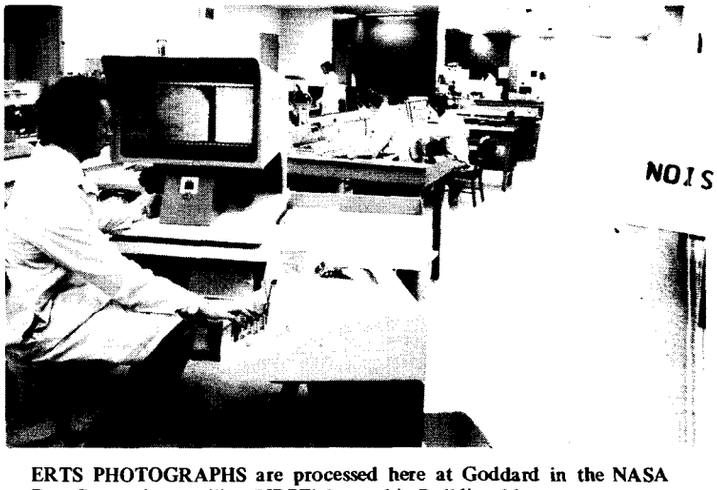
Public and private sector organizations participating in NASA's Technology Utilization program may also obtain photography, analyses, and related background material, when available, from the six Regional Dissemination Centers sponsored by NASA. The Center which particularly specializes in remote sensing technology is the Technology Applications Center, University of New Mexico, Albuquerque, N. Mex., 87106.

The Department of Interior has an Earth Resources Observation Systems (EROS) Data Center in Sioux Falls, South Dakota. In addition to the reproducible ERTS imagery, the center has NASA aircraft data. The EROS Data Center is located at 10th & Dakota Avenue, Sioux Falls, South Dakota 57198. All products of the Center are for sale and prices are available on request. They range from $1.25 for a 70 mm black and white contact print to $27 for a 40 by 40 inch color transparency. Orders will ordinarily be filled within a week of receipt of the request.

Department of Commerce's National Oceanic and Atmospheric Administration has an Earth Resources Data Center at Suitland, Md. This Center will furnish data gathered by the new spacecraft to users in the oceanographic, hydrologic and atmospheric sciences and to the public.

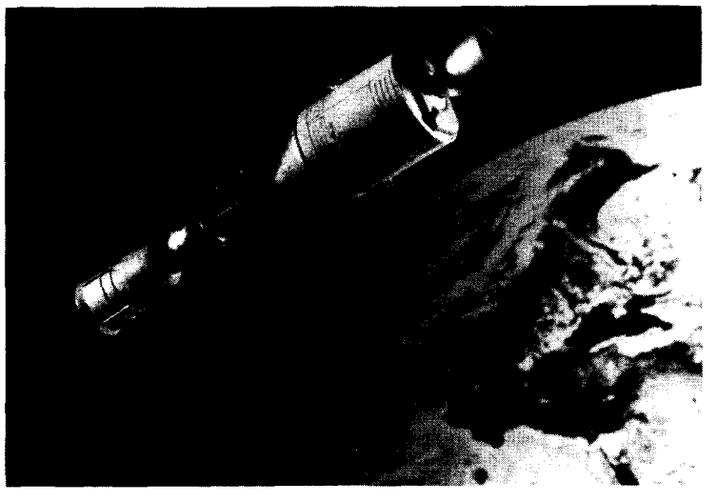
To aid in selecting the data desired, NOAA has established public browse files at 22 locations around the nation where ERTS data will be available about the first of September. They are located in: Hillcrest Heights, Md.; Rockville, Md.; Silver Spring, Md.; Washington, D.C.; Miami, Fla.; Norfolk, Va.; Garden City, N.Y.; Woods Hole, Mass.; Asheville, N.C.; Detroit, Mich.; Kansas City, Mo.; Fort Worth, Tex.; Salt Lake City, Utah; Anchorage, Alaska; Honolulu, Hawaii; Norman, Okla.; Boulder, Colo.; La Jolla, Calif.; Tiburon, Calif.; Seattle, Wash.; Madison, Wisc.; and College Station, Tex. Orders should be mailed to the National Climatic Center, NOAA Environmental Data Service, Federal Building, Asheville, N.C. 28801. Costs will be the same as Interior's EROS Center.

The Department of Agriculture also sells ERTS-1 imagery dealing with agriculture and photos may be purchased from the Western Aerial Photo Laboratory, Agricultural Stabilization and Conservation Service, USDA, 2505 Parley's Way, Salt Lake City, Utah 84109. Costs will be the same as other agencies.



ERTS PHOTOGRAPHS are processed here at Goddard in the NASA Data Processing Facility (NDPF) located in Building 23.

LOOKING AHEAD WITH NASA



APOLLO-SOYUZ. Models of the USSR's Soyuz and the U.S. Apollo spacecraft are shown in simulated rendezvous and docking in Earth orbit. The docking and crew transfer module is shown attached to the Apollo command module. The rendezvous and docking mission planned for 1975 will be a joint flight by three American astronauts and three Soviet cosmonauts. The agreement was signed in Moscow on May 24, 1972 by President Nixon and Premier Alexei Kosygin. The mission will provide the first capability to rescue men in space.

First U.S. / Russian Flight Planned

The first international manned space flight is planned for 1975 when American Astronauts in our Apollo spacecraft and Russian cosmonauts in their Soyuz will link up in space.

The United States and the Soviet Union have signed an agreement to carry out a joint manned space mission. Space officials of both nations are planning for American astronauts in an Apollo spacecraft to rendezvous and dock with a Russian Soyuz spacecraft piloted by Soviet cosmonauts, probably in 1975.

A tentative flight plan is for the Apollo spacecraft to be launched from the Kennedy Space Center, Fla. A few days later the Soyuz would be launched from the Soviet Union. The Apollo craft, outfitted with a compatible docking hatch and airlock will maneuver and link up with the Soyuz. They would remain docked for about two days. While docked Americans will enter the Soyuz craft and cosmonauts will visit the Apollo spacecraft.

The American and Soviet spacemen will work together as systems engineers. The venture may make possible the rescue of crewmen in the event of emergency situations and is part of a program of broader US/USSR space cooperation.

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