

tors—a total of almost 5,000 man-hours of rendezvous simulation. It was never automatic.

Gemini IXA gave us our first sophisticated rendezvous experience. Command Pilot Stafford, a veteran of Gemini VIA, completed three different rendezvous within 24 hours with his angry alligator.

Within 12 orbits, Astronaut Stafford completed his initial rendezvous, then performed an optical rerendezvous using onboard calculations of the pilot as a backup, and finally simulated a type of rendezvous above the target vehicle which would follow a lunar abort.

A dual rendezvous was performed between Gemini X and the Agena VIII target vehicle still in orbit from an earlier launch. It was a passive target vehicle.

Gemini XI achieved an M equals one rendezvous—or rendezvous in the first orbit. This was a direct ascent rendezvous and simulated still another type of rendezvous following a lunar abort.

During the first rendezvous, Gemini VIA had moved within 1 foot of Gemini VII, but, of course, the two spacecraft could not dock.

The first space dock came in March 1966. The spacecraft was Gemini VIII. Astronaut Armstrong moves in very slowly, making his final approach, until he is about 3 feet from the target. He then holds his position, reading the status display panel on the Agena.

When he docks, the Gemini-Agena configuration will remain stable for almost 30 minutes. The control problems which developed were unrelated to the first successful dock in space.

Gemini completed nine successful dockings. Both crew members performed dockings on the final two missions, XI and XII.

One important aspect of docking is that it allows a crew to utilize the propulsion system of another spacecraft for further maneuvers.

The Agena Target Vehicle has a primary propulsion system with 16,000 pounds of thrust.

The primary propulsion system of Agena was first ignited in docked configuration by Command Pilot Young on Gemini X—and it lifted his spacecraft to a new orbital altitude record of 414 nautical miles.

Again on Gemini XI, the primary propulsion system was lit in a white blaze of energy, and quickly propelled the crew to 741 nautical miles, shattering the previous record.

"Carnarvan, this is Gemini Eleven."

"Go ahead, Eleven."

"The world really is round from up here."

"Got a good view, have you?"

"Have we ever! I mean it is spectacular—fantastic."

A major postdocking maneuver was the experiment with a 100-foot Dacron line, or tether, connected to both spacecraft.

The command pilot gradually plays out the tether until it becomes taut.

On Gemini XI and again Gemini XII, we stabilized the spacecraft on the tether without further use of thrusters. Two techniques were used: the spinup mode on Gemini XI and the gravity gradient on Gemini XII.

Gemini's demonstration of docking and postdocking techniques—coupled with a long duration capability—has helped emphasize the continuing utility of manned space missions.