

We foresee this instrument as an ultimate space capability to be obtained through a step-by-step program growing from a 38-inch telescope through a 60-inch size and finally to the 120-inch configuration. Some comparisons of orbital telescope capabilities with ground-based instruments are shown in the next chart (fig. 111, MC66-5597). It is of interest to note that even a 38-inch telescope in earth orbit will be superior to the 200-inch Mt. Palomar telescope in effective resolution capability as well as in spectral range.

Space station alternatives

Only during the past few years have we begun to focus on the use of a manned orbital space station for experimentation in areas other than those dealing directly with man's ability to survive in the orbital environment. We are currently identifying experiments as part of an integrated science and applications program.

Some key trends have developed from this overview of the total manned earth orbital experiment potential. Our total projected orbital experiment workload has grown from 10,000 man-hours at the end of 1963 to about 20,000 man-hours at the end of 1964 and at the end of 1965 approximately 50,000 man-hours had been identified for possible future implementation. A future annual workload of up to 50,000 or more experimental man-hours seems plausible to predict at this time.

About this projection we have structured a potential program of orbital experimental man-hours to meet the anticipated experiment workload. From the studies completed we have concluded that the Apollo Applications program will perform many of the critical pivotal experiments identified to date. These are the experiments which will facilitate effective future utilization of a larger station in a low-earth orbit of either a moderate latitude or a polar orbit.

Current trends in experiment identification indicate that in the early 1970's a crew of nine men would be fully occupied on a continuous basis in space. This appears to be well within our technical capabilities for such a time period.

We can further foresee the possible desirability of a station in synchronous orbit, primarily to exploit the advantages of continuous synoptic coverage of a

OPTICAL TELESCOPE COMPARISONS						
	GROUND-BASED		IN-ORBIT			
	200" MT. PALOMAR	16"	16"	38"	60"	120"
EFFECTIVE RESOLUTION (MILES)						
MOON	3	3	3	14	.09	.05
MARS	50	50	50	20	13	7
DETECT STAR PLANETS	NO	NO	NO	NO	?	POSSIBLY
SPECTRAL RANGE	VISUAL		VISUAL PLUS INFRA-RED AND ULTRAVIOLET			
REQUIRED STABILIZATION (ARC-SEC)	10.1-0.2	±0.2	±0.2	±0.1	±0.05	±0.025
APPROXIMATE WEIGHT OF TELESCOPE (LBS)	1,000,000		500	1000	4000	30,000

FIGURE 111