

"KH-12"

STS-62C & STS-62D

Add-on for Orbiter2010-P1 (build 100830)
v. 120124

INSTALLATION

Unzip into your Orbiter folder as usual.
Should not overwrite any standard Orbiter files.

REQUIREMENTS

Can be used with no other add-ons

RECOMMENDED (optional)

Shuttle Fleet 4.8

<http://www.orbithangar.com/searchid.php?ID=5531>

Kev's SLC-6

<http://www.orbithangar.com/searchid.php?ID=1331>

Precession MFD

<http://www.orbithangar.com/searchid.php?ID=4889>

Note: Shuttle Fleet 4.8 requires Universal UMMU 2.0

<http://orbiter.dansteph.com/index.php?disp=d>

INCLUDES

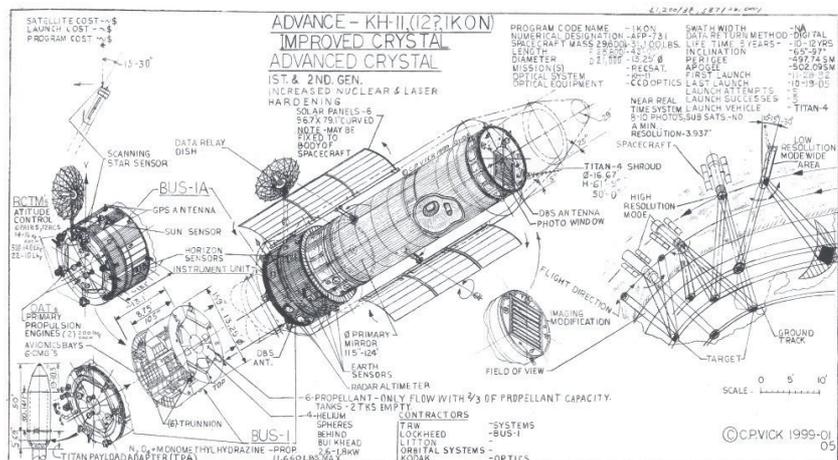
KH-12 satellite. Also includes Shuttle cargo-bay pallets, satellite docking system, EVA astronauts and replacement fuel tanks for servicing mission.

Satellite launch (STS-62C) and Servicing Mission launch (STS-62D) scenarios for default Atlantis and ShuttleFleet4.8

"KH-12" OVERVIEW

The KH-12 is an optical reconnaissance satellite equipped with a high resolution CCD.

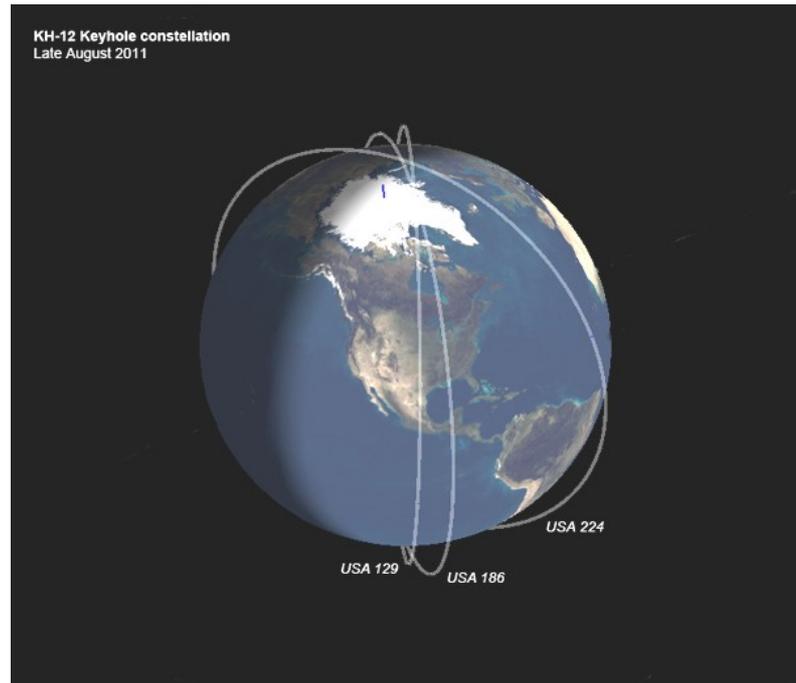
Originally designed for launch and servicing by the Shuttle, the initial launch schedule for 1986 (STS-62C) was cancelled and the KH-12 satellites have since used the Titan IV booster.



ORBIT

KH-12 uses a high-inclination 98° sun-synchronous orbit, at approximately 656km altitude, targeting either 9.00AM or 12.00PM (midday) local time at the equator.

Sun-synchronous orbits use the Earth's non-symmetrical gravity field to cause a precession of the orbit LAN such that the orbit maintains its plane relative to the Earth-Sun line. You must have "Non spherical gravity" enabled on your Orbiter launchpad to see this effect.



KH-12 SPECIFICATIONS

Empty mass	12500kg
Fuel mass	1000kg
Main Engine (4xRCS)	200N
RCS (Rotation only)	50N

KH-12 CONTROLS

V = Deploy HGA	(auto Earth tracking)
B = Deploy Solar Arrays	(auto Sun tracking)
N = Open/Close Louvres	
M = Lock/Release Solar Arrays and HGA	(for servicing)

STS-62D-Payload CONTROLS (STS-62D servicing mission)

B = Payload Bay light On/Off
J = Create EV1 (EVA astronaut)
K = Create EV2 (EVA astronaut)

EVA Astronaut (EV1/EV2) CONTROLS (STS-62D servicing mission)

B = Light On/Off
G = Grapple/Release
V = End EVA (if < 1m from docking port)
F5 = Show Attachment Points
[↑][↓] = Raise/Lower arms
[←][→] = Rotate hand
[Shift]+[↑][↓] = Bend Up/Down
[Shift]+[←][→] = Turn Left/Right

SCENARIOS

Two hypothetical scenarios:

STS-62C Launch KH-12 from Vandenberg, 1986

STS-62D Launch KH-12 Servicing/Refuel mission from Vandenberg, 1987

STS-62C Launch

Shuttle: Discovery

Launch from Vandenberg

19 Sept 1986 17:30:00 UTC

Launch to 98° inclination, 656km circular orbit

(You can use "Precession MFD" to check your orbit is Sun-synchronous)

Deploy KH-12

Land at VAFB

STS-62D Servicing Mission Launch

Shuttle: Discovery

Launch from Vandenberg

07 Jan 1987 17:45:00 UTC

Rendezvous with KH-12

Replace KH-12 fuel tanks

Land at VAFB

SHUTTLE FLEET 4.8 NOTES

The launch autopilot is set for the correct launch azimuth and there is a full complement of UMMU crew on board.

STS-62D Servicing Mission Notes

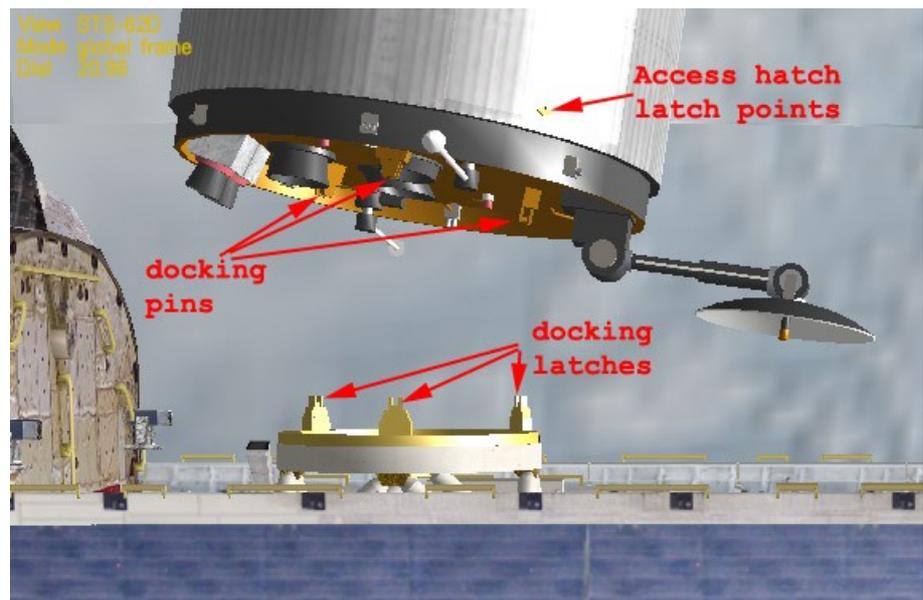
Before rendezvous, lock the KH-12 solar arrays and HGA.

Grapple the KH-12 with the Shuttle RMS arm and place it on the docking ring in the shuttle payload bay.



Align the docking pins on KH-12 with the docking latches then release KH-12 from the RMS arm.

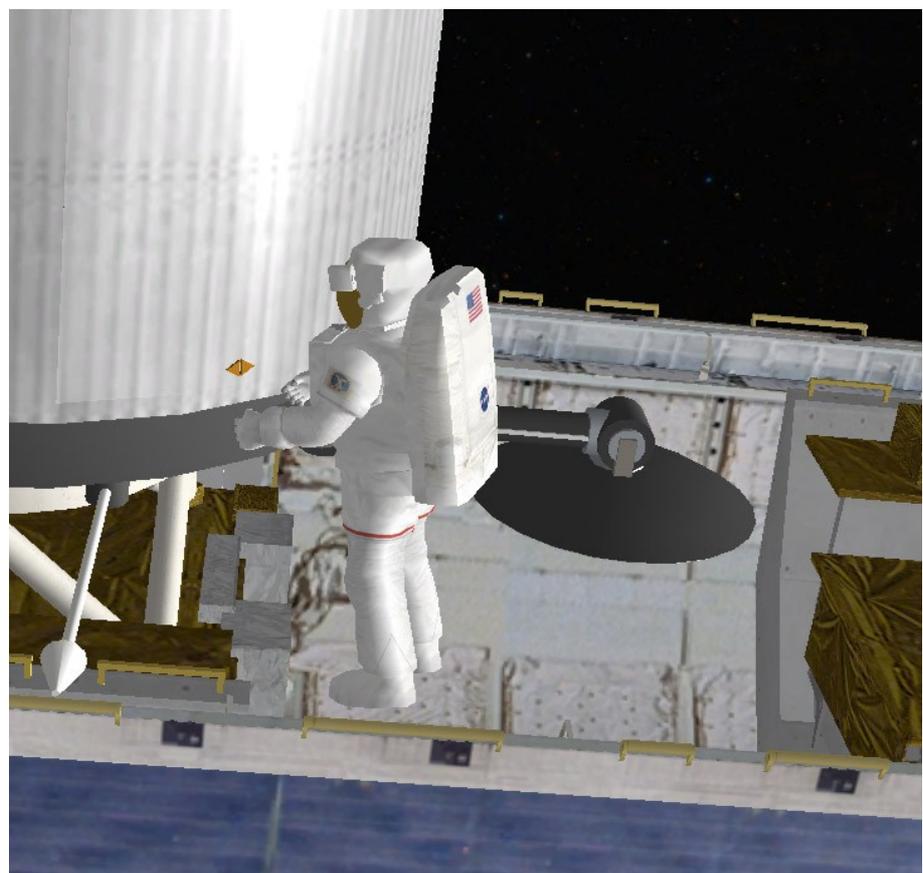
It will automatically be attached to the docking ring and an on-screen message "Secured" is displayed.



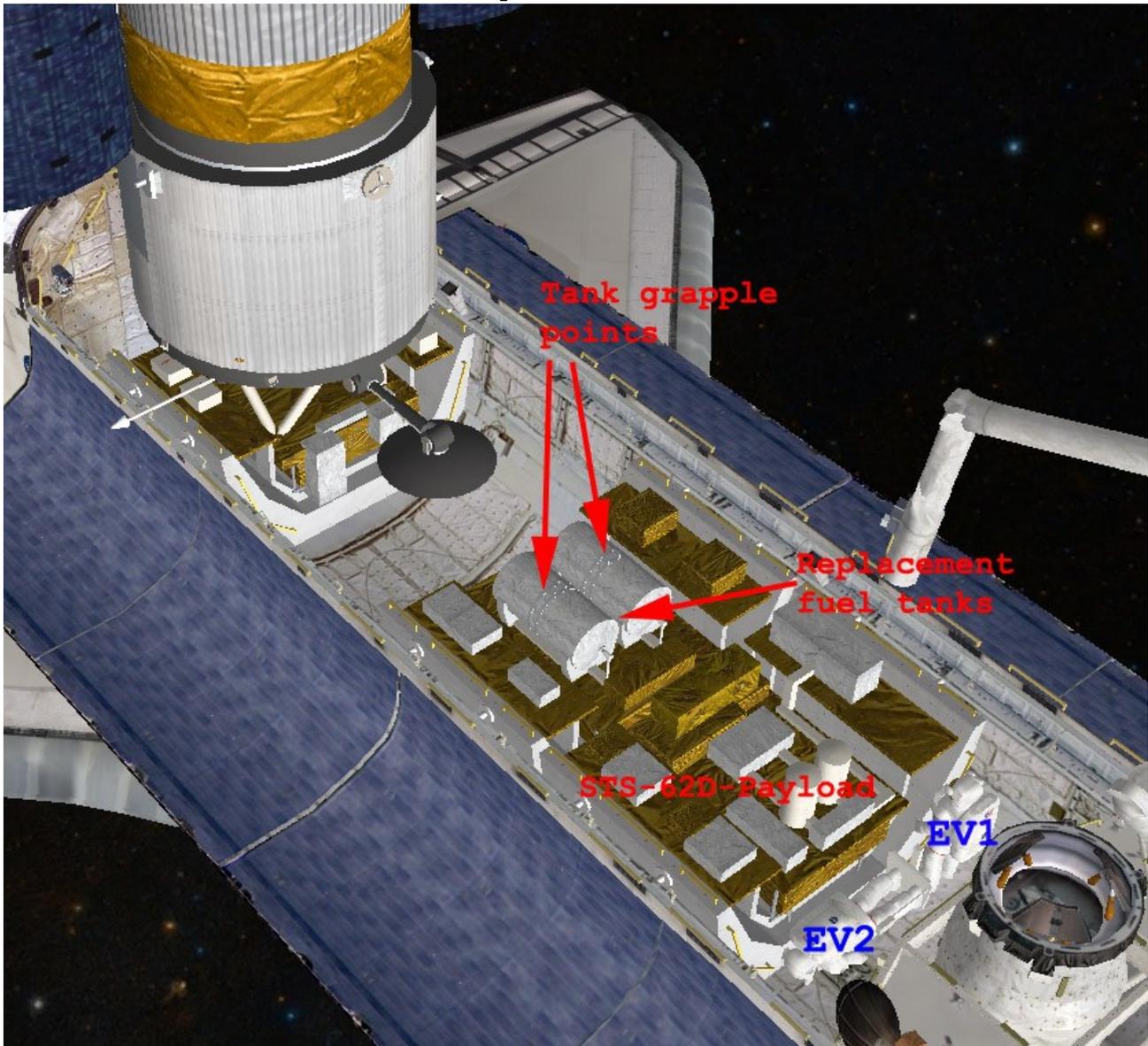
The KH-12 contains two replaceable fuel tanks, accessed by hatches in the aft section.

The access hatches are opened or closed by placing a grapple point (Shuttle RMS arm or EVA astronaut hand) close to the latch point on the hatch.

(latch points are indicated by a small gold triangle on the mesh)



"STS-62D-Payload" vessel carries the replacement fuel tanks and has a light for illuminating the payload bay. It can also create the two EVA astronauts "EV1" and "EV2". (ShuttleFleet users can use the UMMU crew for EVA if preferred)



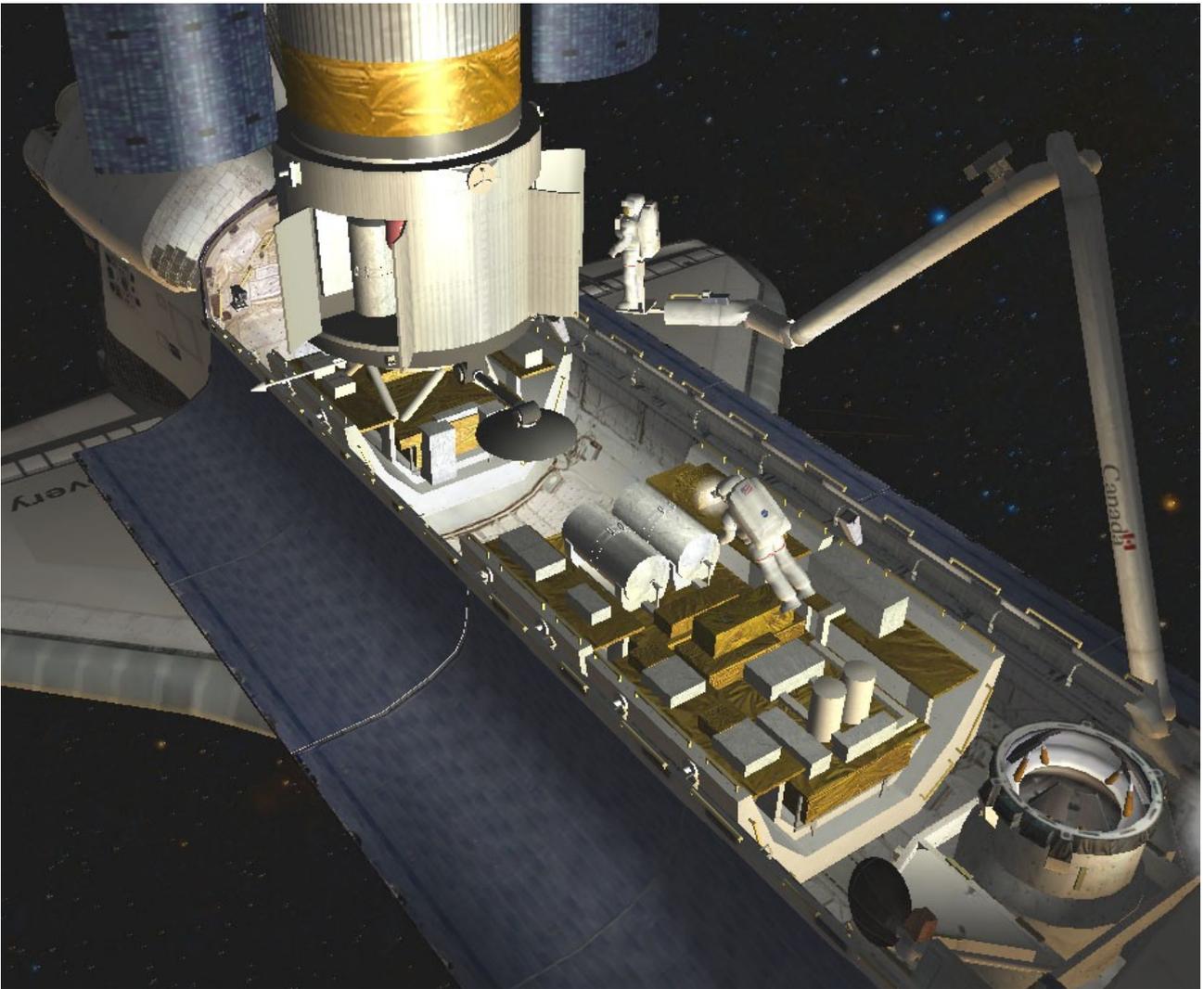
Both EVA astronauts are equipped with a head-mounted light and a grapple point on the right hand.

EV1 can move around the payload bay, but remains attached to the STS-62D-Payload vessel.

EV2 cannot move, but is equipped with a footpad for attachment to the Shuttle RMS arm.

To end the EVA, move within 1m of a docking port and press V.

Fuel tanks may be grappled by the handles. Place the tank in the correct position on KH-12 or the payload bay carrier, then release. The tank will be secured automatically if closer than 0.5m from correct position.



When the tanks are replaced, the KH-12 fuel increases by 500kg per tank.

Once the KH-12 has been refuelled, close the access hatches, release the satellite and come on home!

Happy Orbiting!
BrianJ