N10F-00

NEWS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (202) 962-4155
WASHINGTON, D.C. 20546 TELS: (202) 963-6925

FOR RELEASE: SUNDAY
January 25, 1970

RELEASE NO: 70-8

LAUNCHING OF SERT 2

A spacecraft to test how one type of electric rocket engine operates in space is to be launched into Earth orbit no earlier than Jan. 29, 1970.

The test thrusters are two electron-bombardment ion engines. Ion engines, one of several types of electric thrusters, may be used in the future to position Earth-orbiting spacecraft or to propel spacecraft to distant planets.

The National Aeronautics and Space Administration spacecraft, SERT 2 (Space Electric Rocket Test) will be launched from the Western Test Range in California by a Thorad-Agena-D booster.

SERT 2 will be placed in a circular orbit 621 statute miles above the Earth and in a plane inclined 99.1 degrees to the Equator. In this orbit, it will take about 105 minutes to complete each revolution.

SERT 2 will provide the first orbital test of electron-bombardment ion engines. Satisfactory operation for a period of six months or longer will be a milestone in the advancement of electric propulsion. A SERT 1 suborbital flight in July 1964 provided the first successful test of an ion engine in space.

The electron-bombardment ion engine was invented at the NASA Lewis Research Center, Cleveland, Ohio.

Ion engines produce tiny amounts of thrust but are potentially more efficient in space than either chemical or nuclear rocket engines. The SERT 2 engines generate thrust by ionizing a vaporized propellant, mercury, electrically accelerating the ions, neutralizing these ions and expelling them at extremely high speeds--on the order of 50,000 miles per hour.

Because the mass of the propellant (ions) being expelled from the engine is very small, the resulting thrust is very low, about six one-thousandth (0.006) of a pound. This gentle thrust can be more than ample for refining the orbits of Earth satellites and, when operated continuously for long periods, to propel spacecraft on distant missions.

Ion engines, unlike chemical rockets, cannot operate in the atmosphere. They require the vacuum of space and therefore, can be considered for use only on spacecraft, satellites and as upper launch vehicle stages.

On the SERT 2 mission one ion engine will be operated continuously for about six months to determine the engine's operating characteristics and reliability in the space environment, to confirm ground test findings in vacuum chambers and to develop and check out ion engine operational procedures.

The launch date has been selected to place the SERT 2 in continuous sunlight for at least six months immediately after launch. Then, for a period of one to three months, it will be in the Earth's shadow for a portion of each orbit. During that time the ion engines will not be operated. Afterwards, the spacecraft will again be in continuous sunlight for up to eight months and operation of the second ion engine is planned at that time.

Limiting the duration of operation is the amount of mercury propellant--29 pounds for each engine, or enough to operate each engine for a maximum of nine months.

Other experiments on SERT 2 are to determine if long-duration operation of the ion engines presents any problems in (1) radio communications between the spacecraft and Earth, (2) the electrical compatability of the thruster system and the rest of the spacecraft and (3) whether exhaust products will cause degradation of solar cells or the thermal control and optical properties of various surfaces.

A variety of other measurements will be made throughout the SERT 2's active lifetime including data on thruster efficiency variations: interactions, or coupling, if any, between the ion beam and the surrounding plasma of space; thrust magnitudes; and temperature fluctuations of an optically reflective coating.

The solar arrays on SERT 2 are the largest ever flown on a NASA satellite. The two arrays, attached near the nozzle of the Agena stage to provide electric power, measure five by 19 feet and contain a total of 33,300 solar cells.

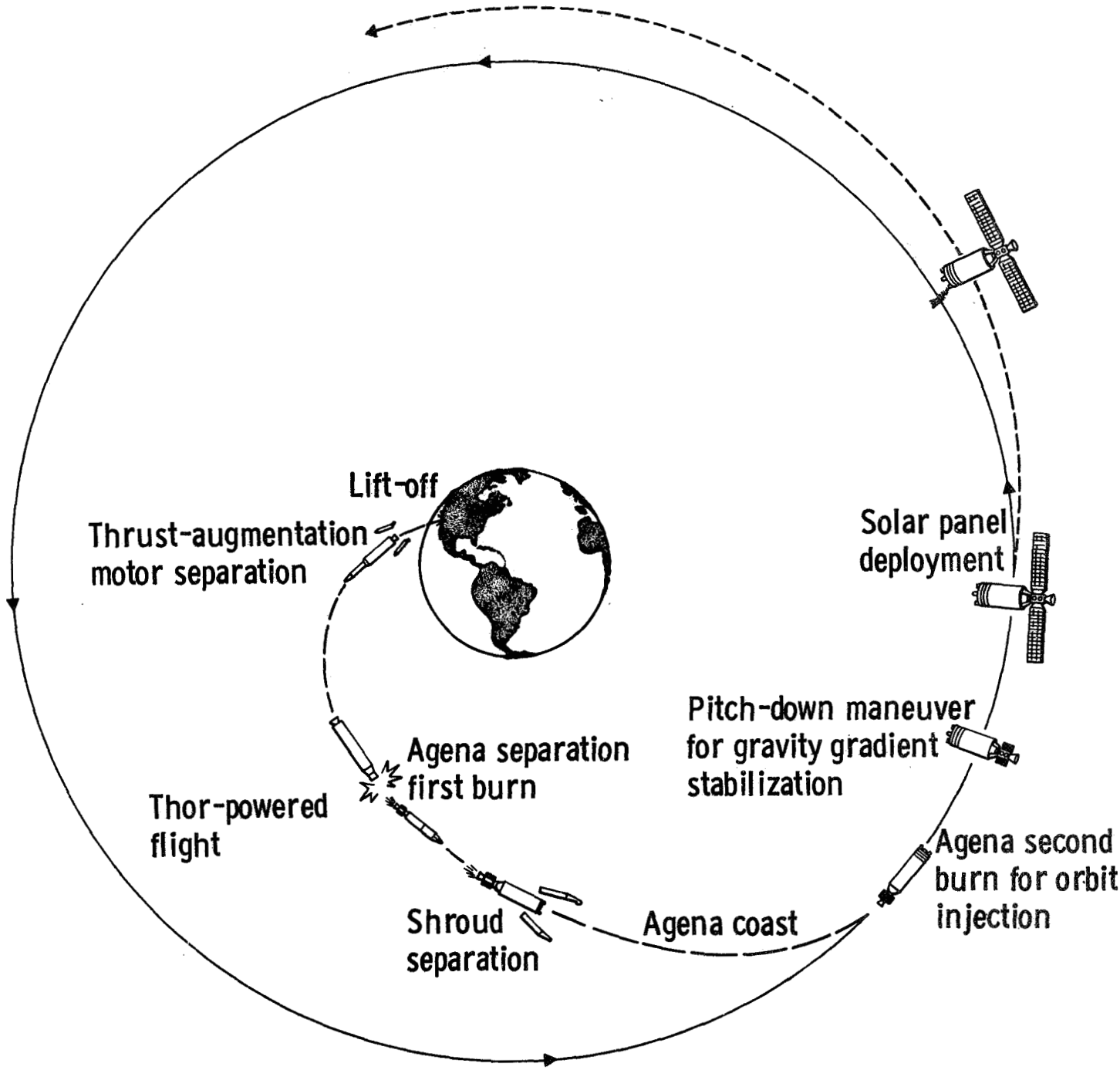
The reason for the big solar panel system is the ion engines require large amounts of power for their operation. The approximately 1,000 watts needed for SERT 2 is divided into alternating and direct current ranging from 4 volts AC to 3,000 volts DC.

The SERT program is managed by NASA's Office of Advanced Research and Technology. The Lewis Research Center is assigned project management for both the spacecraft and the launch vehicle.

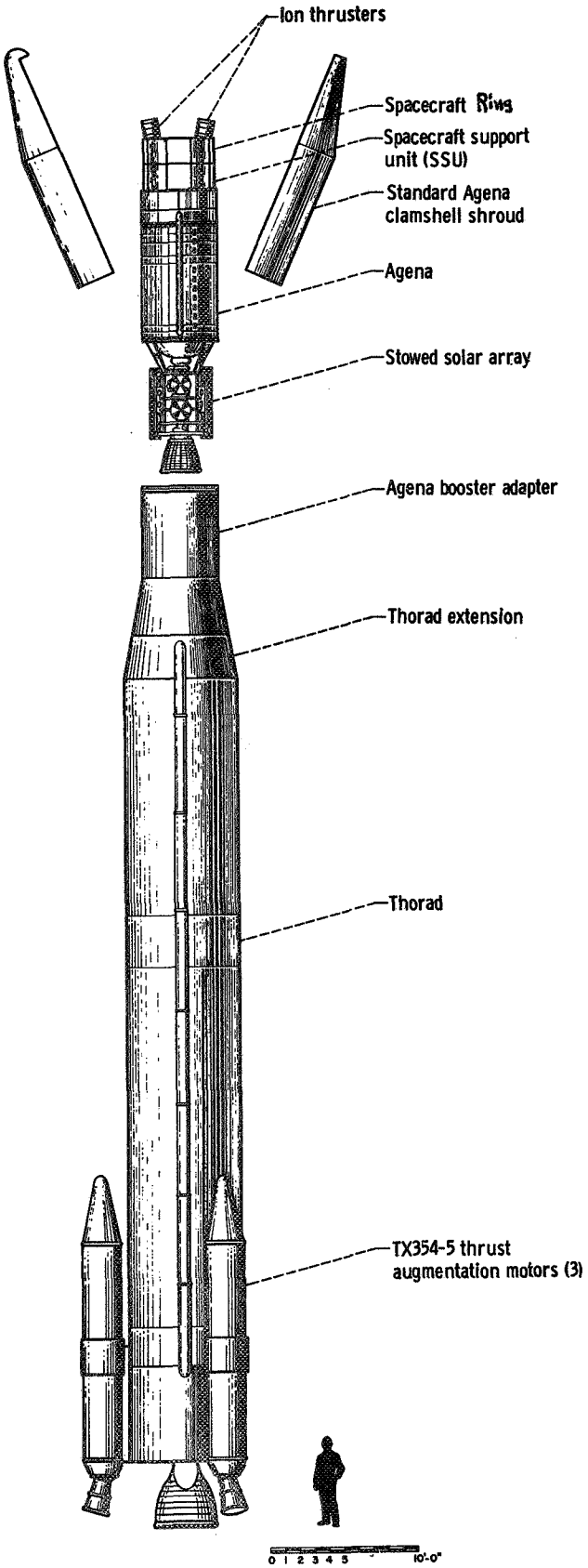
Launch operations are the responsibility of NASA Unmanned Launch Operations, Kennedy Space Center, Fla., with support provided by the Air Force Test Wing, Western Test Range, Calif., and the Air Force Satellite Test Center, Sunnyvale, Calif.

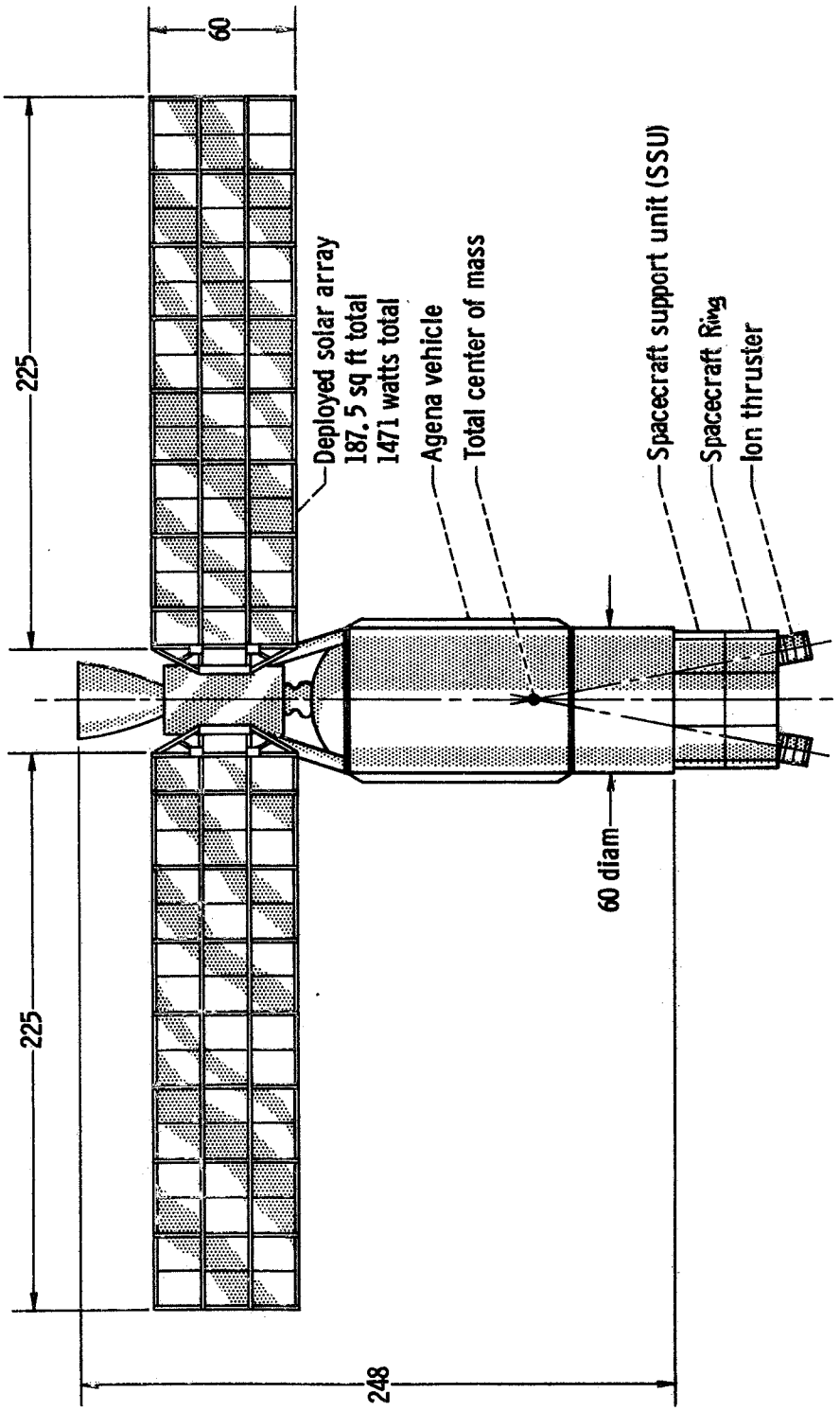
The NASA Goddard Space Flight Center, Greenbelt, Md., is responsible for SERT 2 orbital tracking and data acquisition using stations of the Satellite Tracking and Data Acquisition Network and the NASA Manned Space Flight Network.

The Thorad booster is built by McDonnell-Douglas Corp., and the Agena stage is built by Lockheed Missiles and Space Co., Sunnyvale, Calif.



Representation of SERT 2 Flight Sequence


Ion thrusters
Spacecraft Ring
Spacecraft support unit (SSU)
Standard Agena clamshell shroud
Agena
Stowed solar array
Agena booster adapter
Thorad extension
Thorad
TX354-5 thrust augmentation motors (3)
0 1 2 3 4 5
10'-0"



SERT 2 Orbit Configuration

-end-