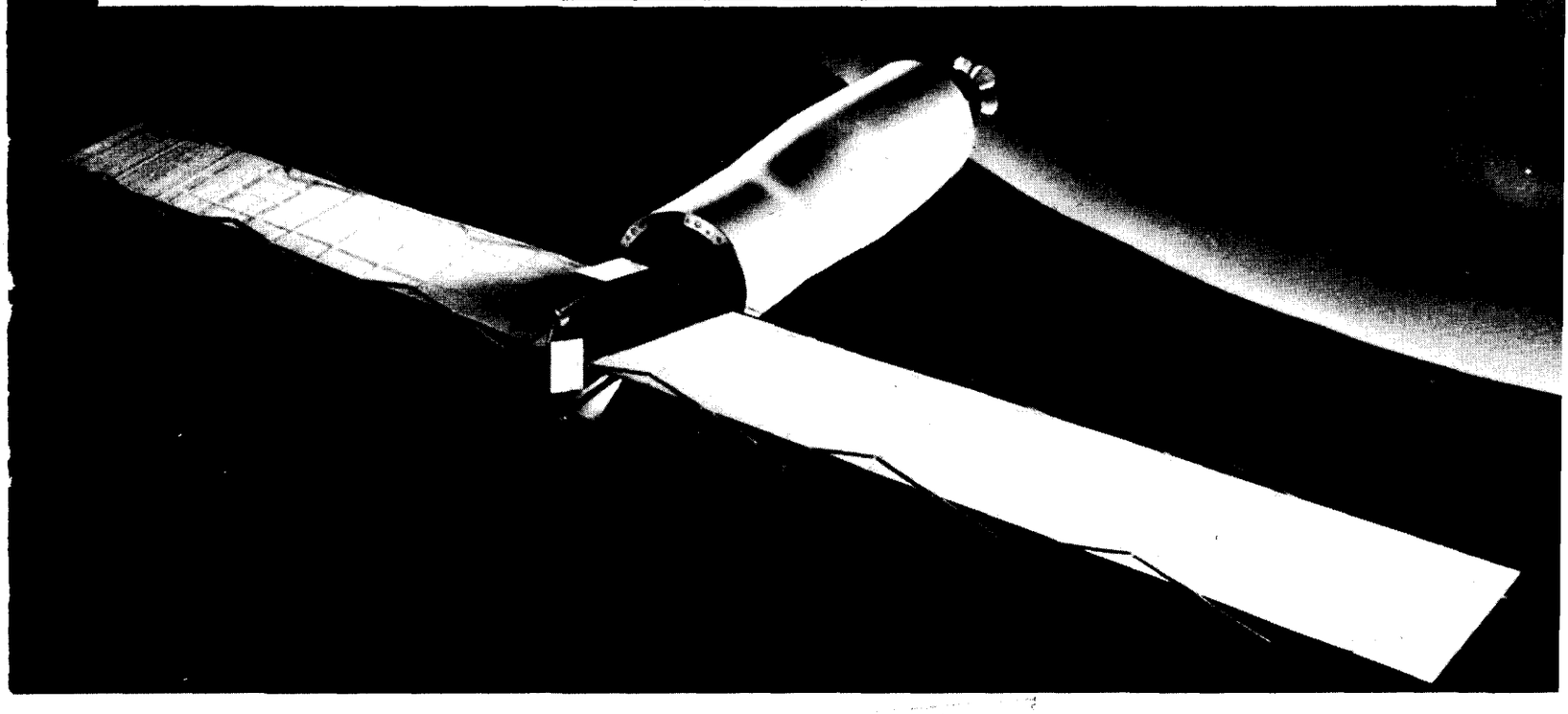
GODDARD NEWS

GODDARD SPACE FLIGHT CENTER / GREENBELT, MARYLAND

VOLUME VI, NUMBER 6 | THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION | February 10, 1964



It's neither bird nor plane. This unusual artist's conception is the first of a new series of huge satellites that will use Saturn I boosters. See Saturn story on pages 4 and 5.

NASA HISTORICAL ARCHIVES

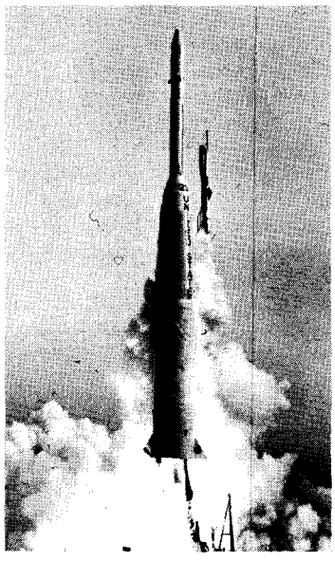
FROM RELAY TO RANGER:

Field Projects Branch Keeps Busy

That was the month that was!

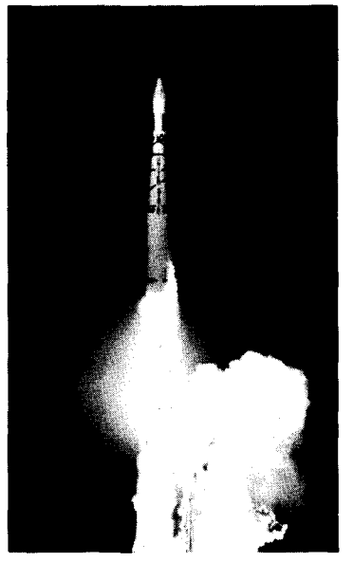
Bob Gray, head of Goddard's field projects branch at Cape Kennedy had a busy January—particularly the last two weeks. After coordinating and supervising the launch of this Center's Relay II and Echo II (one from each coast), he did the same for the JPL-managed Ranger VI.

Delta



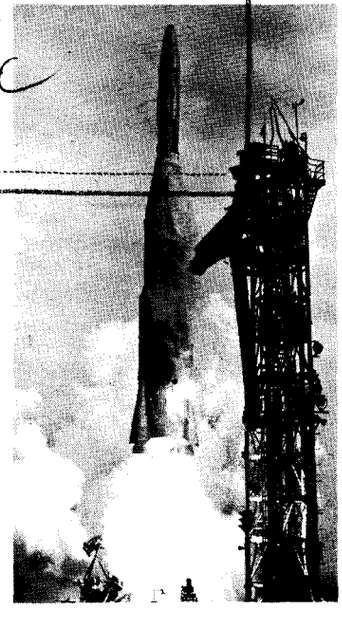
Relay II Launch

Thor-Agena B



Echo II Launch

Atlas-Agena B



Ranger Launch

Gray's branch is responsible for *launches* of Delta, Thor-Agena B, Atlas-Agena B and Centaur vehicles from both the Atlantic and Pacific ranges. Lewis Research Center manages Thor-Agena and Atlas-Agena, and Centaur.

The JPL-managed Ranger sped into orbit January 30 atop the Atlas-Agena B from Cape Kennedy. After being placed in parking orbit, the Agena B was restarted and pushed Ranger VI into lunar impact trajectory.

A delicate mid-course correction in the wee hours of the morning of January 31 put the Ranger directly "on target."

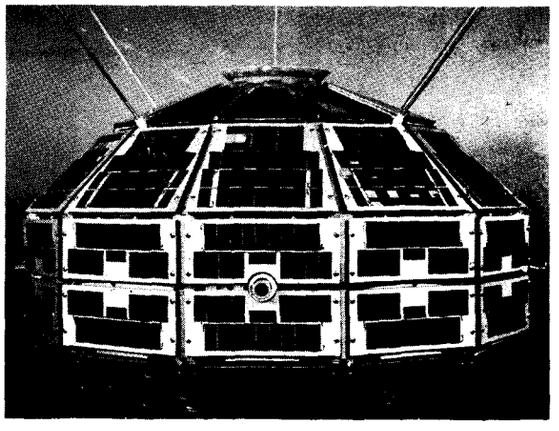
Ranger impacted early Sunday morning, but the television cameras failed to function during the craft's approach.

The tight schedule of the manned lunar landing program demands data on the surface of the moon that only the Ranger program can provide. Another Ranger will be fired as soon as possible, probably within a month.

Ranger VI carried two wide angle and four narrow angle television cameras. Its primary purpose was to photograph the surface of the moon from about 900 miles out until crash landing. About 3,000 photographs of varying resolution were expected to result.

The next three Rangers to be launched will have the same mission, and carry the same equipment.

United States and Canada To Co-operate in the Ionosphere



Alouette I, shown here, is similar to the proposed Alouette B.

NASA and the Canadian Defence Research Board have announced an agreement for a multi-satellite upper atmosphere research program. The new program will involve satellites called Alouette B and ISIS A, B, and C to be launched at intervals between 1965 and 1970. ISIS stands for International Satellites for Ionospheric Studies.

Goddard, the NASA center given responsibility for scientific satellite programs, will play a major role in the new series as in the original Alouette program. This center will also participate in data analysis and carry out supporting sounding rocket experiments.

Along with Alouette B, NASA will launch a Direct Measurement Explorer satellite similar to Explorer VIII. As with Explorer VIII, it will be a Goddard assignment.

The Alouette B — which will be designated Alouette II if it achieves orbit—and ISIS spacecraft will carry experiments designed to continue and substantially expand those of Alouette I, launched by Goddard for Canada in September, 1962. It still provides data on the "topside" of the ionosphere.

Under the terms of the new agreement for joint research in and above the ionosphere, Canada's Defence Research Board will design, construct, and test the spacecraft, provide the basic experiment (the topside sounder) and operate at least one ground station capable of supplying data on spacecraft operation.

NASA's primary obligations include providing four launch vehicles, placing the spacecraft in orbit, and providing and launching up to five sounding rockets for testing components and sub-systems and determining the compatibility of experiments.

Alouette B will resemble its predecessor in size, shape and weight (320 pounds). It will repeat some of Alouette I's experiments for confirmation purposes but will extend them substantially as it passes over the earth's poles in an elliptical orbit varying in altitude from 460 to about 1600 statute miles. (Alouette I is following a circular orbit over the poles at a 630-mile altitude.)

The proposed Alouette will differ from its predecessor by carrying a fifth experiment, an electron probe, designed by NASA to determine the temperature of electrons in the vicinity of the orbiting satellite. The short, antenna-like probes on Alouette B will relay the temperature readings to 13 world-wide ground stations along with data from the other four experiments.

The launch vehicle will be the Thor-Agena which will be launched from the Pacific Missile Range. Tentatively, the launching will take place during the first half of 1965 under the direction of Goddard's field projects branch.

Plans for the ISIS satellite series are still in the preliminary stages.

Because the ISIS B spacecraft will be planned as an "even more experimental" satellite than its predecessors, its experiments and design will depend on data returned from Alouette II and the Direct Measurement Explorer.

Associated with Canada's Defence Research Telecommunications Establishment throughout the program will be research laboratories in the USA, the United Kingdom, and in other countries. NASA's office of space science and applications will have overall responsibility for US participation in the program.

Syncom Committee Meets Here

Goddard played host to the 11th meeting of the Syncom Technical Steering Committee late in 1963.

This committee is composed of personnel from the Goddard Syncom project office and the U. S. Army Satellite Communications Agency (USASCA). It was formed to consider and assure the resolution of all problems of the total Syncom system integration.

A Goddard Project

Goddard manages the Syncom project for NASA, and the U. S. Army Satellite Communications Agency within DOD is assigned management responsibility for the satellite's ground communication systems.

At the November meeting the Technical Steering Committee formulated plans for the launch of Syncom C. This spacecraft will be launched early in 1964 from Cape Kennedy and will be positioned adjacent to the international date line in near equatorial orbit.

The transportable ground communications station which was located near Goddard at the Agriculture Research Center Airport in Beltsville, is now to be located at Clark Air Force Base, Philippine Islands. The USNS Kingsport will be relocated to an area near Guam for the launch period. After launch it will be repositioned to the Hawaiian Islands.

The communications station at Camp Roberts, Calif., will also be an integral part of the network as it completes the link between the Philippines and the Continental United States.

The meeting took place in the recently opened Management Information Control Center Conference room. The room was convenient for a meeting of this type. It has a center table for conferees plus additional separate seating capacity for interested personnel who are not specific meeting participants.

In addition, the internal projection room offered immediate viewing of projected visual aids without interruption to the meeting.

Shown at the Syncom meeting are, from left: Cmdr. C. C. Dace; J. J. Cohen; Col. H. E. Porter; Col. Robert Barthle; and Bob Darcey, Syncom project manager.

F.Y.I.

"Look out!!! Smithsonian says there are more bows and arrows—and people to shoot them—in this country now than there were when Columbus came. . . ."—*SAO News*

NEXT ISSUE

This wierd light in the sky is not a comet. It is a sodium vapor trail, an experiment launched by a Goddard sounding rocket. Next issue, Goddard News will present a four-page feature on the sounding rocket program which the Center handles for NASA.

Impetus

Editor's Note: This column of thoughts from various quotable sources will run whenever ideas are available which fit this definition—"comments which give impetus to the creative mind; which stretch and exercise the intellect." Publication does not necessarily imply endorsement.

"One of the most important questions facing the country is whether we will maintain the momentum we have built up in our total national space program—whether we will continue to make the necessary effort to assure that the United States does not forfeit its chance to lead in this vital new area of human activity.

"All of you saw the headlines saying, 'Khrushchev Announces Withdrawal from Moon Race' or words to the effect; but I wonder how many read the subsequent stories in which Khrushchev said his remarks had been misinterpreted, and that the Soviet Union intended to explore the moon as soon as this could be done with confidence of success.

"Even our opponents realize that we have the leading role in space,' Khrushchev said recently. 'They haven't overtaken us yet, and we are not going to let them. Our people are covering themselves with glory. We shall give the capitalist world no peace, since it has to go.'

"We have a balanced, fast paced space program geared to our national needs and resources. I can assure you that the Soviets are also working hard on a well conceived program, even though they throw a veil of secrecy over their failures and try to confuse us about their objectives . . .

"The lunar mission was selected as a long-range goal because it offered a challenging focal point for the American space effort within this decade, and one which provides a dramatic demonstration of American space capability to the world. It was chosen, as President Kennedy said, 'not because it is easy, but because it is hard.'

"Beyond doubt the route to the moon will be hard and long, but every step along the way will add significantly to the strength of the United States.

"The price will be great, but not nearly so great as the price of lost world leadership. . . ."—*Robert C. Seamans, Jr., NASA's Associate Administrator*

News About Space & Aeronautics

● The H-1 rocket engine is being uprated from 188,000 to 200,000 pounds thrust.

A single H-1, at the lower thrust rating, now powers the reliable Delta. Delta has been successful in 22 consecutive launches under Goddard management.

Eight H-1's at the lesser power level presently provide the Saturn I booster a total of 1.5 million pounds thrust. A more advanced version of the rocket, Saturn IB, will use eight of the stepped-up engines which will give a stage thrust of 1.6 million pounds.

The up-rating work has been underway since late last year and is expected to be completed, including engine qualification tests, during 1964.

Certain internal redesign, including changes in the turbo-pump and ducting, will be made to increase the flow of propellants, liquid oxygen and kerosene. The up-rating will be done by the engine contractor, Rocketdyne Division of North America Aviation, Inc.

• • •

● The Manned Spacecraft Center has awarded a $99,973 study contract to Bendix Products Aerospace Division, South Bend, Ind., for a shock absorbing device which will permit a soft landing on the moon.

The work involves testing full-scale crushable aluminum honeycomb structures under the various environmental conditions which scientists expect spacecraft to encounter during a moon mission.

Engineers explain that a shock absorbing system for a lunar gear must be able to soften the landing shock, but must not contribute rebound which would make the moon craft bounce in the light gravity of the moon.

Aluminum honeycomb is under study because it meets these prerequisites and also offers advantages of light weight and high reliability.

• • •

● "Mariner II successfully transmitted data back to earth from almost 54 million miles, with a power supply of only about three watts—about enough to operate the parking lights on an automobile. And our scientists have estimated that when Mariner's signal reached the receiving dish at Goldstone, from 36 million miles in space, the three watt signal had dispersed to one-third of a quintillionth of a watt. This is the same proportion as one second in 90 billion years."—*Administrator Webb at The University Club, New York City, January 9, 1964.*

James E. Webb

GODDARD NEWS

"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."
—Dr. Robert H. Goddard

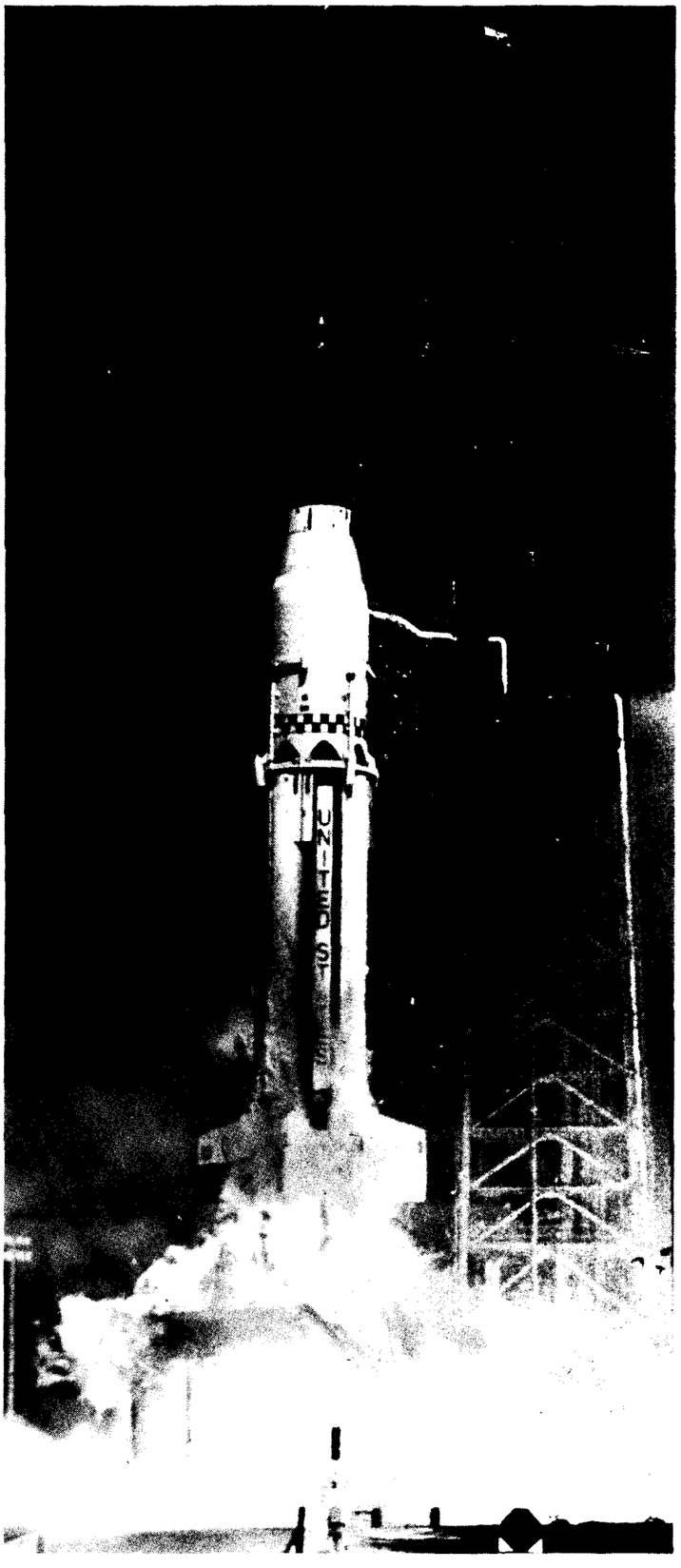
The Goddard News is a bi-weekly publication of the National Aeronautics and Space Administration's Goddard Space Flight Center, Greenbelt, Md., suburban Washington, D. C.

Phone—Ext. 4141 or 4142

Bruce Brough, *Editor* Shirley Deremer, *Inside Goddard*

SA-5's Success Ushers in a New Era...

The world watched on January 29 as the United States launched a rocket which had been described by President Kennedy in his last speech as the vehicle that would finally put this nation ahead of the Soviet Union in load-lifting ability. The entire vehicle including dummy payload, stood 164 feet tall, equal to the height of Niagara Falls.



This is the sight that was nationally televised on January 29 —the lift-off of Saturn I vehicle SA-5.

The first flight test of the Block II configuration of Saturn I was a major success. As the payload and spent second stage, weighing nearly 19 tons, was placed into orbit, Goddard assumed the job of coordinating a world-wide system of tracking and data acquisition facilities.

Portions of this Center's Manned Space Flight Network and Space Tracking and Data Acquisition Network (STADAN) were supported by the SAO (Smithsonian Astrophysical Network) and elements of the Defense Department's tracking facilities. (See GODDARD NEWS, Dec. 31, 1963 issue.)

The precount, countdown and first two orbits were handled in a manner similar to the Mercury-Atlas mission, with the network under the control of John E. Dowling, Goddard network director at the space operations control center here.

Although the air-to-ground voice links and command subsystems were not used, standard operations procedures were employed. Radar data was transmitted to Goddard in real time and the standard station-to-station (SCAMA) voice communication network was effectively implemented.

SA-5 is the fifth consecutive successful launch of the Saturn vehicle. It is the first to fly with a "live" second stage powered by the high-energy liquid hydrogen fuel that has been a flight-proven concept only since the first Centaur launch near the end of 1963.

The Block II configuration represented by this Saturn differed from the first four of the big birds in several respects. First, the booster is longer, allowing for extra fuel capacity. Second, the eight H-1 engines in the first stage were flown at full rated power, 188,000 pounds of thrust, for the first time. (This gave the booster a total thrust of 1.5 *million* pounds.)

Also, fins were added for aerodynamic stability. And, of course, a live second stage was utilized to give Saturn orbital capability for the first time.

This drawing shows how the fi 1) folded aboard the launch module have been jettisoned; feet.

The next step in the Saturn developmental program will be the use of actual payloads, including the unmanned Apollo capsules in earth orbit.

The Saturn I testing program has met with great success. Previously, four large rockets, each generating 1.3 million pounds thrust and weighing about a million pounds, have been launched without notable delay and have performed perfectly.

The first four missions were principally to test the propulsion and control systems of the first stage, and the overall structural integrity and aerodynamic design of the complete rocket.

The Saturn project is under the direction of the associate administrator for manned space flight, Dr. George E. Mueller. The development operation is directed by NASA Marshall Space Flight Center, Huntsville, Ala., and launchings are conducted by an integrated team of the John F. Kennedy Space Center, Cape Kennedy, Fla. and the Marshall Center.

Chrysler Corporation and

(Cont'd on p. 5)

Traffic 'Bottleneck' Will Be Relieved By New Bridge

None of us need UNIVAC or an IBM computer to prove that there are a lot more vehicles on Glenn Dale Road today than there were yesterday. No one has to be a traffic engineer to prove that it takes from 10 to 15 minutes to get across the Baltimore-Washington Parkway during the evening rush hour.

The widening of Glenn Dale Road was one step in the right direction. This eliminated the "bottleneck" at Goddard's main gate and helped the flow of east and west bound traffic to and from Goddard. This also made it easier for those who use Cipriano Road to get on and off Glenn Dale Road. Today our "bottleneck" has moved down Glenn Dale Road to the single lane over the Baltimore-Washington Parkway.

Construction of a second bridge across the Parkway will start as soon as weather permits this spring, and will be completed sometime early in the spring of 1965. This second bridge will give us two lanes of traffic from Goddard across the Parkway to University Boulevard. This should eliminate the congestion that many of us face going home in the evening, and make the accompanying picture ancient history.

To relieve traffic congestion while construction is in progress, we suggest that as many Goddard people as possible plan to take alternate routes to the Center. Further information to assist in so doing will be published in the near future.

As they say, "Things always get worse before they get better."

This familiar bottleneck will soon be a thing of the past. Construction of a second bridge across the parkway will begin this Spring to remedy the problem.

INSIDE GODDARD

GODDARD SPACE FLIGHT CENTER / GREENBELT MARYLAND

FEBRUARY 10, 1964

Fast-Growing Credit Union Elects Goddard Man President

The NASA Washington Federal Credit Union is growing by "leaps and bounds" it was disclosed at their 13th Annual Membership meeting held on January 28.

This was the first evening meeting held in the history of the Credit Union. The membership participation exceeded that in past years.

Credit Union members elected their peers to offices becoming vacant on the Board of Directors and the Credit Committee. The new officers are as follows:

President—R. M. Buckingham (Goddard)

First Vice President—W. F. Mitchell (Headquarters)

Second Vice President—C. E. Henley (Goddard)

Treasurer—E. D. Rosen (Headquarters)

Secretary—E. M. Foster (Headquarters)

The year 1963 was particularly good for the Credit Union. Assets and income more than doubled 1962 figures. They increased their business office staff, secured larger offices both downtown and at Goddard, and mechanized the accounting system.

Their credit delinquency rate has decreased until it is now one of the lowest in the metropolitan Washington area.

The Credit Union has become one of the fastest growing (if not the fastest) in this area. This fact was disclosed by the Federal Examiner of the Bureau of Federal Credit Unions during a recent examination.

Officers of the Credit Union are working to provide improved services during the next year. They plan to increase the size of the business office, install bank-type office equipment, add special out-of-view conference rooms in which financial matters may be discussed in private, install additional telephone lines and in general add services.

The Credit Union also has added two important services —the sale of traveler's checks and money orders.

Goddard's Richard M. Buckingham was elected president of the NASA Washington Federal Credit Union. Buckingham is in the project support office here.

Entertainment at the annual meeting was provided by Don Premo of Goddard and his excellent barber shop quartet. In addition, a movie "Till Debt Do Us Part" was shown.

The door prize, a $25 U. S. Savings Bond, was won by Arthur Smith of Goddard's theoretical division. Smith holds account number 6 having joined the Credit Union February 6, 1959. Refreshments were served upon adjournment of the meeting.

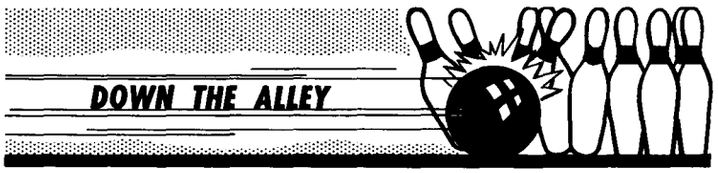
Civil Defense Office Needs Fire Fighting Volunteers

The civil defense planning office will hold an orientation meeting in the auditorium of building 3 on February 26 to outline Goddard's civil defense fire fighting requirements and to recruit fire fighting volunteers.

All persons with previous fire fighting training and/or experience are encouraged to attend.

Additional information can be obtained from Goddard's fire marshal, Mr. Malcolm Tarlton, ext. 4640 or the civil defense planning office, ext. 5421.

Those who plan to attend this meeting should obtain supervisory approval as it will be held during working hours.



GODDARD MIXED DUCKPIN LEAGUE STANDINGS

Tuesday (As of Jan. 28, 1964)

	W	L
Alley Catz	35	22
Stargazers	35	22
Comets	34	23
Cole's Coolies	32	25
Alley Nauts	30	27
Quicksilvers	30	27
Vagabonds	30	27
Bluffers	29	28
Bob Cats	29	28
Toppers	26	31
Moonshiners	23	34
Ducklings	22	35
Dukes & Duchesses	22	35
Possibilities	22	35

Thursday (As of Jan. 30, 1964)

	W	L
Ticktocks	33	27
Moon Pilots	35	25
Bob Cats	34	26
Meteorites	34	26
Astronauts	33	27
Safety Pins	31	29
Wombats	31	29
Starliters	31	29
Thor Heads	31	29
Woodchoppers	30	30
Syncoms	27	33
Satellites	27	33
Strikers	21	39
Space Katz	20	40

GODDARD MEN'S TENPIN LEAGUE STANDINGS

Wednesday (As of Jan. 22, 1964)

	W	L
Bandits	39	33
Rabs	39	33
Outcasts	38+	33+
Quiet Ones	39+	33+
Snakeyes	38	34
The Junto	37+	34+
Vibrators	35	37
Rackets	35	37
Packers	34	38
Rattfinks	33+	38+
Gubaths	33	39
Keglers	31	41

Thursday (As of Jan. 30, 1964)

	W	L
Gutterballs	47	29
Longshots	45	31
Pinspallers	44½	31½
Marvelous Ones	44	32
Kiboshers	43½	32½
Tartars	43	33
Old Goats	41	35
Fink's Grp.	38	38
Hi Lows	37½	38½
Markers	35	41
Spoilers	35	44
Bad Risks	34	42
Guided Muscles	32	44
A&M PM's	32	44
Fat Sparks	30	46
Manywatts	26½	49½

GEWA Dance Coming Up

The Goddard Employees Welfare Association is having their Spring Dance May 29, 1964. Be sure to mark the date on your calendar for this event because it is being held on a holiday weekend.

Fred Perry's Orchestra will provide continuous music for dancing.

Watch the GODDARD NEWS for further information on this big affair.

Dear Sir,

I would like a set of pitures of John Glen and Alen Shepard to hang up in my bedroom and to show my friends. I always did want a piture of the astrnounts to hang up in my room, even thou I saw them on T.V.

Thank you very much.

from
Michael P

Goddard Welcomes

NEWCOMERS TO GODDARD SINCE THE LAST ISSUE.

Lois F. Bair
Management Service & Supply Div.

Edward J. Eisele
Network Engineering & Operations Div.

Abolghassem Ghaffari
Systems Analysis Office

Robert J. Janda
Spacecraft Technology

Edgar T. Kauffman
Fabrication Division

Richard C. Lavigne
Aeronomy & Meteorology Div.

Moreland Lysher
Project Support Div.

Dorene L. Patterson
Procurement Div.

Joseph R. Skortoski
Test & Evaluation Div.

Barbara J. Wilson
Systems Analysis Office

Robert R. Wilson
Network Engineering & Operations Div.

S. P. Kovell
Congressional Relations & Industrial Applications

M. W. Kalet
Spacecraft Systems & Projects

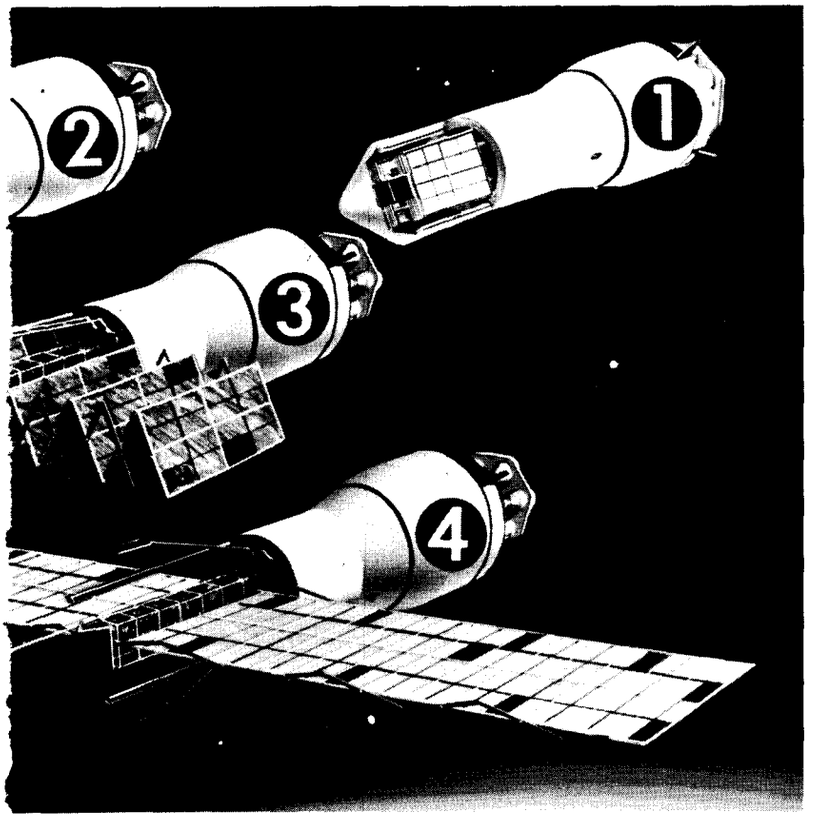
G. F. Pieper
Space Sciences & Satellite Applications

A New Saddle-Light?

Perhaps this Shetland pony mispronounced the specialty of the Center. It is scientific *satellites!* In any event, the pony wandered through the gate late in 1963, and refused to get a visitor's pass. He is in good hands here with Patricia Vacchio, gatehouse.

All ended well, with the owner reclaiming his wandering Shetland.

Heavy Payloads Planned



rst Saturn-launched meteroid detection satellite will be deployed: ehicle; 2) after the boilerplate Apollo service and command 3) unfolding; and 4) unfolded to the full span of nearly 100

Douglas Aircraft Company, first and second stage prime contractors, respectively, assisted in the launch of SA-5.

Launched from New Complex

SA-5 was launched from Complex 37B at John F. Kennedy Space Center. This huge facility, under construction two years at a cost of $65 million, was used for the first time. Thus this was a test of both rocket and ground facilities.

The main purposes of the flight was to further test the first stage (S-I), to demonstrate separation of the S-I stage and the second stage (S-IV), and to test the function of the S-IV propulsion system which uses liquid hydrogen to provide a performance more than a third greater than conventional fuels such as the one used in the S-I stage.

The satellite assembly is 84 feet long including the empty S-IV rocket stage. It carries no scientific payload.

Aside from vehicle measurements, as in the past Saturn launchings, NASA will also measure acoustic, vibration and blast effects of this launching. A total of about 50 measurements will be made at Launch Complex 37, elsewhere on Cape Kennedy, on Merritt Island and on the Florida mainland up to a distance of about 15 miles from the launch site. This program is being conducted by the John F. Kennedy Space Center.

With the reshaping of the Apollo manned flights, the Saturn I program will end with the 10th flight. There will, then, be five firings after this one. The mission of those vehicles will be to contribute to the development of Saturn IB and Saturn V, to launch early, unmanned versions of the Apollo command and service modules (beginning with SA-6) and to place in earth orbit large satellites (having wingspread of 100 feet) to detect the presence and size of meteoroids in near space (SA-8 and SA-9).

The Saturn I, with dummy Jupiter nosecone such as carried on SA-5, stands 164 feet tall. With Apollo spacecraft, including launch escape system, it will be 190 feet wall.

Goddard Display Attracts Floridians

More than 100,000 Central Floridians got a first-hand view of the research work of Goddard Space Flight Center during the recent Pinellas County, Florida, Industrial and Aerospace Exhibition held at St. Petersburg.

Another 3,000 college, senior and junior high school students listened to lectures conducted by Goddard's office of public information on NASA's programs.

Residents of four countries, plus industry representatives from over 17 states, viewed eight Goddard exhibits.

They included: the Orbiting Solar Observatory (which many observers said was the biggest attention-getter of the fair); full-scale models of Nimbus, TIROS and Syncom; two Goddard panel exhibts on spacecraft program activities; the Goddard tracking station exhibit; and the TIROS exhibit.

This is one of the displays that represented Goddard at the Pinellas Exhibition in Florida.

Dr. Townsend Receives Flemming Award

John W. Townsend, Jr.

Dr. John W. Townsend, Jr., Goddard's Assistant Director, Office of Space Science and Satellite Applications, has been named as one of the 10 most outstanding young men in the Federal Service.

He will receive the Arthur S. Flemming Award at a luncheon this Thursday, Feb. 13, at the Statler Hilton Hotel in Washington, D.C. He is one of five men so honored in scientific and technical fields. All winners are under 40 years of age.

Goddard Coming Events

Goddard colloquim lecture:

- **February 11, 3 p.m., Auditorium Bldg. 3—Dr. Brian J. O'Brien, Rice University, Houston, Texas, "Auroras and Van Allen Radiation."**

Films:

- **February 20, 12:30 p.m., Auditorium Bldg. 3—"Syncom II."**

Echo II, a New Bright Star Unfolds...

1) The Echo II canister is picked up by television cameras aboard the Agena B second stage before balloon inflation.

2) The canister halves (above and below balloon) are separated, and the 135-foot sphere begins to inflate.

3) This is an enlarged picture of a segment of Echo during inflation. For a time, it resembled a wrinkled sausage.

Goddard's Echo II is the brightest light in the sky these days, even though different "eyes" take different views of the huge satellite.

At last report, the balloon seems in perfect shape to the optical trackers, but it seems to be losing its reflective characteristics according to some early radar reports.

This may mean that it is not retaining its perfect spherical shape. However, there are other possible explanations for the reported optical-electrical disharmony.

For example, the problem could be: inaccuracy in measurement; interference with the radar beam caused by launch vehicle and other objects which went into orbit with the spacecraft, or interference due to electrical charging of the gas used to inflate the satellite.

In any event, telegrams containing the first data from Soviet optical observations of the United States passive reflector communications satellite were received at NASA Headquarters on January 27.

The communications from the Soviet Academy of Sciences also indicated that photographs of the satellite had been obtained at five stations.

These observations were conducted as part of the Bilateral Agreement on Space Cooperation between NASA and the Academy of Sciences of the USSR.

And, to countless amateur Echo watchers of all nationalities, she's still the brightest star. They side with the optical trackers.

A bit of light verse from a new book, *Jokes for Children*, may apply to Echo II:

"Star light, star bright,
First star I see tonight,
I wish I may, I wish I might
. . . .
Oh, nuts, it's a satellite!"

4) As the subliming powder turns to gas in the vacuum of space, Echo II begins to assume its spherical shape.

5) Nearly fully inflated, Echo II seems to bow to its appreciative television audience. It is the largest satellite.

First Inter-center Tape Recorder Conference Held Here

Associate Director Eugene Wasielewski welcomes the personnel of various Centers to the tape recorder conference. Conference chairman H. J. Peake of Goddard is at center and L. A. Arsement of Marshall is seated at right.

Goddard was host to NASA's first inter-center conference on spacecraft tape recorders on January 29-31 in the management control center in building 8.

Harold J. Peake, chief of Goddard's flight R-F systems branch, chairman of the conference, considered the meeting of prime importance because "it is the first time that persons directly involved in spacecraft tape recorder problems at the various centers were assembled in one room for a give-and-take on the subject."

The conference consisted of discussions on the problems, successes and failures in the field. According to Peake and Pleasant T. Cole, head of the recording techniques section, one of the major problems facing the group is the need for development of magnetic tape with properties not presently available.

Cole, who was in charge of arrangements for the conference, identified the shortcomings of present tapes as being due to the fact that they were not developed specifically for use in the miniturized recorders used in aerospace research. They have been more or less adapted from regular industrial tape. Cole also presented talks on video records and tape tolerances.

Problems inherent in the outer space environment and in the requirements for compact recorders make "regular" tape inadequate for some future needs, the conference found.

For example, a tape will be needed that can withstand higher temperatures than the current product. Tape now available can be counted on up to 70 degrees C. Tape used aboard future planetary probes will be required to withstand 145 degrees C, which is necessary for sterilization.

Goddard Tape Talkers

Participants from Goddard were: P. W. Uber, W. T. Tallant, L. C. Rogers, flight R-F systems branch; and R. N. Gibson, Jr., W. A. Kley, K. W. Stark, M. A. Strange, A. F. White, Jr., W. A. Burton, instrumentation branch.

More accurate "slitting" is also required. Commercial tapes are slit from wide role (up to 18 inches) in the manufacturing process. The accuracy of this process is now marginal, since spacecraft recorders require tolerances *after* splitting of + or − five ten-thousandths of an inch. A human hair is almost twice this thickness.

For obvious reasons, spacecraft recorders need magnetic tape with a minimal amount of static electricity. Tape commercially available generates too much static electricity to be fully efficient.

These future requirements were among numerous items covered at the three-day conference. Attendance averaged about 40 per day, with the majority of the attendees participating in the discussions.

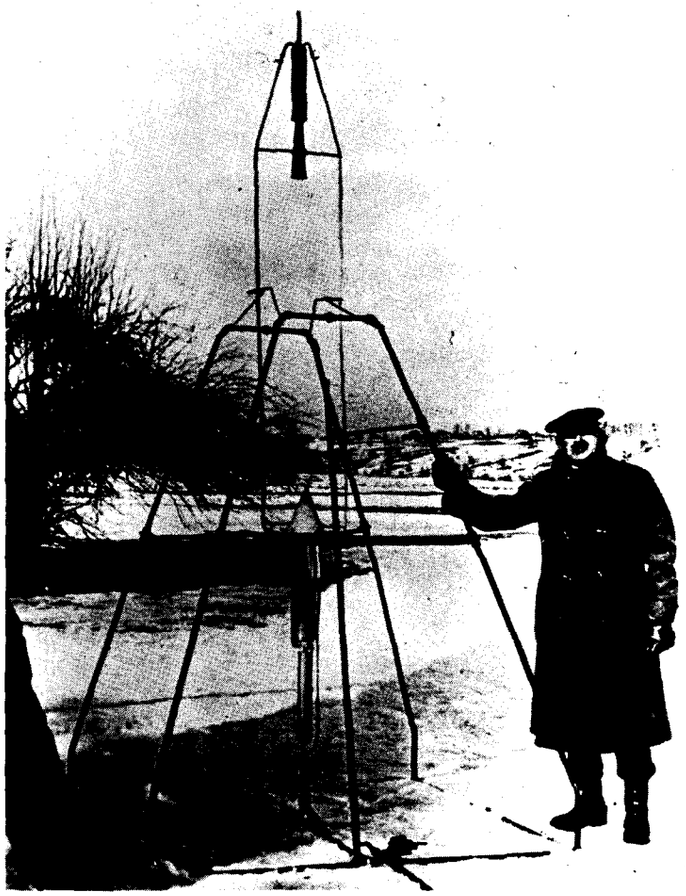
The management control center in building eight was the scene of the meetings. A good attendance was reported.

Session chairmen were: D. S. Hepler, head, R-F section; Dr. R. W. Rochelle, head of Goddard's flight data systems branch; and Roland L. Van Allen, also of flight data systems branch.

The conferees were welcomed to Goddard by Eugene W. Wasielewski, associate director. Director Harry J. Goett gave an informal talk during the conference dinner January 30. Robert E. Bourdeau, head of planetary inospheres branch, space sciences division, was guest speaker for the dinner.

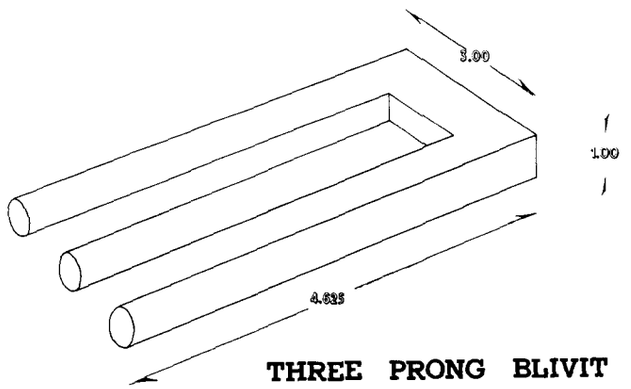
Space Shots — PICTORIAL REVIEW

Liquid Fuel Chronology



Liquid fueled rockets have come a long way since Dr. Robert Goddard fired the first (shown here) in 1926.

Liquid fuel will propel our astronauts to the moon atop this Saturn V, shown here in approximate scale with Niagara Falls. Saturn V will be more than twice as tall.



THREE PRONG BLIVIT

This little item is a machinist's nightmare! The tongue-in-cheek design was published in *Lab-oratory*, JPL's monthly magazine, under the heading "Somebody Finally Designed Something That JPL Couldn't Make." GODDARD NEWS will have to concede that it is also beyond our Center's in-house capabilities (unless we hear otherwise from Mr. Levinsohn). We imagine that our contractors would also be inhibited if three prong blivited!

Relay Talks During Launch

As Relay II rode atop Delta 23 toward orbit from Cape Kennedy on January 21, project scientists and engineers at Goddard were provided complete spacecraft health and welfare checkup information before the last stage of the launch vehicle was ignited.

Only 17 minutes after lift off, and approximately 8 minutes prior to third stage firing, a complete summary of Relay II's launch phase condition was handed to project officials, Dr. John Townsend and Clarence Schroeder, here.

Unmanned spacecraft begin chattering away in their speedy numerical language prior to launch and generally continue for the remainder of their lifetime. Relay II is no different.

Through sensitive antennas and data handling facilities at the NASA STADAN (Space Tracking and Data Acquisition Network) station at Fort Myers, Florida, the chattering digital information was "heard." It was electronically organized into the prescribed form for processing by the Goddard computers there, and dispatched to the Center over high speed teletype lines. As it arrived, the computers went to work and in fractions of a second a high speed printer was producing the vital data.

To the electronic sleuths of the spacecraft world such timing of project information during the highly critical launch phase is important. Every shred of evidence for every second of performance time prior to a spacecraft's entry into orbit can be effectively utilized for decision making purposes. In the event of failure, engineers are often able to determine from such data just what went wrong . . . and why.

Relay II's first public demonstration was the trans-Atlantic telecast of portions of a Soviet-American hockey game, the first championship event of the 1964 Winter Olympics being held at Innsbruck, Austria.