# GODDARD NEWS

GODDARD SPACE FLIGHT CENTER / GREENBELT, MARYLAND

VOLUME II, NUMBER 5 THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FEB. 16, 1962


# TIROS . . . FOUR-FOR-FOUR

At 7:43 in the morning on February 9, a Delta vehicle roared up from its launch pad at Cape Canaveral and a few minutes later, sent another Tiros spinning into orbit. It was the sixth straight success out of the three-stage booster's first seven launchings. For Tiros, with all instrumentation functioning, it was four for four —all four satellites in the weather satellite program orbited and functioned successfully.

Circling the earth every 100 minutes, the 285-pound hat box-shaped spacecraft is sending back data on the earth's radiation, distribution of reflected solar energy, heat balance and photographs of cloud cover for meteorological study and use in weather prediction. Tiros IV travels in a path that takes it around the world 48.29 degrees north and south of the equator and has a perigee (nearest point to the earth) of 441 miles and an apogee of 525 miles (farthest point from the earth).

With the exception of one television camera lens system Tiros IV is basically the same as its three predecessors. The new type lens was installed for the purpose of reducing distortion and providing somewhat better resolution in the picture image while preserving relatively large coverage. It will cover an area 450 miles on a side from an altitude of 475 miles when the camera is pointing straight downward.

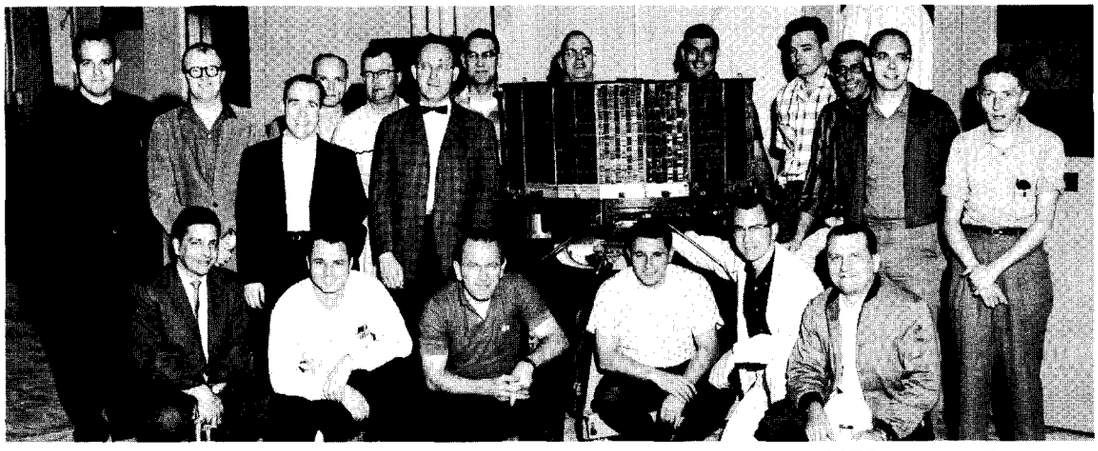
The other a wide-angle camera is the same as used in Tiros I, II, and III. It covers an area 750 miles on a side from an altitude of 475 miles. Each camera can take 32 pictures in a series, store them on tape, and then transmit them upon command to a ground acquisition, or "read out" station. The satellite has sent back cloud-cover pictures "of excellent quality".

The TV camaras use a one-half inch Vidicon tube especially designed for satellite use. The camaras are aligned parallel to the satellite's spin axis and extend through the spacecraft baseplate. Each camera consists of a Vidicon tube and focal plane shutter which permits still pictures to be temporarily stored on the tube face plate. An electron beam converts this stored picture into a TV type electronic signal which can be transmitted to ground stations or stored on a magnetic tape recorder.

In each camera system there is a magnetic tape recorder and electronic clock or timer. Over remote parts of the earth each recorder can store up to 32 pictures on the magnetic tape for later relay—this can be done by programming the timer as much as five hours in advance. When the satellite is within ground range the TV photograph signals are "read out" and the tape is erased for the next recording. When the satellite is within range of the ground station, the recorder can be by-passed so that pictures can be directly transmitted. Read outs are therefore referred to as being either direct or remote.

(See TIROS, Page 2)

**PHOTO TAKEN BY TIROS IV . . . This is one of the first photographs taken by Tiros IV. The picture was taken as the satellite passed over the northern portion of the U. S. Visible are Lake Michigan, partially ice free, at the bottom left corner and an ice free strip of Lake Superior. (Picture should be viewed horizontally.)**



**TIROS LAUNCH TEAM . . . Front row (left to right): Robert Rados, GSFC Project Manager; John Davis, GSFC IR Subsystems Manager; Glen Corrington, RCA Project Leader; Paul Bizzaro, RCA; Ed Mowle, RCA Systems Integration Engineer; and John Maskasky, GSFC Spacecraft Systems Manager; Back row (left to right): Chester Briggs, Airtronics, IR; William G. Stroud, Chief, A & M Division; Ernie Powers, GSFC Project Coordinator; Ed Alvord, GSFC T & E Division; Harry Miller, University of Wisconsin; Abe Schnapf, RCA Program Manager; Bob Parent, University of Wisconsin; Bill Boyer, Airtronics, IR; Dan Hubbard, Airtronics, IR; Frank Scearce, RCA Ground Station Engineer; John Baller, Airtronics, IR; Walter Wojcik, GSFC IR Consultant; and Bill Burton, GSFC IR Consultant.**

## TIROS

(Continued from Page 1)

The recording tape is 400 feet long and moves fifty inches per second during playback and recording. Photographs are transmitted from one camera at a time and complete read out from both cameras takes about three minutes.

The satellite carried three radiation experiments essentially the same as those in Tiros III. The purpose of these experiments is to learn how much solar energy is absorbed and reflected, and how much infra-red radiation is emitted, by the earth and its atmosphere and to develop a means of determining the nighttime cloud cover of the earth.

The scanning experiment includes mapping of reflected solar radiation, temperature of the earth's surface or of cloud tops, and temperature of an atmospheric level varying with the amount of water vapor but at an average altitude of about 25,000 feet.

One non-scanning experiment will provide gross heat budget information by measuring reflected solar radiation and emitted long wave radiation from the earth and atmosphere.

The second non-scanning experiment designed by Dr. Vernon Soumi at the University of Wisconsin, will also measure the gross heat budget. This data although of lower resolution will be more continous since the sensors can view the earth all the time.

Data from the infra-red experiments are recorded continuously on magnetic tape for playback of the last orbit's data on command from one of the ground stations.

John Maskasky of Goddard's Aeronomy and Meteorology Division is the Spacecraft Systems Manager. He is responsible for the supervision of the design, fabrication, testing and final checkout and calibration of Tiros spacecraft.

There are two primary command data readout stations for Tiros. One is located at NASA's Wallops Station, Wallops Island, Virginia, under the direction of station manager Charles Lundstedt. Goddard Operations Representative, Ronald McIntyre directs the Tiros mission at the other station, located at the Pacific Missile Range, California. Both stations are operated under a service contract to NASA by the Radio Corporation of America. A backup station is maintained at RCA's facility in Princeton, New Jersey.

**TIROS TECHNICAL CONTROL TEAM . . . Ernie Powers, third from left, is Goddards Tiros Technical Control Manager. RCA members under contract to NASA manning the Control Center are (left to right) Leo Cleary, Joseph Parisi and David Dickey.**

Vern Stelter of Tracking and Data Systems Space Projects Integration Group, as System Manager for Data Acquisition, has the responsibility over all areas involved in the acquiring of the satellite data. Paul Wood, Atmospherics Structures Branch, Aeronomy and Meteorology Division is Systems Manager for Data Utilization and is responsible for all those areas where use of the satellite data is involved.

At the ground stations, cloud cover pictures are displayed in kinescopes and photographed by 35 mm cameras. In addition, both photo and infra-red data is recorded on magnetic tapes. The Weather Bureau teams at both primary stations, analyze the most immediately useful photographic data for real time operational use.

The Goddard Space Flight Center has the responsibility for technical direction of the Tiros program including tracking, command, data acquisition, and infra-red radiation experiments. Robert M. Rados of the A & M Division headed by William G. Stroud, is the project manager. Ernest Powers is the project coordinator and also manager of the Tiros Technical Control Center at Goddard.

At a press conference held at NASA Headquaters after the satellite had been determined to be in orbit with all instrumentation functioning, Herbert I. Butler, Associate Chief for Projects, Goddard A & M Division emphasized the fact that the success of the Tiros program is the result of industry—government—laboratory team work—the result of the cooperative efforts of the Radio Corporation of America for the spacecraft and the Douglas Aircraft Company, prime contractor for the Delta launch vehicle.

The first in the highly successful series, Tiros I, was launched from Cape Canaveral, Florida, April 1, 1960. Between launch and June 17, 1960 when operations ceased, the satellite transmitted nearly 22,952 photographs of cloud cover. Despite its relatively brief useful lifetime of 78 days, meteorologists hailed the Tiros I experiment as opening a new era in weather observation.

Tiros II, launched on November 23, 1960 has yielded 36,156 TV pictures and some 600 reels of magnetic tape containing medium and low resolution infra-red data. It far exceeded its estimated useful lifetime of three months and continued to provide data over a year.

Tiros III was launched July 12, 1961 and like the two previous Tiros launches, it was a perfect operation. The satellite further substantiated the feasibility of operational weather satellites by again proving the data could be used on a real-time basis for daily weather analysis. By July 20, Tiros III was providing operational data on Hurricane Anna and it subsequently photographed Hurricane Esther two days prior to conventional methods which resulted in additional warning time. Operational utilization of the satellite data was discontinued in late November of 1961 due to loss of adequate contrast in the TV pictures.

Tiros III has transmitted to NASA command and data acquisition stations over 35,000 TV pictures and enough medium and low resolution IR data to require over 550 reels of magnetic tape for recorded storage.

## ELECTROCHEMICAL WORKING GROUP VISITS GODDARD

Some 40 persons from the Electrochemical Working Group, Inter-agency Advanced Power Sources Group (IAPG) recently visited Goddard.

N. Whitney Matthews, Chief, Spacecraft Technology Division, briefed the group on Space Science and Satellite Applications in Building 2. Following the group was given a tour of Buildings 3 and 4.

The IAPG was formally activated on May 1, 1961. It consists of six agencies, Army, Navy, Air Force, Advanced Research Projects Agency, Atomic Energy Commission and the National Aeronautics and Space Administration.

IAPG effects an exchange of information at the technical level on research and development programs of the agencies involved in its field of interest, with the objective of increasing the effectiveness of the total interagency power program.

**(See photo on page 3)**

# J. RALPH JETT RECEIVES SILVER BEAVER AWARD

J. RALPH JETT

The National Capital Area Boy Scouts Council recently presented 28 Scout leaders with Silver Beaver Award for service to Scouting.

The awards were presented at a dinner at the National Guard Armory honoring 17,000 volunteer Scout leaders in the National Capital Area Council and celebrating the 52nd anniversary of the founding of the Boy Scouts here.

J. Ralph Jett, Chief of Maintenance Section, Goddard Space Flight Center was one of the 28 Scout leaders to receive the Silver Beaver Award. Mr. Jett has been active in Scouting since 1949, when he became Scoutmaster of Troop 86. A recipient of the Arrowhead Honor and the Scouter's Key, Mr. Jett is a "Scouter's Scouter."

**40 TOUR GODDARD . . . Members of the Electrochemical Working Group, Interagency Advanced Power Sources Group visited Goddard and were given a tour of the principal facilities at the Center.**

## GSFC TENPIN LEAGUE STANDINGS

**(As of February 6, 1962)**

| | Team No. | Team Name | Games Won | Lost |
|---|---|---|---|---|
| 1. | 12 | Split Fits | 59 | 29 |
| 2. | 14 | Hi-Five | 57 | 31 |
| 3. | 3 | Bleebs | 56 | 32 |
| 4. | 17 | Odd Balls | 55 | 33 |
| 5. | 24 | Atom Spheres | 52½ | 35½ |
| 6. | 9 | The Junto | 51 | 37 |
| 7. | 10 | Rackets | 49½ | 38½ |
| 8. | 18 | Hi-Lows | 49 | 39 |
| 9. | 23 | Flap Doodles | 48½ | 39½ |
| 10. | 19 | Oscillators | 48 | 40 |
| 11. | 15 | Mogenbaiters | 45½ | 42½ |
| 12. | 4 | Orbiting Elements | 43½ | 44½ |
| 13. | 11 | Colt 45's | 42 | 46 |
| 14. | 8 | Coolies | 41 | 47 |
| 15. | 22 | Second Stage | 40½ | 47½ |
| 16. | 1 | Guided Muscles | 39 | 49 |
| 17. | 16 | A-OK's | 38½ | 49½ |
| 18. | 7 | Vibrators | 38½ | 49½ |
| 19. | 5 | Integrators | 36½ | 51½ |
| 20. | 13 | Fumbling Five | 36½ | 51½ |
| 21. | 6 | Aborters | 36 | 52 |
| 22. | 20 | Honey Potters | 34 | 54 |
| 23. | 20 | Twenties | 33 | 55 |
| 24. | 21 | Lechers | 27 | 61 |

## GSFC DUCKPIN LEAGUE STANDINGS

**(As of February 6, 1962)**

| Team Standings | Won | Lost |
|---|---|---|
| 1. Bluffers | 42 | 21 |
| 2. Wood Choppers | 37 | 26 |
| 3. Quicksilvers | 36 | 27 |
| 4. Flintstone "5" | 35 | 28 |
| 5. Alley Cats | 35 | 28 |
| 6. Untouchables | 33 | 30 |
| 7. Bob Cats | 30 | 33 |
| 8. Ducklings | 28 | 35 |
| 9. Hi Vacs | 28 | 35 |
| 10. What You Says | 26 | 37 |
| 11. Space Katz | 24 | 39 |
| 12. Stumblebums | 24 | 39 |

# GSFC FILMED FOR TV BY NBC-CBS

Cape Canaveral will not be the only site featured by the major television networks during the long-awaited MA-6 flight operation. Goddard's vital Mercury communications control and computing center will be featured by both the National Broadcasting Company and the Columbia Broadcasting System in video-filmed segments which will be shown intermittently throughout the day as the flight progresses.

As all three major networks plan to conduct continous independent programming from launch through recovery, portions of the program will be live and remote from Cape Canaveral, while the Mercury Network, Goddard Space Flight Center, Manned Space Flight Center, and pre-launch films will be interspersed in five minute segments as the quiet portions of the mission proceed.

Charles Von Friend, ace CBS correspondent and film crew recorded the role of Goddard in the Mercury mission, filming 45 minutes in the Computer Center, the Telecommunications Center and the SCAMA (switching, conferencing, and monitoring arrangement) room. Bud Lewis, NBC producer assigned to the network Mercury team headed by Roy Neal, captured 35 minutes of video film.

Featured in the interviews conducted by both networks were Jim Donegan, Project Mercury Operations Director for Goddard; Niles "Buck" Heller, Goddard's overall Director of Mercury at Goddard; Jim McDowell, Communications Director, Manned Satellite Communications Network, and Duane Robertson, Voice System supervisor at Goddard.

The scenes will be seen locally on Channel 4 (NBC) and Channel 9 (CBS) Washington.

**SWING YOUR PARTNER . . . The Goddard Wives' Club recently held a square dance at the Laurel Pines Country Club. The successful affair was organized by Norma Rusnak, Chairman of the Goddard Wives' Club Square Dance Interest Group.**

# THE CHARTS BELOW CAN BE USED AS AN AID IN COMPUTING THE EXCEPTABLE SALES TAX DEDUCTION FOR FEDERAL INCOME TAX PURPOSES.

## DISTRICT OF COLUMBIA 1961

**RESIDENTS' AVERAGE GENERAL SALES TAX PAYMENTS***

| Income as shown on line 9, page 1, Form 1040 | Sales tax payment | Income as shown on line 9, page 1, Form 1040 | Sales tax payment |
|---|---|---|---|
| Under $1,000 | $7 | $7,500 under $8,000 | $66 |
| $1,000 under $1,500 | 16 | $8,000 under $8,500 | 69 |
| $1,500 under $2,000 | 21 | $8,500 under $9,000 | 73 |
| $2,000 under $2,500 | 25 | $9,000 under $9,500 | 75 |
| | | $9,500 under $10,000 | 79 |
| $2,500 under $3,000 | 29 | $10,000 under $11,000 | 83 |
| $3,000 under $3,500 | 33 | $11,000 under $12,000 | 89 |
| $3,500 under $4,000 | 37 | $12,000 under $13,000 | 94 |
| $4,000 under $4,500 | 40 | $13,000 under $14,000 | 99 |
| $4,500 under $5,000 | 44 | $14,000 under $15,000 | 102 |
| $5,000 under $5,500 | 48 | $15,000 under $16,000 | 105 |
| $5,500 under $6,000 | 52 | $16,000 under $17,000 | 108 |
| $6,000 under $6,500 | 55 | $17,000 under $18,000 | 111 |
| $6,500 under $7,000 | 59 | $18,000 under $19,000 | 112 |
| $7,000 under $7,500 | 63 | $19,000 under $20,000 | 113 |

*Based upon the District of Columbia general sales tax only. Figures in the table do not reflect payments of the 2 percent tax on all motor vehicles and trailers on issuance of first certificate of title. Payment of this tax should be computed separately.

U. S. Treasury Department, Internal Revenue Service Document No. 5312 (Rev. 11-61)

## MARYLAND 1961

**RESIDENTS' AVERAGE STATE GENERAL SALES TAX PAYMENTS***

| Income as shown on line 9, page 1, Form 1040 | Sales tax payment | Income as shown on line 9, page 1, Form 1040 | Sales tax payment |
|---|---|---|---|
| Under $1,000 | $13 | $7,500 under $8,000 | 75 |
| $1,000 under $1,500 | 13 | $8,000 under $8,500 | 80 |
| $1,500 under $2,000 | 18 | $8,500 under $9,000 | 84 |
| $2,000 under $2,500 | 24 | $9,000 under $9,500 | 87 |
| | | $9,500 under $10,000 | 89 |
| $2,500 under $3,000 | 29 | $10,000 under $11,000 | 96 |
| $3,000 under $3,500 | 34 | $11,000 under $12,000 | 104 |
| $3,500 under $4,000 | 38 | $12,000 under $13,000 | 110 |
| $4,000 under $4,500 | 44 | $13,000 under $14,000 | 118 |
| $4,500 under $5,000 | 48 | $14,000 under $15,000 | 123 |
| $5,000 under $5,500 | 52 | $15,000 under $16,000 | 128 |
| $5,500 under $6,000 | 58 | $16,000 under $17,000 | 132 |
| $6,000 under $6,500 | 62 | $17,000 under $18,000 | 137 |
| $6,500 under $7,000 | 66 | $18,000 under $19,000 | 140 |
| $7,000 under $7,500 | 70 | $19,000 under $20,000 | 144 |

*Based upon the 3 percent Maryland general sales tax only. Figures in the table do not reflect payments of the 2 percent titling tax on motor vehicles, which should be computed separately.

U. S. Treasury Department, Internal Revenue Service Document No. 5321 (Rev. 11-61)


## GODDARD NEWS

An official publication of the Goddard Space Flight Center, Greenbelt, Maryland, published bi-weekly by the Office of Public Information. Address news contributions to: The Editor, Shirley R. Deremer, Goddard News, Goddard Space Flight Center, Room 7, Bldg. 1, Greenbelt, Maryland. Telephone: 982-4955.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