



STS-109 Shuttle Mission Imagery Postflight



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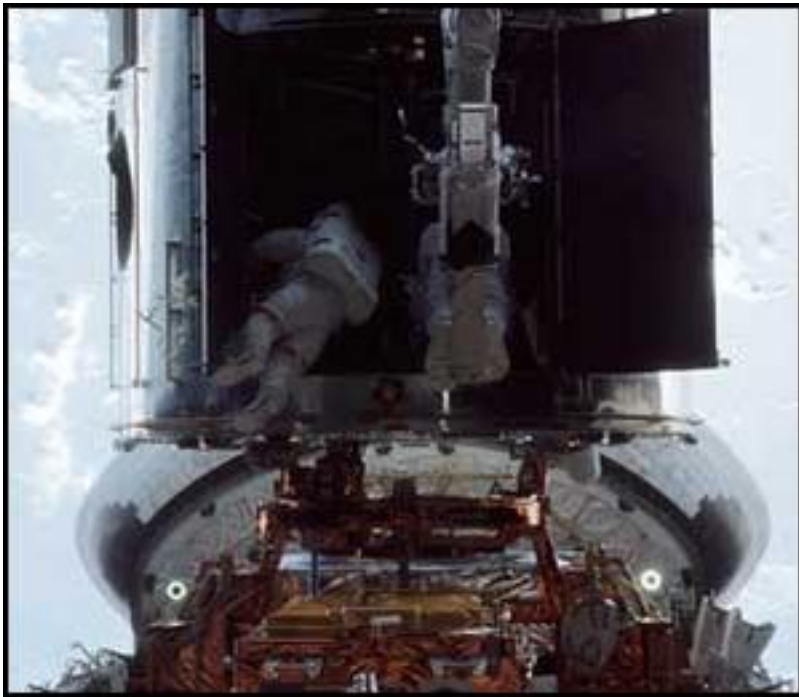
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[high res \(0.7 M\)](#) [low res \(60 K\)](#)

STS109-315-005 (8 March 2002) --- Barely visible within the Hubble Space Telescope's heavily shadowed shroud doors, astronauts John M. Grunsfeld (left) and Richard M. Linnehan participate in the final space walk of the STS-109 mission. The crew of the space shuttle Columbia completed the last of its five ambitious space walks early on March 8, 2002, with the successful installation of an experimental cooling system for Hubble's Near-Infrared Camera and Multi-Object Spectrometer (NICMOS). The NICMOS has been dormant since January 1999 when its original coolant ran out. Astronauts Grunsfeld and Linnehan began their third spacewalk of the mission at 2:46 a.m. CST. Linnehan was given a ride on the shuttle's robotic arm to the aft shroud doors by astronaut Nancy J. Currie, working from the aft flight deck of Columbia. After the shroud doors were open, Linnehan was moved back to Columbia's payload bay to remove the NICMOS cryocooler from its carrier. Grunsfeld and Linnehan then installed the cryocooler inside the aft shroud and connected cables from its Electronics Support Module (ESM). That module was installed on March 7 during a spacewalk by astronauts James H. Newman and Michael J. Massimino.

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[high res \(0.8 M\)](#) [low res \(70 K\)](#)

STS109-315-016 (8 March 2002) --- With five days of service and upgrade work on the Hubble Space Telescope (HST) behind them, the STS-109 crew members on board the Space Shuttle Columbia took an overall snapshot of the giant telescope in the shuttle's cargo bay. The seven-member crew completed the last of its five ambitious space walks early on March 8, 2002, with the successful installation of an experimental cooling system for Hubble's Near-Infrared Camera and Multi-Object Spectrometer (NICMOS). The NICMOS has been dormant since January 1999 when its original coolant ran out. The telescope received new solar array panels, markedly different in appearance from the replaced pair, on the mission's first two space walks earlier in the week.

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STS109-318-028 (8 March 2002) --- With five days of service and upgrade work on the Hubble Space Telescope (HST) behind them, the STS-109 crew members on board the Space Shuttle Columbia took an overall snapshot of the giant telescope in the shuttle's cargo bay.

[high res \(1.0 M\)](#) [low res \(95 K\)](#)

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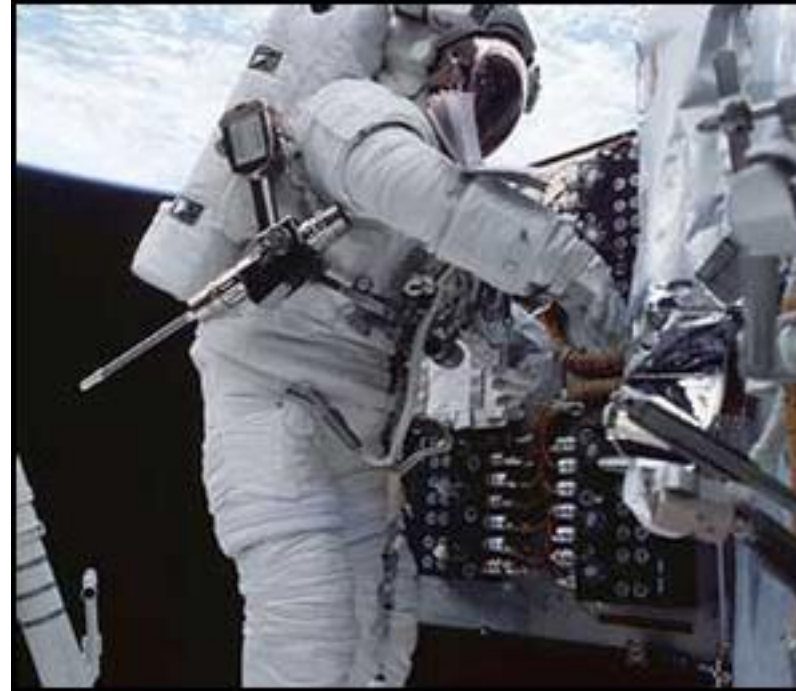


[high res](#) (1.0 M) [low res](#) (84 K)

STS109-319-034 (1-12 March 2002) -- Astronaut Duane G. Carey, STS-109 pilot, consults a reference manual on the flight deck of the Space Shuttle Columbia. Making his first trip into space, Carey has been very busy this week inside the crew cabin, assisting four space walking astronauts participate in five days of extravehicular activity (EVA) to perform work on the Hubble Space Telescope (HST).

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[high res \(0.9 M\)](#) [low res \(77 K\)](#)

STS109-322-003 (6 March 2002) --- Astronaut Richard M. Linnehan, STS-109 mission specialist, participates in the third of five space walks to perform work on the Hubble Space Telescope (HST). The third overall STS-109 extravehicular activity (EVA) marked the second of three for Linnehan, who was joined by astronaut John M. Grunsfeld on them all. On this particular walk, astronauts Linnehan and Grunsfeld turned off the telescope in order to replace its power control unit or PCU--the heart of the HST's power system.

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STS109-322-021 (6 March 2002) --- Astronaut Richard M. Linnehan, STS-109 mission specialist, participates in the third of five space walks to perform work on the Hubble Space Telescope (HST). The third STS-109 extravehicular activity (EVA) marked the second of three for Linnehan, who was joined by astronaut John M. Grunsfeld on all three. On this particular walk, astronauts Linnehan and Grunsfeld turned off the telescope in order to replace the heart of its power system.

[high res \(1.0 M\)](#) [low res \(69 K\)](#)

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[high res \(0.9 M\)](#) [low res \(70 K\)](#)

STS109-322-028 (6 March 2002) --- Astronaut Richard M. Linnehan, STS-109 mission specialist, participates in the third of five space walks to perform work on the Hubble Space Telescope (HST). Linnehan's sun shield reflects astronaut John M. Grunsfeld and the blue and white Earth's hemisphere as well as one of the telescope's new solar arrays. The third overall STS-109 extravehicular activity (EVA) marked the second of three for Linnehan and Grunsfeld, payload commander. On this particular walk, the two turned off the telescope in order to replace the power control unit or PCU--the heart of its power system. Grunsfeld took this photo with a 35mm camera.

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STS109-323-013 (7 March 2002) --- Astronaut Michael J. Massimino moves about in the cargo bay of the Space Shuttle Columbia while performing work on the Hubble Space Telescope (HST), partially visible behind him. Astronauts Massimino and James H. Newman (out of frame), mission specialists, were participating in the fourth STS-109 space walk (EVA-4).

[high res](#) (1.0 M) [low res](#) (89 K)

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STS109-323-035 (7 March 2002) --- Astronaut Michael J. Massimino, on the shuttle's robotic arm, prepares to install the Electronic Support Module (ESM) in the aft shroud of the Hubble Space Telescope (HST), with the assistance of astronaut James H. Newman (out of frame). The module will support a new experimental cooling system to be installed during the next day's fifth and final scheduled spacewalk of the mission. That cooling system is designed to bring the telescope's Near-Infrared Camera and Multi-Object Spectrometer (NICMOS) back to life.

[high res \(0.6 M\)](#) [low res \(42 K\)](#)

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[high res \(1.1 M\)](#) [low res \(95 K\)](#)

STS109-326-008 (5 March 2002) --- Astronaut Michael J. Massimino, mission specialist, works at the stowage area for the Hubble Space Telescope's port side solar array. Astronauts Massimino and James H. Newman removed the old port solar array and stowed it in Columbia's payload bay for a return to Earth. They then went on to install a third-generation solar array and its associated electrical components. Two crew mates had accomplished the same feat with the starboard array on the previous day.

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[high res \(1.1 M\)](#) [low res \(78 K\)](#)

STS109-326-031 (5 March 2002) --- The broad smiles of astronauts Michael J. Massimino (left) and James H. Newman reflect the success of their just-completed lengthy space walk designed to finish the replacement of the solar arrays on the Hubble Space Telescope (HST). A day earlier, two other astronauts replaced one of sets of solar panels. The two are in the process of doffing their extravehicular mobility unit (EMU) space suits on the mid deck of the Space Shuttle Columbia.

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[high res \(0.9 M\)](#) [low res \(72 K\)](#)

STS109-328-018 (5 March 2002) --- Astronaut Michael J. Massimino, STS-109 mission specialist, peers into Columbia's crew cabin during a brief break in work on the Hubble Space Telescope (HST), latched down just a few feet behind him in Columbia's cargo bay. Astronauts Massimino and James H. Newman were making their second extravehicular activity (EVA) of the mission.

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STS109-328-026 (5 March 2002) --- Perched on the end of the Columbia's remote manipulator system (RMS) arm, astronaut Michael J. Massimino, removes the old solar array on the port side of the Hubble Space Telescope (HST). Astronauts Massimino and James H. Newman went on to replace the array with a new one. A day earlier, two other astronauts accomplished the same feat on the starboard side.

[high res \(1.0 M\)](#) [low res \(78 K\)](#)

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STS109-331-005 (9 March 2002) --- The Hubble Space Telescope (HST) heads back toward its normal routine, after a week of servicing and upgrading by the STS-109 astronaut crew on board the Space Shuttle Columbia.

[high res \(1.0 M\)](#) [low res \(77 K\)](#)

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STS-109 Shuttle Mission Imagery



[high res \(0.9 M\)](#) [low res \(56 K\)](#)

STS109-331-010 (9 March 2002) --- The Hubble Space Telescope (HST) heads back toward its normal routine, after a week of servicing and upgrading by the STS-109 astronaut crew on board the Space Shuttle Columbia.

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STS109-346-002 (1-12 March 2002) ---
Astronaut Scott D. Altman, STS-109 mission commander, looks out an overhead window on the aft flight deck of the Space Shuttle Columbia.

[high res \(1.0 M\)](#) [low res \(75 K\)](#)

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[high res \(0.6 M\)](#) [low res \(31 K\)](#)

STS109-346-018 (3 March 2002) --- The Hubble Space Telescope (HST), with its normal routine temporarily interrupted, gets closer and closer to its capture by the Space Shuttle Columbia prior to a week of servicing and upgrading by the STS-109 astronaut crew. The shuttle's Remote Manipulator System (RMS) robotic arm was used to snare the telescope and latch it down into the cargo bay.

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[high res](#) (0.7 M) [low res](#) (68 K)

STS109-348-004 (3 March 2002) --- The Hubble Space Telescope (HST), with its normal routine temporarily interrupted, is berthed in the cargo bay of the Space Shuttle Columbia prior to a week of servicing and upgrading by the STS-109 astronaut crew. A thin blue line of airglow pin-points Earth's horizon at sunrise.

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[high res](#) (1.0 M) [low res](#) (75 K)

STS109-349-027 (4 March 2002) --- Astronauts John M. Grunsfeld and Richard M. Linnehan, STS-109 payload commander and mission specialist, respectively, wearing the liquid cooling and ventilation garment that complements the Extravehicular Mobility Unit (EMU) space suit, are photographed on the mid deck of the Space Shuttle Columbia after the mission's first session of extravehicular activity (EVA). The EVA-1 team replaced one of the telescope's two second-generation solar arrays, which is also known as SA2, and a Diode Box Assembly. The solar array was replaced with a new, third-generation solar array, which is called SA3. The space walkers also did some prep work for STS-109's other space walks.

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STS109-406-026 (1-12 March 2002) ---
Astronaut James H. Newman, STS-109 mission specialist, works with Payload and General Support Computers (PGSC) on the mid deck of the Space Shuttle Columbia.

[high res \(0.9 M\)](#) [low res \(78 K\)](#)

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[high res \(3.8 M\)](#) [low res \(114 K\)](#)

STS109-711-064 (7 March 2002) --- Two of Columbia's four spacewalkers--astronauts James H. Newman and Michael J. Massimino--participate in the first science instrument upgrade of the fourth Hubble Space Telescope (HST) servicing mission during the flight's fourth day of extravehicular activity (EVA). The two, with Newman on Columbia's remote manipulator system (RMS) robotic arm, removed the Faint Object Camera to make room for the new Advanced Camera for Surveys (ACS).

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[high res \(3.2 M\)](#) [low res \(139 K\)](#)

STS109-713-003 (8 March 2002) --- Astronaut John M. Grunsfeld, STS-109 payload commander, anchored on the end of the Space Shuttle Columbia's Remote Manipulator System (RMS) robotic arm, moves toward the giant Hubble Space Telescope (HST) temporarily hosted in the orbiter's cargo bay. Astronaut Richard M. Linnehan works in tandem with Grunsfeld during this fifth and final session of extravehicular activity (EVA). Activities for the space walk centered around the Near-Infrared Camera and Multi-Object Spectrometer (NICMOS) to install a Cryogenic Cooler and its Cooling System Radiator.

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[high res \(3.7 M\)](#) [low res \(159 K\)](#)

STS109-713-014 (8 March 2002) --- Astronauts John M. Grunsfeld (right) and Richard M. Linnehan, STS-109 payload commander and mission specialist, respectively, are photographed near the giant Hubble Space Telescope (HST) temporarily hosted in the Space Shuttle Columbia's cargo bay at the close of the fifth and final session of extravehicular activity (EVA). Activities for the space walk centered around the Near-Infrared Camera and Multi-Object Spectrometer (NICMOS) to install a Cryogenic Cooler and its Cooling System Radiator.

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STS109-715-038 (4 March 2002) --- Astronauts John M. Grunsfeld, STS-109 payload commander, works in tandem with astronaut Richard M. Linnehan, mission specialist, as the two devote their attention to the replacing one of the Hubble Space Telescope's (HST) two second-generation solar arrays, which is also know as SA2, and a Diode Box Assembly. The solar array was replaced with a new, third-generation solar array, which is called SA3. Linnehan stands on a foot restraint on the end of the Space Shuttle Columbia's Remote Manipulator System (RMS). The space walkers also did some prep work for STS-109's other sessions of extravehicular activity (EVA).

[high res \(3.3 M\)](#) [low res \(115 K\)](#)

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[high res \(3.6 M\)](#) [low res \(117 K\)](#)

STS109-716-025 (4 March 2002) --- Astronaut Richard M. Linnehan, STS-109 mission specialist, anchored on the end of the Space Shuttle Columbia's Remote Manipulator System (RMS) robotic arm, unfolds a solar array during the mission's first scheduled session of extravehicular activity (EVA). Astronaut John M. Grunsfeld (out of frame), payload commander, works in tandem with Linnehan during the space walk to replace one of the two Hubble Space Telescope's (HST) second-generation solar arrays, which is also known as SA2, and a Diode Box Assembly. The solar array was replaced with a new, third-generation solar array, which is called SA3. The space walkers also did some prep work for STS-109's other sessions of extravehicular activity (EVA).

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[high res \(2.7 M\)](#) [low res \(61 K\)](#)

STS109-730-034 (9 March 2002) ---
Backdropped by the horizon of the blue and white Earth and the blackness of space, the Hubble Space Telescope (HST) floats gracefully after the release from Columbia's robot arm at the close of a successful servicing mission. The event marks the fifth time in history that a Space Shuttle has released the great observatory. Those occasions were the initial release in 1990 and four subsequent servicing missions including STS-109.

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STS109-E-5904 (9 March 2002) --- Astronaut John M. Grunsfeld, STS-109 payload commander, holds a camera on the aft flight deck of the Space Shuttle Columbia. The image was recorded with a digital still camera.

[high res](#) (1.1 M) [low res](#) (88 K)

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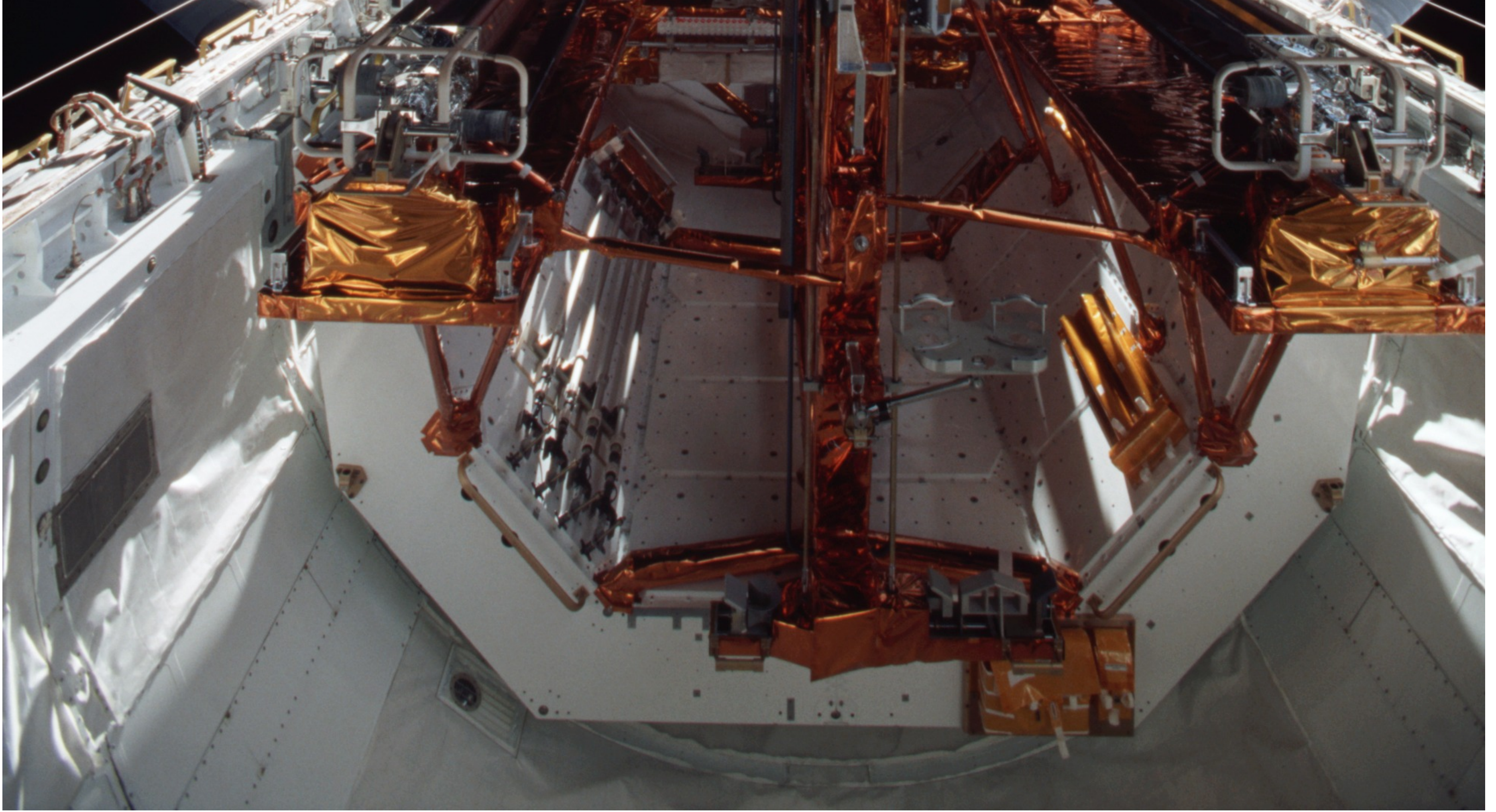
STS109-E-6032 (11 March 2002) --- On the Space Shuttle Columbia's mid deck, the crewmembers for the STS-109 mission pose for the traditional in-flight portrait. From the left (front row), are astronauts Nancy J. Currie, mission specialist, Scott D. Altman, mission commander, and Duane G. Carey, pilot. From the left (back row), are astronauts John M. Grunsfeld, payload commander, and Richard M. Linnehan, James H. Newman, and Michael J. Massimino, all mission specialists. The image was recorded with a digital still camera.

[high res \(1.2 M\)](#) [low res \(75 K\)](#)



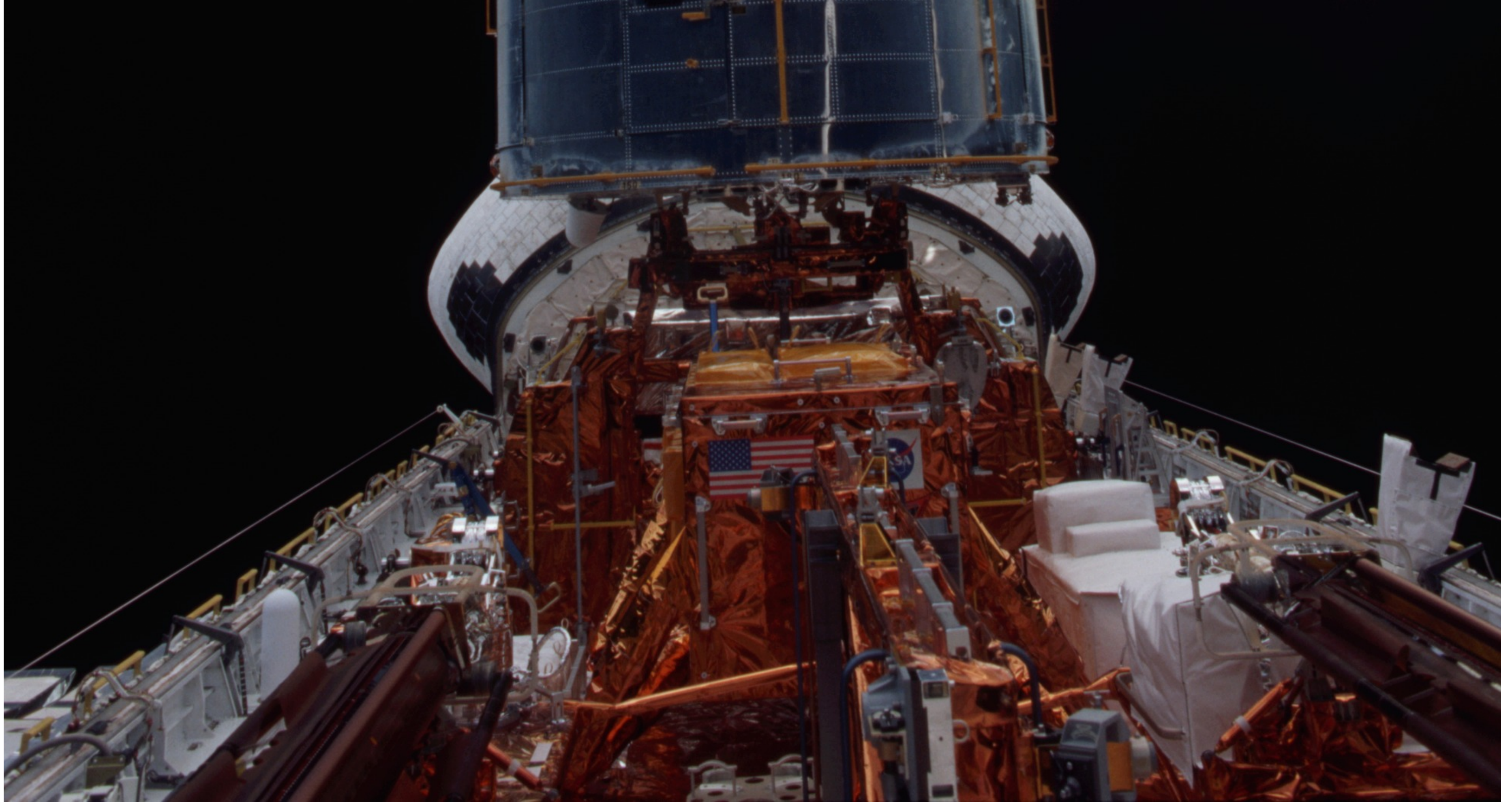








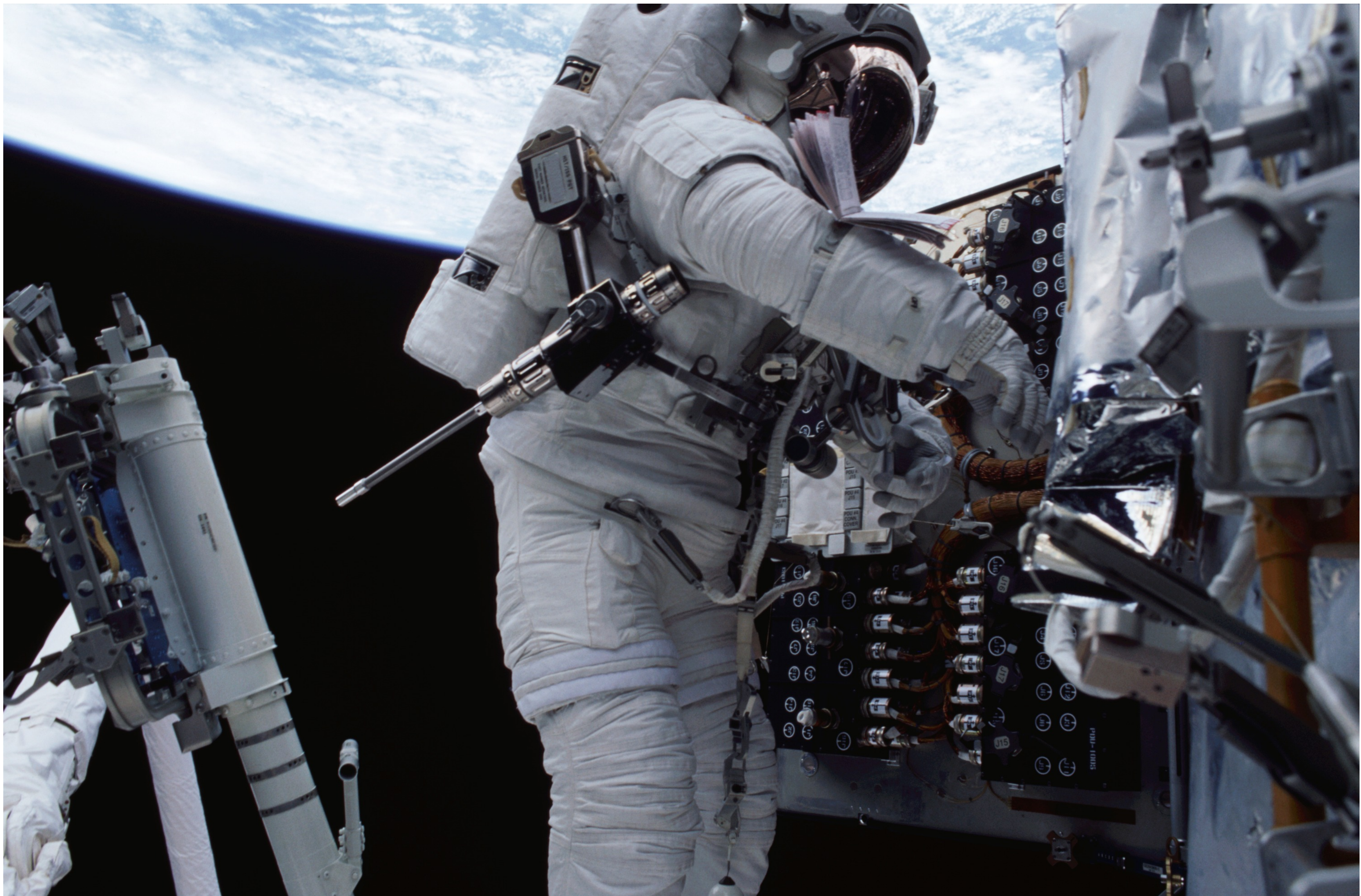


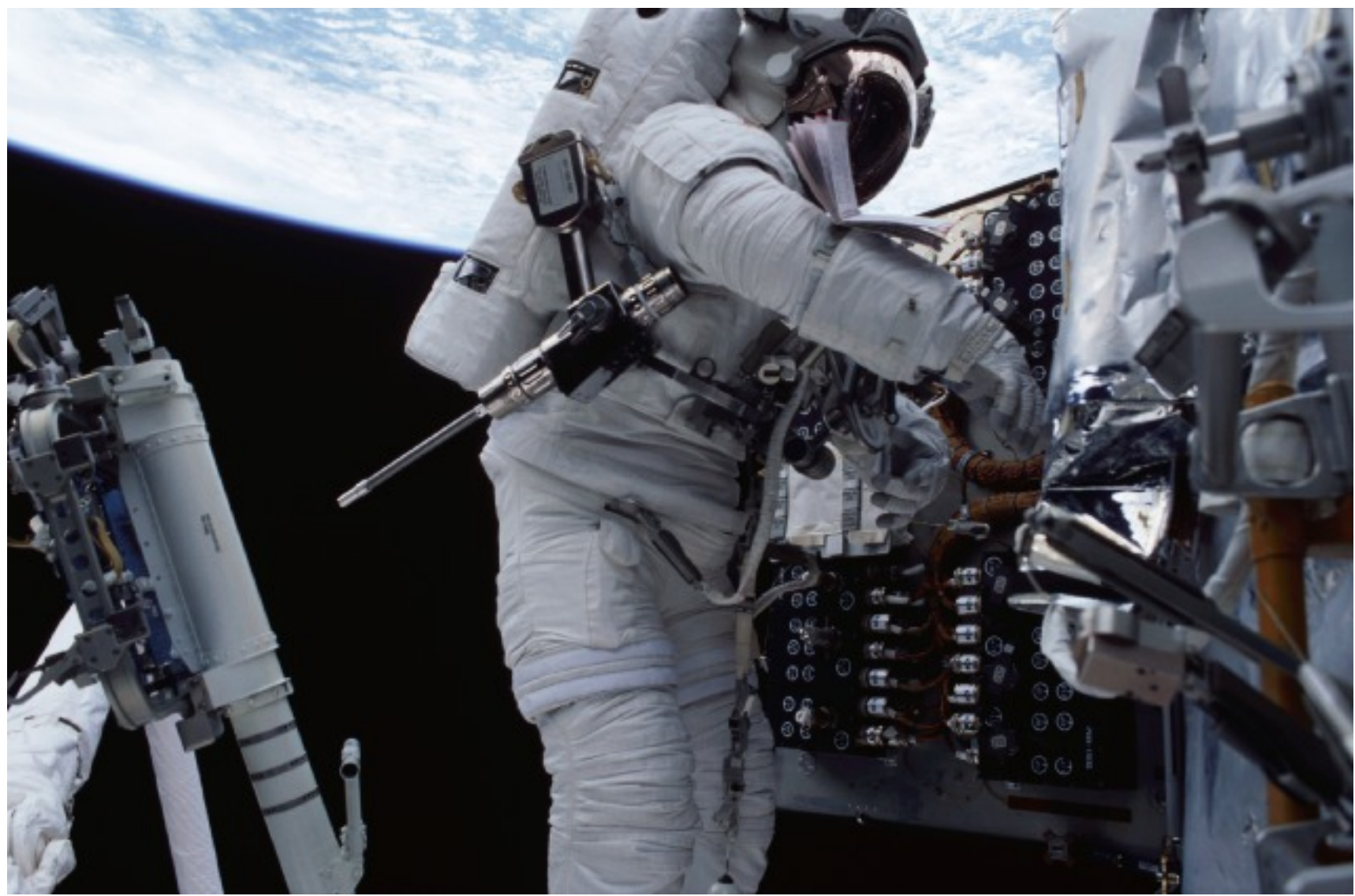






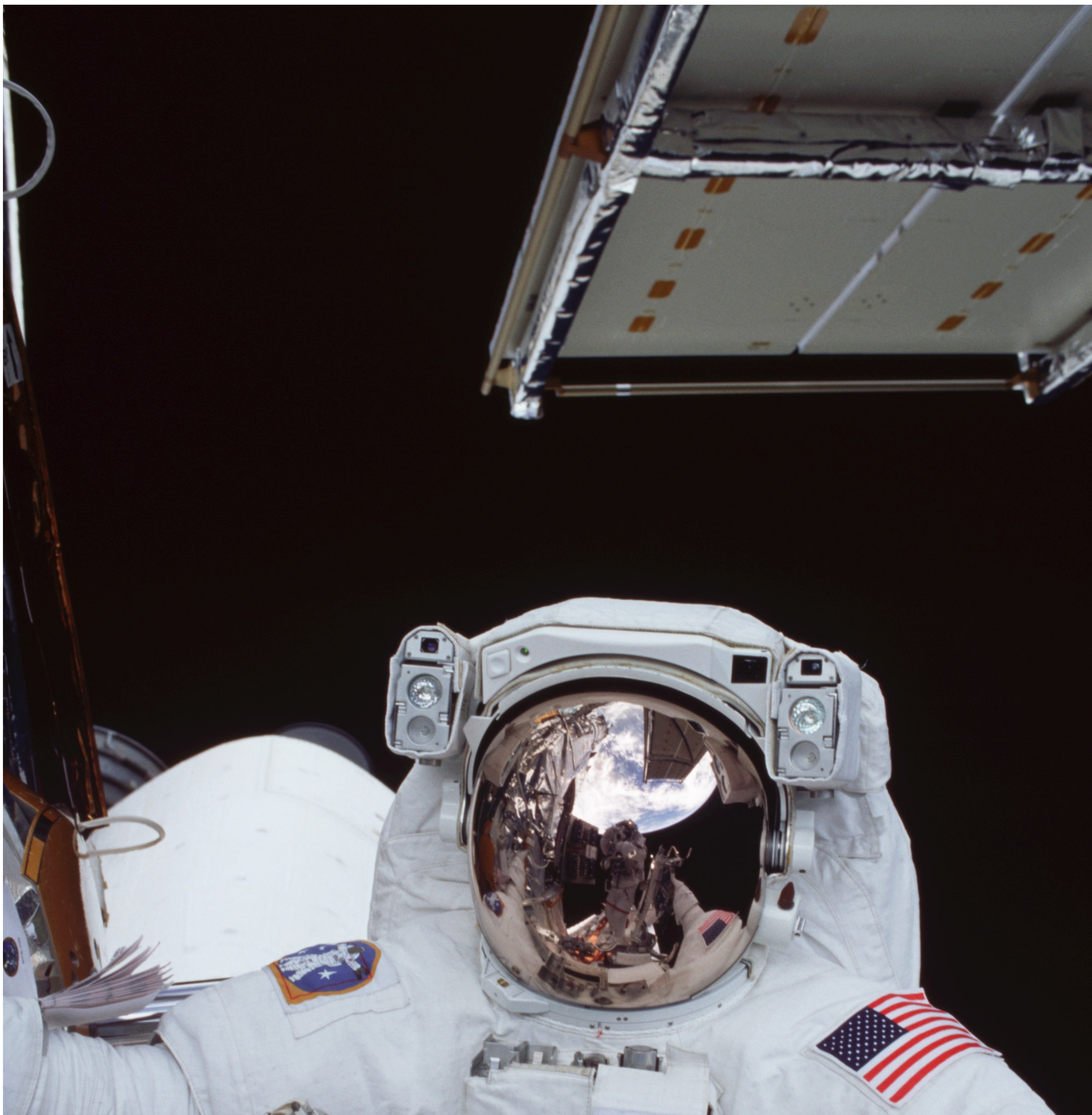


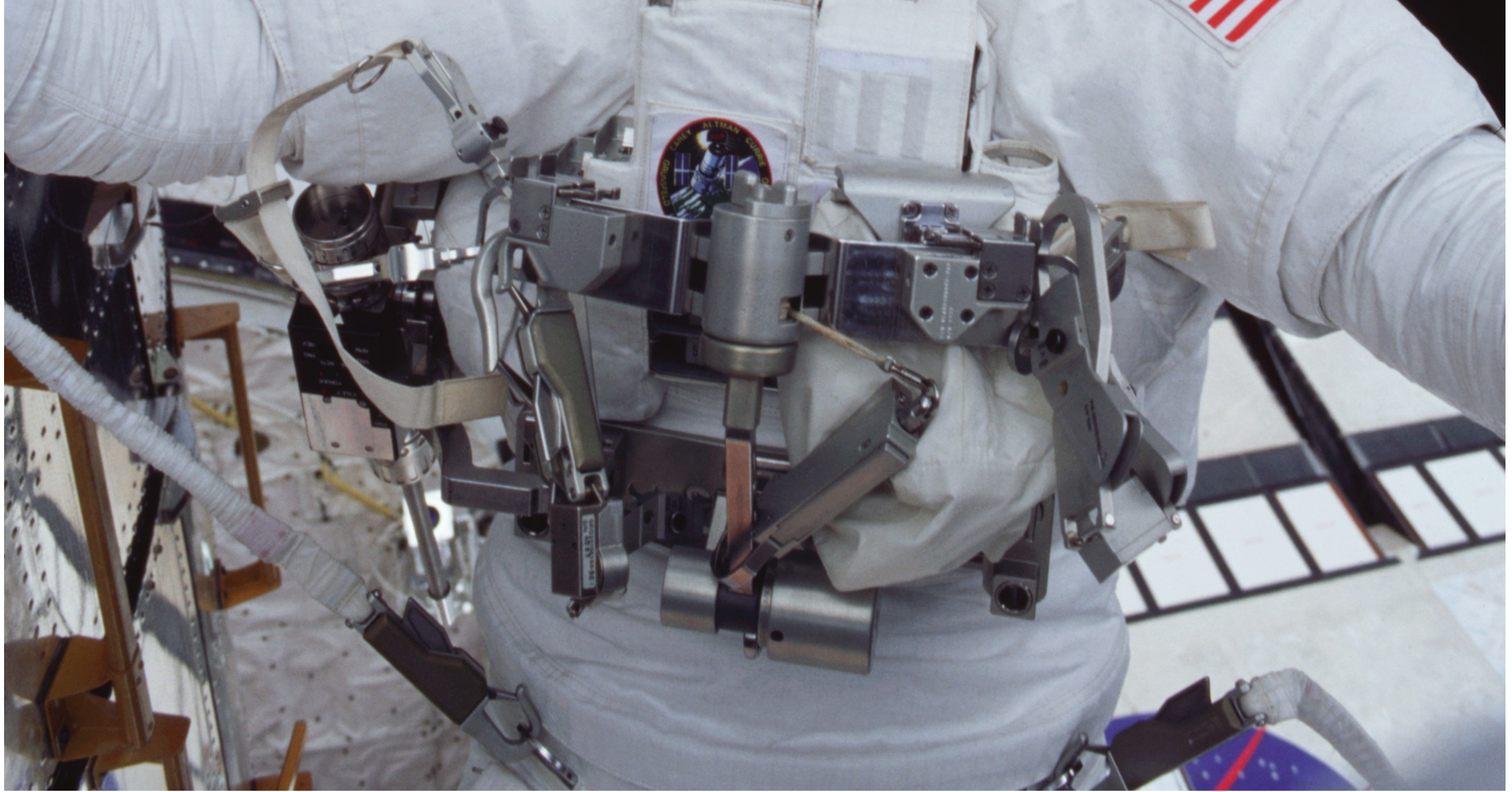












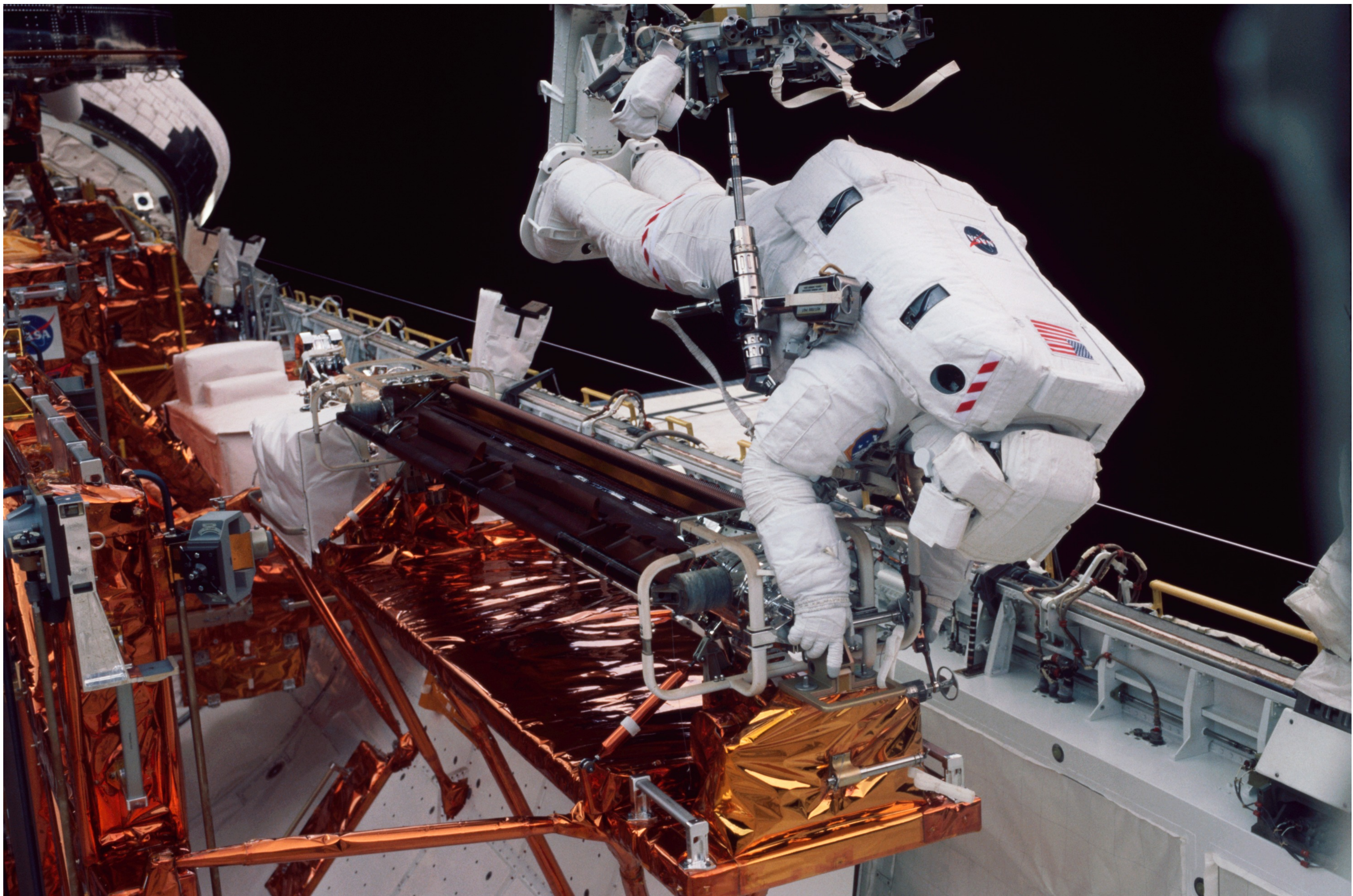


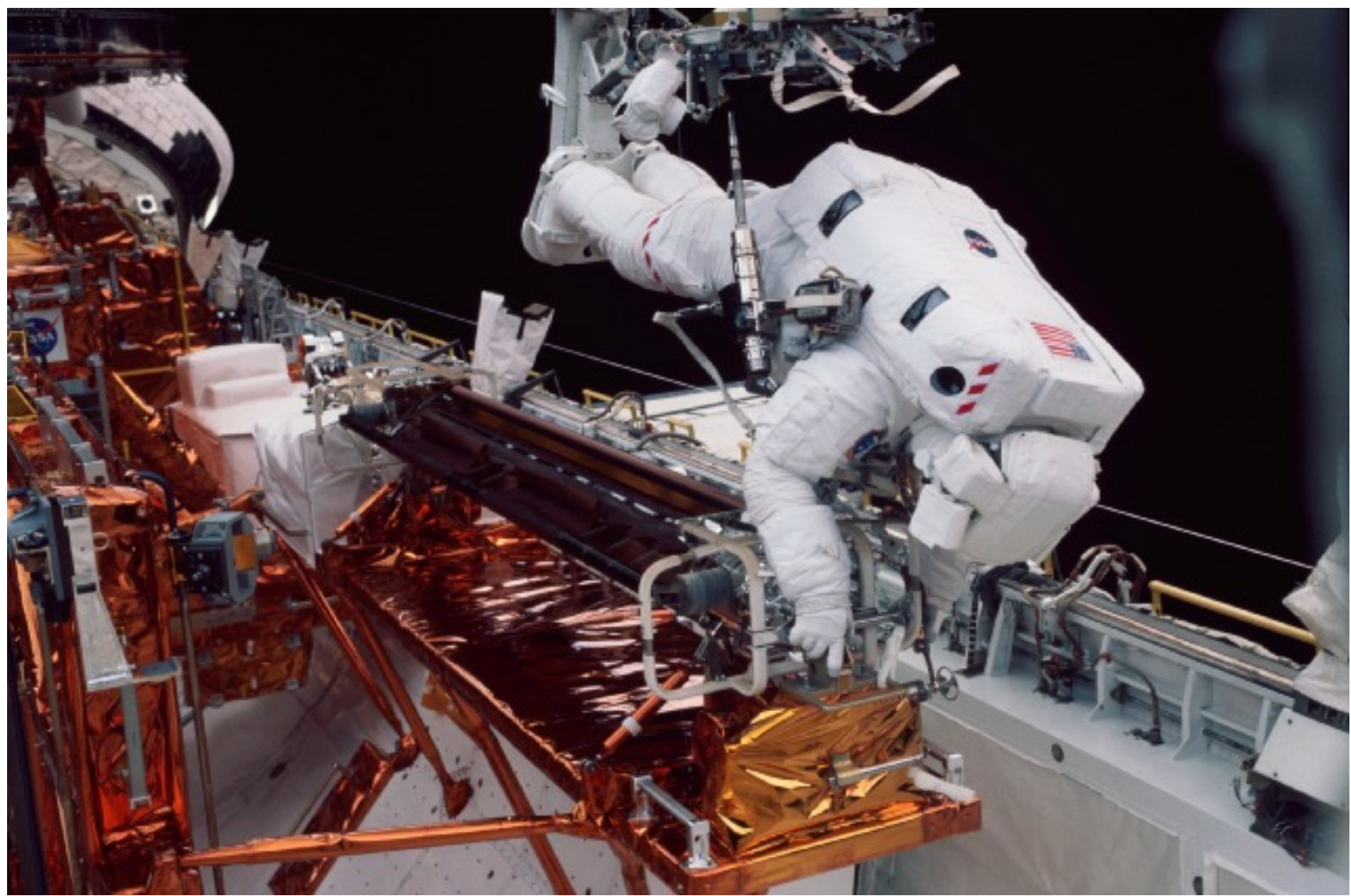


























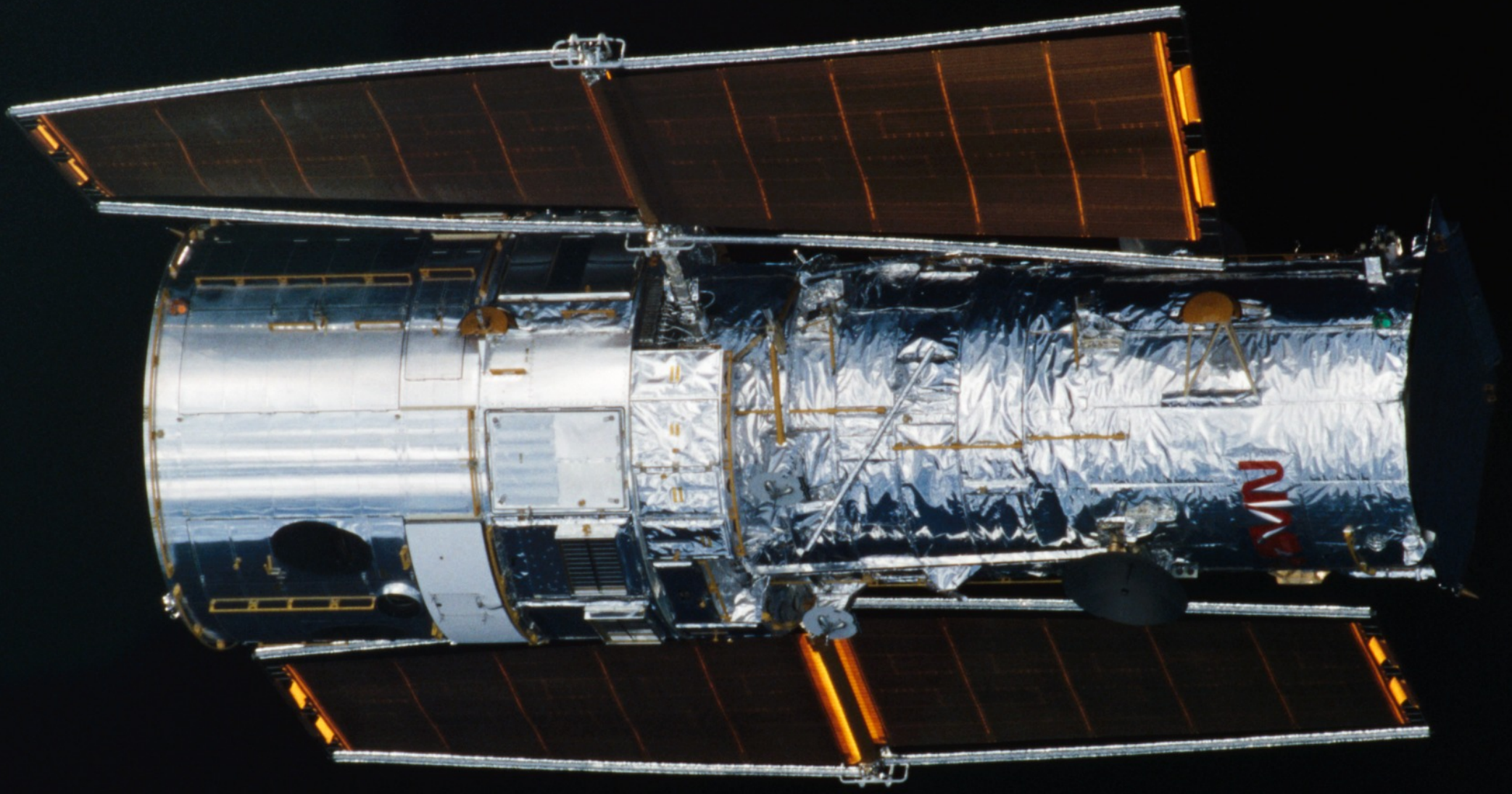




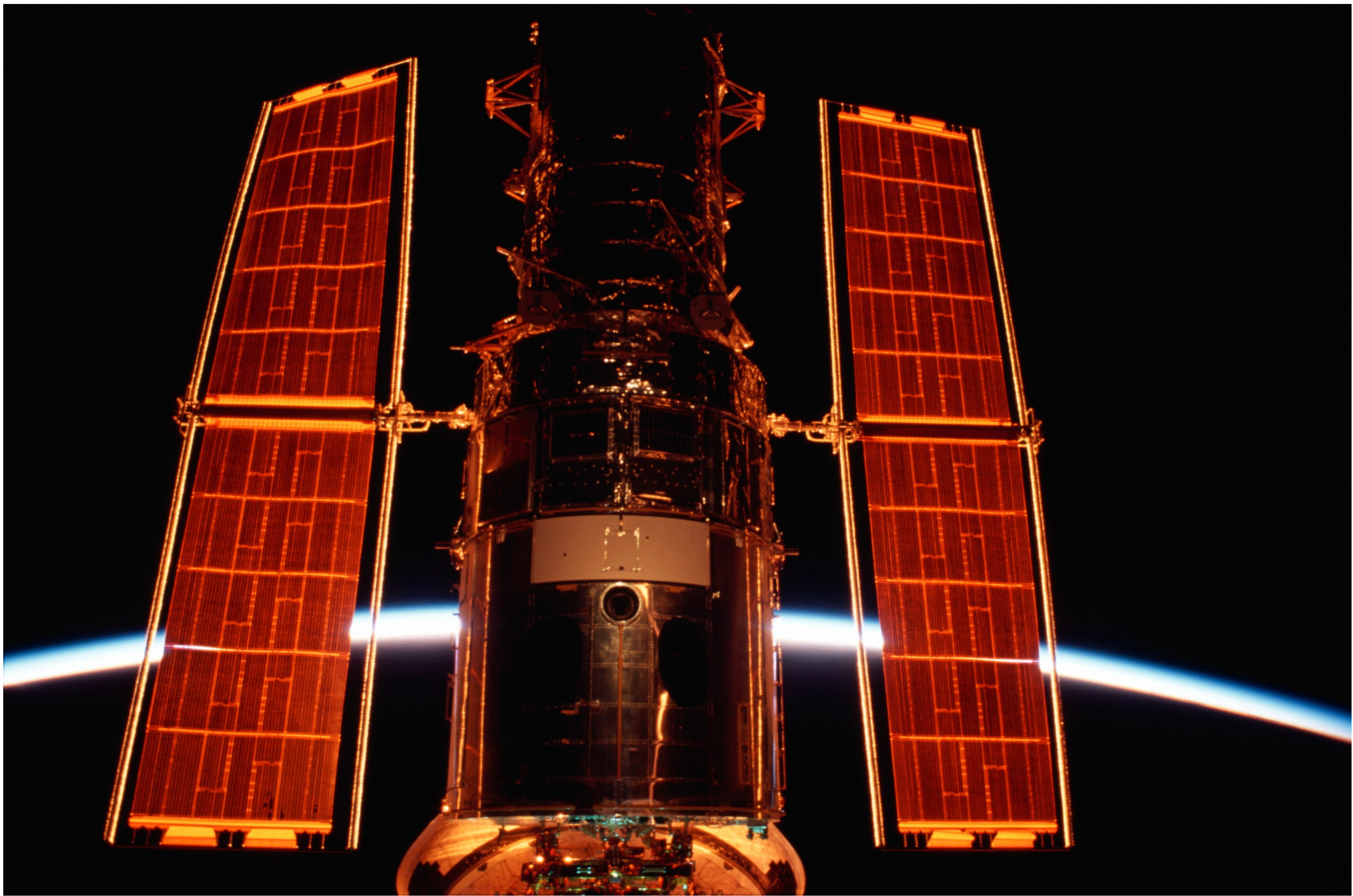


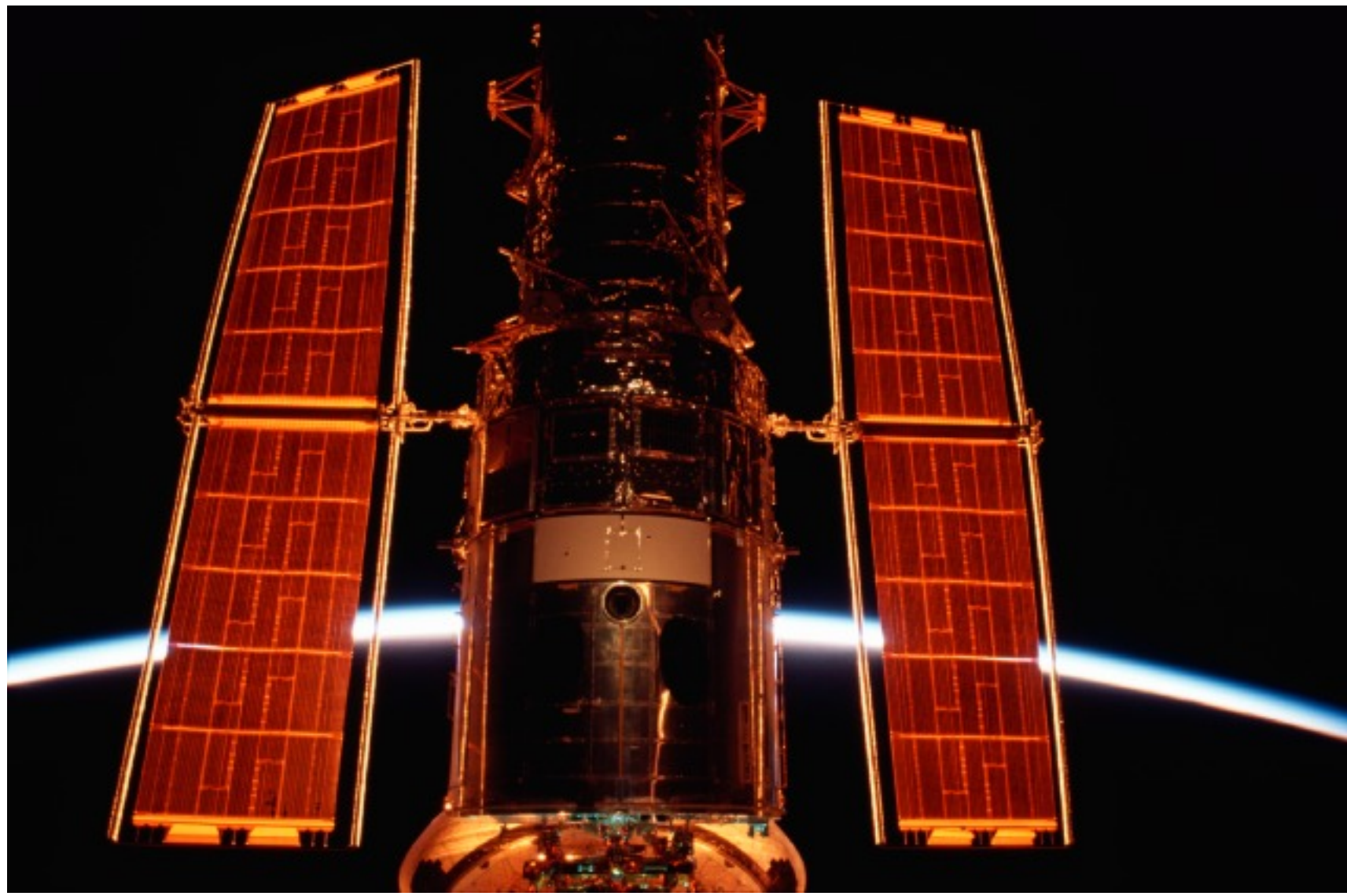










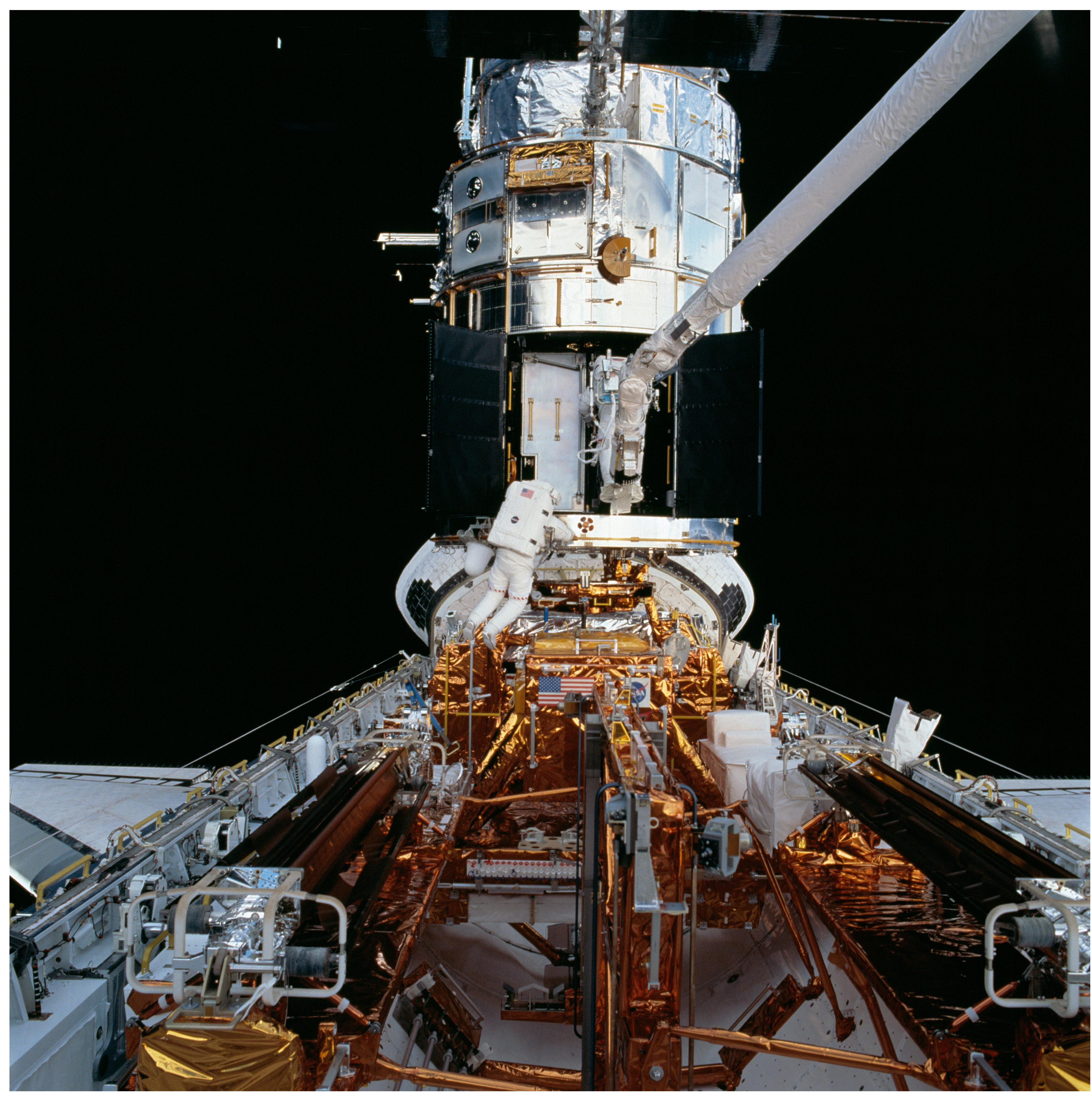




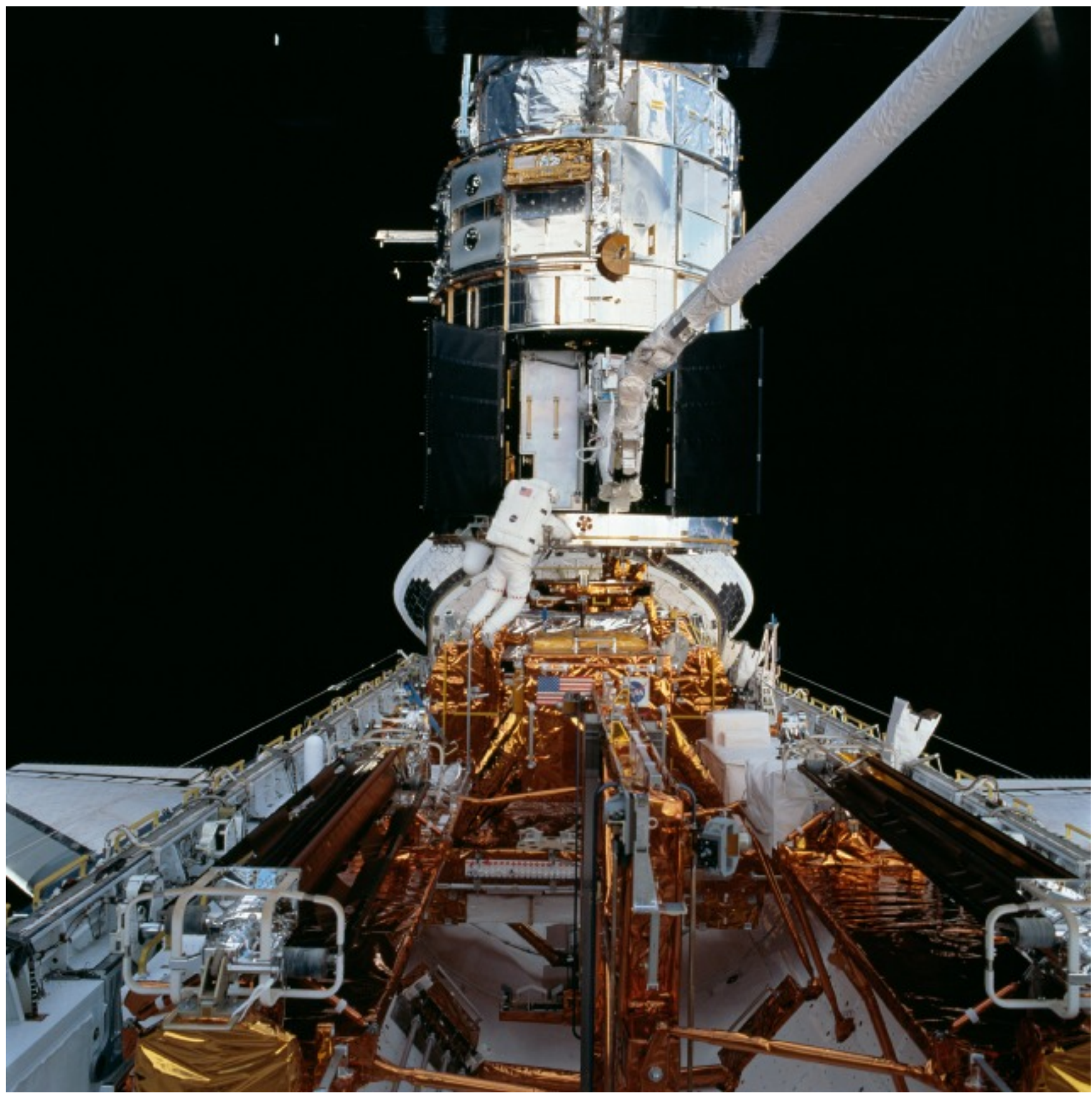


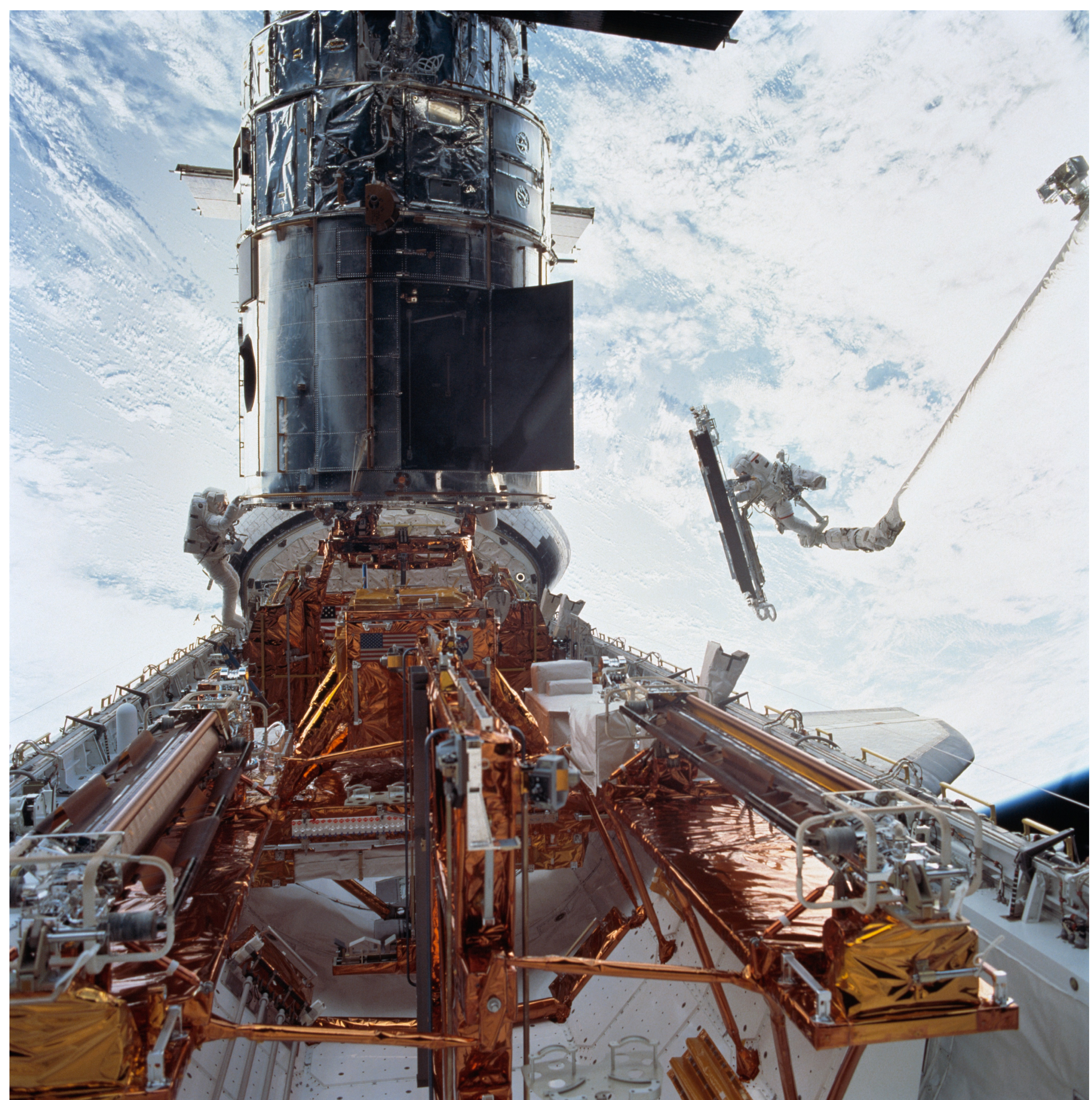












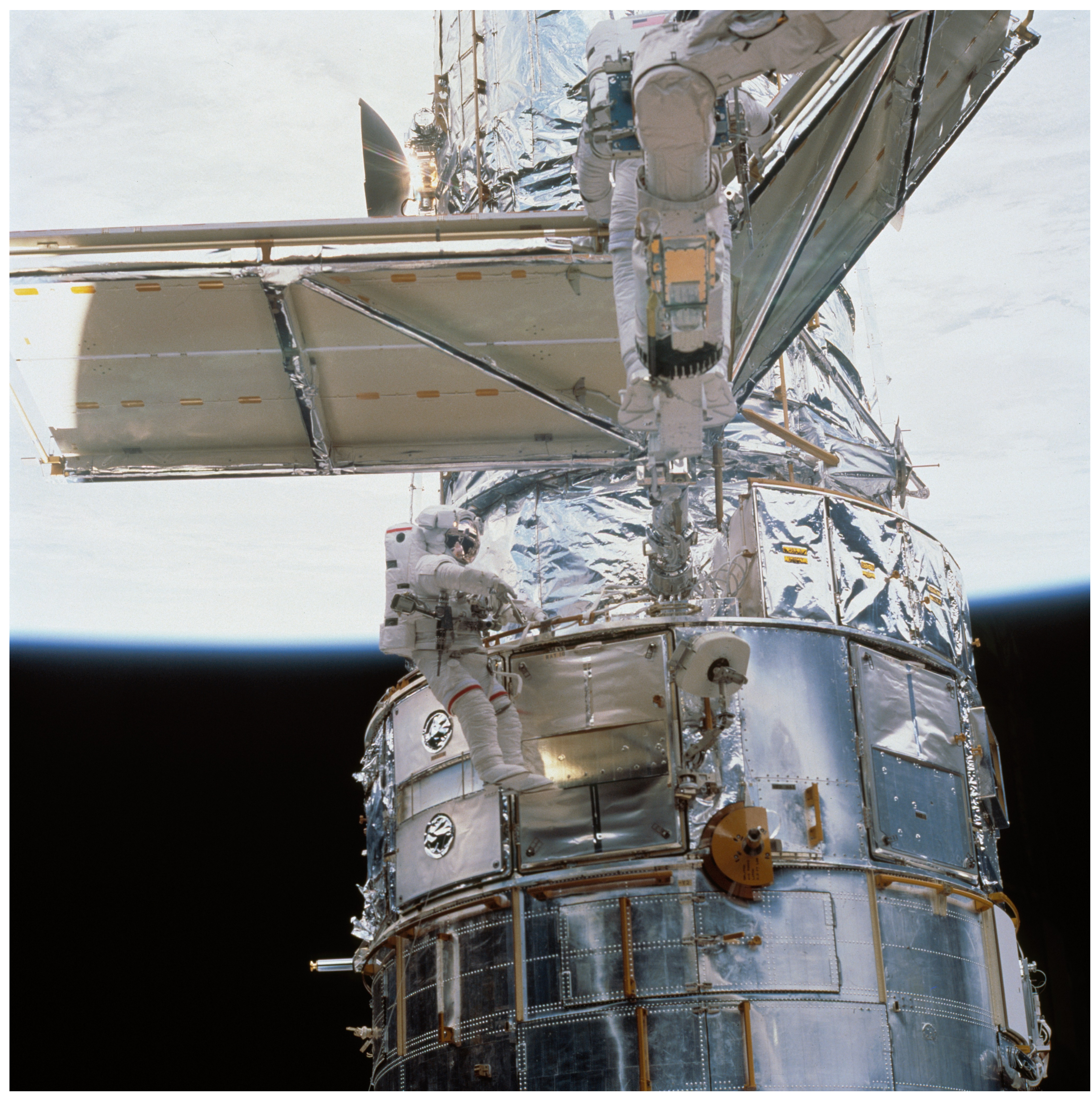














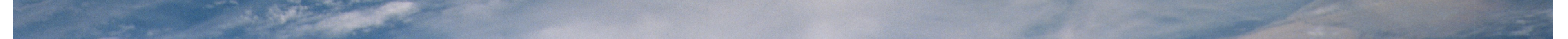
















KU OPS

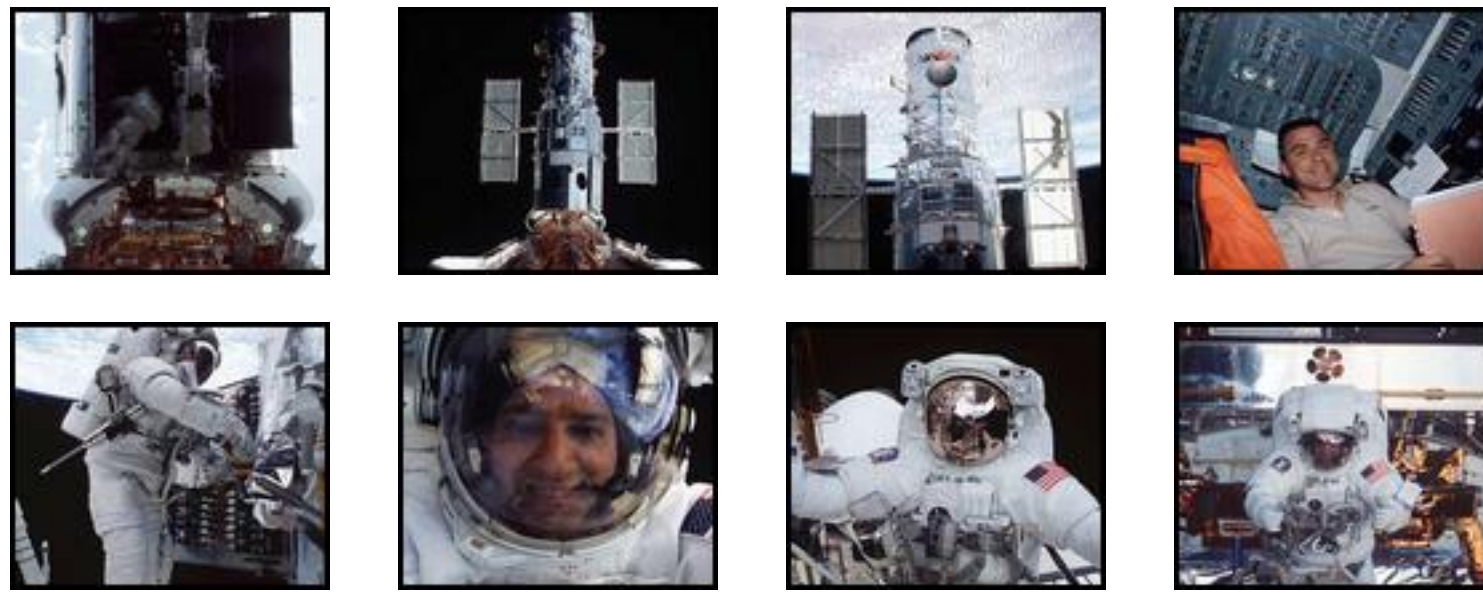
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RDR ITEM 21 - M
Angle ITEM 24 - M
KU ANT ENA - ITEM 2 EXEC (M)
GND I/O RESET
DSD-DIS Ref - RDRDOT
KU MODE - RDR PASSIVE
RDR OUTPUT - M
CNTL - PNL
KU Ref - GPC >>>
2. AUTO TRK ACQ
KU Ref - AUTO TRK
SLEW - as req'd (as seen in COAS)
FL AZ angle < 30 deg
KU SEARCH - SEARCH (B-gray)
Repeat time and search as req'd
If acquisition not successful - MCC >>>
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[high res \(1.0 M\)](#) [low res \(95 K\)](#)

