

as to the course that we are going to follow. This is an evolutionary process. We learn from each step as to what can and should be done in a scientific sense at the next step.

Some examples of the lunar surface exploration payload can be seen on this chart (MT 66-10246, fig. 16) and there are a number of extended lunar surface explorations.

One thing in particular that is of interest to the scientific community equipments that need to be developed and can be used to carry out is the ability to move around on the lunar surface. We have looked at several modules that can carry out extended traverses on the Moon and on this chart (MT 66-9608, fig. 17) you see one example of such a vehicle. A summary of the objectives of such a mobile lunar exploration is shown here (MT 66-10247, fig. 18).

The classes of vehicles that will be useful for transportation beyond Earth orbit (MT 67-5865, fig. 19) include the current Saturn V which is capable of putting something like 100,000 pounds on a trajectory to the Moon. We would expect that the next major step would be the development of a nuclear upper stage which would roughly increase this from 50 to 100 percent depending upon the actual characteristics developed in such a propulsion system.

If we look forward to the future, it is possible to envisage the fact that NERVA can grow and be capable of larger payloads in these missions. The Saturn V also is capable of growth. One way would be to strap on solids. Another way would be to improve the basic

### **EXAMPLE AAP LUNAR SURFACE EXPLORATION PAYLOAD (LM SHELTER/TAXI MODE)**

- |                                                 |                                |
|-------------------------------------------------|--------------------------------|
| 1. LUNAR SCIENTIFIC SURVEY MODULE               | 12. SURFACE ELECTRICAL SURVEY  |
| 2. GEOPHYSICAL STATION                          | 13. EROSION/EXPOSURE PANELS    |
| 3. LUNAR SCIENTIFIC SURVEY MODULE MOUNTED DRILL | 14. BORE-HOLE LOG              |
| 4. MULTIBAND PHOTOGRAPHY/RADIOMETRY             | 15. HAND TOOLS                 |
| 5. LUNAR SURVEYING SYSTEM                       | 16. SAMPLE CONTAINERS          |
| 6. TOPOGRAPHIC/GEODETIC                         | 17. PHYSICAL PROPERTIES EQUIP. |
| 7. ACTIVE SEISMIC                               | 18. DATA HANDLING SUBSYSTEM    |
| 8. GRAVITY SURVEY                               | 19. NAVIGATION SUBSYSTEM       |
| 9. MAGNETIC SURVEY                              | 20. SYSTEMS INTEGRATION EQUIP. |
| 10. PORTABLE GEOCHEMISTRY                       | 21. LABORATORY EXPERIMENTS     |
| 11. GAS ANALYZER                                |                                |

NASA HQ MT66-10,246  
12-30-66

FIGURE 16