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The Complete Guide to Aviation MRO

Stop guessing where parts and tools are.
Start seeing every asset, every minute.

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The Cost of Not Knowing

25%

of technician time lost searching for parts, tools, and information instead of performing maintenance.

Turbojet Engine

Tool Set

Paper Checklist

The Visibility Gap in Aviation MRO

Aviation MRO (maintenance, repair, and overhaul) keeps aircraft airworthy. But most operations run on partial visibility: paper checklists, spreadsheets, and tribal knowledge about where a part, tool, or work package actually is. Aerospace MRO is estimated at over $90 billion annually worldwide, yet many organizations still can't answer a simple question in real time: **is that part in the hangar, the crib, or on the aircraft right now?**

That gap shows up on the balance sheet in ways that are easy to underestimate until they're added up.

3–5%

annual tool and part loss rate; specialized tools cost $500–$5,000+ to replace

$1,000s

lost per hour to unplanned AOG events and missing work packages

2–4 FTEs

tied up for weeks preparing for AS9100/ AS9110 audits

10–30%

typical MRO overspend when inventory visibility is limited

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Where Visibility Breaks Down

A single tool or part crosses several handoffs before a job is closed out. Each handoff is a place where paper tracking loses the thread and where Thinaer picks it back up.

Tool Crib

Checked out on paper. No record of who has it or when it's due back.

Hangar Floor

Tools move station to station with no digital trail of location.

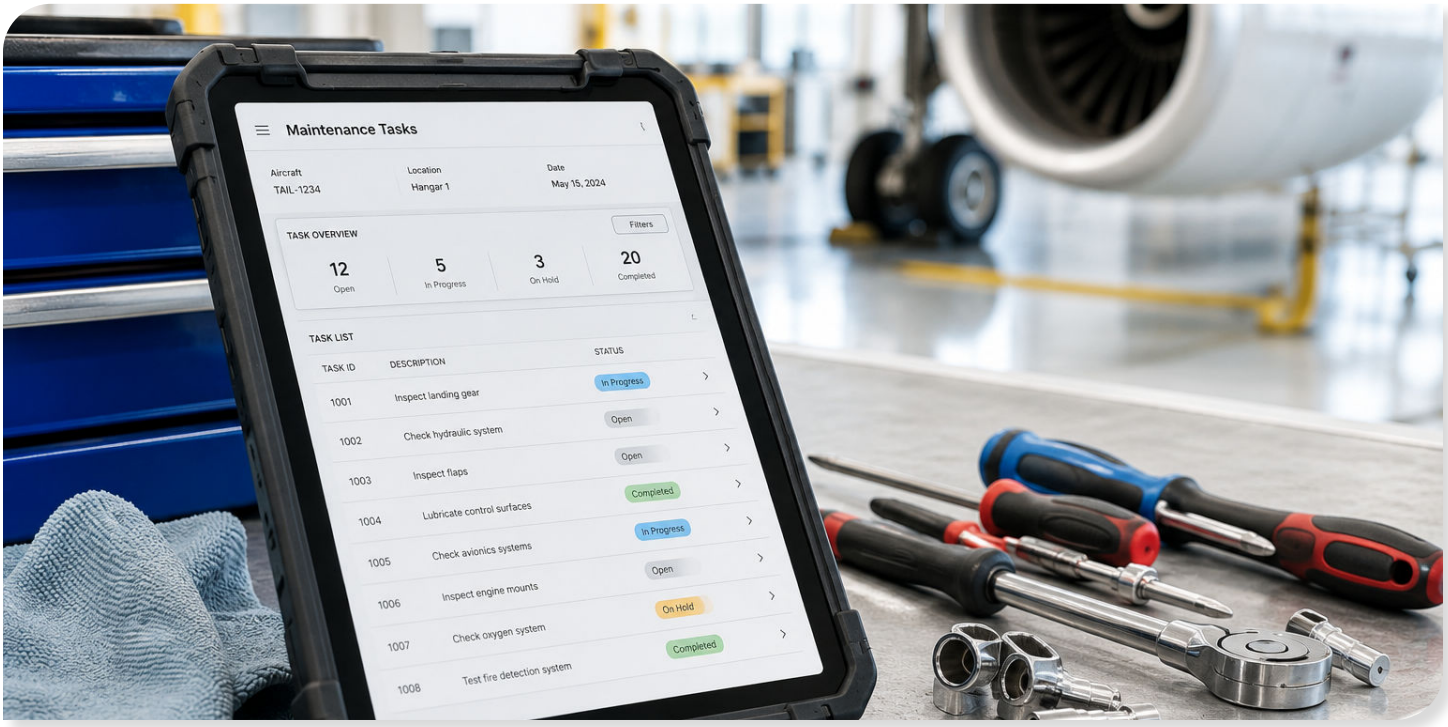
Aircraft / Engine Bay

A missed tool here becomes a FOD risk, not just a lost item.

Closeout & Audit

Missing items surface too late — after the aircraft should already be released.

Thinaer replaces every handoff above with a timestamped, location-aware record — so the trail never goes cold.



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“Lost tools don’t just cost the part. They cost the hours around it.”

10–30% typical overspend when MRO teams can’t see what they have or where it is

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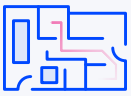
Thinaer is the Physical AI capture layer. We turn unstructured physical environments, including factories, hospitals, hangars, shipyards, and classified bays, into structured, AI-ready data, visualized through Sonar.

The Solution: Real-Time MRO Telemetry with Thinaer's Sonar

Sonar captures real-time location, usage, and status for every tool, part, and kit moving through your MRO operation, eliminating search time and closing gaps before they become compliance problems.

Digital Tool & Part Tracking

Plug-and-play BLE, RFID, and wired sensors. Tracked with off-the-shelf heat shrink, adhesive backing, or custom mounts — for nearly any tool, part, or kit shape.

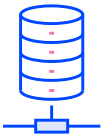


Breadcrumb Trails

Instantly backtrack a tool or part's path, or produce digital proof of where and when it was last seen — on or off the aircraft.

Audit-Ready Compliance

Automated chain-of-custody logging reduces AS9100/AS9110 audit prep. Every movement is timestamped with location and user accountability.



Enterprise Integration

Secure ingestion at scale into existing MRO software, ERP (like SAP), MES, data lakes, and BI tools such as Tableau, Power BI, and Grafana.

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The Benefits of Smart MRO Visibility

1. **Reduced "Go Find" Time**

   Locate tools and parts in seconds. Return technician focus to aircraft work.

2. **FOD Prevention**

   Automatic alerts when tools remain in an aircraft or FOD-sensitive zone.

3. **Audit Prep Reduction**

   Automated tracking and reporting for AS9100 and AS9110 audits.

4. **AOG & Delay Prevention**

   Real-time kit and part visibility eliminates expediting costs and rush shipping.

5. **Predictive Insights**

   AI-ready usage data turns reactive maintenance into data-driven decisions.

6. **Same-Day Data Visibility**

   Sonar is live from day one, capturing actionable insights while deployment continues in the background.

7. **Cost Reduction**

   Lower annual loss rates on tools and parts with continuous tracking.

8. **Productivity Gains**

   Improve schedule adherence and hangar throughput with data-driven allocation.

Key Insight

The real question is not how much maintenance a facility does, it's how much of it was planned. Best-in-class MRO operations target 80%+ planned maintenance. The other 20% is the expensive part and where the cost lives.

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Built for Real-World Aviation MRO

Aerospace — FOD Prevention

Problem: Manual checklists fail to prevent costly Foreign Object Damage.

Solution: Tag tools with Thinaer beacons; set FOD-sensitive zones; trigger alerts if tools remain in aircraft or vehicles; sync to ERP (SAP) for automated reporting.

Outcome: Prevent FOD events, accelerate QA closeout, and ensure compliance with digital proof of tool removal.

Tool & Part Accountability

Problem: High-demand tools are frequently misplaced between crib, hangar, and line, slowing turnaround.

Solution: Sonar visualizes tool and part locations with breadcrumb trails and streams dwell-time data to analytics.

Outcome: Find tools instantly and improve utilization with new insights.

Compliance & Audit Readiness

Problem: AS9100/AS9110 audit prep is manual and pulls technicians away from maintenance for weeks.

Solution: Automated chain-of-custody logging timestamps every movement with location and accountability.

Outcome: audit-ready documentation as a byproduct of normal operations.

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Your Aviation MRO Evaluation Checklist

How many of these can you check off today?

RFID/BLE Tool & Part Tracking

Plug-and-play sensors, including BLE, RFID, and wired options, for accurate location awareness across hangars, cribs, and aircraft.

Real-Time FOD Alerts

Instant alerts if a tagged tool enters an aircraft or leaves a designated zone.

AS9100/AS9110 Support

Automated chain-of-custody logging with timestamped location and user accountability.

Visual Dashboards

Real-time geo maps and breadcrumb trails in Sonar, available on mobile.

MRO/ERP Integration

Secure ingestion into ERP (SAP), MES, data lakes, and BI tools like Tableau and Power BI.

AI-Ready Data

Structured data feed consumable by any off-the-shelf AI tool for guided workflows.

Your Score

0–2
You're flying blind.

3–4
You have pieces in place, but gaps remain.

5–6
You're ahead of most MRO operations. Let's talk about what's next.

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Ready to start seeing results in days, not months?

What once demanded lengthy consulting engagements and costly AI platforms can now be achieved quickly and affordably with Thinaer and modern GenAI tools.

See insights in days, not months. Professional deployment services ensure you see immediate value through real-time visibility from day one, while your data simultaneously flows to strategic systems for advanced analytics.

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Book a Demo

Physical AI starts here.