December 2009

# AEROSPACE AMERICA


# The year in review

A PUBLICATION OF THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

## Society and aerospace technology

This spring, an interesting social experiment began in space when the ISS attained its first six-person international crew, the largest crew ever to live in space together for a long period of time. While there have been larger crews on space shuttle missions, these only last a couple of weeks, and ISS tours of duty can last up to six months.

Arriving in March aboard a Soyuz spacecraft were two of the crewmembers, Russian Commander Gennady Padalka and NASA physician Michael Barratt. Japan's first full-time crewmember, Koichi Wakata, also arrived in March, on the shuttle Discovery. In May, the three were joined by Russia's Roman Romanenko, Frank De Winne, who represents ESA's 11 member countries, and Canadian Space Agency shuttle veteran Robert Thirsk. For the first time, all five space agencies building the station were represented by a full-time crewmember.

Until now, three-person crews have spent large amounts of time building and maintaining the station. One of the main reasons for having a larger crew on the international lab is to increase the number of hours devoted to science experiments from 20 to 70 hr a week. In addition to increasing the science return, having a larger crew is a tremendous social experiment. The Russians and Americans, who have been rotating crews aboard the station since 2000, have now been joined by a team representing different cultures.

In talking about some of the challenges, the crew have compared it to having in-laws visiting for the holidays, except the crew is living in a space about the size of a jumbo jet and sharing limited bathrooms, food preparation areas, and sleeping quarters that are located in various modules throughout the ISS.

As they live and work together in space, the crewmembers themselves are performing an important set of social experiments, including a formal one called Interactions, which records the crew's feelings and examines the influences of culture on their stay in space. This experiment has been running since the station's early days. Investigators also collect anonymous data from ground control personnel for comparison with the data collected from crewmembers on orbit.

In addition to the station's assigned crew, spacefarers from around the world will be visiting the ISS, temporarily bumping up crew sizes to as high as 13. This will be a test for recently installed sophisticated life support systems. These space travelers will be arriving on vehicles launched from Russia and the U.S., but cargo also will arrive on new transport vehicles designed by Europe and Japan. The ISS has become the first global port for spaceships, involving the hardware needed for spacefaring societies and *people*—the "soft" ware at the heart of human exploration. This reality is the focal point of astrosociological research and clearly points to the need for collaboration between the natural/physical sciences and the social sciences.

*ISS Expedition 20 crewmembers share a meal in the station's Unity node with visiting space shuttle Discovery crewmembers. While the two craft were docked during STS-128, 13 people lived on the ISS (NASA photo).*

Perhaps most important, a space crew now reflects, for the first time, the global nature of our world. Eventually the international crews will staff the station for up to six months, simulating the time periods for longer space journeys. The international partners have indicated they would like to continue ISS operations until 2020, enabling hundreds of astronauts from around the world to staff and visit the global outpost.

*ISS Expedition 20 crewmembers from Canada, Europe, Russia, and the U.S. monitored the unpiloted Japanese H-II transfer vehicle (HTV) in its first approach to the ISS. Once the HTV was in range, they used the station's Canadian robotic arm to grab the cargo craft and attach it to the ISS Harmony node, built by the U.S. (NASA photo).*

Since international cooperation will more than likely make longer space missions possible, the crews and their social interactions may well involve the most important area of research, one that helps pave the way for explorations and settlements farther away from Earth.

by **Tracy McMahan** and **Jim Pass**