Kartoffelkuchen's Delta Pack for Kerbal Space Program

This pack adds the Delta rocket family into the game, including the Delta II, III and IV rockets.

No, this is not an official United Launch Alliance Mod Pack, I have no affiliation with them.

Installation

Unzip the contents from the .zip file into your main KSP directory. If done right, your "GameData" folder should now include the "Launchers Pack/Rockets/Delta" folders. Inside of the "Ships/VAB" folder, you should find the various provided .craft files.

This pack is supported by Realism Overhaul, the easiest way to install it is via CKAN.

Content

This pack includes 61, highly detailed parts for in-game use. This image gives you an overview of the parts included:

A note on sizes

These rockets are scaled down to about 62% of their real-life counterpart to get them in line with the Kerbal Space Program universe. I've made this decision for two main reasons, for one, the Delta IV would be *really*, *really* large (5m) and would hardly properly fit into the VAB, the second reason is that this way, their real-life function better translates into the game. Delta II is a small launch vehicle, with the main purpose of launching smaller satellites into high-energy orbits, Delta III with it's larger 4m Payload fairing but low-thrust upper stage is supposed to launch larger, but lighter satellites into high-energy orbits and Delta IV with its up to 5m wide payload fairing is a versatile heavy-lift launch vehicle which can reach almost any orbit.

In game, the Delta II has a main diameter of **1.5m**, Delta III of about **2.5m** and Delta IV of **2.5m** (Medium) or **3.0m** (Medium+ / Heavy).

How to use

Included are the following .craft files:

- Delta II 7320
- Delta II 7920-10L
- Delta II 7920-10L example Payload
- Delta II 7925H
- Delta III 8930
- Delta IV Medium
- Delta IV Medium 4,2
- Delta IV Medium+ 5,4
- Delta IV Heavy

All of these rockets have the payload adapter as their origin, this way you will only need to construct or load up your payload, then merge the best-suited launch vehicle into the scene and attach it to the rocket. You can now choose to add or remove boosters (category **Engines**), choose a different set of fairings (category **Payload**) or a different payload adapter (category **Payload**).

Please note that the **payload fairings are not actually working fairings**, they *do not* shield the payload from aerodynamic forces! I know this is unfortunate and can be quite annoying sometimes, but I have not yet found a way around this issue. Because of this, you might need to fly a more inefficient, higher launch trajectory to avoid the rocket spinning out of control.

Also, the **Delta II turntable is not working properly**, only the top half of it is about to spin when ignited, I've thought about adding this functionality using the newly released robotics add-on, but since not everyone has access to it, this is not an ideal solution. Also, since I don't like add-on requirements, I've skipped the Infernal Robotics add-on integration. This

way, the turntable will for now, when used, spin up the whole upper stage. It's a Kerbal way of doing things, I guess.

Launch and Ascend

Delta II

You can fly this rocket pretty much like your usual Kerbal rocket. It has a high TWR (especially the ones with 9 boosters) and quickly gets you out of the atmosphere.

For the 79XX versions, 6 boosters are ignited on the ground, the other 3 are ignited around the T+ 35 second mark during the ascent. At about T+ 45 seconds, jettison the burnt-out boosters.

Once main engine cutoff occurs, the two LR-101 vernier engines will continue burning for a few seconds to fine tune the trajectory and attitude in preparation for stage separation.

Delta III

Although the rocket jumps from the pad fairly quickly, it has quite a low TWR once all the boosters are jettisoned.

As with the Delta II, 6 boosters are ground-lit, the other 3 are ignited at about T + 35 seconds. The spent boosters are jettisoned in a 3 by 3 sequence, so you'll need to press stage twice to jettison all of them.

Make sure that you fly a sufficiently high trajectory, TWR will drop drastically once all boosters are separated and only the core remains. Try to aim for a stage separation altitude of 30-35km, your typical staging velocity will be at about 500-600 m/s. The fairings are, in contrast to the real world launch vehicle, jettisoned after stage separation. Once you've staged, activate RCS and press Action Group 1 to extend the RL10 nozzle. Then continue with the ascent by activating the engine.

Due to the low upper stage TWR, you might need to pitch up to quite some extend to prevent dropping back into the atmosphere. This takes some time to get used to, but once you got it, you can get into a low Kerbin orbit fairly easily with a single engine burn, just like the real thing.

Delta IV

It has a sufficient TWR to get you of the thicker atmosphere relatively quickly. As with the Delta III, the upper stage has quite a low TWR and you might need to pitch up to prevent dropping back into the atmosphere. Activate the RL-10 nozzle extension with AG1. This is especially the case with launching heavy payloads, you'll have to fly quite an altitude-aggressive trajectory.

Roll control is provided by the vectorable RS-68 turbine exhaust pipe.

Concerning the Delta IV Heavy, throttle the center core RS-68A down to 60% thrust and only throttle it back up shortly before stage separation. Once again, the upper stage has a really low TWR, especially with heavy payloads, but this should not be as big of a problem with the

Delta IV Heavy as it is with the Delta IV Medium or Medium+, since with the Heavy you'll be really far downrange once you ignited the upper stage.

Credits

Modelling, texturing, configuration – Kartoffelkuchen

All logos used are owned by ULA.