

Moreover, the gamma-ray and X-ray portions of the astronomy program probably require the lower inclination. Any inclination less than 50° , however, would seriously compromise effective accomplishment of the earth resources program. The continental United States must be utilized to provide the calibration sources necessary to the program and, furthermore, it is highly desirable that the immediate information gained be most useful to the United States.

Within the meteorology program, it is, of course, desirable to see all of the earth's atmosphere. Much the same reasoning as was applied to the earth resources program must be applied to the meteorology program, however, and therefore an inclination range of 50° to 70° is indicated. There is a general consensus, fortunately, that considerable and meaningful portions of the meteorology program can be accomplished in that inclination range. Lesser inclinations would materially depreciate the value of the program.

The long-range activity envisioned within the astronomy and meteorology programs requires synchronous altitude orbits. However, it does not seem wise at this stage of development in manned space flight to consider long durations for man at synchronous altitudes. The benefits of low-altitude manned space flight should be realized before planning long-term synchronous orbits. Additionally, it is reasonable to expect that more sophisticated unmanned satellites will accrue from the space station activity and these satellites may satisfy a portion of the needs of meteorology at the very high altitudes. The needs for observations in the range of 750 to 1500 miles at sun-synchronous near-polar orbits may also be best served by unmanned satellites. The long-range activity within the earth resources program requires near-polar orbit for total earth observation. This requirement may ultimately be more closely related to the collection of operational data than to research and development activity and may be best satisfied by unmanned satellites once the research activity has been conducted aboard the low-altitude moderate-inclination space station.

It can be concluded therefore that an orbit altitude of 200 nautical miles and 50° to 70° inclination will satisfy most of the initial activities in each program area and will also satisfy a significant portion of all the long-term activities. The long-range astronomy and meteorology programs require much higher orbit altitude.

Space station staff skill requirements

The space station staff primary skills required to accomplish all of the programs are summarized in figure 9. Those six skills for which there is the greatest demand are indicated to be basic skills and may be required on a continuous basis. It is recognized that these are also the basic skills required to operate the space station. The remaining skills mostly represent scientific specialties which are not necessarily required on a continuous basis and may be phased or shared in accordance with program scheduling and demand.

Dr. MUELLER. We have carried out during the course of the last year a rather comprehensive study of both the benefits to be derived from a space station and the characteristics that a space station might have.

I am sure that we can put a summary of that in the record if you would like. The principal things that the space station was going to provide for us and will not be provided as an early a time is a capability for extended stay time in orbit about the Earth, it would have developed the ability to carry out extensive observations on the Earth itself, in terms of at an earlier time having a thorough Earth resources evaluation capability, it would have provided us with the ability to carry out manned meteorological observations for extended periods of time, and it would have permitted us to provide a base for astronomical observations.

Now, essentially, the elimination of this has delayed by at least 1 year the availability of this capability.

Mr. RUMSFELD. Is there anything besides dollars that is causing a problem as far as the \$100 million turndown on the beginning work of the space station? Is there any conflict, discussion, negotiation, or