

ASTRONOMY

In the area of astronomy, we will be attacking such questions as:

- (1) What can be learned about the fundamental nature of the sun, using observations at wavelengths that are obscured by the earth's atmosphere?
- (2) What can we learn about other planets, using the greater detail observable from space?
- (3) What is the nature of the celestial sources of x-ray radiation that have been observed by rocket born sensors?
- (4) Are there other sources of high energy radiation (e.g. gamma rays)?
- (5) What can be learned from low frequency radio waves that do not penetrate the ionosphere?
- (6) It is practical and worthwhile to operate a large astronomical observatory in space?
- (7) How can man's presence best contribute to astronomy in space? As an observer? As a mechanic?
- (8) Do the benefits of astronomy from synchronous orbit outweigh the additional cost?

EARTH OBSERVATION

In the area of earth observations from space, we will look for answers to such questions as:

- (1) Can more accurate weather prediction be made using more detailed observations from space?
- (2) How well can the remote measurement of wind velocity, moisture content, temperature, pressure, etc., be made?
- (3) What altitude is best for different kinds of observations?
- (4) How does solar activity interact with the earth's atmosphere to effect weather? Crops? Communications? Magnetic activity?
- (5) Can the observation of rainfall and snow cover lead to better water management?
- (6) Can the observation of crops and forests from space help in improving the production and distribution of food?
- (7) Can observations from space help to control the pollution of air and water?
- (8) How much detail is needed for useful observations?
- (9) What wavelengths or groups of wavelengths yield the most valuable data?
- (10) How frequently should observations be made?
- (11) What is man's proper role in observations of the earth from space?

WEIGHTLESS ENVIRONMENT FOR EXPERIMENTATION

In addition to the above major areas of activity, Apollo Applications will provide a facility in which scientists can conduct experiments which exploit the weightlessness and other attributes of the space environment. These will attach such questions as:

- (1) How are the growth and activity of plants and animals affected by weightlessness?
- (2) How are the daily life rhythms of plants and animals affected by removing them from their normal environment and 24 hr. daily cycle?
- (3) What is the behavior of fluids and gasses in a weightless condition?
- (4) How is the sense of balance affected by weightlessness?
- (5) How do animals adjust to gravity after a prolonged period of weightlessness?
- (6) How are the functions of the bodily organs affected by weightlessness?
- (7) Will observations of biological specimens under weightlessness provide better understanding of their normal function?
- (8) Are there beneficial effects of weightlessness that could be exploited?

MISSION PLANNING

Mission assignments for Apollo Applications in the 1970's are of necessity tentative and still under study. Early AAP missions are contingent on events in the Apollo program. Many problems that might arise in the Apollo program would not impact AAP. For example, a problem associated with the Saturn