

In the past eight years of orbital experimentation we have measured the environment in terms of radiation and meteoroid flux. We know the effects of up to 14 days of weightlessness on man and have performed space rendezvous and extravehicular operations. We know how to design and fabricate spacecraft to protect man and supply him with a shirtsleeve environment, electric power and sustenance for long mission durations. Our booster capability using the Saturn V launch vehicle will be nearly 100 times the capability of the Atlas which was used on the first manned flight. This increased launch vehicle capability makes possible the use of optimized instrumentation without weight limitation, such as that developed for airplane or ground military usages, with resultant cost savings. We also expect to have a nuclear stage in the late 1970's. These accomplishments sum to give the United States a major capability to perform space experimentation.

The availability of man in space as a participating scientist, coupled with our space technology experience and rapidly increasing payload capability, puts us in the position where we can begin to apply the research program experiences and approaches developed in ground laboratories to the planning and development of an effective orbital experiment program. The ground-based research experience has demonstrated the value of orienting the research program towards specific user goals and laying out systematic programs to accomplish these goals.

*Manned earth orbital telescope*

A proposed national facility offering large potential returns in terms of determining the dimensions and origins of the universe is the manned earth orbital telescope (fig. 110, MC66-5366). This instrument, with 120-inch near diffraction-limited optics, should increase our capability for resolving celestial objects by a factor of 20, extend range by four magnitudes of brightness, and allow observations into the infrared and ultraviolet ranges. Such a telescope should be able to detect planets the size of Jupiter in orbit about the closest star, Alpha Centauri.

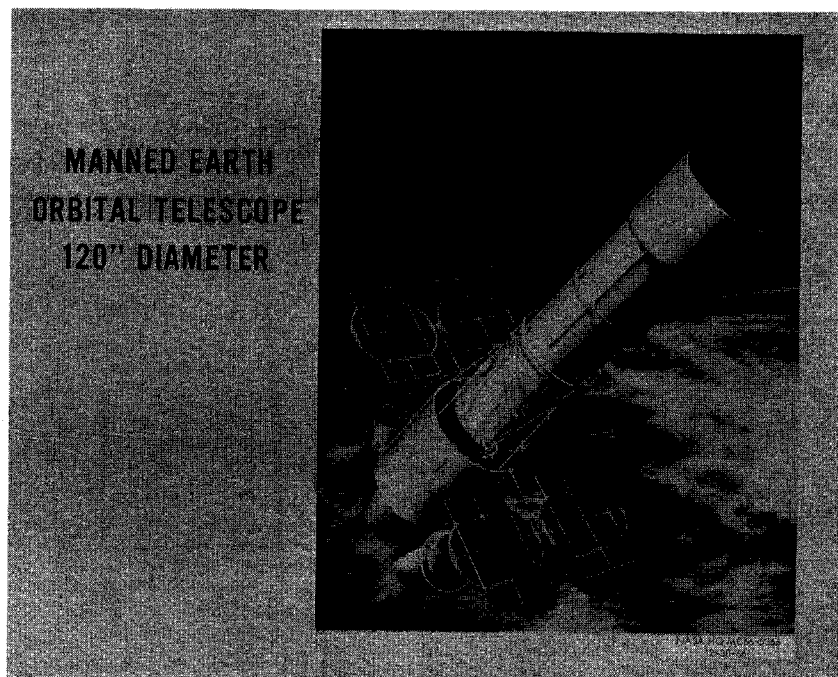


FIGURE 110