EVA tasks

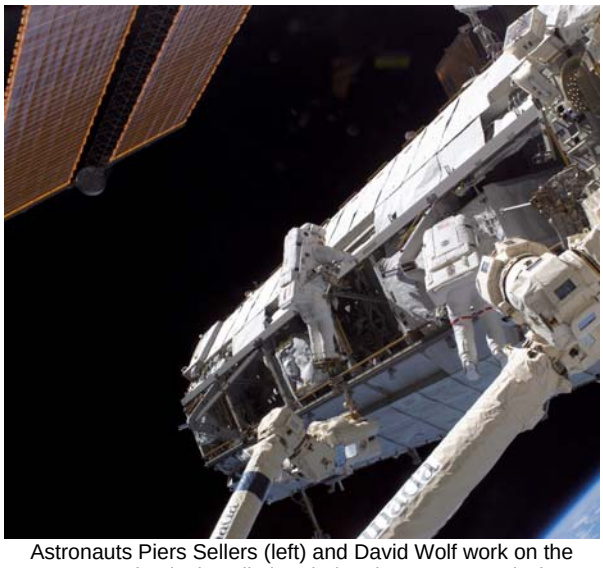
During the Astrolab mission ESA astronaut Thomas Reiter is scheduled to undertake an extravehicular activity or spacewalk. The EVA is scheduled to take place from the US Quest airlock together with NASA astronaut Jeffrey Williams. The EVA is planned to take place in July and is currently scheduled to last 6 hours 30 minutes. The first 30 minutes of the EVA will be used for airlock depressurisation, egress through to the outside of the ISS and setup. During the spacewalk Reiter and Williams will complete a combination of the following tasks:

Astronauts Carl Walz (left) and Daniel Bursch, Expedition Four flight engineers, undergo a pressure check in Quest's Equipment Lock, prior to the beginning a five-hour, 47-minute EVA. (Image: NASA)

Install Floating Potential Measurement Unit on S1 truss: The first EVA task following egress is the installation of the Floating Potential Measurement Unit (FPMU) on the tip of the S1 truss section. Excessive charging of the ISS could cause breakdown of thermal control coatings and provide an electric shock risk to astronauts. This device will be used to monitor ISS charging so that steps can be taken to provide a safer environment for the astronauts during Extra Vehicular Activities (EVA). As well as measuring ISS charging, the FPMU measures electron density, and electron temperature.

Remove and replace multiplexer/demultiplexer on the S1 truss: ISS Multiplexer/demultiplexers are responsible for combining distinct data signals into one stream for transmission to the ground and splitting a single data stream received from the ground into the relevant distinct data signals. The multiplexer/demultiplexers being replaced is located on the Starboard Thermal Radiator of the S1 truss section.

Remove and replace Node 2 starboard Shunt Jumper on the S0 truss section and installation of Spool positioning devices on the starboard and port shunt jumpers: The European-built Node 2 is at KSC awaiting launch to the International Space Station. Prior to its launch and connection to the ISS the exit/entry points to the relevant ISS thermal loop are joined together with what are known as a Shunt Jumpers. Thermal loops are the system used on the ISS using liquid filled pipes to remove excess heat from equipment and keep the internal ISS temperature within required values. Spool positioning devices will be installed at the same time as the shunt jumpers. These devices are designed to ensure that quick disconnect devices in fluid lines will function properly.



Astronauts Piers Sellers (left) and David Wolf work on the S1 Truss after its installation during the STS-112 mission. (Image: NASA)

Inspection of Spool positioning device on S1 truss Radiator Beam Valve Module: The Radiator Beam Valve Module controls the flow of ammonia to the truss' heat-rejecting radiators. As mentioned above Spool positioning devices are designed to ensure that quick disconnect devices in fluid lines will function properly.

Remove and replace Remote Power Controller Module on S0 truss: The Remote Power Controller Module is a circuit breaker for the Control Moment Gyro 2 on the outside of the station. The control moment gyro 2 is a device which helps to stabilise the ISS.

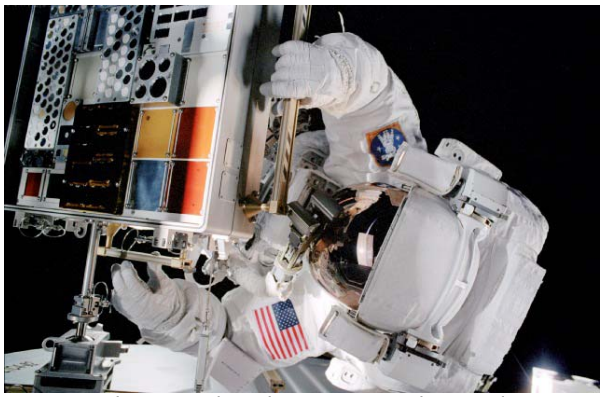
EVA Tasks

Use EVA infrared Camera: An EVA infrared camera will be used as a technology demonstration to take images during the EVA.

EVA infrared camera. (Image: NASA)

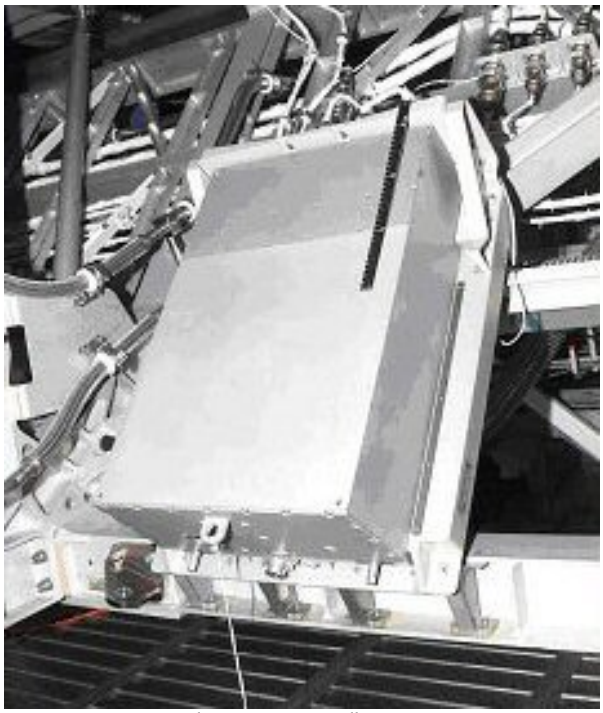
This camera can be used for identification of leaks and thermal performance degradation.

Materials International Space Station Experiment (MISSE) - 3 and 4: MISSE-3 and 4 are a test bed for materials and coatings, which will be attached to the outside of the ISS. The materials are being evaluated for the effects of atomic oxygen, direct sunlight, and extremes of heat and cold. This experiment allows the development and testing of new materials to better withstand the rigors of space environments. Results will provide a better understanding of the durability of various materials when they are exposed to the space environment. Many of the materials may have applications in the design of future spacecraft.



Operations to retrieve the MISSE-1 and 2 experiment containers during the Expedition 11 EVA in August 2005. (Image: NASA)

Installation of a Rotary Joint Motor Controller on the S1 Thermal Radiator Rotary Joint: An electronics box called a Rotary Joint Motor Controller for the S1 Thermal Radiator Rotary Joint will be installed. This rotary joint rotates the three radiator structures in a 105-degree span either way to keep the three radiators panels in the shade; it also transfers power and ammonia to the radiators.



Rotary Joint Motor Controller. (Image: NASA)

The last 30 minutes of the EVA are used for EVA clear-up, ingress back into the airlock and repressurisation.

The EVA of Reiter and Williams includes so-called ‘get ahead’ tasks, i.e. tasks that are performed by the astronauts at specific points during the EVA should they be ahead of schedule. Therefore tasks may take place during the EVA in addition to the ones listed above. These tasks can be influenced by what has been accomplished during the previous EVAs of the STS-121 crew and during an EVA by the Expedition 13 Commander Pavel Vinogradov with the Expedition 13 First Flight Engineer Jeffrey Williams.