



Ready for action: Soyuz craft could maintain access to the International Space Station after 2010.

## Ending of shuttle service puts space experiments 'at risk'

**Declan Butler**

Imagine your experiments are 365 kilometres above your head and there is no way to bring them back to Earth. That's the situation researchers using the International Space Station could face after 2010, when NASA stops flying the space shuttle.

The crew presents another problem. Scientists argue that the station needs six or seven people to perform a full research programme. At present, only three crew members can return safely to Earth on board a Russian Soyuz capsule in the case of an emergency — and in January NASA cancelled its Orbital Space Plane, which could have served as a lifeboat for a larger crew.

Officials from NASA and the other agencies that will operate the station set up a project team last month to explore options for maintaining access to it. The team is due to report in June.

"After 2010, the functionality of the space station risks being very limited," says John Kiss, a botanist at Miami University in Ohio and president-elect of the American Society for Gravitational and Space Biology. Most experiments must be brought back to Earth for analysis, he points out. "Astronauts are buckling experiments to their ankles," says Kiss, because room is already so restricted on return flights.

Transporting either cargo or crew to and from the station may become a huge problem, says Mary Musgrave, a plant physiologist at the University of Connecticut. She notes that NASA's fresh plans for manned missions to the Moon and Mars would use the station to test how organisms cope with

extended periods of low gravity. "That would require frequent and extended access to the station," she says. "At present we are not seeing a plan for providing that access."

"We have to find alternative ways to bring back scientific payloads," agrees Jorg Feustel-Buechl, head of manned flight at the European Space Agency (ESA). One possibility is to use ESA's Automatic Transfer Vehicle, designed to carry 7.5 tonnes of cargo to the shuttle and to burn up on re-entry. It could be modified to jettison a capsule that would parachute to Earth, but this would cost at least €100 million (US\$125 million), he says.

The crew problem is more acute. The last Soyuz capsule that Russia is contracted to send is due back in 2006, and two such capsules would be required to return a full crew. ESA officials are considering plans to buy more Soyuz craft and dock them two at a time throughout the station's lifetime. "We now have a clear rescue plan that permits a crew of six, which will allow the science to get done," claims Feustel-Buechl.

NASA has also pencilled Soyuz flights into its budget from next year until 2020. But there is an obstacle: a US law passed in 2000 bars the agency from buying additional Soyuz vehicles. Some Congress members are advocating an exemption to this rule that would let the agency buy Russian launches to keep the station going.

The project team's findings are expected to be considered when the heads of NASA, ESA and the other space-station partners meet in June to hammer out plans for the station in the light of NASA's revised exploration agenda. ■

## Spanish lawmakers clash over control of stem-cell research

**Laura Nelson, London**

Spain's highest court is expected to rule this summer on a dispute between the national government in Madrid and the southern state of Andalusia over who should govern research on human embryonic stem cells.

The row echoes disagreements in the United States, where states such as California and New Jersey are trying to fund research that the federal government shuns.

The Spanish government passed a law in November that permits embryonic stem-cell research to be carried out under certain circumstances. Some researchers welcomed the law as relatively liberal for a predominantly Catholic country.

But Andalusia passed a still more liberal measure earlier in 2003. The province also backed ambitious plans to establish a stem-cell bank and research centre in Granada, with €5 million (US\$6.2 million) of regional-government money.

Both laws permit the use of stem cells derived from frozen embryos surplus to reproductive requirements. But the national law prohibits the creation of human embryos for research and states that embryonic stem cells should be used only as a last resort.

Researchers are worried that, under the national law, central government will have to assess and approve each project. "This might take six months or two years," says Francisco Martin, a stem-cell scientist at the Bioengineering Institute at Miguel Hernández University in Alicante.

"The national law was a reaction against the Andalusian law," says physiologist José López-Barneo of the University Hospital in Seville. "It was designed to stop the regional law."

Other researchers, however, say that the national law will clarify the situation countrywide, and is liberal enough to allow their work to proceed. They cite an agreement to collaborate on stem-cell research signed in January between the Spanish government and the Salk Institute for Biological Studies in La Jolla, California.

Juan Carlos Izpisua Belmonte, a geneticist at the Salk Institute, says that the agreement may permit researchers to do embryonic stem-cell research in Spain that would not get public funding in the United States. ■