Science & Technology

NASA's new missions to the Moon and Mars

by Marsha Freeman

When National Aeronautics and Space Administration officials presented their five-year plans to the Congress in planetary, space science, and Space Shuttle programs at the end of July, NASA offered a series of space science missions which would begin to restore U.S. leadership in space and pave the way for a manned return to the Moon and manned missions to Mars.

Testifying July 28 before the Space Science and Applications Subcommittee of the House Committee on Science and Technology, Dr. Burton Edelson, who heads NASA's Office of Space Science and Applications, outlined more than a dozen new missions for which NASA will request new starts between fiscal year 1985 and 1989. They include missions to the inner Solar System planets, the Moon, primitive heavenly bodies such as comets, and Earth-oriented remote sensing programs.

Back to the Moon

Over the past year scientists and engineers at the NASA Johnson Space Center in Houston have been putting together plans for a U.S. return to the Moon. They have made it clear that further unmanned investigation of more of the lunar surface is needed before large-scale colonization can begin.

In its final report issued in April, the Solar System Exploration Committee (SSEC), which was established in 1980 to plan NASA's planetary missions to the end of this century, concurred that such a lunar orbiter mission was necessary.

According to Dr. Edelson, NASA will request a new start for a Lunar Polar Orbiter mission in FY88. The spacecraft would be modeled on the highly successful Explorer class, which has been used for physics and astronomy missions.

Global mapping of the lunar geochemistry could be performed, with an eye toward discovering whether there are reservoirs of ice at the lunar poles. The European Space Agency has expressed interest in the lunar polar orbiter mission planned by NASA.

The last NASA missions to Mars, launched in the mid-1970s, landed two Viking spacecraft on the surface and provided mankind its first analysis of the Martian surface. In order for manned Mars missions to be launched over the next decades, a thorough analysis must also be made of the Martian atmosphere, the first thing that can be "mined" on Mars.

Mission to Mars

The NASA five-year plan includes a Mars Geoscience/Climatology Orbiter for FY85, to be sent to Congress next January. This would be the first in a series of new near-planetary missions based on the Pioneer-class spacecraft that brought us the first pictures of Jupiter and Saturn.

An atmospheric radiometer would measure Martian water vapor, dust, cloud condensate, and temperature. A gamma-ray spectrometer would look at surface elements, distribution of subsurface ice, and the thickness of the polar caps.

The SSEC proposed that the planetary observer program build to a funding level of about $50 million per year, to carry out a series of missions near Earth's neighbors. It recommended that the program be initiated in FY85 at a level of only $5-$10 million and built up in preparation for a 1990 launch.

Space Station is next

Two missions scheduled for 1989 will require a space station in low-Earth orbit by launch time in the early 1990s.

The first is preliminarily called "System-Z" for lack of a more specific name. It would include a polar Earth orbiting remote sensing system which would be the next generation technology after the current Landsat remote sensing satellites. Advances in infrared sensors and other technologies being tested on the Space Shuttle should be ready for operational deployment on satellites in the early 1990s.

The second mission is a geostationary platform, which would need to be checked out and perhaps assembled in low-Earth orbit at a space station. The platform would host a set of advanced communications satellites and the electrical and other facilities of a single facility would be shared.

NASA Administrator James Beggs has made statements recently reflecting his confidence that President Reagan will give NASA the go-ahead for space station development this fall. The release of the present five-year plan, which includes station-dependent missions for science projects, further indicates the space agency's optimism.

Dr. Edelson stated in his testimony that NASA plans a $1.5 billion budget for space science and applications by 1990, requiring an approximate 30 percent increase, in real dollars.

President Reagan's decision on the space station in the next months will determine whether NASA is propelled back to the Moon and Mars.