

- Develop reentry flight path control;
- Develop extra vehicular capability;
- Attain flight and ground crew proficiency; and
- Conduct scientific experiments.

Gemini III completed three successful orbits on March 23, 1965.

It had begun 19 months of manned spaceflight accomplishments.

On the very next flight, the long-duration mission headed the list of objectives. Long duration is fundamental to spaceflight.

If Man could not withstand a zero-gravity environment for extended periods, two things were obvious.

Either our future flights would be limited, or gravity would have to be induced artificially in flight.

There were three long-duration missions: 4 days of Gemini IV, 8 days of Gemini V—the length of a lunar mission—and an extended mission of 14 days on Gemini VII.

Long duration was a test of the endurance of both spacecraft and crew. On the spacecraft side, Gemini V was powered by fuel cells for the first time. They replaced conventional batteries.

Fuel cells were also flown successfully on all missions from VII through XII.

This is important because batteries are inadequate for many future space missions at the power levels needed. Apollo, for example, will use similar fuel cells.

Medical aspects of the flight were closely studied: for such everyday matters as the ability to eat and sleep in space and for longer term results.

When Frank Borman and Jim Lovell completed 14 days in Gemini VII, we had basic answers.

We can medically commit crews to flights up to 30 days—a necessary condition for Man's role in Apollo and the Orbital Workshop.

The first rendezvous in space occurred December 15, 1965, between two spacecraft: Gemini VIA and Gemini VII.

Over Hawaii, in the fourth orbit, Pilot Stafford reported the decreasing distance between the two spacecraft:

"One hundred fifty feet.

"One hundred fifty feet, and holding, Wally."

As station keeping continued, Gemini VIA moved within a foot of Gemini VII. It was a successful beginning which saw Gemini complete ten rendezvous with target vehicles in less than a year. Seven different modes were investigated.

An 11th rendezvous to photograph a solar eclipse was achieved on Gemini XII.

To those of us who followed the flights from the sidelines—listening to reports from television—rendezvous seemed almost like an automatic exercise. But because something is done well does not mean that it was easy to do. Rendezvous required 3 years of theoretical preparation—integrating space mathematics into the constraints of the mission and hardware.

Approximately 100,000 hours were spent on computer computations.

When crews were assigned to specific rendezvous flights, each prime and each backup crew trained for approximately 400 hours in simula