

# Shuttle lays basis for colonizing space

by Marsha Freeman

Extraordinary advances were made during 1983 in the world's most versatile space transportation system, the Space Shuttle, and in the sciences that depend on space for new breakthroughs. These successes have laid the basis for more long-range planning, and for the first real effort to colonize our nearest cosmic neighbor, the Moon.

Two Shuttle orbiters made a record total of four flights, during which they launched communications satellites for the United States, Canada, India and Indonesia. Astronauts carried out extra-vehicular activity in the payload bay of the orbiter, and did tests with the Remote Manipulator arm which will be used later for satellite repair.

The first American woman (Sally Ride) ventured into space. The most advanced communications satellite, the Tracking and Data Relay Satellite (TDRS) opened new capabilities for future Shuttle missions. In the future, mission control will be able to communicate with the crew nearly 85 percent of the time, rather than the 15 percent possible until now. This increased communication is vital for doing scientific research in space.

The most exciting capability demonstrated this year by the Shuttle system was on the recent ninth mission, which took the European-built Spacelab on its first flight. At the same time, the unmanned IRAS (Infrared Astronomical Satellite) made startling discoveries in far-away galaxies during its short stay in Earth orbit.

## Peering into new galaxies

On Jan. 24 NASA launched IRAS, with the capability to look at distant cosmic objects which may not be visible through light, but can be seen by the heat, or infrared radiation, that they emit. Only built to last nine months, IRAS was able to find a dozen new comets orbiting the Sun, the possibility that the star Vega may have planets orbiting around it, and belts of cosmic dust whizzing around the solar system that no one had "seen" before.

IRAS identified thousands of previously-unknown sources of infrared radiation and laid the basis for putting even more sensitive telescopes into orbit in the next few years.

The first flight of the Shuttle-compatible Spacelab demonstrated a concept scientists had been anxiously awaiting for two decades—the ability to send their scientific peers into

space and talk with them, to evaluate and alter experiments while they were still in space.

Biologists and medical experts began to solve some of the mysteries of sickness in space, or "space adaptation syndrome." If hundreds and then thousands of people are to populate space in the next decades, scientists must find preventive measures for them while they adapt to the micro-gravity of space.

Astronomers shared the real-time excitement of the crew in pointing their telescopes toward the cosmos to test out the latest technologies in astrophysics. Plasma physicists shot beams of electrons into the Earth's ionosphere to better map the magnetic and electrical environment that surrounds our planet.

## Stepping stones for the future

New commercial space activities are being opened up from the basic research being performed on short Shuttle missions. Electrophoresis experiments run this year have shown that crucial pharmaceuticals for curing diseases can be made economically and with high purity in space.

The materials processing experiments performed have led to optimism that more perfect crystals, new metal alloys, and uncontaminated new materials will be profitably made in space over the next decade.

In the last six months of 1983, NASA announced that new planetary missions, including the Mars Geoscience Orbiter and a Lunar Polar Orbiter, will be requested in future budgets. The planetary program, which also disappeared over the past decade, has been brought back to life with missions to the planets, comets, and asteroids.

The space agency has also come closer to formal plans for the first U.S. permanent space station. NASA has rejected the idea of extending the mission time for the Shuttle fleet in orbit as an alternative to building a station, and has ruled out the deployment of an unmanned space platform as a half-way measure that would supposedly "save money."

It is expected that President Reagan will announce his support for the NASA space station in his January State of the Union address. There have also been indications that he might announce that the United States will return to the Moon, perhaps by the end of this century.