NASA TO LAUNCH SERT I SPACECRAFT FROM WALLOPS

NASA will launch the 375-pound SERT I (Space Electric Rocket Test) spacecraft on a sub-orbital flight from Wallops Island no earlier than tomorrow. A four-stage solid-fuel Scout rocket will be the launching vehicle.

The experiment will test for the first time in space two NASA electrostatic (ion) engines.

Primary purpose is to verify that the ion engines can produce thrust in space. This is possible only if the positive ion exhaust beam can be effectively neutralized. Methods of neutralizing the beam appear to work in ground vacuum tank tests but must be verified in space.

Neutralizing is accomplished by injecting a stream of electrons into the ion beam as it rushes out of the back of the engine. Ground tests are not conclusive because in a vacuum chamber it is possible for electrons to be emitted from the sides of the chamber.

If data from SERT I indicate that beam neutralization is completely effective, the development of ion thrusters for space missions may continue in ground vacuum chambers with confidence. If beam neutralization is of limited effectiveness, a new program of vacuum chamber and flight tests may be undertaken.

The SERT I flight test is part of the program being carried out by the Office of Advanced Research and Technology. It is aimed at providing research information and technology required for future development of electric engines.

Lewis Research Center manages the SERT project and RCA, Astro-Electronics Division, Princeton, New Jersey, is the SERT I payload integration contractor.

Since electric engines exhaust their propellant at speeds much greater than conventional chemical rockets, they become contenders to propel future deep space missions. This increased exhaust velocity gives them a greater "specific impulse"--a miles-per-gallon-type figure for rockets.

SERT's test engines have exhaust velocities greater than 100,000 miles per hour. For research use, the thrust of the two test engines, .001 of a pound and .006 of a pound, is sufficient to study the problem of ion beam neutralization.

The engine, or "thruster", is only part of the propulsion system which includes a power generating source, a control system and propellant.

The projected uses of electric engines for deep space missions depends on the availability of light weight nuclear electric power systems in the high kilowatts to multi-megawatts power range and their ability to operate reliably for one to three years.

A more immediate use probably will be for attitude control or station-keeping of satellites, spacecraft or space stations, where low power levels are required. Thus, solar cells or isotope power generation systems would be able to provide the electrical energy needed for electrical engine operation.

The SERT I spacecraft is spin-stabilized and contains two ion thruster engines of different types driven by a single battery supply.

One engine, using mercury as a propellant, is an electron bombardment ion engine, built by the Lewis Center. The other engine, built by Hughes Aircraft Company, Hughes Research Laboratories, Malibu, Calif., is a contact ionization thruster and uses cesium for a propellant.