



# Ensuring Mission-Ready Fleets: AI-Driven Predictive Maintenance for Proactive Success



## Do You Know?

According to the National Business Aviation Association, predictive maintenance has fundamentally transformed the operational efficiency, delivering recorded improvements of **35–40%**.

A single AOG event costs airlines **\$50,000–\$150,000** for the first day alone, escalating to over \$2 million for multi-day groundings. Quantiphi's AI-powered Predictive Maintenance Agent shifts your maintenance posture from reactive to predictive while reducing unplanned downtime and slashing maintenance costs by **18–25%**, keeping every aircraft mission-ready.

## Problem Statement:

Despite the continuous stream of operational data produced by modern aircraft, maintenance crews are often constrained by traditional scheduled or reactive frameworks. This disconnect prevents teams from acting on early failure signals, leading to avoidable Aircraft on Ground (AOG) events and compounding financial inefficiencies.



### Reactive Maintenance Cycles

- ▶ Fixed schedules over-service healthy parts and under-serve degrading ones, wasting labor and materials.
- ▶ Unplanned removals cost **30–50%** more than scheduled work due to emergency sourcing premiums.



### Aging Fleet, Compounding Complexity

- ▶ Legacy platforms generate disjointed, multi-source data spanning decades of use.
- ▶ Without AI data analysis, teams can't isolate early warning signs from routine wear, risking mission aborts.



### Unplanned Downtime

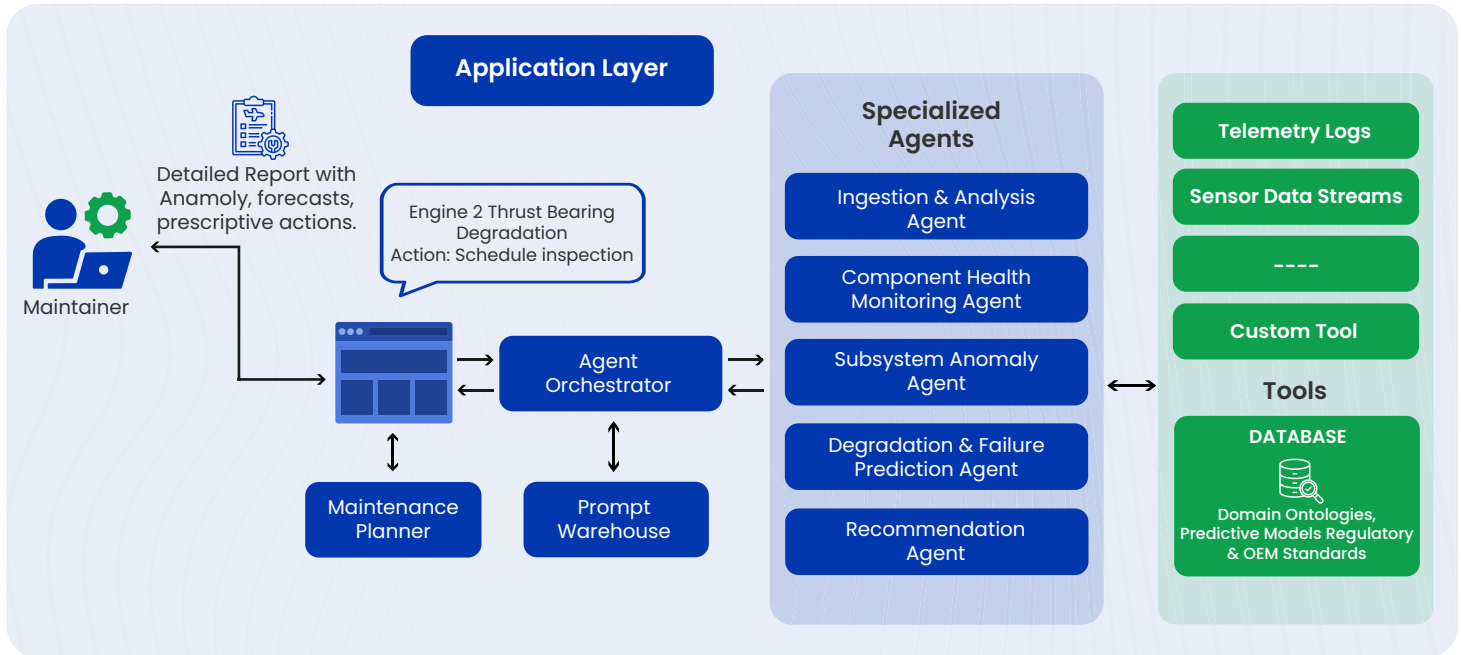
- ▶ Reactive habits cause delayed repairs, high spare-part pressure, and lower fleet readiness.
- ▶ Logistics and compliance delays add **2–5 days** of grounding beyond the initial repair window.

## Solution:

Leveraging historical data, live sensors, and fleet-wide failure patterns, the Aircraft Predictive Maintenance Agent identifies subsystem vulnerabilities before they result in failure. This foresight facilitates highly targeted pre-mission maintenance and optimizes global logistics support.

## How It Works:

The system accelerates aircraft maintenance planning by analyzing health data, forecasting component degradation, and recommending proactive maintenance steps validated by technicians.



## Key Features:

### Multi-Source Data Fusion

Aggregates maintenance, avionics, and sensor data into a unified view.

### Subsystem Failure Prediction

Anticipates failures across avionics, propulsion, hydraulics, and more.

### Mission Capability Scoring

Real-time readiness scoring per aircraft across different operational metrics.

### Continuous Fleet Learning

Models improve with every maintenance event logged across the fleet.

## Strategic ROI: Delivering Measurable Operational Advantage

### ≥35% Reduction in Unscheduled Maintenance Events:

Monitored systems show dramatically fewer surprise failures.

### 15% Reduction in Component Failure Rates:

Continuous monitoring improves reliability and prevents cascading failures.

### ~12% Extension in Component Lifecycle:

Smarter maintenance timing avoids premature replacements.

### Elevated Fleet Safety:

Proactively identifies microscopic wear patterns before they manifest as in-flight anomalies.

\*varies case by case

## Why Quantiphi?

Quantiphi provides **end-to-end Multi-Agentic Systems (MAS)** tailored for aerospace. We blend AI, aerospace, and systems engineering expertise to build production-grade, **compliant** solutions with **Human-in-the-Loop** design. Leveraging frameworks like **NVIDIA AI Enterprise** and open standards, we ensure seamless integration, coordination, and measurable outcomes.

### Built for Compliance

Supports smooth adoption within regulated environments.

### End-to-End Support

From design to optimization, we guide your MAS journey every step of the way.

### Human-in-the-Loop Design

Built to enhance technician workflows through guided, explainable diagnostics.



**Enhance aircraft efficiency and reliability with Predictive Maintenance capabilities.**

**Schedule a 30-minute discussion tailored to your most critical aircraft specific challenge!**

**Schedule a Call**



Quantiphi is an award-winning AI-first digital engineering company driven by the desire to reimagine and realize transformational opportunities at the heart of business. We are passionate about our customers and obsessed with problem-solving to make products smarter, customer experiences frictionless, processes autonomous and businesses safer.



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