

*Advantages of orbital workshop*

Successful completion of this experiment would provide several important advantages. The use of this orbital workshop experiment module involves minimal new development, thus allowing basic exploration of space station requirements within a reasonable funding level. It provides an early capability for a large, controlled environment to evaluate human performance and secure engineering data for future subsystem designs for both manned and unmanned spacecraft. It enables low-cost design validation and checkout of equipment requirements for long term habitability in zero gravity. Finally, this large protected volume in space can supplement a more sophisticated system for special purposes, such as biomedical experiments and protected tests of complete extravehicular operations.

The orbital workshop is an important new concept for an economical embryonic space station. Using manned vehicles as space platforms, the space station will provide the capability for carrying out many experiments in earth orbit. It increases our useful habitable workspace volume by a factor some 30 times greater than the Apollo Command Module itself provides.

A space station can be exploited to make many contributions in the major fields of space science, earth-oriented applications, and support for space operations.

Space Science experiments will be undertaken primarily for acquisition and expansion of fundamental knowledge encompassing the disciplines of astronomy/astrophysics, bioscience and the physical sciences.

Earth-oriented Applications will be those for which potential economic and social benefits can be identified. These include the areas of atmospheric science and technology including meteorology, aeronomy and air pollution; communications and navigation/traffic control; and earth-sciences and resources including agriculture/forestry, geology/hydrology, oceanography/marine technology, and geography.

Support for space operations will be aimed at developing techniques and technologies for advancing space applications, exploration and travel to other parts of the solar system. Specific areas of interest include those of biomedicine/behavior, advanced technology and supporting research, extravehicular engineering activities, operations techniques, and advanced mission spacecraft subsystems.

*Orbital workshop experiments*

The next chart (fig. 69, ML66-9785) lists engineering, medical, technology, and Department of Defense experiments which are planned to be flown on alternate Apollo missions. The orbital workshop experiments will be most useful in the development of a long duration space station which has potentially highly productive returns in terms of broad benefits to humanity.

*Apollo Telescope Mount (ATM) experiment*

The Apollo Telescope Mount (ATM) provides a new capability for a variety of solar and stellar scientific experiments to be performed above the earth's atmosphere (fig. 70, ML66-9610). The ATM provides a stabilized platform which can be carried on alternate Apollo missions to accommodate experiment instruments having a requirement for finely controlled pointing.

The ATM includes scientific instruments and supporting subsystems mounted in a structural rack attached to the ascent stage of an Apollo Lunar Module. The Lunar Module descent stage will not be used on ATM missions. The ATM rack will be equipped with a pointing control system consisting of control moment gyroscopes, fine control vernier gimbals, electronic control circuitry, and appropriate astronaut controls and displays. A thermal control system and a communications and data handling system are also included. Electrical power will be furnished by a solar array mounted to the ATM rack, with rechargeable batteries to maintain system loads during periods of darkness.

With such a configuration, the ATM can be operated in several possible modes to obtain the maximum amount of solar data within the limits of available astronaut time and the possible degrading effects of motion and contamination disturbances. The ATM configured Lunar Module can be operated either docked to the primary crew living quarters or separated from them by a tether if required to isolate the solar instruments from contamination or vehicle