ENGINEERING NOTE

Mission-critical programmes slip. The question is why.

NASA's Webb review board named the cause: **embedded problems**. Made early, found months or years later.

PUBLICLY REPORTED

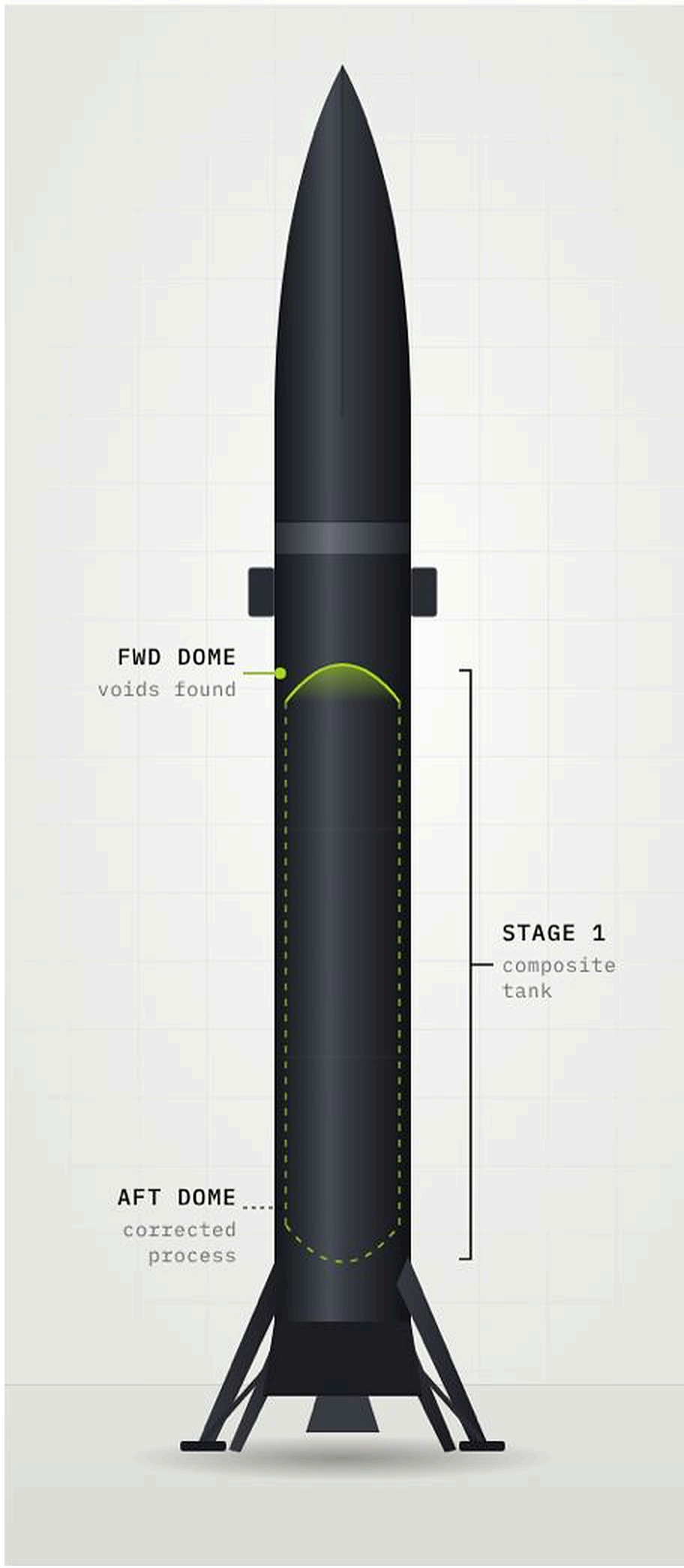
NASA Webb 2007 → 2021
Loose fasteners and wrong solvent, found in test.

Airbus A380 ~2 YRS LATE
Wire harnesses did not fit: two sites, two CAD versions.

Boeing 787 2008 → 2011
Wing-to-body join reinforced after static test.

NASA SLS 2017 → 2022
Core stage weld tooling faults, contaminated tubing.

Rocket Lab Neutron 2025 → 2027
Tank rupture in qualification. Dome voids after cure.



Sources: Webb IRB (2018); Airbus (2006); Boeing; NASA OIG IG-19-001; Rocket Lab (2026). Illustration is generic and not a depiction of Neutron.

WHERE THE RISK SURFACED

Neutron found its hardest problem on full-scale hardware.

The Stage 1 tank is a large carbon-composite cryogenic structure. Its main risks came to light in qualification and production.

JAN 2026

Tank ruptures in a hydrostatic qualification test

Cause: a manufacturing defect near a joint. A contractor laid up the tank by hand, a choice Rocket Lab says was driven by schedule.

FEB 2026

Production moves to automated fibre placement

Minor design changes add margin. First launch moves to Q4 2026.

OCT 2026

Post-cure inspection finds voids in a new forward dome

The team fixes the process and rebuilds the dome. First launch moves to 2027.

> **“Possible success isn’t our standard.”**
>
> PETER BECK, CEO ROCKET LAB · OCT 2026

The right call. But each finding came late in the lifecycle, and each one cost months.

Sources: Rocket Lab Form 8-K (21 Jan 2026); Q4 2025 results (26 Feb 2026); Neutron update (14 Oct 2026).

THE SAME RISK, RETIRED EARLY

SpaceX tested the same kind of tank years before committing.

2016 — **Carbon-composite tank test article**

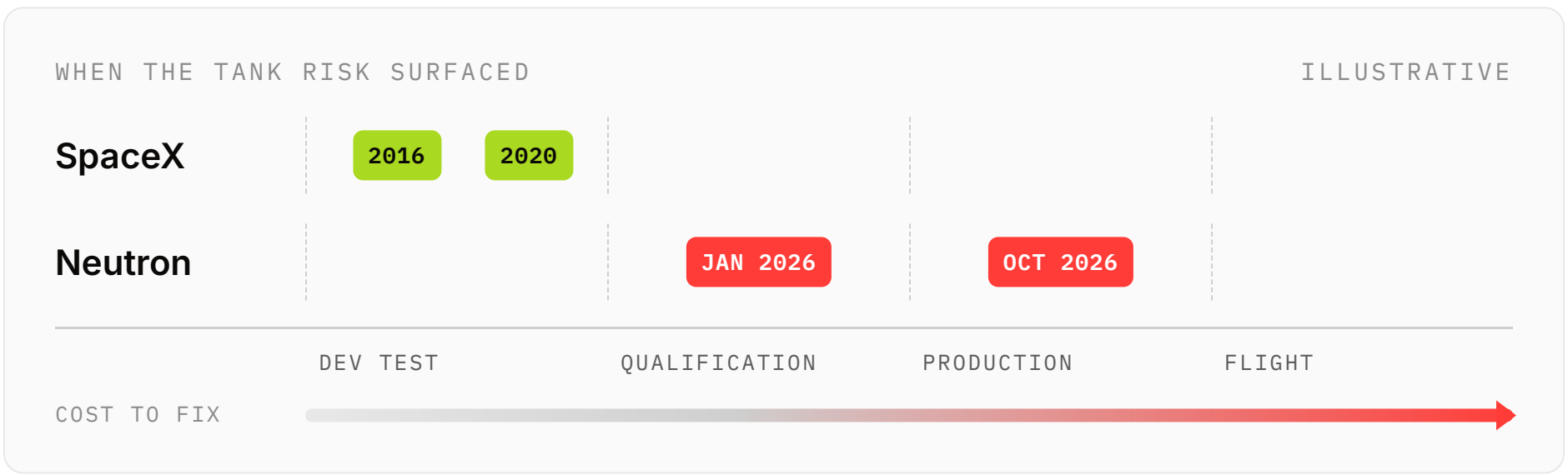
Cryogenic tests, then pressure to about two-thirds of design burst.

DEC 2018 — **Switch to stainless steel**

Reasons given: cost, ease of manufacture, strength at cryogenic temperature.

2020 — **Test tanks pressurised to failure, on purpose**

Cheap test articles such as SN7.1. The data feeds the next prototype.



SpaceX has its own delays and failures. The difference is where they happen: early, on cheap hardware.

Sources: SpaceX and Elon Musk statements, 2016–2018; Universe Today (Sep 2020) on SN7.1.

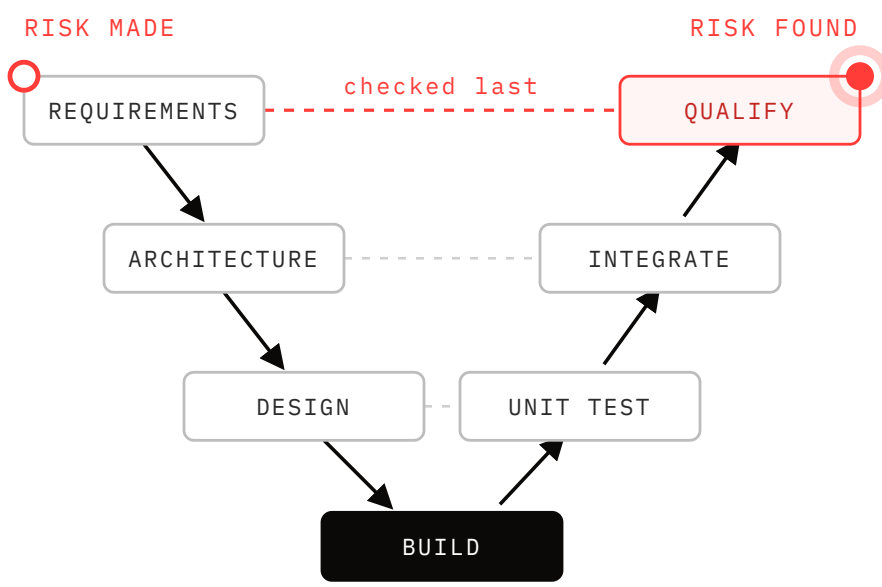
THE CHANGE IN APPROACH

From one long V to many short loops.

Test the riskiest items first, on the cheapest hardware. Then widen the loop.

WATERFALL

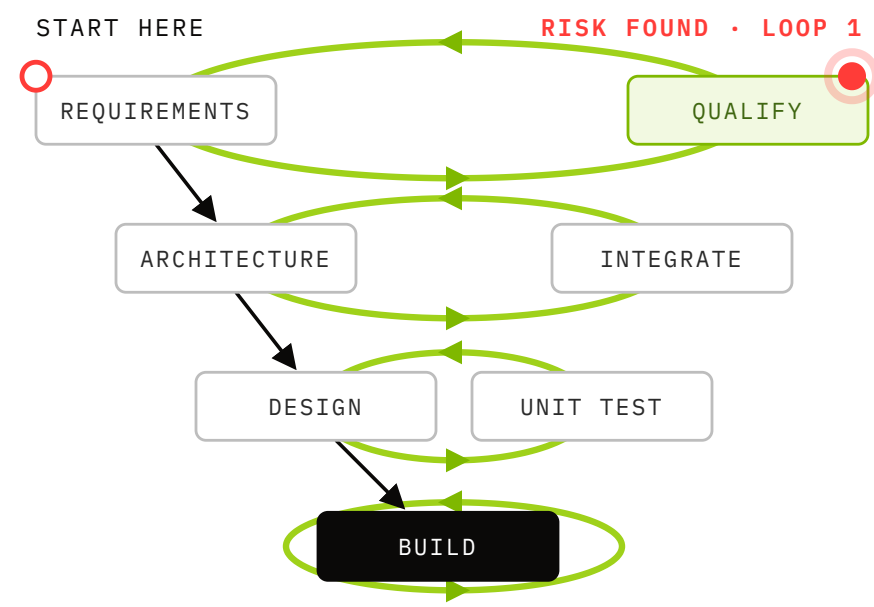
One V, risk found late



ONE PASS · YEARS

ITERATIVE

Close each level as you go



A LOOP AT EVERY LEVEL · WEEKS

01 Rank open risks. Test the hardest parts first.

02 Link every change to the requirements and evidence it affects.

03 Flag evidence that no longer matches the current build.

Close the loop early.

loop-machines.com

Approach after Flow Engineering's Iterative Systems Engineering Handbook, Vol. 1.
Independent analysis of public information. Not affiliated with Rocket Lab or SpaceX.