

HyperDart Spaceplane System



SUMNER SPACE SYSTEMS

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Required Add-ons:

Universal Remote Manipulator System by Yury Kulchitsky - available at <http://www.orbithangar.com/searchid.php?ID=3373>

Universal MMU by Dan Steph - available at <http://orbiter.dansteph.com>

AeroBrakeMFD is recommended but not required, a ship data file for the HyperDart is included. - available at <http://www.orbithangar.com/searchid.php?ID=2139>

The HyperDart Spaceplane System

The HyperDart Space System is designed as a “near-future tech” space system. The designs are built to represent what could have been if some prototype and design studies had been further perused.

The HyperDart is based off the FDL-7 hypersonic lifting body glider designed in the late 1950's to support the Air force's MOL program. When the MOL program was cancelled the need for the FDL-7 disappeared. The HyperDart features an all composite structure. Currently Planet space has revived the design as the basis for their Silver Dart Commercial space venture.

The XL-70 is based off the XB-70 Mach 3 bomber that first flew on 21 September 1964. The performance has been enhanced from Mach 3.0 to Mach 3.5 to allow for improvements to material and engine technologies. The Design has been slightly altered by moving the vertical stabilizers outboard to the wing fold hinges. This allows a clear path for the HyperDart.

The final craft included is the MiniLander. This was originally a small three place lifeboat. Further development has been delayed due to sever aerodynamic problems. The craft works nicely in the absence of an atmosphere though. It is not included in any of the scenarios, but can be added through scenario editor.

All three craft feature fully functional virtual cockpits (VCs) with interactive controls. The HyperDart and MiniLander are fully UMMU compatible.

Included Scenarios

The included scenarios follow the initial testing and first operational mission of the HyperDart System. The following scenarios are located in the “S3” scenario directory:

Mission 1 – XL-70 Flight Test (10 May 2015) – The first flight of the XL-70.

Mission 2 – HyperDart Glide Test (16 June 2015) – Test the flight dynamics of the HyperDart.

Mission 3 – HyperDart Orbital Test (20 June 2015) – First orbital test of the HyperDart.

Mission 4 – ISS Intercept (1 July 2015) – Launch from KSC and intercept the ISS with the HyperDart.

Mission 5 – IMINT Satellite Intercept (12 January 2016) – The Russians have launched what is believed to be an imagery satellite, use the HyperDart to investigate it.

More Details can be found in the description of each scenario.

HyperDart Cockpit



1. Engine Mode Selector - OMS, OFF, or Main (Aerospikes)
2. RCS Mode Selector - OFF, Rotation, Linear
3. Aero Surface Mode Selector - OFF, Elevator Only, Full Control
4. Gear Switch
5. Bay Door Switch
6. Master Warning Light and Reset Button
7. Left MFD and Control Buttons
8. Right MFD and Control Buttons
9. Payload Release Button (press twice within 5 seconds)
10. Center of Gravity (left) and Trim (right) Adjustment and Indicators
11. Fuel Levels (Main, OMS, RCS)
12. Dynamic Pressure Indicator
13. Autopilot Selector Switches
14. HUD Mode Selector Switches
15. Light Switches (Beacon, Nav, Strobe)
16. Throttle Quadrant

When Dynamic Pressure reaches 80% of the max value the Master Warning light will illuminate. Once dynamic pressure lowers below this level the reset button may be used to extinguish the master warning light. If max dynamic pressure is exceeded random failures may occur (left wing, right wing, lifting body, elevators and ailerons) When a failure occurs the Master Warning Light will illuminate along with an indicator light for the failed system.

Throttle position for the selected engines may be changed with keyboard commands or by clicking on the throttle quadrant.

Flying the HyperDart

Testing has shown the HyperDart Launches best at 20Km, Mach 3.5. Maintain about 20 degrees nose up during ascent. The main engines alone are not enough to establish orbit. The use of the OMS engines will be required for orbit insertion. Orbits of 250Kmx250Km are easily attainable. Favored reentry technique is to lower velocity by 100m/s from 250Km orbit about 3/4 of an orbit before base. AeroBrakeMFD can help with timing. The HyperDart likes a long slow reentry. Once below Mach 1 the HyperDart bleeds speed off fast so come in a bit hot for landing. Gear tolerance is approximately 3m/s.

XL-70 Launcher Cockpit



1. Left MFD and Controls
2. Right MFD and Controls
3. Master Warning Light and Reset Button
4. Payload Release Button (press twice within 5 seconds)
5. Center of Gravity and Trim Adjustment and Indicators
6. Fuel Level
7. Dynamic Pressure Indicator
8. HUD Mode Selector Switches
9. Warning Lights
10. Lights (Strobe and Beacon - NAV disabled due to CTD)
11. Co-pilot MFD 1
12. Co-pilot MFD 2
13. Gear Switch
14. Wingtip Switch (wings animate but it is cosmetic only)

When Dynamic Pressure reaches 80% of the max value the Master Warning light will illuminate. Once dynamic pressure lowers below this level the reset button may be used to extinguish the master warning light. If max dynamic pressure is exceeded random failures may occur (left wing, right wing, lifting body, elevators and ailerons) When a failure occurs the Master Warning Light will illuminate along with an indicator light for the failed system.

Throttle position for the selected engines may be changed with keyboard commands or by clicking on the throttle quadrant.

Flying the XL-70

The XL-70 flies just like any airplane, however it is a very high powered airplane. Pay close attention to your airspeed to maintain acceptable dynamic pressure levels. The engines are air breathing engines, they will make less power as altitude increases, but more power at higher speeds. Manage throttle to break Mach 1 around 10KM and adjust climb rate to balance thrust and dynamic pressure levels. At 20KM the XL-70 can maintain approximately Mach 3.5. The six powerful engines' thrust line is below the center of gravity so they induce a nose up condition that will need to be trimmed out.