European Astronauts and the Space Shuttle

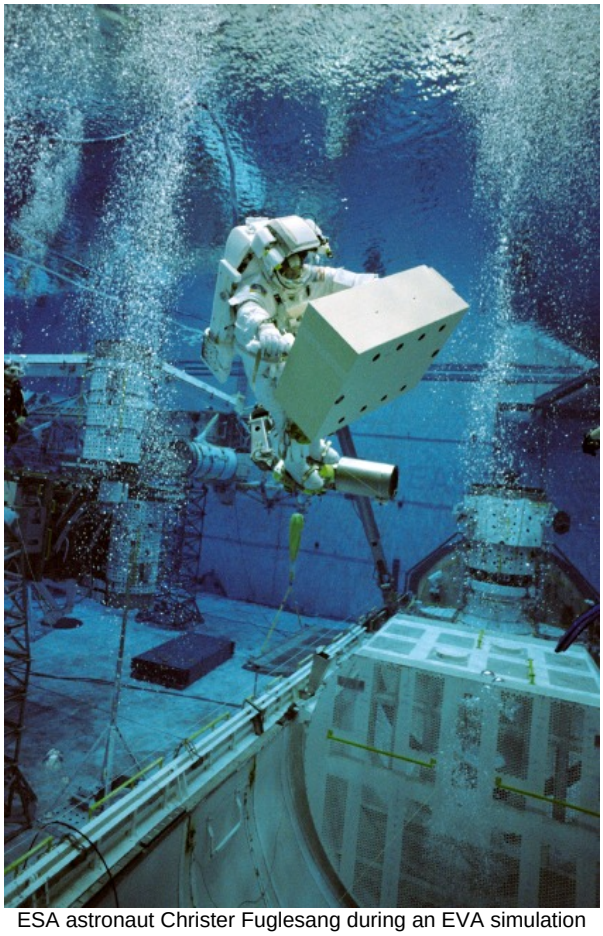
Not only does the STS-121 Shuttle mission pre-empt the renewed construction of the International Space Station, it also signifies the first long-duration flight of a European astronaut to the ISS since construction started in 1998. The flight of the Space Shuttle Discovery on the STS-121 mission follows on from the first return to flight mission, also of Discovery on the STS-114 mission in 2005. When ESA astronaut Thomas Reiter arrives at the ISS he will become a member of the ISS Expedition 13 and Expedition 14 Crews, remaining on the ISS for five months. During his time on the ISS he will carry out relevant ISS tasks as well as an ESA experimental programme.

Sergei Avdeyev, Yuri Gidzenko and ESA astronaut Thomas Reiter in the Mir core during EuroMir 95 mission. (Image: ESA)

Reiter previously served 179 days (3 September 1995 until 29 February 1996) on the ESA-Russian Euromir 95 mission to the Mir Space Station performing some 40 European scientific experiments and performing two spacewalks (EVAs) to install and later retrieve cassettes of the European Space Exposure Facility experiments (ESEF).

ESA astronaut Christer Fuglesang from Sweden is scheduled to follow Thomas Reiter into orbit on Shuttle in December 2006 when he becomes part of the STS-116 crew to carry out an ISS assembly mission during which time he will undertake a spacewalk.

The flights of ESA astronauts Reiter and Fuglesang come in a long tradition of European astronauts who have flown on the Shuttle since ESA astronaut Ulf Merbold from Germany became the first European astronaut to fly on Shuttle in 1983.



ESA astronaut Christer Fuglesang during an EVA simulation for the STS-116 mission at the Johnson Space Center's Neutral Buoyancy Laboratory. (Image: NASA)

Ulf Merbold became the first European to undertake a mission on the Space Shuttle (STS-9) on the 10-day Spacelab-1 mission between 28 November 1983 and 8 December 1983. Not only was this the first spaceflight of an ESA astronaut, it was the first flight of the European-built Spacelab and the first flight of a non-American on the Shuttle.

Spacelab was the first purpose-built space laboratory developed by Europe under a cooperation agreement with NASA. It was a modular research laboratory that would fit inside the Shuttle's cargo bay and built by a consortium of European companies. During the Spacelab-1 mission over 70 scientific experiments were conducted in a variety of fields including Astronomy, Solar Physics, Space Plasma Physics, Earth Observation, Material Science, Technology and Life Sciences. Working in two teams of three, the crew worked 12-hour shifts, allowing for 24-hour operations.

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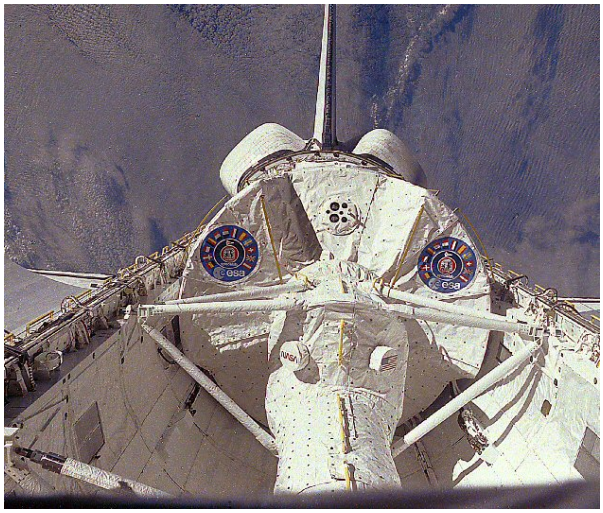
Launch of STS-9 Spacelab-1 mission in 1983 with ESA astronaut Ulf Merbold on 28 November 1983. (Image: NASA)

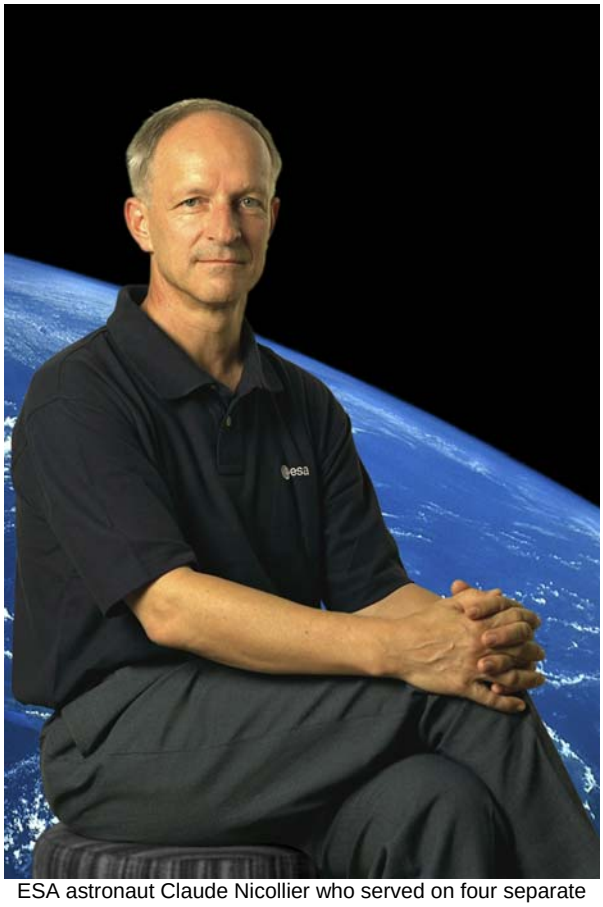
Between 1983 and 1998, Spacelab flew on the Space Shuttle a total of 22 times. Seven of these missions included European astronauts: ESA astronaut Wubbo Ockels, and German Aerospace Research Establishment (which became DLR) astronauts Reinhard Furrer and Ernst Messerschmid in 1985. Ulf Merbold undertook his second Spacelab flight in January 1992 (Spacelab IML-1 mission) followed two months later by Belgian astronaut Dirk Frimout. In 1993 DLR astronauts Hans Schlegel (currently ESA) and Ulrich Walter, and in November 1994 ESA astronaut Jean-Francois Clervoy. Jean-Jacques Favier (CNES) became the last European astronaut to fly on a Spacelab mission on Shuttle between 20 June and 7 July 1996.

Not only have Spacelab experiments made a major contribution to space science research, but also the knowledge and expertise gained by both ESA and NASA during the Spacelab missions has made a significant contribution to today's International Space Station programme.

Beyond the Spacelab missions, European astronauts have carried out a wealth of research and gained a wealth of experience aboard Shuttle in the past 20 years. Following the flight of Patrick Baudry on the Spartan-1 mission for CNES in 1985, there was a gap of seven years until the flight of ESA and Europe's most experienced astronaut to have flown on the Space Shuttle, Claude Nicollier having flown on Shuttle on four separate occasions.



Spacelab-1 shown in the Shuttle cargo bay while in orbit. Crew access tunnel in foreground is shown leading to pressurised module. (Image: NASA)



ESA astronaut Claude Nicollier who served on four separate Shuttle missions between 1992 and 1999. (Image: ESA)

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ESA's European Retrievable Carrier (EURECA) being held by the Shuttle's robotic arm prior to deployment on STS-46 Shuttle mission in 1992. (Image: NASA)

Nicollier's first flight was on STS-46 in 1992 together with Italian Space Agency astronaut Franco Malerba. This mission deployed the European Retrievable Carrier EURECA and the Tethered Satellite System TSS-1. Nicollier's second mission was on the first Hubble Space telescope servicing mission, STS-61 in December 1993. During the 11-day flight, the Hubble Space telescope was captured and restored to full capacity through a record of five spacewalks by four astronauts. His third flight was on STS-75 Columbia (22 February to 9 March 1996) together with ESA astronaut Maurizio Cheli and Italian Space Agency astronaut Umberto Guidoni. This mission was a 15-day flight, with principal payloads being the reflight of the Tethered Satellite System (TSS) and the third flight of the United States Microgravity Payload (USMP-3).

The TSS experiment produced a wealth of new information on the electrodynamics of tethers and plasma physics before the tether broke at 19.7 km, just shy of the 20.7 km goal. Scientists on the ground were able to devise a programme of research making the most of the satellite's free flight while the astronauts' work centered on research related to the USMP-3 Microgravity investigations.

In December 1999 Nicollier was part of the STS-103 mission together with ESA astronaut Jean-Francois Clervoy who was on his third flight on the Shuttle. This was the third Hubble Space telescope mission. During this eight day mission, Nicollier carried out his first spacewalk or EVA, of 8 hours 10 minutes duration to install a new computer and one of three fine guidance sensors. He is the first European to obtain EVA experience on a Shuttle flight.

ESA astronaut Jean-Francois Clervoy exercising on the Shuttle flight deck bicycle ergometer on the STS-84 mission, the 6th Shuttle flight to the Mir Space Station. Clervoy is a veteran of three separate Shuttle missions. (Image: NASA)

Between the third and fourth flights of Nicollier, four European astronauts undertook missions on the Shuttle. Jean-Francois Clervoy was on the 6th Shuttle flight to Mir in May 1997 and Jean-Loup Chrétien (CNES) on the 7th Shuttle/Mir flight (25 September 97 – 6 October 1997). Pedro Duque flew as Mission Specialist on the Space Shuttle Discovery, STS-95 mission (29 October to 7 November 1998). This nine-day mission was dedicated to research in weightlessness and the study of the Sun. Michel Tognini, currently Head of ESA's European Astronaut Centre, flew on the STS-93 mission, which took place from 22-27 July 1999. During this mission his primary task was to assist in the deployment of the Chandra X-Ray Observatory, and to conduct a spacewalk if

needed. The Chandra X-Ray Observatory is designed to conduct comprehensive studies of the universe, and the telescope will enable scientists to study exotic phenomena such as exploding stars, quasars, and black holes.

ESA astronaut Gerhard Thiele preparing for underwater EVA training at the Johnson Space Center's Neutral Buoyancy Laboratory prior to launch of the STS-99 mission. (Image: ESA)

With the passing of the millennium, Gerhard Thiele became the first European astronaut to fly on Shuttle. From 11-22 February 2000, Thiele participated as mission specialist in the STS-99 Mission. The Shuttle Radar Topography Mission (SRTM) was dedicated to the first, three-dimensional, digital mapping of the Earth surface on a nearly global scale. He was responsible for SRTM operations, including the deployment and retraction of the 200-foot high boom from Endeavour's cargo bay upon which one of the flight's radar systems was mounted. Thiele was also one of two spacewalking crew members, in the event contingency spacewalk would have been required during the flight.

From 19 April to 1 May 2001, Umberto Guidoni participated in the Space Shuttle's STS-100 mission, being the first European on board the International Space Station. On that flight, the Space Shuttle delivered elements and equipment required for the ongoing assembly of the International Space Station. In particular, it carried the Multi-Purpose Logistics Module (called Raffaello), provided by the Italian Space Agency and loaded with laboratory outfitting equipment, as well as the Space Station Remote Manipulator System (SSRMS), the Canadian robotic arm that will be used extensively to assemble the Space Station.

ESA astronaut Umberto Guidoni becomes the first ESA and European astronaut to enter the ISS in April 2001.

Phillipe Perrin is currently the last European astronaut to have flown on Shuttle. He served as a mission specialist on STS-111 (5-19 June 2002) onboard Space Shuttle Endeavour. The 14-day STS-111 mission exchanged the ISS Expedition Crew and delivered a Canadian-built mobile base system for the Station's robotic arm. During the Mission Perrin carried out three successful spacewalks. On the first two Extravehicular activities, he helped to install the mobile base system and on the third, he performed a late-notice repair of the Station's robotic arm by replacing one of its joints. He spent a total of about 19 hours outside the station. During that mission, he was also arm operator and berthed the MPLM back into the orbiter payload bay towards the end of the mission.