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HISTORICSPACESYSTEMS

Info Sheet

Highlighting Space Systems of the Past, Present, and Future

1960 1970 1980 1990 2000

Gemini-B

NASA-Gemini's Air Force Twin

Most who have followed the history of the race to the moon remember the NASA-Gemini program. In the mid-1960's ten flights each carried a pair of astronauts into earth orbit to develop the techniques needed for later Apollo moon flights.

Few may remember that the U.S. Air Force also had plans for a modified Gemini spacecraft, the Gemini-B.

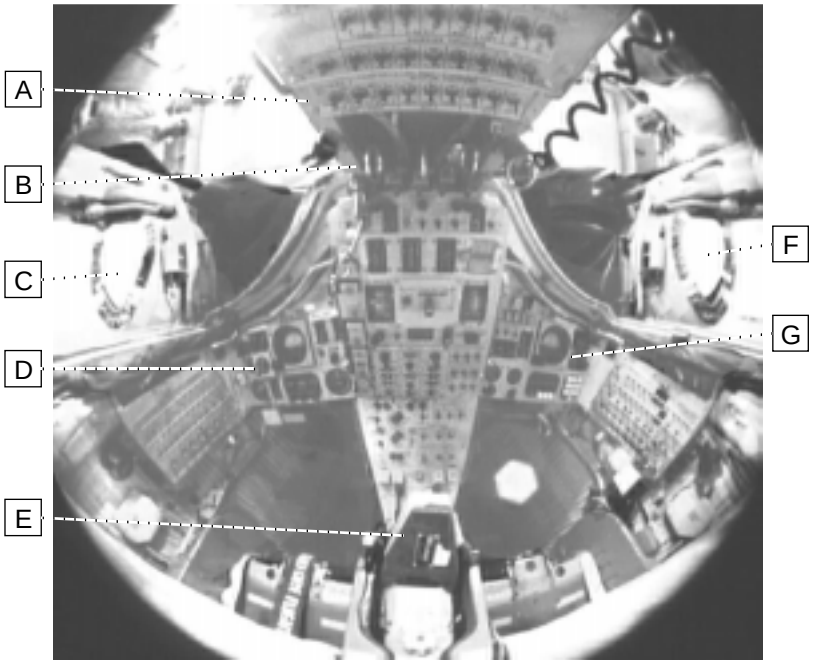
On August 25, 1965 the Air Force began developing a top secret research spacecraft called the Manned Orbiting Laboratory (MOL). The MOL was to be launched aboard a Titan IIIC rocket with the manned Gemini-B at the top. Once in orbit the two-man Air Force crew would enter the MOL through a hatchway in the Gemini-B heatshield.

At the end of their 30-day mission the astronauts would return to the Gemini-B for a fiery reentry to earth.

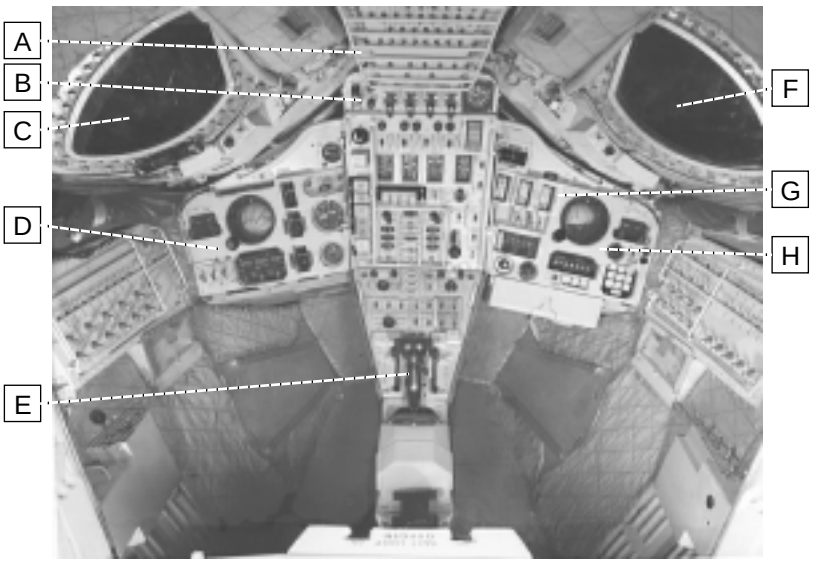
KEEPING YOUR COOL AT 3500° F

The major technical challenge for Gemini-B designers was the heatshield hatch. It had to open in orbit for access to the MOL. Then it had to seal tightly to protect the crew through the deadly heat of reentry.

The heatshield hatch design was proven on an unmanned test flight using the Gemini 2 spacecraft. Gemini 2 had already flown once on January 19, 1965 to test the original Gemini heatshield design in preparation for the NASA manned flights. *(Continued)*



Gemini 7 interior (through fish-eye lens with hatches open) illustrates arrangement of controls in the NASA-Gemini design. A: Overhead panel. B: Environmental controls. C: Left hatch window. D: Left main instrument panel. E: Attitude controller (covered). F: Right hatch window. G: Right main instrument panel. (NASA Photo.)



Gemini-B interior viewed through heatshield hatchway. A: Overhead panel (moved forward to allow access to heatshield hatchway). B: Environmental controls (redesigned and moved lower). C: Left hatch window. D: Left main instrument panel. E: Attitude controller. F: Right hatch window. G: MOL tank pressure and temperature gauges. H: Right main instrument panel. (McDonnell Douglas photo.)

The spacecraft was modified with the new heatshield hatch and sent into space a second time on November 3, 1966. (This was the first reuse of a manned spacecraft design.) The heatshield hatch worked.

CLIPPING THE B'S WINGS

Although the MOL and Gemini-B hardware were in production and Air Force astronauts were training, the program was cancelled to cut costs. Program activity was halted on June 10, 1969. Some of the Air Force astronauts transferred to NASA to support later missions.

GEMINI-B DIFFERENCES

The drawings and photographs illustrate some of the differences between the NASA-Gemini and Gemini-B designs.

Note that some controls and displays are identical while others have been altered or replaced. Equipment was moved and notches were cut into the ejection seat headrests to make room for the heatshield hatch. The seats in the NASA-Gemini were nearly identical, while those in Gemini-B were mirrors of each other. Equipment for long duration flights was removed since Gemini-B was to be used only for launch and reentry.

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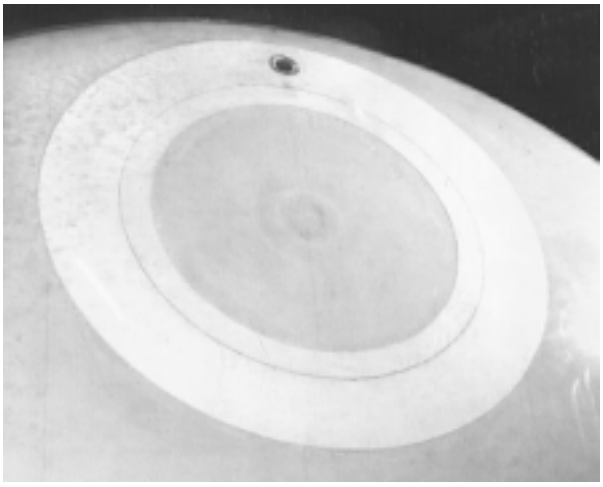
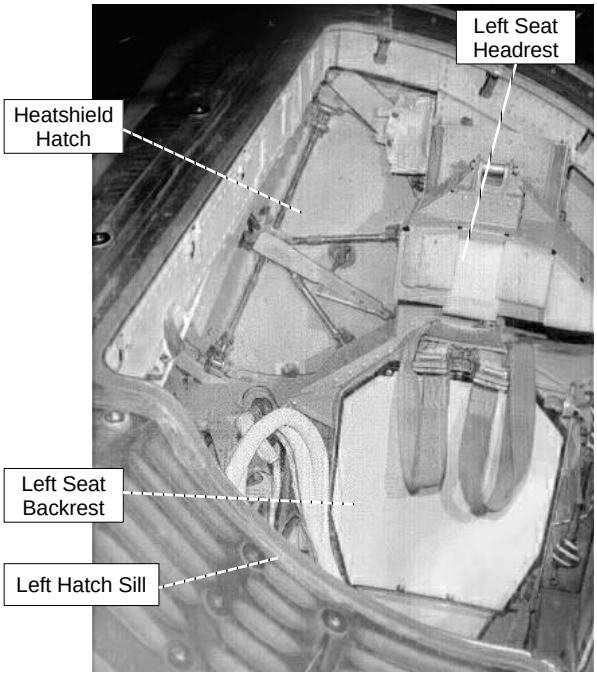
NASA Project Gemini Familiarization Manual, McDonnell Aircraft, 1965.

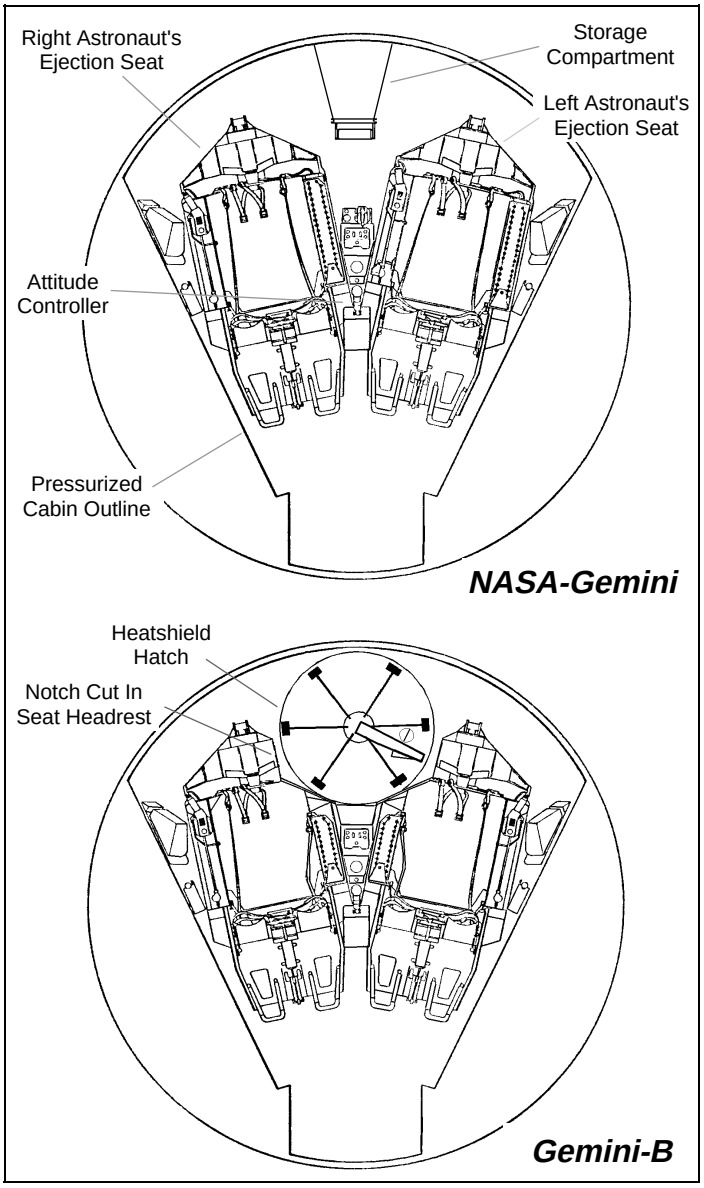
James M.Grimwood, Barton C. Hacker, Peter J. Vorzimmer. *Project Gemini: A Chronology*, NASA, 1969.



Gemini-B heatshield hatch exterior on a Gemini-B prototype at the U.S. Air Force Museum, Dayton, Ohio. (John Fongheiser photo.)



Left astronaut's seat and heatshield hatch area in a Gemini-B prototype at the U.S. Air Force Museum, Dayton, Ohio. Note the hatch locking mechanism. (John Fongheiser photo.)



The NASA-Gemini rear cabin area compared with the Gemini-B. The heatshield hatch is the dominant difference. The ejection seats have also been changed. (McDonnell Aircraft art modified by John Fongheiser.)

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