Microsoft

PREDICTIVE MAINTENANCE IN AEROSPACE

Cortana Intelligence Solution

Impact of unscheduled equipment downtime can be extremely destructive for Businesses. It is critical to keep field equipment running in order to maximize utilization and performance and by minimizing costly, unscheduled downtime.

To maximize asset performance, one important way to analyze such information is to utilize **Predictive Maintenance,** which can be defined as predicting possibility of failure of an asset in the near future so that the assets can be monitored to identify failures & take action before failures occur.

The early identification of issues helps deploy limited maintenance resources in a more cost-effective way and enhance quality and supply chain processes.

Business Problems in Aerospace Industry

How to determine when a **plane actually requires maintenance?** (Right now, an aircraft is brought in at set two-year intervals for inspection)

How to improve the overall **customer experience?**

01

How to ramp-up production in order to reduce the **huge backlog** of **aircraft orders** (around 12,000 aircrafts in 2014)?

02

03

Aircraft spend much time in repairs, what is the best way to **lower repair time?**

04

Benefits of Utilizing Predictive Maintenance (PM)

Use of Sensors for Repairs

Rather than two-yearly intervals detailed inspection, sensor data can be used to more exactly determine when maintenance is required, improving reliability and cutting costs

Reducing Loss Due to Delays

Data collected can be used to predict & analyze climatic conditions which results in:

- Better scheduling
- Fewer flight disruptions
- Bringing down loss due to delays

Detecting Faults

PM can identify faults pre-emptively using historical data. This allows the company to perform short maintenance, & reducing the time spent in repairs

Help in Manufacturing & Assembly

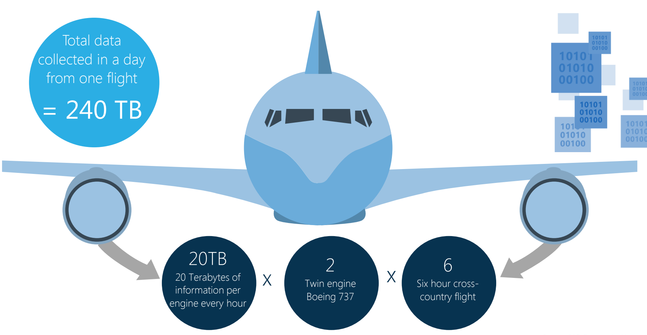
- By predicting production equipment health & lifecycle
- By making agile production plan to optimize the schedule dependencies

Real-time Visualizations

- Get real-time visualizations of the health of your fleet
- Improve operational efficiency of assets

Sensor Data Collected by an Aircraft in a Six Hour Flight per Day

Total data collected in a day from one flight = 240 TB



20TB
20 Terabytes of information per engine every hour

X

2
Twin engine Boeing 737

X

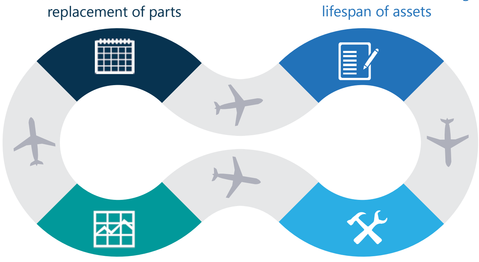
6
Six hour cross-country flight

Source: SAP Community Network

Predictive Maintenance Solutions can Provide Businesses with Key Performance Indicators (KPIs)

Estimated order dates for replacement of parts

An estimate of the remaining lifespan of assets



Health scores to monitor real-time asset condition

Recommendation for proactive maintenance activities

Aerospace Use Cases

Business problem

Aircraft Component Failure

Solution: A multi-class classification model was built that predicts the probability of a failure due to a certain component within the next month. By employing these solutions, airlines can reduce component repair costs, improve component stock availability, reduce inventory levels of related assets and improve maintenance planning

Business problem

Flight Delay and Cancellations

Solution: By using predictive analytics, necessary maintenance actions can be taken to mitigate the risk while the aircrafts are being serviced and thus prevent possible delays or cancellations. Using Azure ML web service, the predictive models can seamlessly and easily be integrated into airlines' existing operating platforms.