

motions. This assembly can be stabilized by gravity gradient forces as demonstrated with Gemini-Agena tethering on Gemini XII.

The ATM is controlled by the astronauts to orient telescopes to selected solar activity regions or specific stellar targets, using a television monitor to locate targets of scientific value (fig. 71, ML66-9678). The ATM enables experiments to be conducted using the data gathering features of recoverable photographic film as well as of photometric techniques. Communications from scientists on the ground to the astronaut-observer will aid in the selection of targets and the data to be recorded. The ATM pointing control system can hold alignment with selected targets for long term photographic exposures.

The initial launch of the ATM is planned to conduct solar observations from low earth orbits beginning in 1969 to obtain data from the next period of maximum solar activity. A mission duration of up to 56 days is expected for the initial flight.

The ATM for the solar missions will accommodate the acquisition and holding of solar instruments to within 2.5 arc seconds of a target selected by the astronaut. The astronaut will have the capability of offsetting solar instruments up to 20 arc-minutes from the center of the solar disc. Offset pointing capabilities for other targets will be determined by the specific orientation sensors used.

The ATM provides the desirable capability of conducting space experiments with photographic data recovery. Film magazines can be recovered from the telescope cameras by the astronauts and stowed in the Command Module for the return to earth. Experiment designs selected for the first ATM launch take full advantage of this technique.

Five basic experiments to obtain solar data during the period of maximum solar activity have been selected for development for the initial ATM launches (fig. 72, ML67-5554). Supporting instruments are also being developed to make the scientific experiment instruments effective (fig. 73, ML67-5555). The combination of instruments involved in the overall ATM experiment platform will

MAN IN APOLLO TELESCOPE MOUNT

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| 1. SENSING | <ul style="list-style-type: none"> • INITIAL ACQUISITION AND POINTING • FINE ALIGNMENT AND TRIM |
| 2. COMPUTING | <ul style="list-style-type: none"> • TRIM FOR STABILITY DURING "DRIFT MODE" OBSERVING PERIODS • SETS AND CONTROLS CAMERA EXPOSURE SEQUENCES' |
| 3. MAINTENANCE | <ul style="list-style-type: none"> • MONITORS EXPERIMENT OPERATION • INSURES PROPER FUNCTIONING OF ATM |
| 4. DATA ACQUISITION | <ul style="list-style-type: none"> • RECOVERS EXPOSED FILM AND MAGNETIC TAPES |
| 5. SCIENTIST | <ul style="list-style-type: none"> • DETERMINES SOLAR EVENTS OF INTEREST AND DIRECTS SYSTEM TO OBSERVE |

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FIGURE 71