

The European Astronaut Centre

Science journalist Stuart Clark visited the European Astronaut Centre to witness the tasks associated with supporting Europe's astronauts.

When Bärbel Niederlag-Scholz picked up the telephone, she was not surprised to see a Houston number on the display. Working at the European Astronaut Centre in Cologne, she was used to collaborating with staff at the Johnson Space Centre in Texas, USA. However, the voice on the other end of the line was not American and its owner was not in Texas. It was ESA astronaut Thomas Reiter, calling from the International Space Station. He needed to make some requests for new reading material.

Like in the best hotels, every day the astronauts on the International Space Station are provided with a newspaper, in electronic pdf format in this case. They also receive a shortened video file, containing the day's television news. In addition, Niederlag-Scholz is responsible for collating other news stories that are then relayed to Reiter several times a week. "I try to balance the negative stories with some positive ones as well," she says, "It would be too easy at the moment simply to send reports of terrorism and wars." She also tries to concentrate on German stories, so that Reiter continues to feel connected to home.

Niederlag-Scholz's job is just one of nearly one hundred in the Agency that directly support the manned spaceflight programme. Thomas Reiter is the first long-duration ESA astronaut to use the International Space Station. His mission has lifted the European Astronaut Centre (EAC) to a new level of visibility both within ESA and throughout the world.

EAC is one of the smaller ESA centres with just 95 workers, most of whom are contractors. Being in Cologne, in a specially built facility on the DLR site, Michel Tognini, the Head of the EAC, admits that it can sometimes feel a little isolated from the rest of ESA. Scratch beneath the geography, however, and it is clear that EAC's bonds to the rest of the Agency are strong.

"EAC provides a service to ESA. The Agency has a mission to serve European interests in space and when that mission requires a human presence in space, we provide

the astronauts,” says Gerhard Thiele, Head of the Astronauts Division at EAC, and himself listed on the active roster.

The centre is a division of the Directorate of Human Spaceflight, Microgravity and Exploration (DHME) and also has a strong interface with the Directorate of Operations and Infrastructure. Then there are the increasing links with the Science Directorate, especially with the planned deployment of the Columbus Laboratory Module next year.

“The Columbus Laboratory is one of the best laboratories ever flown in orbit,” says Tognini. The 4.5-metres-long, cylindrical module will house four, multipurpose experimental modules. The Fluid Science Laboratory will study the behaviour of gases and liquids in space, the European Physiology Module will investigate the effects of long-duration spaceflight on the human body, the Biological Experiment Laboratory will investigate the effects of microgravity on micro-organisms, plants and small invertebrates, and the European Drawer Rack will house different experiments across a range of disciplines so long as they fit into one of the drawers.

The launch of Columbus is also important from an infrastructure point of view. “For the first time we will have our own hardware in space,” says Tognini.

EAC has strong links to Paris Headquarters, where astronauts are often requested to help with publicity or educational events. Astronauts have an enduring appeal that comes as no surprise to Thiele. “Everyone wants to meet an astronaut. That is a simple fact. The reason is because astronauts represent something that lives inside all of us: the sense of adventure. This sense drives us to go beyond the boundaries, to glimpse the unknown, to better understand it,” he says.

Although it takes dozens of people at EAC to support Thomas Reiter on the International Space Station for six months, you cannot stop counting there. European participation in the ISS is part of a multinational co-operation involving the USA, Russia, Japan and Canada. If you factor in the people spread throughout the world supporting the astronauts on the ISS, the number rises to around 500.

The support begins the moment a new astronaut is admitted into ESA. They enter a three-stage training programme. First is a year’s worth of basic training. “In total it runs to between 800-1000 hours,” says Hans Bolender, Head of Astronaut Training.

Included in the training are Russian lessons, so that the astronauts can immediately communicate with Russian colleagues and a course in SCUBA diving. This is so that they can train in the 10-metre-deep pool at EAC. Known as the Neutral Buoyancy Unit, it allows a partial simulation of zero gravity on Earth. Astronauts train in the pool with life-size replicas of space station modules. When not in use by astronauts, Cologne's fire department use the pool for their own training.

Next comes the advanced training. For this the astronaut spends a year travelling between the ISS partner countries, learning about the various modules and systems supplied by each country. In return, all foreign astronauts now come to EAC for their training in the ways of the Columbus module and ESA's other major contribution to the ISS, the Automated Transfer Vehicle (ATV).

The third phase of training occurs when an astronaut is assigned to a mission. Then they begin at least a year of intensive training that is entirely focused on the tasks that have to be achieved during their stay in space. In the case of Claude Nicollier back in 1993, his task could not have been greater. He was chosen to represent ESA during the Hubble Space Telescope's first servicing mission, the flight that corrected HST's faulty optics. With a fifteen percent stake in the orbiting telescope, the entire ESA science community was anxious to see the telescope brought into full service. At NASA, the pressure was even greater. "We were made aware that success was the only option," says Nicollier. To ensure that success, he remembers that every effort was made in the training that they received. "We had a lot of privileges during training," he says.

Once an astronaut arrives in orbit, the ground support steps up a gear. Volker Damann is the Head of the Crew Medical Support Office. His team ensures that the astronaut remains healthy whilst onboard the ISS. That does not mean constant medical monitoring. Instead, in a mini-mission control at EAC, a biomedical engineer monitors the conditions on the space station, watching for any change in the temperature or composition of the station atmosphere that might affect the astronauts. Only during spacewalks and launches are the astronaut's heart rate, breathing rate and ECG readings monitored directly. A doctor then sits at a dedicated console, checking these.

"The emphasis is on prevention rather than cure," says Damann, signalling that health is about so much more than the absence of disease. The World Health

Organisation now defines good health as the complete physical, mental and social well being rather than the simple absence of disease. This brings things back to the work of Bärbel Niederlag-Scholz and her daily web pages for Thomas Reiter. “My assumption is that if we are going to send people to Mars one day, we’ll need a tool for them to keep in contact with Earth. This is preparation for the future,” she says.

Indeed, after the ISS mission ends there is the tantalising prospect of what to do next or where to go next. Certainly, no one at EAC believes that human spaceflight will dwindle. “Exactly what we will do is fuzzy at the moment, but the fact that we will do something is clear,” says Nicollier.

As yet, Europe has no means to launch its own astronauts into space. “We have to use public transport,” says Tognini, with a smile. So whatever the next step is, it will be an international collaboration. Most at EAC have their sights fixed on the Moon.

“The ATV could be adapted into a transfer vehicle for getting from Earth orbit to the Moon’s orbit,” says Tognini, adding that if such a project were to go ahead, it could form part of an industrial collaboration with the Russians. Certainly, the Americans would also be major partners in any effort to return to the Moon. As the ISS is proving, multinational collaborations are good in the field of human space flight.

“Right now there are no signed contracts to do something by a certain date. Nevertheless, I think we will have a European on the Moon around 2020,” says Nicollier.

Future Astronaut Missions

“Thomas Reiter’s Astrolab mission is the first hint of what the future will bring,” says Gerhard Thiele, Head of the Astronauts Division at EAC. The next eighteen months will be focused on taking the Columbus module into space, docking it with the ISS and preparing it to serve the European scientific community.

Christer Fuglesang will launch on a Shuttle in December 2006. His mission includes two spacewalks to help install a new truss section to the ISS. Thomas Reiter will return to Earth with this mission.

Paolo Nespoli will launch on a Shuttle in September 2007, carrying the ESA-build Node 2 module to be installed on the station. He will act as the mission specialist.

Node 2 is the connecting point for ESA's Columbus laboratory module, as well as the US and Japanese labs.

Hans Schlegel and Leopold Eyharts will launch on another Shuttle in September 2007, carrying the Columbus laboratory. Schlegel will act as the mission scientist and Eyharts will remain on the station for two and a half months.

More missions are being negotiated for 2008 onwards.

This material is copyright Stuart Clark. Please do not distribute without permission.