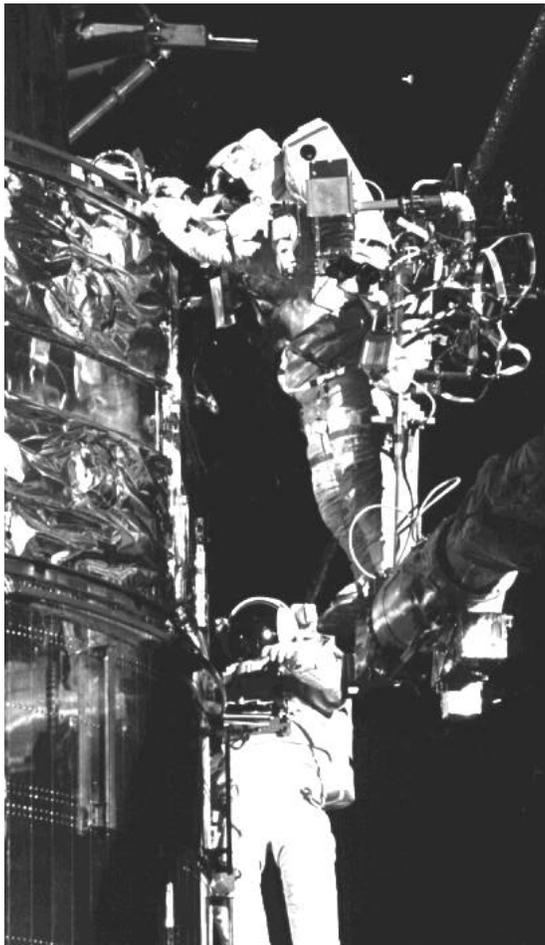


E VAs on the International Space Station

In recent years, NASA has increased the frequency of extravehicular activity to prepare for the assembly of the International Space Station beginning in the late 1990s. Two recent extraordinary Shuttle missions have demonstrated the potential for EVA on the Space Station. These were the STS-61 and STS-82 missions in 1993 and 1997 in which astronauts conducted multiple spacewalks to service the Hubble Space Telescope. During each flight, crew members donned their spacesuits and conducted EVAs in which they replaced instruments and installed new solar panels. Their servicing activities required extreme precision and dexterity during EVAs lasting more than seven hours.

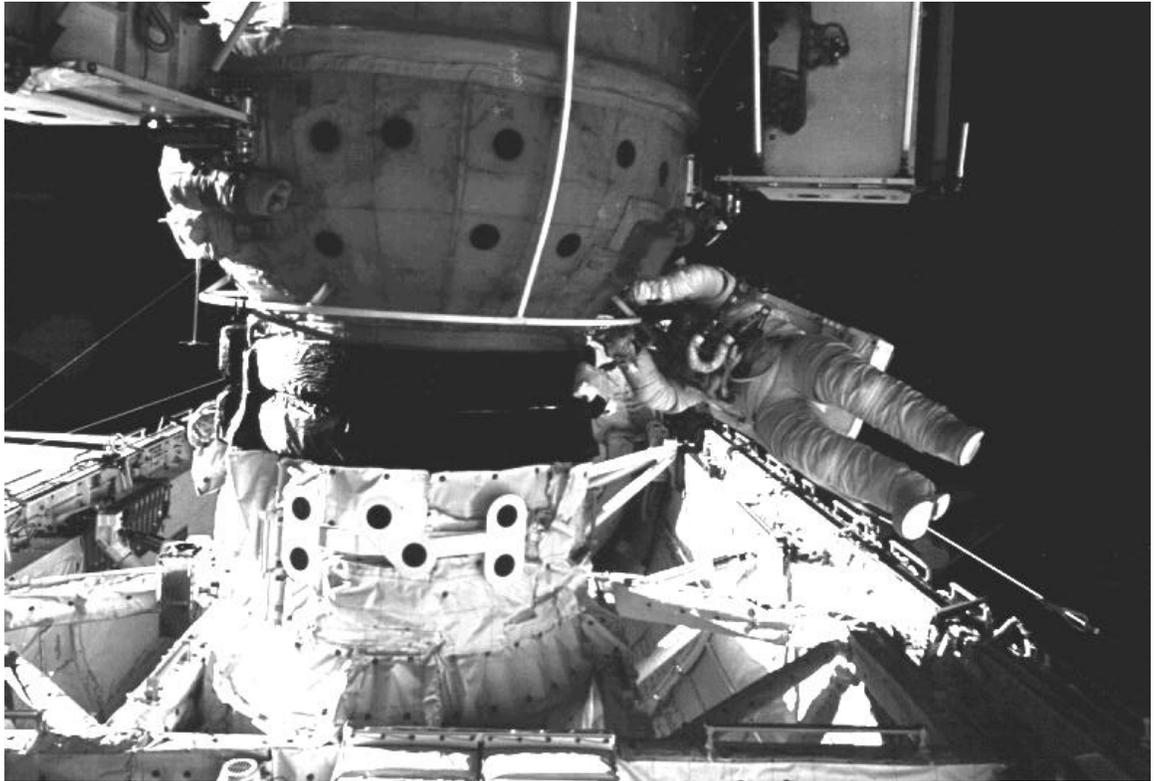
Similar efforts will be needed for the assembly of the International Space Station. During the nearly 40 American and Russian space flights to the station, astronauts and cosmonauts will log over 1,200 hours of EVAs. More hours of spacewalks are expected to be conducted during just the years 1999 and 2000 than were conducted during all previous US space flights.

Spacewalkers will assist in the assembly of the Space Station by making all the connections that require greater dexterity than can be accomplished with station robots. These operations include joining electrical cables and fluid transfer lines and installing and deploying communication antennas. To do this,



STS-82 (1997) astronauts Mark C. Lee (top) and Steven L. Smith (bottom) repair a worn area in the insulation of the Hubble Space Telescope. Detailed work like this will be a frequent occurrence during the assembly and operation of the International Space Station.





STS-76 astronaut Michael R. Clifford works with a restraint bar on the Docking Module of the Russian MIR space station. Similar docking modules (Pressurized Mating Adaptor) will be used on the International Space Station.

spacewalkers will have to remove locking bolts that secured components during launch to orbit.

As the Space Station evolves, astronauts will move components, such as antennas, to the most advantageous locations. For example, a communications antenna may become blocked when additional station modules are joined to the structure. Spacewalkers will have to traverse the outside of the modules and reposition the antenna where it will be unblocked by modules, solar panels, and other structures.

Still other Space Station EVA assembly tasks include removing of locking bolts for solar panels and radiators, driving bolts that hold the truss

assembly to the Space Station, attaching grapple fixtures to objects that have to be moved by the Space Station's robot arms, mounting tool kits, adding batteries, and reconfiguring valves for fluid transfer. Later, during the operational phase of the International Space Station, spacewalkers will replace orbital replacement units (ORUs). These are modular devices, such as the scientific instruments on the Hubble Space Telescope, that are designed to be removed periodically and replaced with improved or more advanced equipment. Operational spacewalks will also take care of mounting external payloads that are brought up to the Space Station on the Space Shuttle.

