On the Moon, there are some difficulties in doing this, too. We cannot cool the drill with water because this would weigh too much. Also, we don't want to interfere with the composition core that we try to raise. Not being able to use water, and not having air, the question is, how do we cool? Well, it seems the smartest thing to do is to use an internal, closed-cycle air or water cooling system, and to reject the excess heat in the coolant through a radiation cooler on the surface.

Pending approval of the Voyager program by the Congress, we expect that the Marshall Center will play a major role in its development. Voyager is an unmanned spacecraft designed to go to Mars, explore the planet from orbit through photographic and remote sensor techniques, and send a lander to measure the Martian atmosphere and surface. The present plan is to fly four Voyagers, the first in 1973; the second in 1975; the third in 1977; and the fourth in 1979. Each mission would be launched by a Saturn V, and each flight will carry two independent planetary vehicles as shown here. Each of the planetary vehicles would consist of the spacecraft that goes in orbit around Mars and a lander that will soft-land, unmanned, on the Martian surface.

This chart compares the configuration of the Saturn V for Voyager with the Saturn V Apollo configuration. It is a little bit different in the nose end, that's all. You can see the two Voyagers here. The total space vehicle will fit neatly into complex 39 at the Cape and use much of the same checkout and launch equipment that we employ for the Saturn-Apollos.

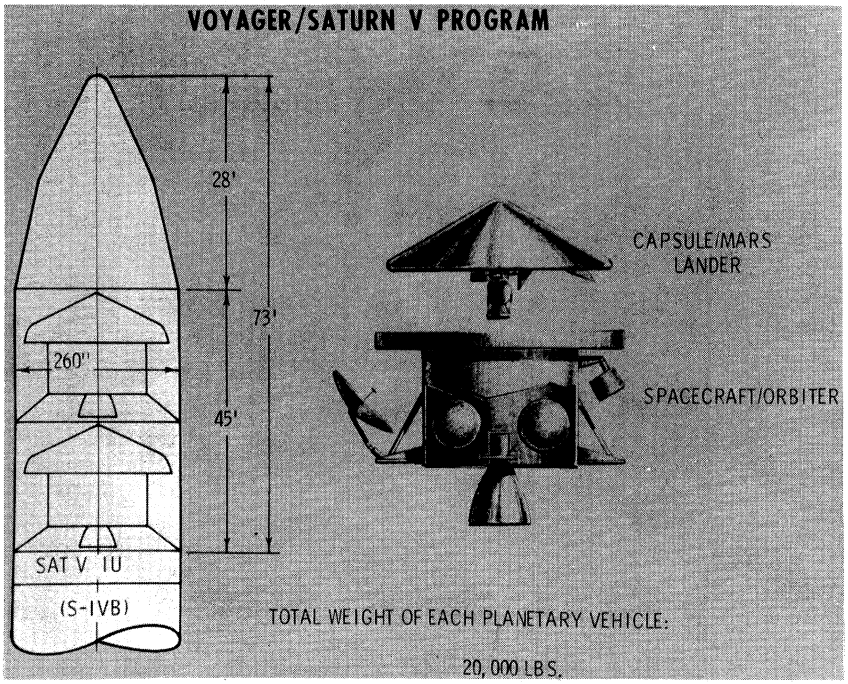

CHART 16