

# SpaceX Starship add-on v.220708

## **RECOMMENDED ADD-ONS**

D3D9 Graphics Client

The hi-res surface tiles for Gulf Coast area:

[https://mirror.orbiter-radio.co.uk/orbiter/assets/packages/Earth/EarthHi\\_10\\_07.zip](https://mirror.orbiter-radio.co.uk/orbiter/assets/packages/Earth/EarthHi_10_07.zip)

Boca Chica base and surface tiles:

<https://www.orbithangar.com/showAddon.php?id=5c32a896-277f-4343-9c91-35e33747e5b7>

Orbiter Forum Thread:

<https://www.orbiter-forum.com/threads/spacex-superheavy.39783/>

## **STARSHIP (UPPER STAGE) CONTROLS**

C = Toggle HUD Info display (LAUNCH/ORBITAL/REENTRY/LANDING)

E = Set cockpit camera view

K = Open/Close Launch Control Panel

V = Start Launch Autopilot

N = Manual Jettison Booster

P = Open/Close payload bay (Starship only)

W = Tilt Payload Attachment Fitting ring (for payload jettison) (Starship only)

J = Jettison Payload (Starship only)

M = Forward Light On/Off (Starship only)

Ctrl+A = Aerofoil Mode Flight/Reentry

Alt+NumPad/ = Aerofoil Steering Enable/Disable

D = Aft Yaw RCS Enable/Disable

B = Upper Stage Main Fuel Dump

Ctrl+K = Enter Upper Stage Landing Target

Alt+PageUp/PageDn = +/- AoA Wing Trim [Ctrl+PageUp/PageDn for fine adjust]

Alt+Delete = Set AoA Wing Trim 0%

U = Reentry Attitude Autopilot On/Off

Controls AoA and Bank from orbit to Mach1.8 (~20km alt.) then switches to "Skydive" mode.

(Use IMFD "Base Approach" or BaseApproachMFD to target reentry interface at 120km alt.

See notes below.)

F = Fly-by-Wire Reentry On/Off [Shift + Cursor Pad Arrows = Bank/AoA]

Set Bank and AoA during reentry, vessel rotates around airspeed vector.

Ctrl+J = Use Landing Reserve Fuel On/Off

Ctrl+N = Upper Stage engine selection (All/Vac/SL)

Ctrl+1/2/3 = Upper Stage Raptor SL selection (1,2 or 3 engines)

Ctrl+B = Skydive-and-Land Autopilot On/Off (from ~20km)

Ctrl+V = Retropulsion Landing Autopilot On/Off (from ~10km)

G = Deploy/Stow Landing Gear

### **TANKER (UPPER STAGE) CONTROLS**

W = Select Target Propellant Tank for fuel transfer (enter tank index 0,1,2,etc.)

J = Start/Stop fuel transfer (200kg/s)

(on docking, tanker will automatically select docked vessel "default" propellant tank)

### **BOOSTER (LOWER STAGE) CONTROLS (after jettison)**

K = Enter Boostback/Landing Target name

M = Set Boostback mode (Boostback+Landing / Landing Only)

B = Start/Stop Boostback autopilot

P = Select Engines (29 / 9 / 2)

J = Deploy/Stow Grid Fins

E = Set cockpit camera view

### **LZ1 LANDING PAD CONTROLS**

N = Toggle pad mesh invisible/visible

### **BC\_PAD TEST STAND CONTROLS**

K = Lights on/off

V = LOX vent on/off

P = Attach Vessel to Pad (Enter name)

### **BC\_TOWER LAUNCH TOWER CONTROLS**

J = Engage/Disengage QDA Claw

G = Engage/Disengage QDA

B = Enable/Disable Catch Sequence (deletes any currently "caught" vessel)

P = Enter Catch Target Name (useful for multiple launches, otherwise can leave on AUTO)

K = Lights on/off

V = LOX vent on/off

N = Attach Launcher to Pad (Enter name)

1 / 2 = Lower / Raise / Pause Catch Arms

3 / 4 = Open / Close / Pause Catch Arms

5 / 6 / 7 = Slew Right / Left / Centre Catch Arms

### **DE-ORBIT FOR RE-ENTRY NOTES**

Use IMFD"Base Approach" or BaseApproachMFD to perform de-orbit burn for reentry.

Re-entry interface parameters:

Altitude (Alt.)                      120km

Re-entry Angle (ReA)              1.5°

Anterior Angle (Ant)                45°

### **MULTIPLE STARSHIPS/TANKERS IN THE SAME SCENARIO**

Due to my limited coding ability, each Starship vessel (not the Booster) requires its own .cfg and associated .dll .

Copy and rename .cfg and .dll (edit new .cfg to point to new .dll)

See "Double launch" scenarios for example.

## **VEHICLE SPECS**

### **Booster stage**

Dry Mass	180000kg
Propellant Mass	3400000kg
Thrust	2200000N per engine (x29)
ISP	3490(Vac) 3200(SL) Ns/kg
RCS Thrust	3600N per engine
RCS ISP	3000 Ns/kg

### **Upper Stage**

Dry Mass	120000kg
Main Propellant Mass	1175000kg
Landing Reserve Propellant Mass	25000kg
Thrust	2200000N per engine (x3 Vac + x3 SL)
ISP (VAC Raptor)	3680 (Vac) 3100 (SL) Ns/kg
ISP (SL Raptor)	3490 (Vac) 3200 (SL) Ns/kg
RCS Thrust	3600N per engine
RCS ISP	3000 Ns/kg
Tanker max.fuel payload	170000kg

### **Starship Propellant Tank Index**

Upper Stage Main	0
Upper Stage Reserve	1
Booster Stage Main	2

### **Tanker Propellant Tank Index**

Upper Stage Main	0
Upper Stage Reserve	1
Payload Propellant	2
Booster Stage Main	3

### **Booster Propellant Tank Index**

Main	0
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