

VesselPlanner

Mission Planner Tutorial

KSP1 • VesselPlanner 0.7.74

Mission Planner lets you describe a mission in chronological order before you size the vehicle. Each step records either propulsion requirements or saved subassemblies, and a saved mission can then drive Stage-by-Stage planning.

Core idea: Plan the mission in flight order first. Then use the saved mission as a guide when Stage-by-Stage works backward through the mission to size the vehicle from the payload downward.

Quick Workflow

Step	Action	What it does
1	Name the mission	Name becomes the saved .cfg filename.
2	Add a step	Choose Engines & Tanks or Subassemblies.
3	Describe the step	Choose maneuver/route and delta-v basis, or add saved subassemblies.
4	Confirm delta-v	Use a CSV/clipboard suggestion or enter delta-v manually.
5	Build the sequence	Insert, reorder, edit, and delete until the mission is chronological.
6	Review total delta-v	Check the summed Engines & Tanks delta-v.
7	Save the mission	Store it under PluginData/MissionPlans.
8	Use Stage-by-Stage	Open the saved mission and work the last mission step first.

1. Understand Mission Steps

Mission Planner is an ordered list. Step 1 happens first in the mission; later rows happen later in flight.

Every step is exactly one of two types:

- Engines & Tanks — stores a maneuver, body or route, Needed Δv , and ASL/VAC basis.
- Subassemblies — stores one or more saved KSP subassemblies, a Count for each, and an optional per-copy decoupler.

A single step never mixes propulsion data and subassemblies. This is important when the mission is later used by Stage-by-Stage: each mission step maps cleanly to one stage type.

Mission order vs. build order: Mission Planner is chronological. Stage-by-Stage shows the selected mission with the last mission step first because the vehicle is designed from the uppermost/final mission hardware downward.

2. Open Mission Planner and Name the Mission

Open VesselPlanner in the VAB or SPH and choose Mission Planner from the left group of mode buttons.

At the top of the page VesselPlanner shows the active delta-v table and its row count. The active table determines which bodies are available and which automatic delta-v suggestions can be filled in.

Mission Planner starts with the name Unnamed Mission. Enter a descriptive name such as Duna Surveyor or Urlum Explorer.

The Saved as label previews the sanitized .cfg filename. Invalid filename characters are replaced automatically.

The mission list uses these columns:

- # — chronological step number
- Step / Maneuver — the maneuver name or Subassemblies
- Body / Route — the selected body or interplanetary route
- Subassemblies — selected saved assemblies for Subassemblies steps
- Δv m/s — propulsion delta-v for Engines & Tanks steps
- Basis — ASL or VAC
- Insert / Order — add, move, and delete controls

The bottom of the page shows Total Δv , which is the sum of the Engines & Tanks steps. Subassemblies steps contribute mass when used by Stage-by-Stage, but they do not add delta-v to this total.

3. Add an Engines & Tanks Step

Click Add New Step. The Add Mission Step window opens with Engines & Tanks selected.

Choose a maneuver. VesselPlanner displays readable labels for the supported maneuver types:

Launch; Sub Orbital Launch; Orbit; Reentry; Landing; Splashdown	Transfer To Another Planet; Return From A Moon
Change Apoapsis; Change Both Pe And Ap; Change Inclination; Change Periapsis; Change Semi Major Axis	Resource Transfer; Impact Asteroid; Fine Tune Closest Approach
Intercept Asteroid; Intercept Vessel; Match Planes With Vessel; Match Velocities With Vessel	

The selected maneuver determines which location controls appear:

- Launch / Sub Orbital Launch — choose Body.
- Transfer To Another Planet — Source body is derived from the previous Engines & Tanks step; choose Destination.
- Return From A Moon — choose Moon.
- Orbit, Reentry, Landing, Splashdown, and orbital-change maneuvers — choose Body.

Enter or confirm Needed Δv (m/s), then choose ASL or VAC. Launch and Sub Orbital Launch default to ASL; other maneuvers default to VAC. You can override the basis before saving.

Tip: Hover the ASL and VAC buttons for an explanation when Show tooltips is enabled in Settings.

4. Use Automatic Delta-v Suggestions

When the active delta-v CSV contains a matching value, Mission Planner fills Needed Δv automatically after the maneuver/body/route selection changes.

Maneuver	Automatic value
Launch / Sub Orbital Launch	Selected body's $dV_{to_low_orbit}$
Landing / Splashdown	Selected body's $dV_{low_orbit_to_surface}$

Transfer To Another Planet	The matching source → destination route's total_capture_dV
Return From A Moon	Moon ascent plus the reverse moon-to-parent escape leg derived from the parent → moon capture value

For Launch, the default body is the KSP home body unless an earlier Landing step establishes a newer launch location. Landing defaults to the most recently specified body in the earlier mission history.

For Transfer To Another Planet, the Source body comes from the previous Engines & Tanks step; intervening Subassemblies steps are skipped. If that previous propulsion step does not provide body context, the transfer cannot be saved until the mission order is corrected.

If no matching value exists, VesselPlanner leaves the step editable and reports that you should enter the required delta-v manually.

5. Import Transfer-Planner Values from the Clipboard

Transfer To Another Planet has an additional Clipboard Δv selector. It becomes available only when the system clipboard contains transfer-planner text for the same source and destination.

The selector can import:

- Ejection
- Insertion
- Total

Choosing one of these immediately replaces Needed Δv with that clipboard value. Clipboard text for a different route is ignored, and the selector disables itself when no matching transfer data is available.

Practical use: Copy a route from a transfer planner, open the matching Mission Planner transfer step, then choose Ejection, Insertion, or Total according to what that stage is intended to supply.

6. Add a Subassemblies Step

Use a Subassemblies step when a mission phase carries one or more saved KSP subassemblies rather than being represented by the engine/tank solver.

In Add Mission Step, choose Subassemblies. The editor shows two lists:

- Available subassemblies — saved KSP subassemblies found in the current save.
- Subassemblies in this mission step — the assemblies already selected for this step.

Click Add beside each desired subassembly. For every selected line:

- Count must be a whole number greater than zero.
- Decoupler can be enabled independently for that line.
- Adding the same saved subassembly again increases its count.

VesselPlanner calculates the saved subassembly's wet mass from its parts/resources. If Decoupler is enabled, the per-copy reference mass is chosen from GameData/VesselPlanner/decouplerMasses.cfg using the subassembly root part's bulkhead profile.

The Subassembly mass line shows the complete mass represented by the step. This mass is later carried into Stage-by-Stage when the mission step is linked to a vehicle stage.

7. Insert, Reorder, Edit, and Delete Steps

Mission order matters, especially for body history and transfer sources.

- Double-click a row — edit that step.
- +▲ — insert a new step immediately above the row.
- -▼ — insert a new step immediately below the row.
- ▲ — move the step earlier.
- ▼ — move the step later.
- ✕ — delete the step.
- Add New Step — append a step at the end of the mission.

After reordering, Mission Planner recalculates derived transfer source bodies from the new history. Review transfer steps after moving rows to make sure the route still represents the intended mission.

Tooltips: The ASL/VAC controls and insert/order/delete buttons display tooltips when Show tooltips is enabled in Settings.

8. Save and Load Mission Plans

Click Save to write the current mission. Mission files are stored under:

GameData/VesselPlanner/PluginData/MissionPlans/

Click Load to list saved mission plans and reopen one.

A saved mission restores the ordered steps, step types, maneuver/body/route values, delta-v and basis, and all Subassemblies entries with counts, decoupler choices, and stored unit masses.

Older mission files that predate explicit step types are loaded as Engines & Tanks steps. Older single-subassembly data is migrated into the current multi-subassembly list where possible.

9. Use the Mission with Stage-by-Stage

After saving the mission, switch to Stage-by-Stage and click Select Mission Plan. Choose the saved mission.

The Stage-by-Stage plan name is initialized from the mission name and remains editable. A mission sidebar appears with the last mission step at the top.

Clicking a mission line creates or opens the matching stage:

- Engines & Tanks mission step — opens an Engines & Tanks stage with Target Δv and ASL/VAC basis prefilled.
- Subassemblies mission step — opens a Subassemblies stage with the saved subassemblies, Counts, and Decoupler settings preloaded.

If the same mission step is already linked to a stage, clicking it opens that existing stage for editing instead of creating a duplicate.

When Calculate is used on a mission-linked Engines & Tanks stage, VesselPlanner derives the Planning body/environment from the mission history, using the transfer destination when the body context comes from an interplanetary transfer.

Next tutorial: For the vehicle-sizing workflow, see Manual/VesselPlanner-Stage-by-Stage-Tutorial.docx.

10. Example: Plan a Kerbin-to-Duna Mission

This example focuses on workflow rather than fixed delta-v numbers, because the active planet-pack CSV determines the automatic values.

1. Name the mission Duna Surveyor.
2. Add an Engines & Tanks step: Launch, Body = Kerbin. Accept the suggested launch delta-v if appropriate; ASL is selected by default.

3. Add an Engines & Tanks step: Transfer To Another Planet. Source should show Kerbin; choose Destination = Duna. Accept the CSV suggestion or choose a matching clipboard Ejection/Insertion/Total value.
4. Optionally add a Subassemblies step for a saved Duna lander or payload package, setting Count and Decoupler as required.
5. Add an Engines & Tanks step: Landing, Body = Duna. Mission Planner normally defaults to the most recent body context and can load the Duna landing value from the active table.
6. Review the row order and Total Δv , then Save.
7. Switch to Stage-by-Stage, select Duna Surveyor, and work the mission sidebar from the last mission step first.

This division of labor keeps Mission Planner focused on what the mission must do, while Stage-by-Stage focuses on what hardware is required to do it.

11. Recommended Working Method

1. Choose or verify the active delta-v table before building the mission.
2. Enter the mission chronologically from launch through the final operation.
3. Use automatic delta-v values as starting points, not as a substitute for your mission-specific margins.
4. Make sure the previous Engines & Tanks step establishes the correct transfer source body. Subassemblies may appear between them, but another bodyless propulsion step will break the source lookup.
5. Use Subassemblies steps for saved hardware that should be carried into Stage-by-Stage as explicit mass rather than re-entering it as generic cargo.
6. Save after major edits, then use Stage-by-Stage to turn the mission into a buildable vessel.

12. Tips and Troubleshooting

If a transfer source is blank, inspect the preceding Engines & Tanks step. It must establish body context.

If automatic delta-v is not found, verify the active planet-pack table and the selected body/route, then enter the mission requirement manually.

If a saved subassembly is unavailable later, Mission Planner can retain the stored mass from the mission file, but you should restore the actual .craft file before trying to place or revise that assembly.

If insert/order tooltips are distracting, disable Show tooltips in Settings.

If you change mission order after linking it to Stage-by-Stage, review the linked stages because body context and vehicle stage sequence may need to be adjusted.

Summary

Mission Planner follows a simple pattern:

Define mission → Add propulsion/subassembly steps → Review order and delta-v → Save → Select in Stage-by-Stage

The key advantage is separation of concerns: the mission describes what must happen, while Stage-by-Stage turns those requirements into a complete vehicle.