

and the danger to the astronauts from such a penetration has not been fully evaluated yet because the habitability quarters design is not complete. If it is considered advisable to use a micrometeoroid shield, it will be installed prior to launch.

Studies based on available data show that the trapped radiation environment at the altitude of the orbital workshop mission will not present a radiation hazard to astronauts within the workshop. Solar flares do not significantly raise the damaging radiation level at this altitude. The Command Module, with its inherent radiation shielding capability, will function as a radiation "storm shelter" for the orbital workshop crew in event of a massive solar flare.

*Question 5. What are the relative merits regarding building the orbital workshop in space versus making the necessary modifications to the S-IVB stage on the ground and then launching into space?*

Answer 5. Some of the modifications required to make the S-IVB stage habitable cannot be made prior to launch if the stage is to be used also for propulsion. On the other hand, complete assembly of the habitability structures and equipment in orbit would require an inordinate amount of astronaut time. A balance has been established between these extremes. A basic structure will be installed prior to launch that will not interfere with the propulsion characteristics of the stage. Experimental equipment and partitions will be packaged externally for launch and will be brought into the S-IVB hydrogen tank and assembled in orbit.

*Question 6. Will systems or subsystems being developed for the MOL program find application in NASA's AAP program?*

Answer 6. This question should be answered in terms of mutual benefits of the MOL/AAP programs. The NASA and the DOD now have agreements in operation that provide an interchange of personnel and technical data. The majority of the MOL systems are basically the Apollo and Gemini systems or extensions of those systems to obtain an orbital capability of 30 days. Any developmental improvements of those systems by the MOL program will certainly be evaluated for utilization in the AAP. One area, as an example, is the electrical power system. DOD is sponsoring the improvement of the Apollo fuel cell by incorporating ceria coated/cobalt activated electrodes to obtain a longer life. Though the MOL operational characteristics will differ, AAP is seriously considering the application of this technology development in the use of the improved fuel cell for AAP missions.

In the experiments area, the DOD is sponsoring several experiments for flight in the AAP orbital workshop. This will give the MOL preliminary flight evaluations prior to finalization in the MOL flights. These experiments deal with in-space maintenance and repair tools; crew activities such as suit donning and sleep station evaluation; expandable airlock technology; and recoverable expandable structures.

*Question 7. Will a Lunar Module ascent stage be diverted from the Apollo program to provide for mating to the ATM? If so, how long before the launch of the ATM must such a module be diverted?*

Answer 7. Yes. If the Apollo program goes well. Present plans identify the need for the assignment of an ascent stage which will be delivered approximately 1 year prior to the ATM launch date. LM/