Shuttle operations explained

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WASHINGTON — The Space Shuttle is the major new program of the National Aeronautics and Space Administration (NASA). It is scheduled to start Operational Flight Test missions in the fall of 1979.Following these, the Space Shuttle will be considered operational and will be termed the Space Transportation System.

The Shuttle will be launched by two detachable solid fuel booster rockets. When these are expended, they will be jettisoned and recovered for subsequent reuse. The Shuttle will then be boosted into Earth orbit using its own engine and liquid fuel from a large external tank. When the proper orbit has been obtained, the tank will be jettisoned to burn in the atmosphere upon re-entry. The Orbiter vehicle will then perform its assigned missions in space and will eventually return to land as an aircraft. The principal advantage of the Shuttle is that its major component, the Orbiter vehicle, is recovered and resused. It is anticipated that eventually there will be a total of four vehicles and between 50 and 30 missions will be flown each year.

The reusable Shuttle Orbiter has already made several highly successful test flights. The Orbiter, rockets and tank will be launched from the Kennedy Space Center at Cape Canaveral, Florida, with nearly 6.5 million pounds of thrust.

After reaching Earth orbit, the Shuttle Orbiter will remain anywhere from a week to a month depending on the mission and its objectives. NASA plans to use this vehicle as the workhorse of the future space program, that is, to take in its payload bay numerous satellites at one time and deliver each one to a proper orbit. In addition, the Orbiter will carry scientific equipment and probably also scientists to run their experiments in space.

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The Shuttle will operate in two different modes. In the sortie mode, experiments will be mounted in the Orbiter cargo bay, operated for the mission duration, and then returned to Earth. The cargo bay is 18.3 meters long and 4.6 meters in diameter and can carry a maximum of 30,000 kg payload. The payload will consist of a combination of pressurized modules in which crew members can work in a shirt-sleeve atmosphere and a number of external pallet modules on which experiments can be mounted.

In the second mode of operation the Shuttle will be employed to carry individual spacecraft into space, to place them in appropriate orbit, and to service them on demand. A Remote Manipulator System will extract the payload from the cargo bay and release it into its own orbit. Subsequently, the Shuttle Orbiter can rendezvous with a free-flying satellite, and retrieve it to the cargo bay where it can be serviced, or else returned to Earth for major refurbishment.