furbishment after the stage is in orbit. Something similar to this example is the next logical step. This is merely one concept. For example, the same purpose can be accomplished by clustering manned space stations and launching them on a Saturn V. In this late concept, the clustered laboratories would be deployed in a spoke configuration, or in other configurations, depending upon the nature of the mission. The basic difference between orbiting a number of space station components and then rendezvousing and assembling them in space, or orbiting a completely equipped laboratory system, primarily involves the sophistication level of the sensing and observing equipment that can be employed. In the first instance, sophistication is limited by the size and weight of equipment that can be delivered to rendezvous and connected. At present it is quite difficult and expensive to perform interconnections and manufacturing operations in space. Tools and techniques for this purpose are still in the rudimentary stages of development. As a consequence of these limitations, it is not possible to employe large, complex sensing and observing equipment. To achieve that capability, it is necessary to accept the increased complexity of having to orbit larger payloads and support larger crews.

This second step, orbiting large payloads, is more useful but it is still part of the brute-force method in that no attempt is made to improve the logistics cost pattern. However, the most acceptable approach has always been to keep the investment cost as low as possible while the programs are in the early development stages, even though a penalty accrues in the cost of operations. Although the step 1 system is assembled in orbit and the step 2 system is furbished and launched from the ground intact, both are brute-force systems. First these systems will be used in lower orbits; then they will be used in synchronous orbits. The data obtained from these missions will provide the information leading to the development of long duration space station operations.

Essentially, the approach to lunar exploration will follow the same growth pattern that has been assumed for Earth orbital missions. For lunar explorations, first there were the photographic orbiter missions, then, a soft landed photographic mission on the Moon. Soon, the Apollo lunar orbiting and landing mission will be undertaken. What should come next in the logical progression appears to closely parallel the missions that will probably be assigned to the Earth orbiting space stations mission. At this junction, it appears advantageous to orbit a sophisticated payload around the Moon to complement the Apollo landing capability. The lunar applications of spent stage-orbital (LASSO) survey mission shown in figure 46 is a typical example of this kind of support capability. Again, the precise configuration is not the important consideration.

What is important is that, through extensions of the existing Apollo hardware, it is possible by this method to obtain the capability to map the lunar surface from an orbiting vehicle. This capability, in conjunction with lunar surface activities, will greatly improve the capability to explore the lunar surface.

In reply to those who doubt the scientific and economic worth of lunar exploration, I should like to say that I believe that by ex-