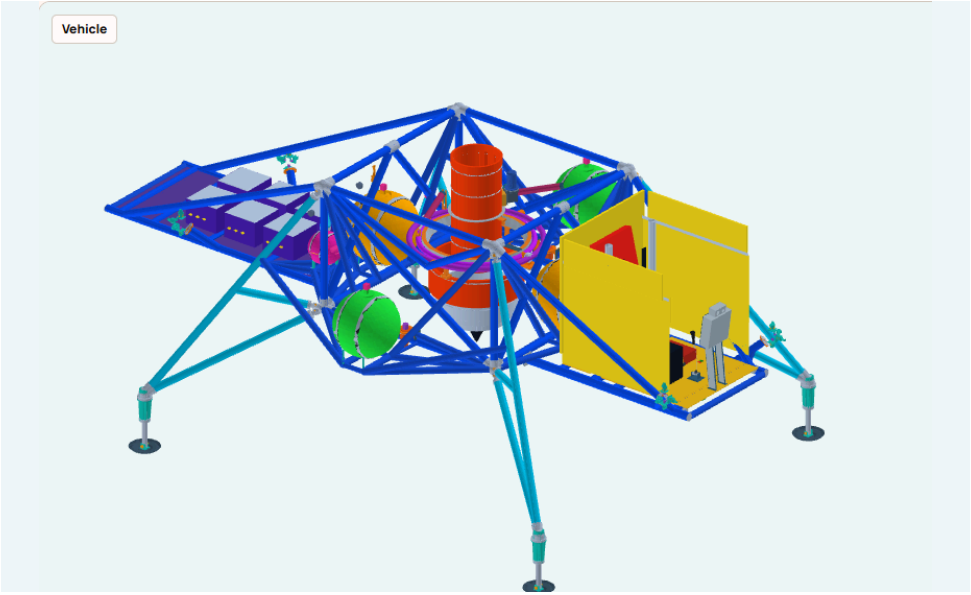
How LLTV works

Step 1 / 10 · Vehicle

Start with the complete vehicle

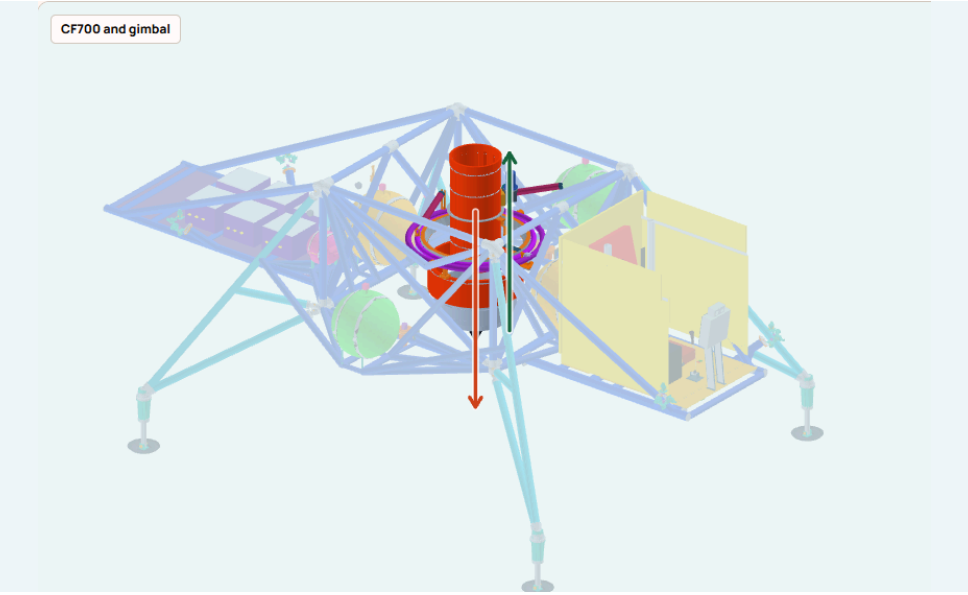


The frame carries the central CF700, a pair of Bell lift engines, the corner RCS clusters and four supports. Continue to see how these systems work together.

Atlas sheet 01

Step 2 / 10 · CF700 and gimbal

CF700 carries most of the weight



The central jet offsets most of the vehicle's weight in lunar-gravity simulation. The arrows show downward exhaust and thrust in the opposite direction.

Exhaust and reaction · Weight and thrust

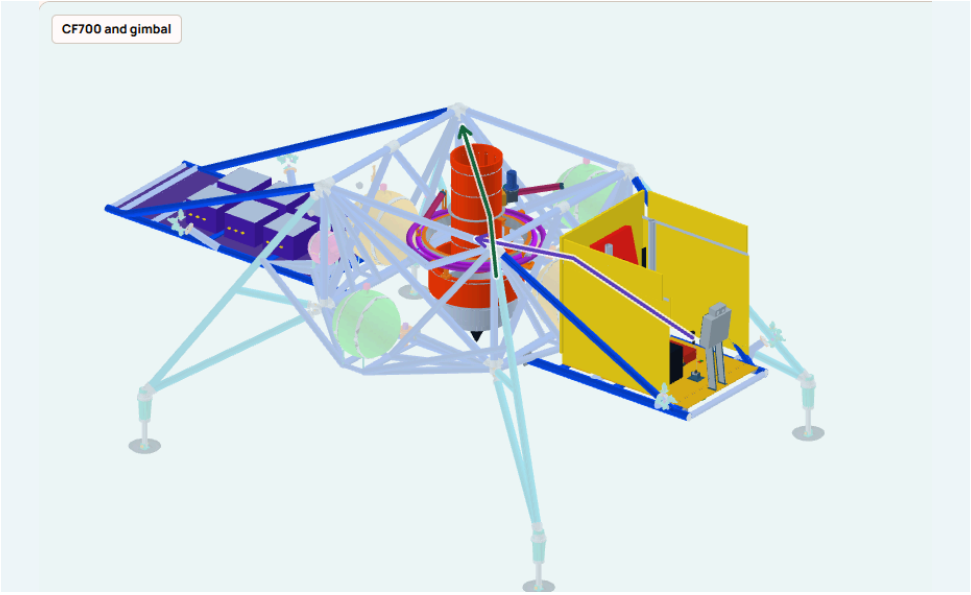
Atlas sheet 09X

External bodies from FreeCAD R4D.1. Arrows and pacing are illustrative. Replay and fuel use are on sheet 27.

How LLTV works

Step 3 / 10 · CF700 and gimbal

The gimbal changes CF700 orientation



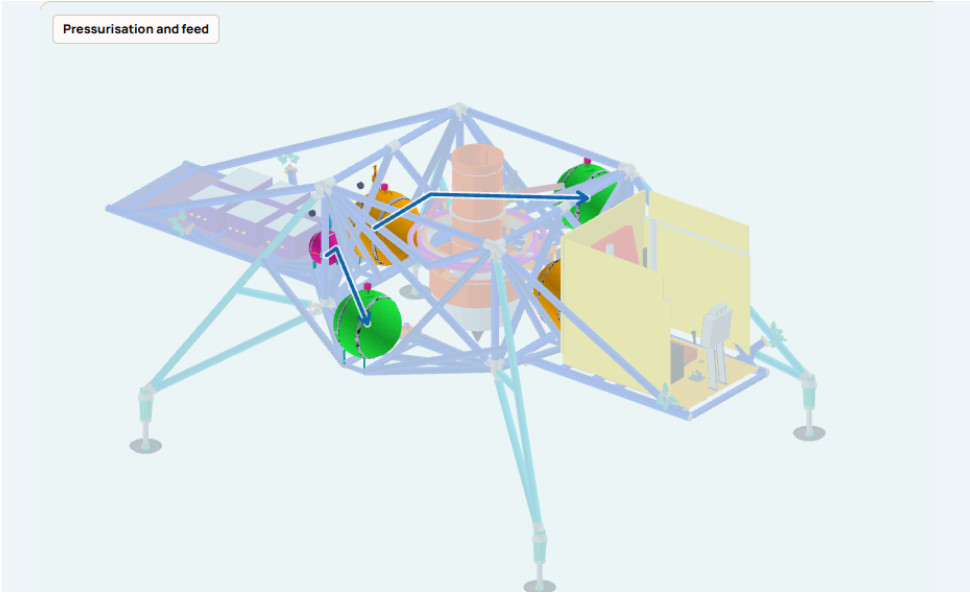
The mount lets the engine move relative to the frame. In simulation mode this helps keep its main thrust near vertical while the vehicle tilts.

Command path · Weight and thrust

Atlas sheet 09

Step 4 / 10 · Pressurisation and feed

Why the vehicle carries helium



Helium from separate bottles passes through regulators to pressurise the peroxide tanks. That pressure displaces liquid toward the engines. The atlas diagram documents historical pressure figures.

Helium

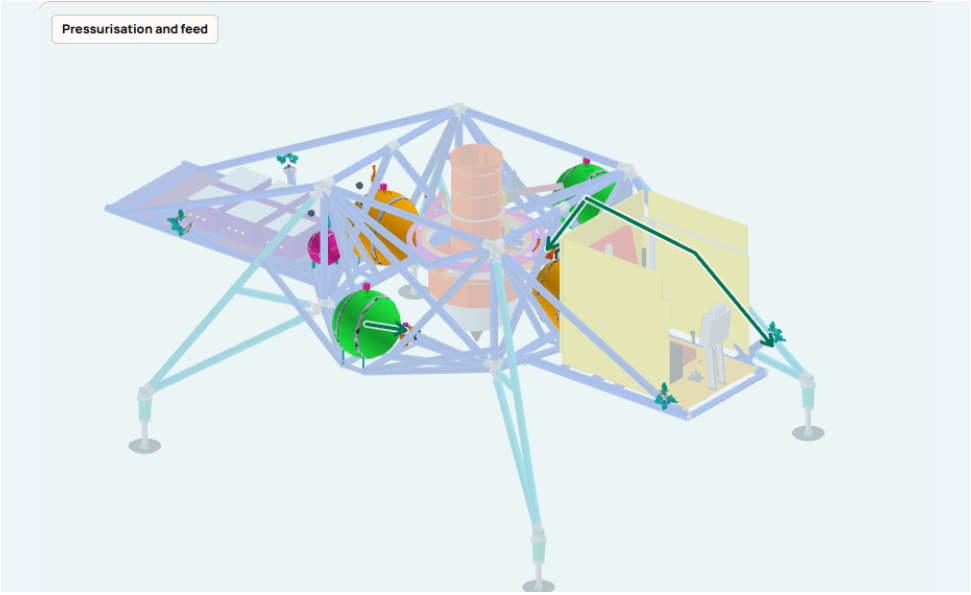
Atlas sheet 24

External bodies from FreeCAD R4D.1. Arrows and pacing are illustrative. Replay and fuel use are on sheet 27.

How LLTV works

Step 5 / 10 · Pressurisation and feed

One working fluid, two jobs



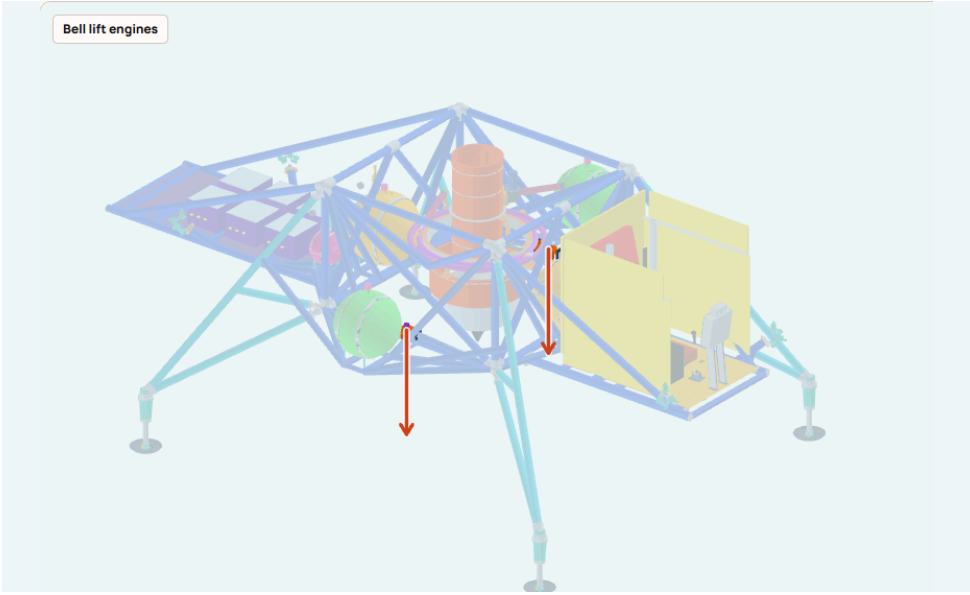
Peroxide solution supplies both the Bell lift pair and the RCS thrusters. The arrows show functional links on one side of the vehicle and the feed to the Bell pair.

Liquid peroxide

Atlas sheet 24

Step 6 / 10 · Bell lift engines

Bell supplies additional lift



Peroxide decomposes on a catalyst. Steam and oxygen exit through the nozzle. The pair adds to CF700 thrust and changes the vertical motion.

Exhaust and reaction

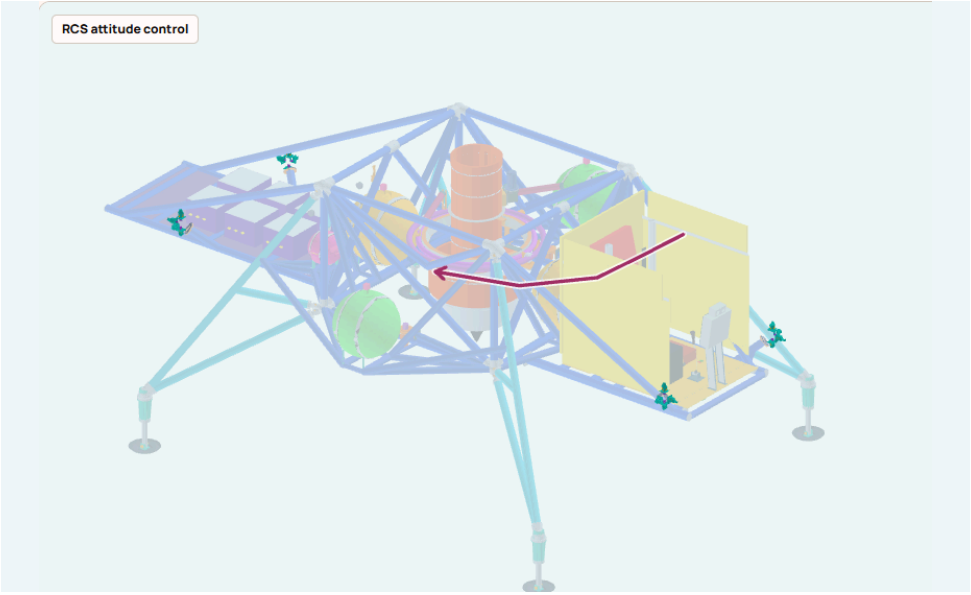
Atlas sheet 25

External bodies from FreeCAD R4D.1. Arrows and pacing are illustrative. Replay and fuel use are on sheet 27.

How LLTV works

Step 7 / 10 · RCS attitude control

An RCS pulse turns the body



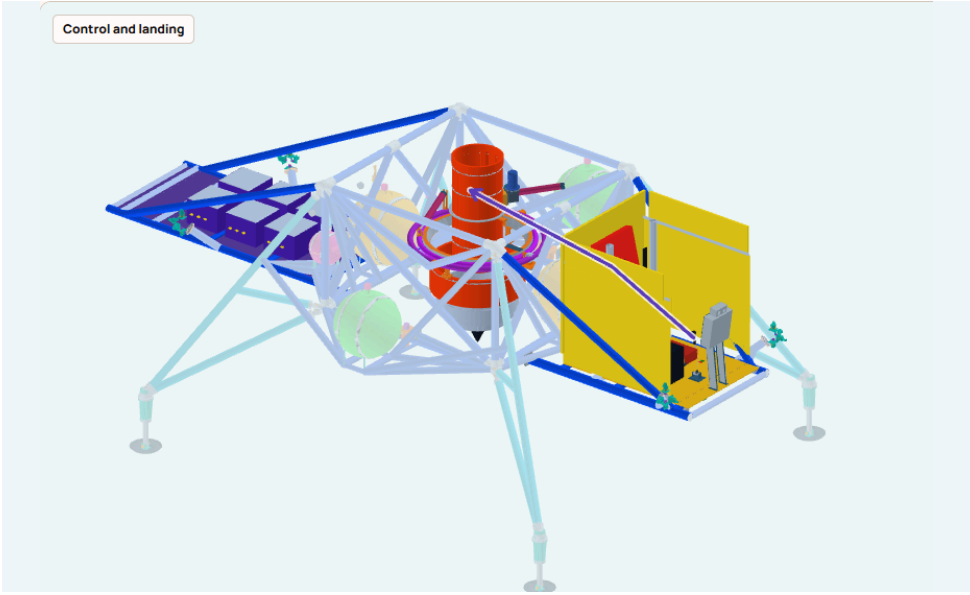
A brief thrust off the centre of mass creates a moment. The RCS groups control roll, pitch and yaw. The arc illustrates one representative rotation.

Torque and rotation

Atlas sheet 25

Step 8 / 10 · Control and landing

Pilot command and system response



The pilot commands motion and the control system coordinates thrust and attitude. The flight replay shows what Bell and RCS are doing during the same phase.

Command path

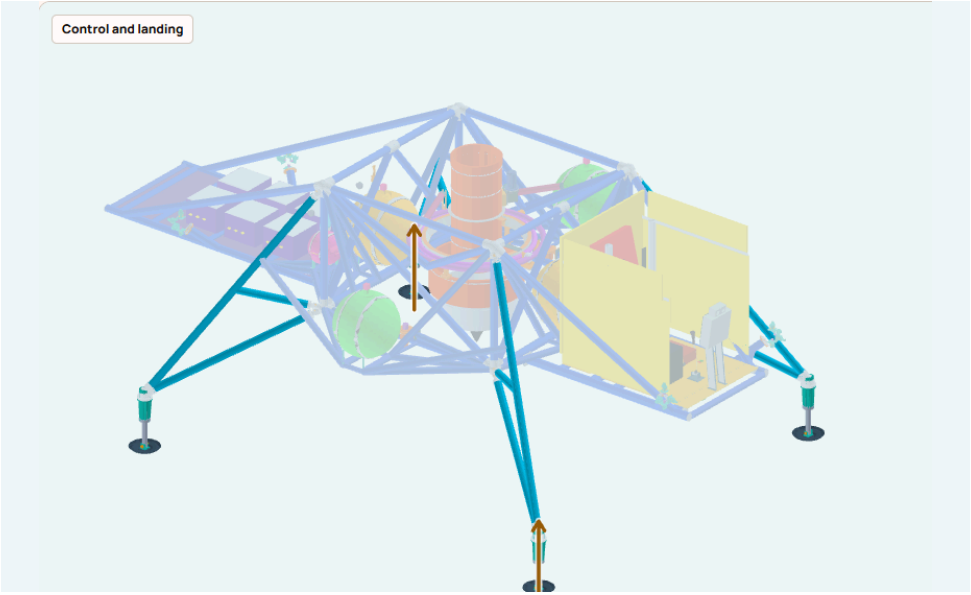
Atlas sheet 14

External bodies from FreeCAD R4D.1. Arrows and pacing are illustrative. Replay and fuel use are on sheet 27.

How LLTV works

Step 9 / 10 · Control and landing

The supports take the load



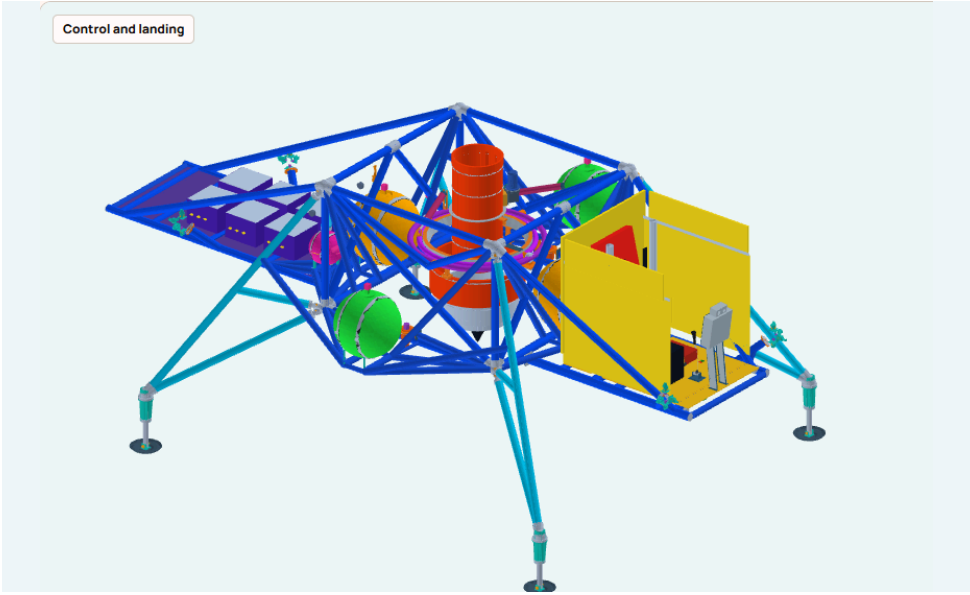
On touchdown the ground reaction reaches the frame through the supports. The replay distinguishes touchdown from settling, so consumption through shutdown is tracked separately.

Ground reaction

Atlas sheet 16

Step 10 / 10 · Control and landing

Check the whole cycle in the replay



Return to the flight and choose a phase: follow liftoff and translation, inspect the descent or compare a go-around. The timeline links vehicle motion with peroxide consumption and cost.

Atlas sheet 27

External bodies from FreeCAD R4D.1. Arrows and pacing are illustrative. Replay and fuel use are on sheet 27.