

What the critical paths have in common

The open critical chain of the ten product schedules, mapped to sixteen common steps and ranked by the critical-chain days they carry across the portfolio

Steps ranked by critical-chain days across the ten product schedules

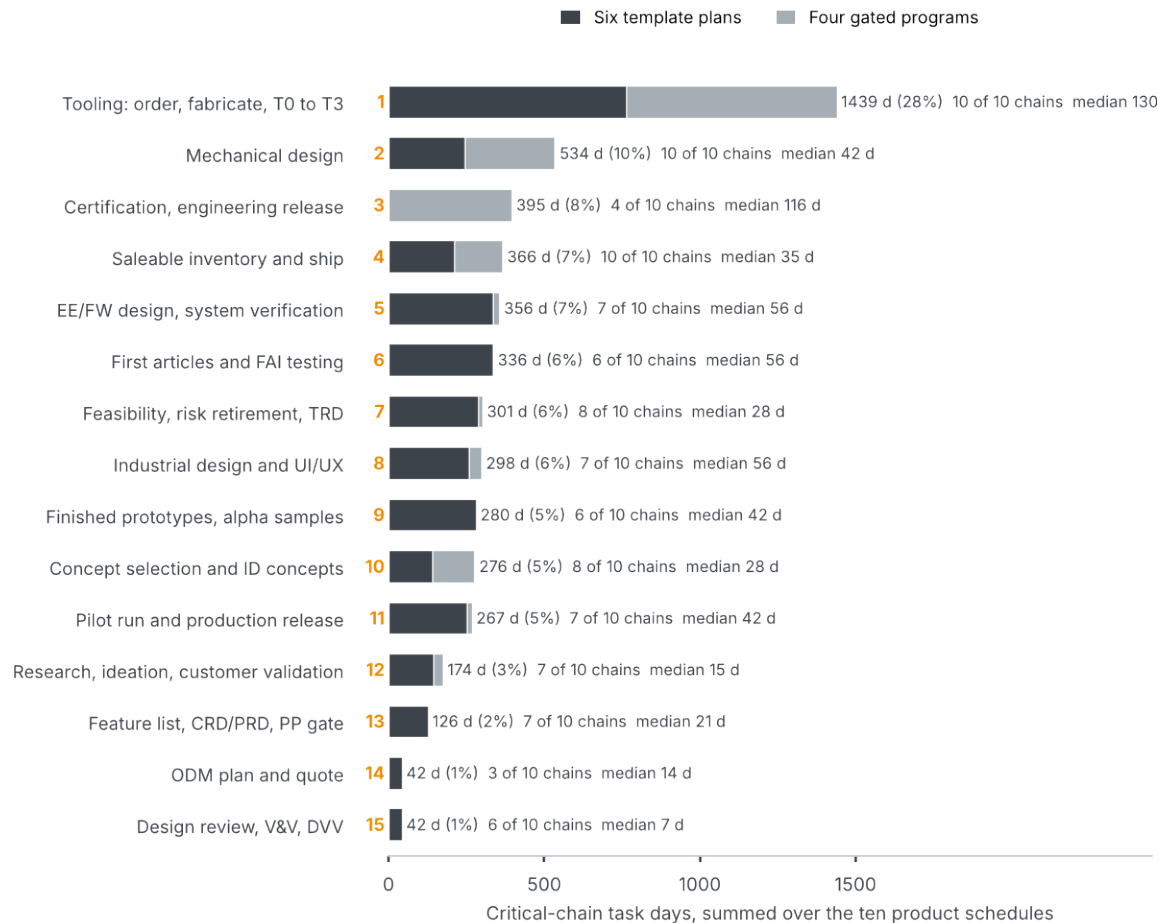


Figure 1. Ranking criterion: the step's critical-chain task days summed over the ten product schedules (chain = fastProject Local CP where populated, else MS Project critical, open tasks only; Lhotse is a module program and is left out). The share is of all critical-chain days in the portfolio. Milestones carry no days and are not ranked. Steps are matched by task name; a few gated-program tasks (rapid-prototype learning cycles, closure) sit outside the sixteen.

What the chains say. All ten product chains carry the same spine: mechanical design, EE/FW design, finished prototypes, tooling, first articles, design review, pilot run, saleable inventory. Tooling is the largest single element on every product chain, 114 to 226 days and a median 130, 22 percent of the critical-chain days in a template plan. What feeds tooling differs by schedule type: the template plans wait for a 42-day finished-prototype build before ordering tools; the gated programs order off mechanical design and run T0 and a recut inside tooling. After tooling every template plan carries the same serial tail, FAI 56, design review 7, pilot run 42, inventory 35, 140 days that no plan overlaps. The front end is on the chain in seven or eight schedules as a series of 14 to 28 day steps, which is why Define runs long: nothing in it is parallel. Lhotse feeds eight chains at the pilot run and five at prototypes, always with float, so the module gates nothing today; it becomes the driver only if it slips past 5/4/27.

What the chains tell us, and what to conclude

Reading the ranked chains: where the portfolio's critical calendar goes, why, and the one arithmetic that follows from it

What the data says

- 1. One step carries 28 percent of the portfolio's critical calendar.**
Tooling is on all ten product chains at 114 to 226 days (median 130): 1,439 of 5,232 critical-chain days. The next largest step, mechanical design, carries 10 percent. Nothing else reaches 8. Whatever the ODM does with its tooling lead time moves every ship date in the portfolio at once.
- 2. The chains run through the same eight steps in the same order.**
Mechanical design, EE/FW design, finished prototypes, tooling, first articles, design review, pilot run, saleable inventory appear on all ten chains, and in the six template plans with identical durations. The portfolio does not have ten critical paths; it has one, copied, with a different front end in front of it.
- 3. Tooling is fed by different things in the two kinds of plan.**
Template plans order tooling only after a 42-day finished-prototype build, which itself waits for EE/FW design to end. The gated programs (Annapurna, Makalu, Everest, K2) order off mechanical design and carry a 14-day recut inside tooling. The template plans therefore hold 63 to 91 days of design on the chain ahead of tooling that the gated programs run in parallel with it.
- 4. After tooling, every template plan runs the same 140-day serial tail.**
FAI units 14, FAI and V&V; 42, design review 7, pilot production V&V; 42, inventory 28, ship 7: six steps, each starting the day the last one ends. Certification is the only downstream work any template plan runs in parallel. Ranks 4, 6 and 11 on the chart are this tail.
- 5. The front end is long because it is serial, not because any one step is.**
Research, concept, requirements, feasibility and the ODM quote hold ranks 7, 10, 12, 13 and 14, each a median 14 to 28 days, each feeding the next. Together they are 17 percent of the chain days and the whole of the Define overrun. The Hallasan plan moved one of them (the capability test) alongside the rest and took 54 days off its ship date in a single edit.

What to conclude

- 1. Fix the template, not ten plans.**
Six schedules share one downstream block to the day. Any change made in the template reaches six ship dates; any change negotiated plan by plan reaches one. The restructuring work belongs in the template file, then in each copy.
 - 2. Order tooling at mechanical design complete, as the gated programs already do.**
Finished prototypes come off the chain and run alongside tooling; a 14-day recut is budgeted for the design changes that follow. Net 63 to 91 days per template plan. This is the practice the client's completed-program record rewarded (the tooling-in-development cohort ran scale-up in 69 days against 195), and the only lever that touches rank 1 without asking the ODM to work faster.
 - 3. Break the serial tail next, with the ODM.**
Pilot material preparation can start at FAI units (Everest does this); pilot production can overlap FAI and V&V; once first articles pass. That is a 42-day lever on every template plan, but it needs the ODM's agreement on when it will commit pilot material, so it is the second move, not the first.
 - 4. Hold Define to its own TARGET by running the front end in parallel.**
ID concepts, customer validation and the capability test do not depend on one another; the CRD/PRD does. Run them together and Define lands at the 12/1/26 TARGET the plans already carry.
- The arithmetic, one committed forecast per template plan**
Define at its own TARGET, then tooling ordered at mechanical design complete with a 14-day recut. Every downstream duration otherwise as planned.

Plan	Ships today	Define at TARGET	Tooling saving	Both moves	Window
Project Fuji	3/13/28	12/25/27	63 d	10/23/27	12/31/27
Project Kailash	2/22/28	12/25/27	63 d	10/23/27	12/31/27
Project Hallasan	1/6/28	12/15/27	66 d	10/10/27	12/31/27
Project Yushan	3/16/28	2/2/28	91 d	11/3/27	12/31/27
Project Kinabalu	4/10/28	1/15/28	63 d	11/13/27	3/31/28
Project Damavand	2/21/28	12/25/27	63 d	10/23/27	12/31/27

What to do with this. Tooling at 28 percent of the critical calendar is an ODM number, and the ODM has already quoted it the same way ten times. The client's own levers are upstream of it and beside it: order tooling earlier, run the front end in parallel, and overlap the tail. With the first two, every template plan ships inside its committed window with two to four months to spare, which is the contingency a single committed forecast should carry. The tail is the reserve after that.