NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

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RELEASE NO. 61-20

NASA TO LAUNCH 12-FOOT SPHERE WITH ALL-SOLID SCOUT

The National Aeronautics and Space Administration is now making final plans that may place another satellite into orbit around the earth, but this time the civilian space agency will be using only solid fuels in the launch vehicle. In fact, the real purpose of this experiment will be to test the capability of the four-stage, all-solid propellant SCOUT launching vehicle.

Although SCOUT is still only mid-way through its developmental test series, this next NASA launch could result in two historical events. If everything goes as planned -- if all four stages fire properly and if the satellite achieves a successful orbit -- it will mark two "firsts" in space history:

1. It will be the first time that the United States has successfully placed a satellite into orbit using a rocket fueled entirely with solid propellants;

2. It will be the first time a satellite was launched from Wallops Island -- the first time the U.S. has orbited a satellite from a site other than Cape Canaveral or Pacific Missile Range.

While putting prime importance on the test of the SCOUT, the NASA will also be trying to get a better understanding of the density of the earth's atmosphere at different altitudes extending out to the edge of outer space.

How do you measure the density that far out? Several different methods have been used through the years. One method is to carry instruments aloft by means of balloons that can reach altitudes as high as 20 miles. Another method involves the use of sounding rocket techniques to measure the density to altitudes in excess of 100 miles. Information obtained from thousands of balloon flights before and after World War II and from hundreds of sounding rocket flights in recent years have generally confirmed the theoretical decrease in density as you go further out into the atmosphere. Furthermore, these flights have found that the density of the air envelope is also strongly influenced by the time of day, by the time of year, and by the latitude of the place where the measurements are made.

In recent years, particularly during the International Geophysical Year, greater knowledge of atmospheric density was gained by satellites of different shapes and sizes such as the Sputniks, Vanguard, Explorer, and Echo I. These satellites extended our knowledge of atmospheric density to nearly one thousand miles and further indicated that the density of the upper atmosphere is influenced markedly by solar storms.

The satellite planned in this test is a 15-pound Echo-type balloon made of mylar plastic and aluminum foil, 12 feet in diameter. As the balloon circles the earth in an elliptical orbit (apogee 1400 statute miles and perigee 400), it will continually lose energy as a result of the minute force (estimated to be less than one-thousandth of an ounce for this satellite) exerted on it by the earth's atmosphere. Because of the relatively light weight of the 12-foot balloon, this small drag force will result in measurable changes in the satellite's orbit. World-wide radio and optical tracking measurements of these changes in the orbit will give us information to determine this force which the atmosphere exerts on the satellite.

Because of the spherical shape of the satellite, this force will depend only on the atmospheric density and not on the attitude of the satellite. Therefore, more accurate values of density can be determined from these results than from results obtained from a satellite such as Explorer I in which the force depends on both density and satellite attitude.

It must be emphasized that the major concern will be centered around the performance of the four stages of this still-new solid propellant Scout vehicle.

The concern is understandable. SCOUT holds great promise for the future as a versatile and economical rocket vehicle. When it becomes fully reliable -- early in 1962 -- it will be able to do a number of useful jobs. In its present form it will be able to place 150 pounds into a 300-mile-altitude orbit above the earth. Vertical probes, with useful payloads, to an altitude as high as 8,000 miles will be possible.

SCOUT, like the military ballistic missiles MINUTEMAN and POLARIS, is fueled entirely by solid propellants. In fact, SCOUT is the only all-solid vehicle in the NASA inventory capable of launching a satellite. The launch vehicle people are "sold" on its future, and it is earmarked to become one of the four basic vehicles in NASA's goal to build up a fleet of standardized units for specific missions. SCOUT will then stand beside the Atlas Agena-B, Centaur, and powerful Saturn.

When SCOUT has successfully run through the developmental tests and is ready for operational use, it is destined to play a major role in future international space efforts. Sometime early in 1962, this versatile vehicle will be charged with the important role of carrying into earth orbit a scientific satellite designed and instrumented by scientists in Great Britain.

History of Scout Launches

The SCOUT has been under development by NASA for two and one-half years, has been tested three times since July 1960. The up-coming test will be the second time it has been tried in an orbital attempt.

This new launch vehicle performed satisfactorily on the first of its 8-shot developmental tests on July 1, 1960. On October 4 in a non-orbital probe shot mililar to the first test it performed perfectly. But when the 72-foot, four-stage rocket tried to orbit its first satellite on December 4, 1960, the day ended in disappointment with the failure of the circuit necessary to trigger the signal to ignite the second stage.

And now the launch vehicle stands ready for the next step --

the fourth checkout of all stages and the guidance-control systems.

There is nothing more that can be done but wait -- wait as the first stage Algol ignites and lifts the 36,600-pound research rocket off the ground, and then wait for the successive ignition of the three others -- Castor, Antares, and Altair. Finally after 622 grueling seconds the fourth stage is supposed to burn out. At this point, if all goes well, the fourth stage and the satellite will be put into orbit. This will occur at about 1,280 statute miles down range. A squib in the payload container will ignite and activate the inflation mechanism opening the inflation bottle valve and permit the inflation gas to flow from the bottle into the ejection bellows. The bellows will expand and push the folded satellite out of the front end of the payload container. When fully inflated, the sphere will be released and will push ahead of **payload container and 4th stage by a separation spring.** A beacon on the satellite will begin sending a signal to the ground tracking stations as soon as the satellite has been ejected from the payload container. This entire operation should take place in four and one-half minutes.

The fourth stage with the payload container is expected to become separated from the inflated sphere by an increasingly greater distance as they continue in orbit because of the differences in drag on the two objects. Since the sphere is a hundred times more sensitive to atmospheric drag than heavier satellites which have been launched, it is expected to remain in orbit from a few weeks to possibly a year before spiraling into the lower atmosphere and burning up. The predicted orbital lifetime of the relatively heavier spent rocket motor, which will also contain a tracking beacon, is much longer.

- END -

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Release No. 61-20-1 HOLD UNTIL LAUNCH

SCOUT VEHICLE DEVELOPMENT FLIGHT
(AIR DENSITY-DRAG MEASUREMENTS EXPERIMENT)

National Aeronautics and Space Administration will launch the fourth in a series of Scout research rocket vehicles from Wallops Station, Wallops Island, Virginia, in an orbital flight which has two scientific purposes.

The principal aim is to study the performance, structural integrity and environmental conditions of the 72-foot, 36,600-pound four-stage Scout research vehicle and the guidance-controls system.

The second objective is to inject into orbit an inflatable 15-pound, 12-foot-diameter spherical satellite, fabricated of mylar plastic film and aluminum foil, for use in studying the characteristics of space -- primarily to measure air drag to determine the density of the earth's atmosphere on the fringe of space.

The present determination of atmospheric density at satellite altitudes is inferred from calculations of tracking data obtained from numerous satellites of different sizes and shapes. The air density-drag measurements experiment will provide accurate information on the characteristics of space between altitudes of about 400 down to 100 statute miles -- giving scientists a firm basis for more accurately predicting the orbital life of satellites and other vehicles.

In the air density-drag measurements experiment, the orbiting spherical satellite will be the measuring instrument. As the satellite, an object with a known mass and frontal area and highly sensitive to drag, begins to descend and dip more and more into the earth's atmosphere, it will lose energy. Worldwide radio and optical tracking measurements of the resultant changes in orbit will allow computations of atmospheric density.

The launch is part of NASA's Scout development program to provide the United States with a small, reliable and flexible solid-fuel booster capable of space probes and of orbital missions. The research rocket has been under development by the NASA Langley Research Center since mid-1958.

Payload Construction

Payload of the Scout vehicle weighs 80 pounds. This includes the 15-pound inflatable satellite and 65 pounds of satellite ejection and inflation equipment, the fourth stage telemeter system, and necessary hardware -- including the metal container in the nose of the Scout fourth stage. The fourth stage rocket motor and the attached payload container which will follow the sphere into orbit will weigh about 127 pounds.

About twice the thickness of the cellophane on a cigarette package, the satellite is constructed of four alternate layers of mylar plastic film and aluminum foil. The fabrication sequence is a layer of plastic film on the inside, an outer layer of aluminum foil, another layer of plastic film, and a final layer of aluminum foil on the exterior surface. Each layer is 0.0005 inches thick, resulting in a total laminated satellite thickness of approximately 0.002 or two mils. The sphere was fabricated at Langley by bonding together 40 flat gores of the aluminum-mylar laminate.

A 2¼-pound, 3 by 4-inch radio beacon attached to the satellite will be powered by 280 solar cells and miniature storage batteries. The storage batteries will supply the necessary power while the satellite is in darkness. The beacon's continuous wave crystal control transmitter will have a power output of about 15 mw and transmit on a frequency of 136.950 megacycles. This will be the first use of the Minitrack frequency of 136 megacycles in a satellite. Eight stations in the Minitrack network will track the satellite: Blossom Point, Md.; Quito, Equador; Ft. Myers, Fla.; Lima, Peru; Antofagasta, Chile; Santiago, Chile; Winkfield, England; and East Grand Forks, Minnesota.

The satellite aluminum foil is separated by a thin equatorial gap constructed of an insulating material -- permitting the resulting two foil-covered hemispheres to form the antenna for the tracking beacon transmitter.

Satellite Tracking

In gathering data for use in the drag measuring experiment, the tracking beacon in the satellite will be tracked by the Minitrack Receiving Station Network of the NASA Goddard Space Flight Center at

Greenbelt, Maryland. Optical tracking of the highly-reflective satellite will be accomplished by the Smithsonian Astrophysical Observatory (SAO) of Cambridge, Mass., through use of Baker-Nunn camera stations and cooperating optical tracking teams. SAO also plans to optically track the fourth stage.

Three Baker-Nunn camera stations are in the United States -- at Jupiter, Florida; Maui, Hawaii; and Oregon Pass, New Mexico. Those in foreign countries are located at Olifantsfontein, South Africa; Woomera, Australia; San Fernando, Spain; Tokyo, Japan; Naini Tal, India; Arequipa, Peru; Shiraz, Iran; Curacao, Netherlands West Indies; and Villa Dolores, Argentina.

Scientists at the Langley Research Center will analyze the satellite tracking data for the determination of the atmospheric density.

The deflated mylar-aluminum foil satellite is folded accordion-fashion and carefully packaged inside a metal tube 8½ inches in diameter and about 19 inches long -- mounted on the front end of the fourth-stage rocket. The satellite and its attached tracking beacon components are inserted inside the front end of the tube to occupy a space approximately 8½ inches in diameter and 11 inches long. Behind the folded satellite is an ejection bellows, a steel inflation bottle containing nitrogen gas under a pressure of about 1,800 pounds per square inch, followed by a fourth-stage telemeter and its batteries.

Orbital Data

The spherical satellite will be launched due east on an elliptical flight path. The perigee will be abour 400 statute miles and apogee about 1,400 statute miles. The belt covered by the initial orbits will extend 38 degrees north and south of the equator. The satellite is programmed to travel at a velocity of approximately 16,600 mph as it is injected into orbit and at perigee. Satellite speed at apogee will be about 14,000 mph. Time of the satellite's initial orbital period is estimated at 115.4 minutes.

The first orbit will carry the sphere across the southern part of Africa and mid-Australia, as it begins its first pass over the United States on the initial orbit near San Francisco. It will cross the lower half of the country before passing over the east coast and the Atlantic Ocean above Charleston, South Carolina. During twilight and evening the sphere, when overhead, will be visible to the naked eye at perigee but will be only barely visible at apogee without the use of binoculars or telescopes.

Sequence of Events

After launch, Scout's first stage remains attached to the vehicle until it is blasted off at second stage ignition at 130,000 feet. The burned out second stage coasts with the vehicle to about 310,000 feet and is blast-separated as the guidance programmer ignites the third stage rocket motor and the drag and heat fairings on the third and fourth stages are jettisoned. The spent third stage, with its guidance and control system operating, coasts to the injection altitude attached to the fourth stage. The fourth stage is then spun to about 150 rpm by small spin rockets, ignited, and separated from the third stage. The velocity increment gained during fourth stage burning places the payload and fourth stage into orbit.

Injection into orbit is scheduled to occur about 10½ minutes after liftoff -- about 1,280 statute miles down range approximately at 52½ degrees west longitude and 35.2 degrees north latitude. A squib in the payload container is ignited and activates the inflation mechanism -- opening the inflation bottle valve and permitting the inflation gas to flow into the ejection bellows. The bellows expand immediately and push the folded satellite out of the front end of the container. The satellite remains attached to the bellows by a disconnect mechanism during the inflation process. After it is fully inflated, the sphere is released by the disconnect mechanism and a separation spring pushes the satellite ahead of the combination payload container-fourth stage. The small tracking beacon becomes operative for the first time automatically upon the satellite's ejection from the payload container. It requires 4½ minutes to eject, inflate and separate the satellite from the rocket.

The combination fourth stage rocket motor-payload container and the inflated sphere are expected to become increasingly separated in orbit because of differences in drag. Since the sphere is hundreds of times more sensitive to atmospheric drag than the heavier satellites which have been launched, it is expected to remain in orbit from a few weeks to possibly a year before spiraling into the lower atmosphere and burning up. The predicted orbital lifetime of the spent rocket motor is much longer.

A small tracking beacon will be placed in the fourth stage to facilitate its tracking by the Minitrack stations.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Release No. 61-20-2 HOLD UNTIL LAUNCH

AIR DENSITY-DRAG MEASUREMENTS SATELLITE (S-56) - SEQUENCE OF EVENTS

TIME (SECONDS)			EVENTS
0.0			First stage ignition
42			First stage burnout
70	1 min.;	10 secs.	Second stage ignition, first stage separation
111			Second stage burnout
116	1 min.;	56 secs.	Third stage ignition, second stage separation, fairings separation
156	2 min.;	36 secs.	Third stage burnout
579	9 mins.;	39 secs.	Fourth stage spin-up
581			Fourth stage ignition, third stage separation
622	10 mins.;	22 secs.	Fourth stage burnout, ignition of payload activation squitch, INJECTION INTO ORBIT
628			Activation of inflation bottle
629			Ejection of satellite from payload container and start of satellite inflation
899	15 mins.		Completion of satellite inflation and disconnection of satellite from payload container

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

RELEASE NO. 61-20-3

SCOUT RESEARCH VEHICLE

The Scout concept originated in mid-1958 at the Langley Research Center-- in the Applied Materials and Physics Division. This division has conducted hundreds of aeronautical and space research programs at Wallops Island, using solid fueled research vehicles having from one to six rocket stages. A special Scout Project Group, including several veterans of Wallops Island research launchings, was formed at Langley to develop the vehicle.

Scout is presently in its development phase. As an operational vehicle, it is designed to place a 150-pound satellite into a circular orbit approximately 300 miles above the earth or to loft a 50-pound scientific probe to an altitude of about 8,400 miles. In reentry body tests, Scout will permit simulation of conditions expected by a space vehicle returning to the earth's atmosphere. With a ballistic trajectory, it will be possible to obtain almost two hours of zero-gravity environment with 100-pound experiments.

Contractors and vendors in the program are:

Vought Astronautics Division of Chance Vought Aircraft, Dallas, Texas - launch tower fabrication and installation, airframe and motor transition section manufacturer.

Allegany Ballistics Laboratory, a Navy Bureau of Weapons facility operated by Hercules Powder Company at Cumberland, Maryland - third and fourth stage motor developments.

Aerojet-General Division of General Tire and Rubber Company, Sacramento, California - first stage motor development.

Redstone Division of Thiokol Chemical Corporation, Huntsville, Alabama - second stage motor development.

Aeronautical Division of Minneapolis Regulator Company, Minneapolis, Minnesota - guidance and controls (Hydrogen-peroxide controls were sub-contracted to Walter Kidde, Clifton, New Jersey).

The following is a description of the four Scout rocket stages and the vehicle's auxiliary parts:

First Stage: Algol, 30 feet long, 40 inches in diameter, and developing 103,000 pounds of thrust, is fin-stabilized and controlled in flight by jet vanes. The largest solid rocket flown in the United States, its sole operational application to date is as the Scout first stage. Algol is named for a fixed star in the constellation Perseus.

Second Stage: Castor is 20 feet long, 30 inches in diameter and has a thrust of over 62,000 pounds. A modification of the Sergeant motor, it has been used successfully in a cluster in NASA's Little Joe program in support of Project Mercury. On the Scout, the Castor is stabilized and controlled by hydrogen-peroxide jets. Castor is the "tamer of the horses" in the constellation Gemini.

Third Stage: Antares is 10 feet long and 30 inches in diameter with a thrust in excess of 13,600 pounds. Stabilized and controlled by hydrogen-peroxide jets and utilizing lightweight plastic construction throughout its design, Antares is a scaled-up version of the fourth stage and is the only motor developed specifically for Scout. Antares is the brightest star in the constellation Scorpio.

Fourth Stage: Altair, six feet long, 18 inches in diameter, and having 2,800 pounds of thrust, is the smallest of the four Scout stages. The spin-stabilized Altair formerly was known as X-248. It is the third stage on the Able and Delta launch vehicles and was the first fully developed rocket to utilize lightweight plastic construction throughout. Altair is a star of the first magnitude in the constellation Aquilae, or Eagle.

Auxiliary Parts: The added Scout airframe parts consist of control surfaces surrounding the nozzle of the first stage, transition sections connecting the four rocket stages, a fibreglass-phenolic protective heat shield which covers the third and fourth stages plus payload, the fourth-stage spin-up table, and the payload attachment structure.

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Exp. IX

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D. C.

RELEASE NO. 61-20-6

IMMEDIATE RELEASE
February 16, 1961

WASHINGTON, D. C. -- Preliminary orbital elements of the fourth stage casing of the Scout rocket launched at 8:05 a.m. EST today were announced tonight by NASA. They are:

Perigee - 410 statute miles

Apogee - 1610 statute miles

Period - 118-3/4 minutes

Inclination - 38°

These elements are based on signals acquired during the day by NASA minitrack stations from the tracking beacon on the burned out fourth stage rocket casing.

NASA scientists were pleased with the performance of the Scout -- in its second orbital try -- which appeared to be almost as programmed.

On the basis of the orbital elements for the fourth stage, NASA scientists said that it is probable that the 12-foot sphere achieved orbit. Since no beacon signals have been received from the sphere itself since 9:20 a.m. EST today at the Woomera minitrack station, there apparently is a malfunction in the payload.

NASA minitrack stations are continuing to track the rocket casing by its tracking beacon. The Smithsonian Astrophysical Observatory's optical tracking network is attempting to confirm that the payload is in orbit.

RELEASE NO. 61-22 For Release: IMMEDIATE
February 10, 1961

US-Australian Voice Transmission Via the Moon

The United States and Australia today joined in a space communication experiment that sent a voice message of good will from Washington to Woomera, Australia by way of the Moon.

Dr. High L. Dryden, Deputy Administrator of NASA talked by telephone from his office with the Honorable Alan Hulme, Minister for Supply, who was at NASA's tracking facility located at Woomera, Australia. Dr. Dryden's message was transmitted by telephone line to Goldstone, California, where NASA's tracking station "bounced" it to Australia via the Moon.

Dr. Dryden's message to Mr. Hulme was: "I would like to take this opportunity to send greetings through the Deep Space Instrumentation Station at Woomera, Australia." Warm greetings especially to our colleagues of the Australiam Department of Supply, which generously has undertaken the operation of this new station, soon to track and retrieve data from spacecraft in the far reaches of the solar system. It is my hope that this moon-bounced message, and the cooperative research which follows, will illustrate to all that man's technological progress can serve to bring men everywhere closer together."

Mr. Hulme, in replying to Dr. Dryden said: "Australia is very pleased indeed to be associated with the United States in this extensive and exciting program. I feel this is a good example of the truly international nature of science at its best. I also would like to take this opportunity to tell you that, in addition to their professional qualification, your countrymen, who have been working with us in the installation of this equipment, have been fine ambassadors for the United States."

The tracking stations at Goldstone and Woomera are part of NASA's Deep Space Instrumentation Facility which is under the technical direction of the California Institute of Technology Jet Propulsion Laboratory, Pasadena, Calif.

Febry 14, 1961 Advanced version of the Navy Bull-Pup missile, solid propellant airborne missile capable of carrying a nuclear warhead, launched from two F-100 aircraft for the first time at Eglin AFB

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RELEASE NO. 61-23

For Immediate Release
February 13, 1961

STATEMENT BY NASA

U. S. tracking agencies have been tracking the latest Russian satellite which was launched Sunday and are seeking to track the probe which was launched from the satellite toward the planet Venus.

According to Russian announcements, the Venus probe is on a command frequency. The probe transmitter is activated by direction of USSR tracking stations at various intervals and can only be tracked when transmitting.