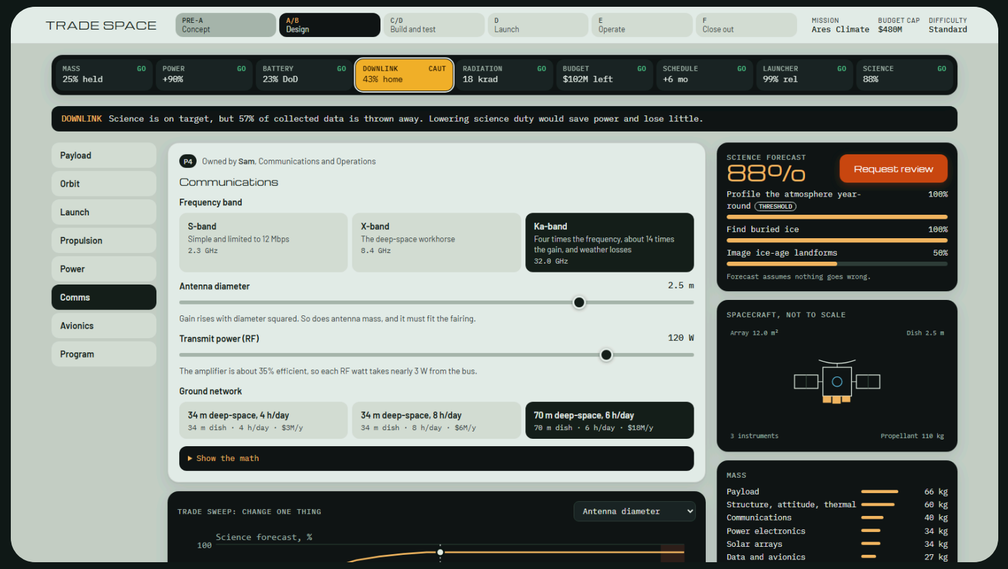
NASA SPACE APPS CHALLENGE 2026

Trade Space

Design, build and fly a complete space mission. Every kilogram, watt and dollar is taken from something else.

Play it: aimerq1234.github.io/trade-space



THE CHALLENGE

Students learn mission design one subject at a time, so the trade-offs stay abstract.

TODAY

Separate topics

Orbits, rockets, power and radios are usually taught and practiced on their own.

REAL MISSIONS

Everything connects

A better instrument adds mass, power, data and cost. Mission teams spend their effort balancing these.

TRADE SPACE

The whole mission in one game

Players feel each trade-off, see why their mission succeeded or failed, and fly again.

HOW IT PLAYS

One mission, through the six phases NASA projects follow

PRE-A

Concept

Pick a mission, its primary objective, a team and a difficulty.

A/B

Design

Size the spacecraft and pass the design review.

C/D

Build and test

Handle surprises and find hidden defects.

D

Launch

Make the window and survive the ride.

E

Operate

Fly it and work the anomalies.

F

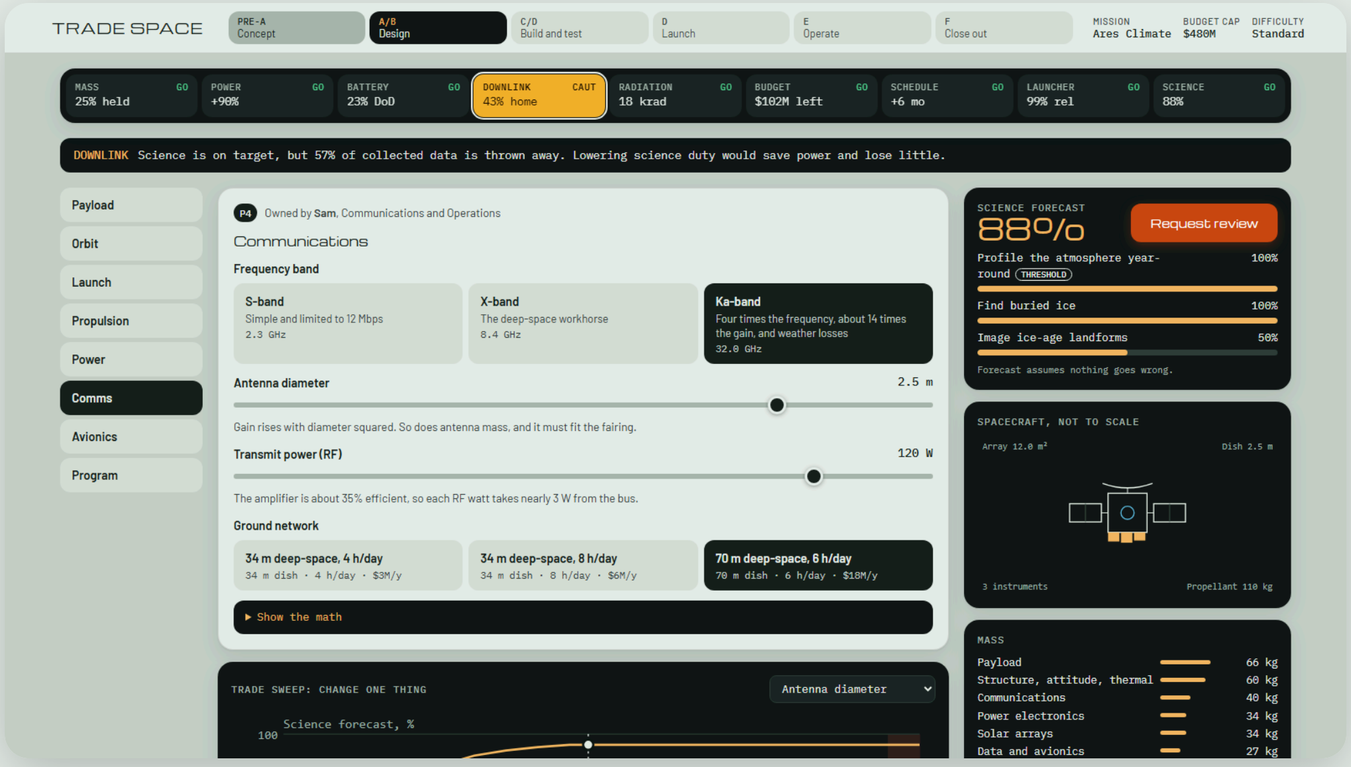
Close out

Learn what shaped the result.

Five missions from Earth orbit to the Moon, Mars, the asteroid Vesta and Europa. Trainee, Standard, Expert and Sandbox difficulty.

DESIGN

Every choice ripples through the spacecraft



Real physics, simply explained

Rocket equation, radio link budget, sunlight and eclipses, radiation dose.

Nine status lights

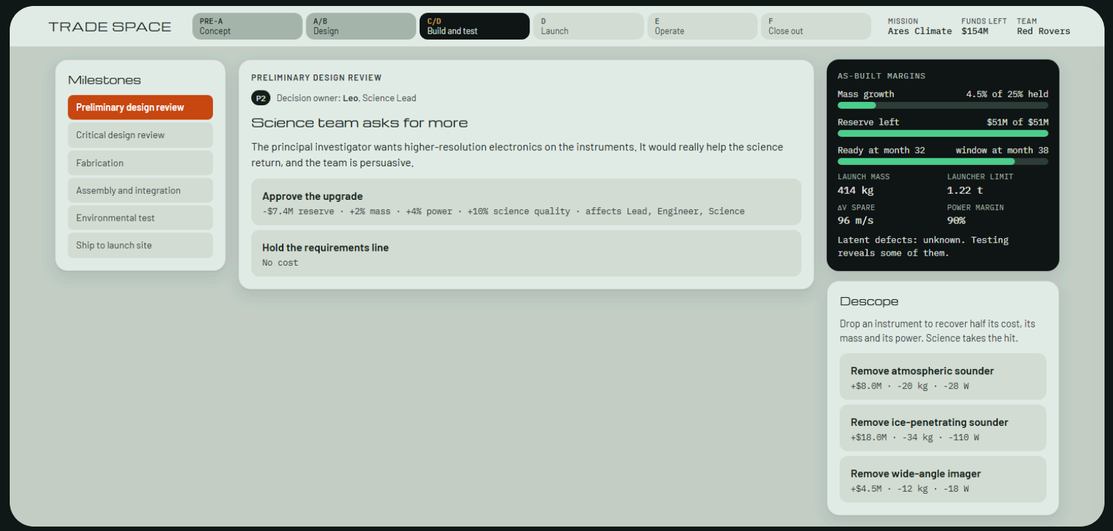
Show what each change broke, in words as well as color.

Show the math

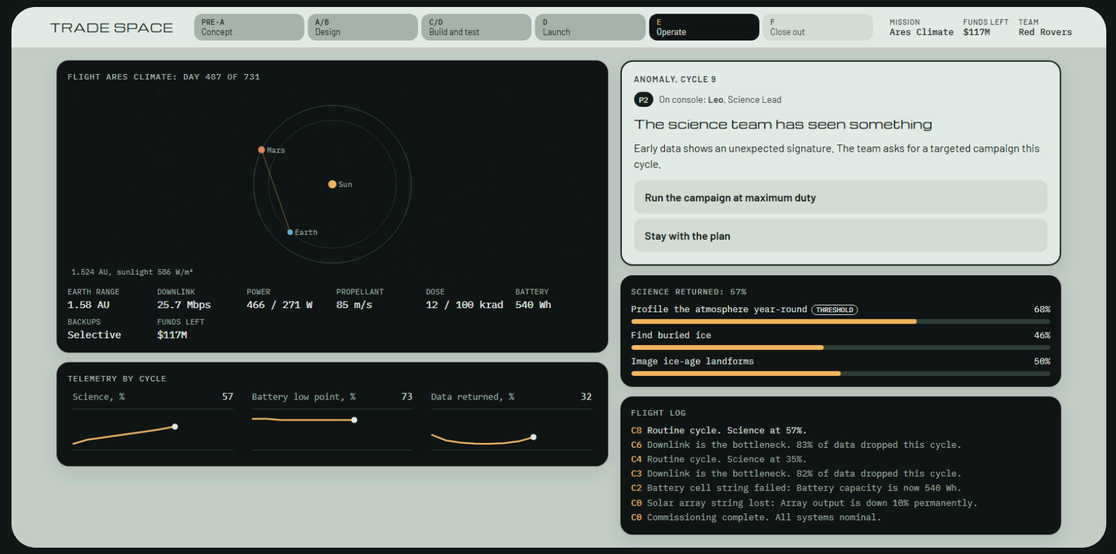
Equations with the player's own numbers, plus a trade sweep chart.

BUILD, LAUNCH AND FLY

Then the mission meets reality



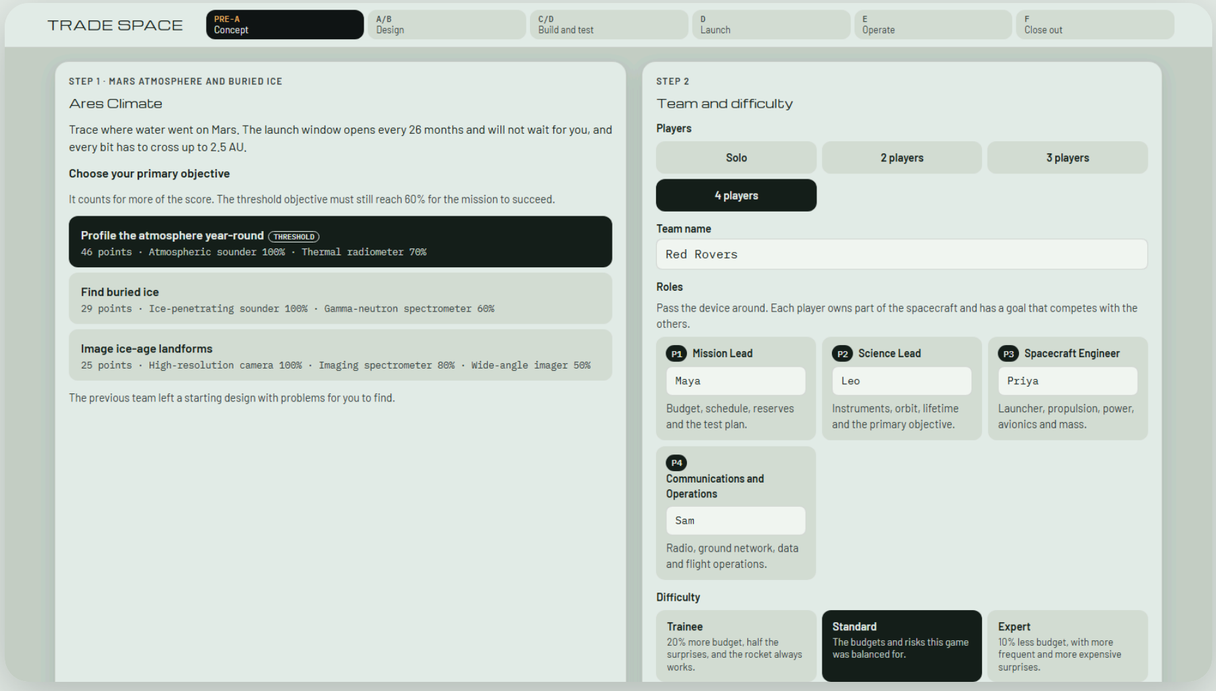
Build: surprises at every milestone, mass growth and a test campaign that decides how many hidden defects fly.



Fly: anomalies, power and battery limits, and radio range. Only data that reaches Earth counts.

TEAM PLAY

Up to four players, each with a goal that competes



Mission Lead

Launch with 10% of the cost reserve left

Science Lead

Reach 90% on the primary objective

Spacecraft Engineer

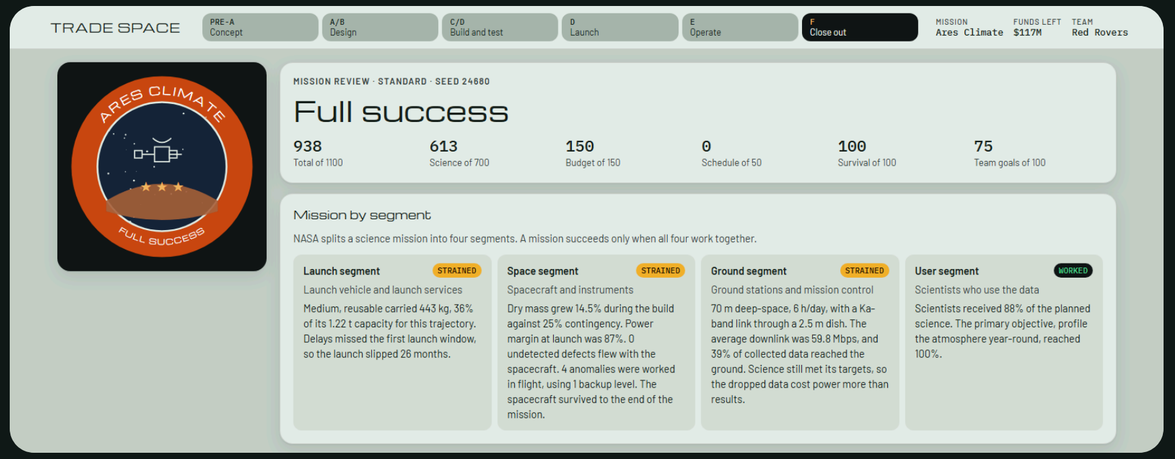
Stay inside mass and power margins

Comms and Operations

Return 85% of the data collected

LEARN AND FLY AGAIN

Every mission ends by explaining why



NASA’s four mission segments

Launch, space, ground and user, each rated

A real mission like yours

LRO, MRO, Dawn, Europa Clipper and more

Report and leaderboard

Copy a report, compare runs, rank teams

Play in any browser, offline, nothing to install

aimerq1234.github.io/trade-space