ACTIONS

EMERGENCY EGRESS

- RAPID OPENING HATCH
- PAD CONSIDERATIONS
- FLIGHT SAFETY CONSIDERATIONS
- RECOVERY CONSIDERATIONS

NASA HQTRS.
MC67-5958

FIGURE 24

unlatched as a manual operation. The inner hatch is not hinged and opens inward. Internal pressure provides sealing loads on the inner hatch, thus resulting in a lightweight system.

One concept we have examined involves minimum modification to the present two hatch system. It utilizes a hot gas generator system to release the heat shield hatch and a Mercury-type "hatch within a hatch," for the inner hatch. The inner hatch is opened by a mild detonating cord which fractures the ring of bolts, thus providing an opening for emergency egress. This system is complex and does not appear to satisfy both the normal mission requirements and the emergency egress needs.

A second consideration was a three-man size hatch to provide an opening large enough for simultaneous three-man egress. This concept presents the problem of a major spacecraft redesign because new load paths must be provided in the structure. Although the opening could be cut with a linear shaped charge, such an operation may aggravate the emergency and, of course, represents a potentially dangerous failure point during flight and during water recovery. We all remember the dangerous situation that Grissom experienced on an early Mercury flight when the blow-off hatch of the capsule was inadvertently actuated when he was on the water. The spacecraft was lost in the Atlantic and Grissom barely escaped drowning.

The third concept we have examined is the unified or integrated hatch system shown here (fig. 25, MC67–5969). This system has been selected as the most promising, and detailed design work is under way. It is a single hatch which swings outward with a latch mechanism similar to that used on the present heat shield hatch and on the Gemini hatch. It can be opened in about two seconds by pressure generated by a hot gas actuator which is triggered by a percussion initiator. A manual mechanism is provided to open or close the hatch from either the inside or outside under normal operating conditions. It is a non-load carrying hatch with a Gemini type seal.

In carrying out this design, we are making use of the same type of hatch closure that was developed in the Gemini program. However, because of the two-shell structure, it is necessary to develop, as may be seen in the next chart (fig. 26, MC67–5968), a means for sealing the heat shield joint against reentry heat penetration under all possible relative motions of the outer heat shield seal with respect to the inner pressure seal. At the same time the inner pres-