

WHITE PAPER

Between the Systems

What conversations with manufacturing operators reveal about the real cost of coordinating new product introduction – 16 min read.

PREPARED FOR

NPI practitioners &
manufacturing
leaders

DATE

Sept 2026

VERSION

v1.1

CLASSIFICATION

Shareable

EXECUTIVE SUMMARY

Across 64 discovery conversations, manufacturing operators told the same story: **launches slip in the coordination between people and systems that no system or team fully owns**. This paper hands back what they told us: what breaks, what it costs, what they have tried, what they wish existed and how to make it real.

FIVE FINDINGS

- **NPI runs between the systems.** ERP, PLM and MES each hold their piece. The project itself, the thing that decides whether you ship on time, lives in Excel, email and meetings.
- **Coordination is part of the product.** The part wins the order; orchestrated execution is what keeps the customer. Contract manufacturers know it, and today they run it by hand.
- **Everyone builds the same workaround.** A spreadsheet empire maintained by power user(s). It decays the same way everywhere: data goes stale, trust collapses, the team reverts to email.
- **The default fix is headcount.** When coordination breaks, the default fix is another PM at \$130–150K a year, not a better system.
- **Expected solutions are not sci-fi.** Operators dream of systems that feed themselves, curate and log signals automatically, warn early and expose everything easily.

WHY CFO AND MANAGEMENT SHOULD CARE

The coordination tax = 30%. Based on what operators reported, for every 3 people working on NPI, at least 1 full salary goes to pure coordination: chasing status, re-entering data, preparing reviews. It is already in your payroll, with no budget line, so nobody sees it. And when it stops being enough, the reflex is to add another PM at \$130,000 to \$150,000 a year, or even worse: using highly skilled technical resources to do program management. The five-minute exercise before your next management meeting: count the people who touch NPI, multiply by their loaded cost, divide by three. Nobody we interviewed had ever calculated that number.

Slippage hits the top line, and company reputation. Schedule slips of 20 to 25% on year-long programs were described as normal, not exceptional. Every slipped launch is revenue pushed to next quarter, and worse: as one ETO leader put it, the real damage is "reputation hit and deferred revenue." We also heard about lead times promised to customers at four to six weeks that were really eighteen to twenty. Customers remember that longer than they remember the penalty clause.

Disorganization becomes someone else's margin. Suppliers price chaos in. One NPI veteran watched them "double the price of parts where we've moved the hole one inch over." A single error in a component spec triggers expensive drop-ship orders to save the build. One program paid 50% more per component because changes came late, and overran by \$1.75M, half of it judged avoidable by the operator himself. When your programs are disorganized, everyone around you charges for it.

CONTENTS

Acknowledgements	5
Audience and methodology	5
What surprised us.....	6
1. The core problem: NPI runs between different systems	7
2. What hurts most	8
3. What it costs	10
4. The workaround landscape	12
5. Where peers disagree	13
6. What operators dream of	14
7. Change management: the playbook	15
BlackOrbit's answer	16

"If there was no change, NPI would be easy!"

NPI program veteran, automotive & robotics

Acknowledgements

To the practitioners who gave us their time and their candor: thank you. We are talking about a 1000+ years of experience combined in manufacturing. You are the ones shipping programs, suffering delays and daily changes, dealing with constant pressure, and always finding heroic solutions to inextricable operational issues. You are part by part powering US manufacturing.

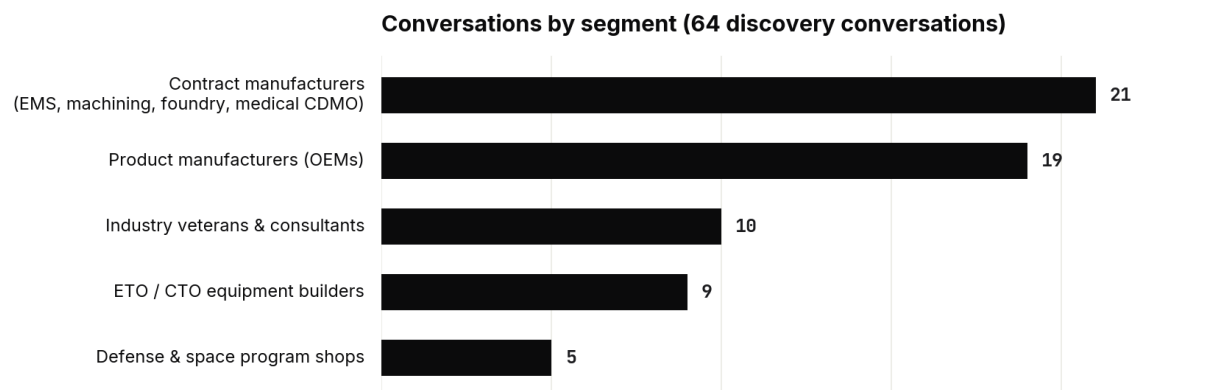
This paper is yours.

Also, if we quoted you and you would like the line attributed or removed, tell us and it is done.

Audience and methodology

We asked manufacturers to walk us through how a new product actually gets through their factory: what breaks, what it costs, what they have tried, and what they would fix first. Between April and August 2026 that **became 64 discovery conversations of 30 to 60 minutes with roughly 45 practitioners across some 40 manufacturing organizations.**

The people in the room were the ones who carry NPI on their backs: program and project managers, NPI and process engineers, engineering managers, directors and VPs of operations, plant managers, plus a handful of industry veterans and consultants who have seen the pattern across dozens of shops. Company sizes ran from 40 people to global enterprises, with the core in mid-size manufacturing: 50 to 500 people, 5 to 80 new products in flight at once.



Repeat conversations with the same company counted individually.

A note on method: this is qualitative field research, not a survey. Frequency figures in this paper are approximate, based on coding of interview notes. Quotes are verbatim but anonymized to role and segment.

What surprised us

Six things people believe, that the interviews contradicted

We went into this research with the same assumptions most people in the industry hold. Several of them did not survive the 64 conversations.

✗ **"Coordination problems mean the shop is poorly run."** We found the opposite. The worst pain was at the best-performing companies: one growing over 300% a year, one doubling revenue every year for five years, one that doubled in twelve months. The only company we interviewed with no coordination pain also had no new products in its pipeline. The problem follows growth, not bad management.

✗ **"The new ERP will fix it."** Six of the forty organizations were migrating their ERP when we spoke. None of them expected it to improve program coordination, and one PM told us the new system "seems to have caused more issues, and it hasn't resolved any that I'm aware of." The system of record gets replaced; the programs keep running on Excel and email.

✗ **"Buy a proper PM tool and the discipline will follow."** Every modern tool we heard about followed the same curve: adopted, partially fed, then abandoned once 40 to 60% of its data went stale and nobody trusted it. Asana, ClickUp, Monday, Workfront, all with the same story. The one tool still standing in almost every shop, after every other tool came and went, is Excel. Not because anyone loves it, but because it is accessible to all: all users have licenses, most people can use it without deep knowledge, no management approval / long IT project needed to get it going.

✗ **"You can hire your way out of it."** The default fix everywhere is another PM, at \$120,000 to \$150,000 a year in most US states. It works, if you can find good skilled technical PMs and/or until he/she leaves. In a market where 65% of manufacturers say program talent is their #1 business challenge, that's a bold bet. We saw a PM team dissolve in a few weeks, leaving about twenty projects to one person with no PM experience. We heard about retired experts whose products nobody can rebuild. When coordination lives in people, it walks out the door with them.

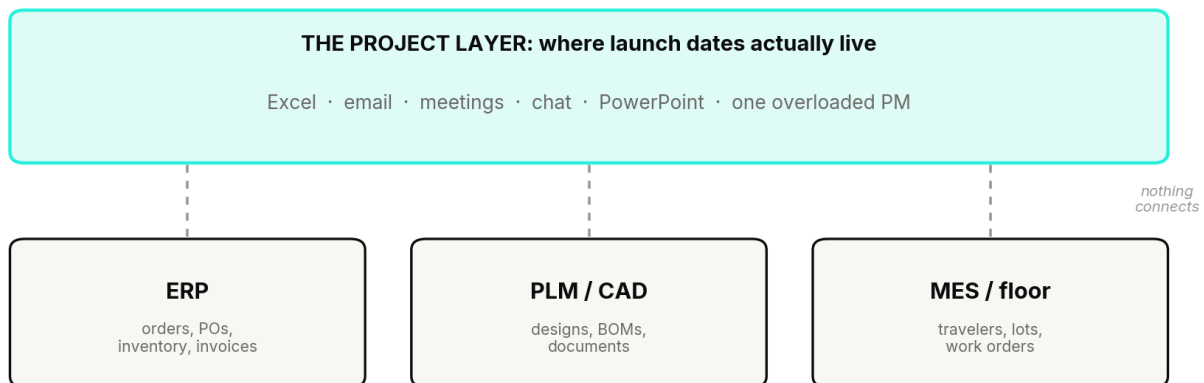
✗ **"The big players have this figured out."** One engineering manager spent nine years at one of the most automated fabs in the world and watched cross-function coordination fail there too. An EMS building for some of the largest tech companies still processes changes on paper with physical signatures. At one large OEM, approving a new piece of software took a year and a half. Scale adds process. It does not add coordination.

✗ **"AI is going to run these programs."** Not one of the 64 conversations asked for that. Even at the company whose corporate leadership pushes AI adoption, the request was for flags and suggestions, for data reconciliation, for automated updates, but always with a person deciding. The strongest pushback we heard: "Without meeting people, without validating it, we will not accept anything a system pushes." What operators actually asked for is plumbing: systems that update themselves and warn early.

1. The core problem: NPI runs between different systems

Every factory we spoke with has systems of record. The ERP knows orders, purchase orders and inventory. PLM and CAD know the design. The MES knows what the floor is doing. All of them are fed, (mostly) maintained and audited.

Then we asked where the project lives: the gates, the handoffs, the dozens/hundreds of work packages behind every new part number, the promise made to the customer. The answer, almost everywhere, was the same: in Excel, in email, in meetings, sometimes in online project management tools, and in the head of a few “heroes”.



“Linking things to each other is the missing one.”

Program manager, defense & space contractor

“It's a disaster... scattered information, there is no framework, there is no place where I can find everything in one place.”

Hardware engineer, large medical-device OEM

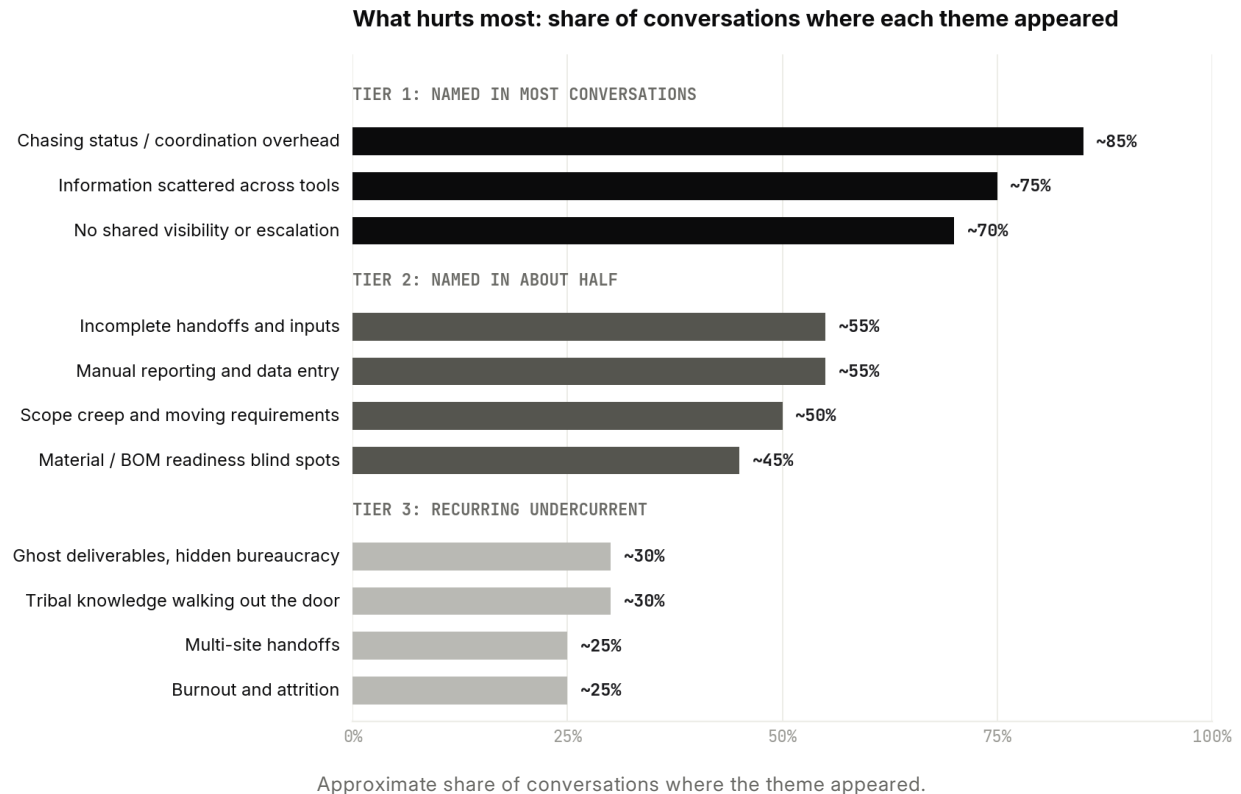
Why it matters now: nearly every company we interviewed is scaling: doubling revenue, doubling NPI count, adding sites and countries. Volume grows through the systems of record. Coordination grows through people. That asymmetry is the industry's quiet tax: the widget scales, the orchestration doesn't.

“Now you have more new people, you have more bloat, you have more errors, you have more people to update.”

Business development lead, mid-size EMS

2. What hurts most

Across 64 conversations the same pains kept surfacing, most of them volunteered before we asked:



Tier 1: the universal three

- **Chasing status.** With no central task state, every open item becomes a direct message, a meeting, or a walk across the floor. Because customers can't generate revenue until they ship, everything feels urgent, so everyone interrupts everyone.

"Everything's urgent, and when everything's urgent you just end up with daily requests on 'where are we at on this task?' Because there's no one place I can look at to see if the task is complete or not."

PM team lead, mid-size EMS

- **Scattered information.** A design package arrives by text message, decisions live in one chat and three inboxes, the schedule is a PDF export. The single source of truth is a person, and that person is a bottleneck.
- **No shared visibility.** PMs can't see the portfolio, sales can't see progress, management hears about slips late, and escalation depends on judgment instead of signals. Several operators told us their leaders are reactive because the information to be proactive simply isn't visible.

"Those two weren't communicating even though they were 30 feet apart."

CTO / GM, contract manufacturing

Tier 2: the structural four

- **Incomplete handoffs and inputs.** Over-the-wall engineering, POs accepted with gaps on the critical path, sales promising 4–6 week lead times on parts that take 18–20 weeks.
- **Manual reporting and data entry.** Status decks, exports, re-keyed hours. One ops director put the maintenance at more than half his week; one exec put reporting at half of hers.
- **Scope creep and moving requirements.** The #1 killer of any traditional planning exercise: changes after tooling commitments quietly dissolve the business case, and the plan never absorbs them.
- **Material and BOM blind spots.** Nobody can answer "what share of our parts is actually ready to build?" while single components carry 8-week to 240-day lead times.

Tier 3: the undercurrents

- **Ghost deliverables.** Undocumented work that always happens and is never planned: the approval that always takes 3–4 weeks, the PO that takes two.

"There are lots of ghost deliverables: hidden, not very official. And it creates a lot of stress."

Process integration engineer, medical CM (translated)

- **Tribal knowledge walking out the door.** Retiring experts, lessons-learned meetings whose output "gets put into the ether," products nobody remembers how to build.
- **Multi-site handoffs.** NPI in one country, mass production in another; validation effectively run twice, coordinated across time zones by DM.
- **The human cost.** Burnout and attrition came up unprompted again and again: resignations citing "how we work," not the work itself.

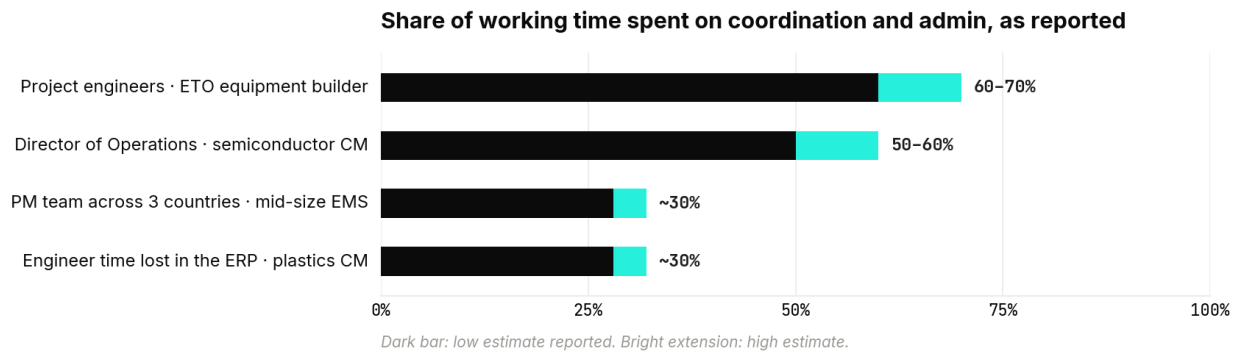
"The way I get help is: after I put my wife to sleep by 9 p.m., I'll be working until 12."

Sole PM, \$10M custom equipment builder

3. What it costs

Operators rarely see the coordination tax on a P&L line, but when asked to quantify it, the numbers were immediate, and consistent.

Time: the hidden headcount



At one semiconductor packaging foundry, the team estimated 30–40 hours per week lost across engineers, managers and technicians just chasing information: **a full-time job's worth of waste, every week, forever.** At an ETO builder, 15 project engineers spend more than half their time coordinating instead of engineering.

"Just doing the data entry... was easily 50 to 60+ % of the week. Just that maintenance to ensure that everybody was on the same page all the time was a huge time suck."

Ex-Director of Operations, semiconductor CM

Schedule: drift is the norm

"If I have a project that's like a year, we'll miss it by three months": a 20–25% slip, described as typical, not exceptional. At one top-tier EMS, the lag between "design change released" and "change implemented" ran six to nine months; every unit built in between was rework waiting to happen.

Money: overruns, margin, and the price of chaos

- **One datacenter-equipment program** overran by 7% of a 1,000-unit, \$25K-per-unit contract (\$1.75M), and the operator judged 50–60% of that overrun avoidable with better coordination.
- **Suppliers price chaos in:** "They would double the price of parts where we've moved the hole one inch over," an NPI veteran told us. **Disorganization becomes someone else's margin.**
- **Late supply-chain involvement** leaves shops "painted into a corner: no substitution, no deviation, but too late to hit the timeline," and it ends in excess and obsolete inventory write-offs.

-
- **Audit prep:** in regulated shops, two to three weeks of engineers triaging projects to reassemble artifacts before every ISO / AS9100 audit.

People: the cost nobody budgets

The quietest line item is the biggest: experienced people leaving. An engineer resigned over “how we work.” A PM team collapsed within weeks. A manager said of a better system: “This would have kept me sane and kept me from quitting.” Replacing that experience costs more than any tool.

4. The workaround landscape

Every company has tried to fix this. The attempts are remarkably uniform, and so are the failures. Tools don't fail at installation; they fail at month three, when humans stop feeding them.

WHAT SHOPS BUILD	THE PROMISE	HOW IT DIES
The spreadsheet empire: a master Excel or Smartsheet, up to 700 lines	Everything in one sheet, everyone understands it	One owner, manual upkeep; breaks silently at scale. "I've only described probably 70% of the systems we use that are manual."
Generic PM SaaS: Asana, Monday, ClickUp, Jira, Smartsheet, Wrike	Modern, collaborative, configurable	Needs a power user; engineers stop updating it; 40–60% of the data goes stale and trust collapses; teams revert to email
Microsoft Project	Rigorous planning and dependencies	Plans well, connects nothing; schedules distributed as PDF exports; no collaboration
The ERP "PM module" / all-in-one PLM promise	One system for everything	Financial project admin isn't coordination; the promised modules are often never implemented at all
Homegrown SharePoint / custom builds	Fits our exact process	Hits a ceiling, no audit trail, still hand-fed; custom development runs 6–12 months and compounds
"Just hire more PMs"	Experience absorbs the chaos	The chaos scales faster than the headcount, and the coordination tax comes back at \$130–150K per head

"It seemed like you were feeding the tool but not getting much value out."

VP, additive-equipment OEM, on why two Asana rollouts died

"Getting individual contributors to update their action items when they're complete... I have not found a solution for that yet."

PM, medical contract manufacturer

"After we purchased it: 'We're really excited to see you build the system, because we've never seen it done before.' I mean, what the hell?"

Program leader, business-jet manufacturer, on an all-in-one PLM

"Their mindset is: well, just throw more PMs at it."

Supply chain / PM lead, consumer-electronics EMS, on contract manufacturers

5. Where peers disagree

Not everything converged. Four honest fault lines ran through the interviews.

THE DEBATE	ONE CAMP	THE OTHER CAMP
AI in the loop	"We are asked to use AI as much as possible in our day-to-days." (defense/space PM, corporate mandate)	"Without meeting people, without validating it, we will not accept anything." (EV-supplier PM); one electronics CM advised never saying 'AI' at all
Gates vs. freedom	Enforce the gates: exceptions are how things fall through. Regulated shops want hard checklists and audit trails	"You can be in two or at times even three phases at the same time. You must just appreciate the risk." (capital-equipment consultant)
Should engineers touch the tool?	Everyone works in one place; that's the point of having one	Keep engineers in email and chat; the tool should nudge them there, or they'll never feed it
Is the tool even the answer?	"This is the product I've been wanting for years": believers see the missing layer	"Ultimately it doesn't come down to the tool; it comes down to the team and the project manager." (medical-CM PM)

6. What operators dream of

We closed most interviews with a magic-wand question. The answers were strikingly modest: nobody asked for autonomous factories. They asked for seven things:

- **One place.** "The schedule and work breakdown, interactions, deadlines, material changes, labor hours & timesheets, risks, actions & decisions: those core things, all in one place."
- **Systems that feed themselves.** The MES logs an event, the plan updates. The floor scans a barcode, status moves. "I don't want to be pulling data from people."
- **The morning view.** Every active NPI, red-yellow-green, click into the late ones and see why, and for each contributor, a view of what they should be working on this morning.
- **Early warnings, not post-mortems.** The late PO flagged in the plan before it slips the gate; a clear-to-build view of the BOM; the critical-path part arriving the week its assembler is on leave.
- **A drop-in start.** "If we can drop our traveler in here and it sets up all the triggers, that's huge." And from an ETO leader: "If you could deploy an off-the-shelf tool in a month, that would be a game changer."
- **Project memory.** Searchable decisions ("when did we make that decision? Who was involved?"), tribal knowledge captured before it retires, lessons that stop vanishing into the ether.
- **Audit-ready by default.** The ISO / AS9100 evidence pack assembled as a by-product of doing the work, not two weeks of triage before every audit.

None of it is science fiction. It is plumbing: the connective layer between systems that already exist. That is perhaps the clearest finding of this research: the industry's biggest NPI problem is also its most buildable one.

7. Change management: the playbook

Whatever you deploy, the interviews are clear about the conditions under which it survives, and they have little to do with features.

Who decides, and whose budget. In almost every company we interviewed, the person who feels the pain cannot sign. The champion is a PM or an engineer; the signature sits with a VP, a COO or the CEO, often behind an IT or security review that adds weeks to months. And since coordination has no budget line, the spend has no natural owner: today it hides in salaries. The practical consequence, if you are that champion: build the case in the language of the previous sections (section 3), payroll and program outcomes, because that is the budget it actually lives in.

The habits that survive. People do not feed tools. "Getting individual contributors to update their action items when they're complete... I have not found a solution for that yet." A VP on two failed rollouts: "It seemed like you were feeding the tool but not getting much value out." Once 40 to 60% of a tool's data goes stale, trust collapses and everyone returns to email. The rollouts that stuck shared three traits: the data entry burden on engineers was close to zero, the tool reached people in email, Teams or Slack instead of demanding they live in a new screen, and the change was carried by the champion with management backing rather than mandated from above. "When it comes down like that, it never works," as one NPD veteran put it. One engineer gave the simplest test: "It should be simple, one click and do everything... if it's complicated for them, they don't wanna use it."

The data you need to start. Less than most vendors assume, because it has to be. The shops we visited ranged from paper travelers with wet signatures to a handful of connected MES environments, and the large majority run programs in Excel and email. That is the realistic starting point, so the existing spreadsheets, travelers and inboxes have to be the input, not a prerequisite to clean up first. One foundry with admittedly immature data collection got a working program view from simple exports of its existing systems. If your programs live in Excel today, you have enough data to start.

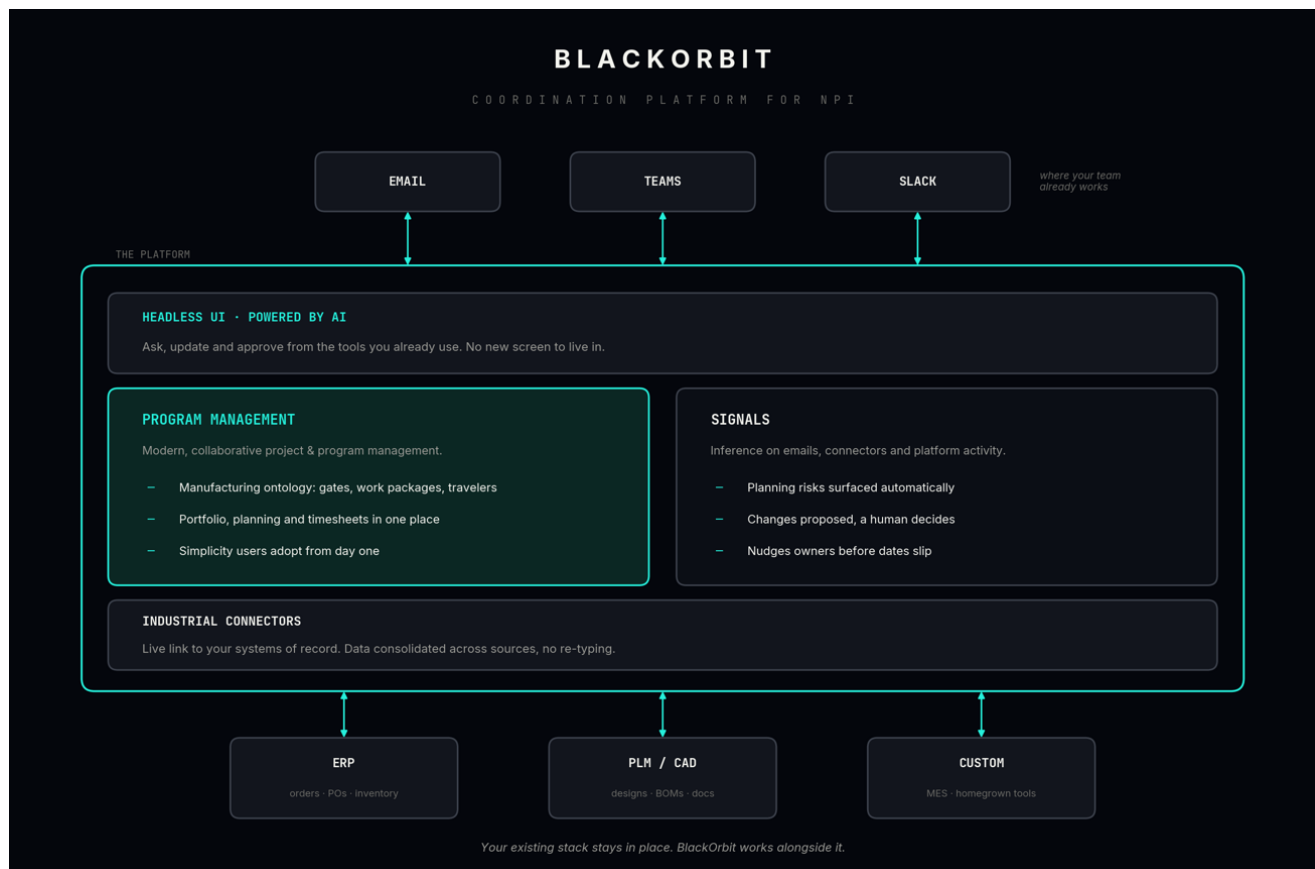
BlackOrbit's answer

This research is the foundation of BlackOrbit, a coordination layer for manufacturing NPI.

The design choices come straight from the interviews: it sits alongside the ERP, PLM and MES; it reads signals from those systems and from the daily flow of email and meetings so humans stop re-keying status; its AI proposes and explains; a person always decides; and it speaks manufacturing natively: gates, work packages, travelers, FAI, not generic tasks.

The platform is built around 4 main pillars:

- **Project and program management:** modern and collaborative, including all the manufacturing ontology and gates. Most users are amazed by its simplicity and nice UX.
- **Industrial connectors** to consolidate data from different sources: ERP, PLM, custom platforms.
- **Inference of signals** based on emails, connectors, and platform data, to then automatically surface planning risks, propose changes and nudges.
- **A headless UI** powered by AI, so that users can interact with the platform with their most used tools: emails, slack, teams, MCP.



*The coordination platform for new product introduction, from spec to production.
Less coordination tax, more shipping programs.*

Ship industrial programs on time.

DESIGN PARTNER INVITATION

We are taking on a small number of additional design partners: mid-size manufacturers running multiple concurrent NPIs who want to shape the tool against their own operation, on preferential terms. If this paper described your factory, we should talk.

hello@blackorbit.ai · blackorbit.ai