

Aiming to the Moon (2)

Project Surveyor

This essay is dedicated to my wife, Estrella, and daughters, Raquel and Sara, for their help and encouragement throughout this effort.

The Ranger project had not been as successful as expected but it accomplished, however, the development of increased navigation and imagery techniques as well as the return of more than 10,000 pictures of the surface of the moon.

These data was not enough to attempt a soft manned lunar landing, so to test the feasibility of such a landing project Surveyor was designed and implemented.

The project was carried out by the Jet Propulsion Laboratory (JPL) which selected the Hughes Aircraft Company to develop the spacecraft systems.



Atlas-Centaur with Surveyor 1

Seven launches took place from June 1966 through January 1968. The crafts were sent on an impact trajectory to the Moon and attempted a soft landing by using retro firing rockets to slow down the speed.

After about 62 to 65 hours of travel the craft was at an altitude of 75.3 km above the Moon and it's speed was about 9,360 km/h. The main solid fuel retrorocket fired for 40 seconds reducing the speed to about 396 km/h after which it was jettisoned. The rest of the 11 km to the surface, lasting about 2.5 minutes, was handled by three liquid fuel vernier engines which slowed the vehicle to 12.8 km/h for touchdown.

There were seven Surveyor missions; five were successful. Surveyors 2 and 4 failed.

- **Surveyor 1**, launch 30th May, 1966; land on Oceanus Procellarum, 2nd Jun, 1966
- **Surveyor 2**, launch 20th Sep, 1966; **crashed** near Copernicus crater, 23rd Sep, 1966
- **Surveyor 3**, launch 17th Apr, 1967; land on Oceanus Procellarum, 20th Apr, 1967
- **Surveyor 4**, launch 14th Jul, 1967; **crashed** on Sinus Medii, 17th Jul, 1967
- **Surveyor 5**, launch 8th Sep, 1967; land on Mare Tranquillitatis, 11th Sep, 1967
- **Surveyor 6**, launch 7th Nov, 1967; land on Sinus Medii, 10th Nov, 1967
- **Surveyor 7**, launch 7th Jan, 1968; land near Tycho crater, 10th Jan, 1968



Surveyor SC

Surveyors also demonstrated the ability to perform mid-course corrections, proved that future manned landings were possible and helped to determine the chemical composition of the soil.

Some parts of Surveyor 3 were returned to Earth by the crew of Apollo 12, which landed near it in 1969.

Note: All photographs depicted in this essay are from public Internet publications and, in no way, they will be used to collect any income.