

Extreme construction team

Shuttle mission STS-116 to the International Space Station is the hardest and most complex

to date. Astronauts must deliver a cargo module and perform three space walks to attach a new section – the P5 spacer – as well as rewiring the orbital outpost to two new electricity-generating solar panels

STARBOARD

1 Flight day 3: Shuttle docks with *Destiny Laboratory*. Mission Specialist **Nicholas Patrick** uses shuttle's robotic arm to lift P5 spacer and hand it to waiting station arm

Port 6 solar array: Temporary electrical system installed in 2000 when first crew arrived – to be moved adjacent to P5 spacer

4 Flight day 6: Two of space station's four power channels shut down. Curbeam and Fuglesang, assisted by Williams operating robotic arm, make 6.5-hour space walk to unplug power cables from P6 array and connect them to P4. Power supply restored

P5 spacer

Canadarm robotic arm

SPACEHAB cargo module

Destiny

PORT

Port 4 solar array

2 Flight day 4: **Sunita Williams** uses station's robotic arm to move P5 into position. During first spacewalk **Robert Curbeam** and **Christer Fuglesang** connect P5 to P4 array

3 Flight day 5: Port half of existing P6 array folded to make room for P4 arrays to rotate and follow Sun

EXTRAVEHICULAR MOBILITY UNIT (EMU)

Lights and TV camera

Polycarbonate helmet: Visor acts as two-way mirror to cut solar glare. Helmet contains 900cl water bag

Instrument panel: Controls oxygen and temperature

Thermal Micrometeoroid Garment (TMG): Eight layers thick to protect against tiny pieces of high-speed space rock

EMU protects against near-vacuum of space and temperature extremes of 135 Celsius in direct sunlight to minus 82 Celsius in shadow

Weight: 140kg
Cost: \$12 million

Life Support System (LSS)
Holds enough oxygen to last seven hours

5 Flight day 7: Remaining two power channels shut down. During third space walk, Curbeam and Williams, assisted by **Joan Higginbotham** operating robotic arm, complete rewiring and restore electricity

P5 spacer: Will connect power and cooling lines when P6 solar array is relocated in August 2007

Weight: 1,864kg
Cost: \$10.97 million

Hard Upper Torso: Toughened fibreglass shell with mountings for arms, instruments, and LSS

Orthofabric cover: Teflon / Nomex / Kevlar
Aluminized Mylar
Neoprene coated ripstop

Restraint: Dacron

Pressure layer: Urethane-coated nylon ripstop

Water tubes: Spandex

Liner: Tricot

Sources: NASA, Hamilton Sundstrand / ILC Dover