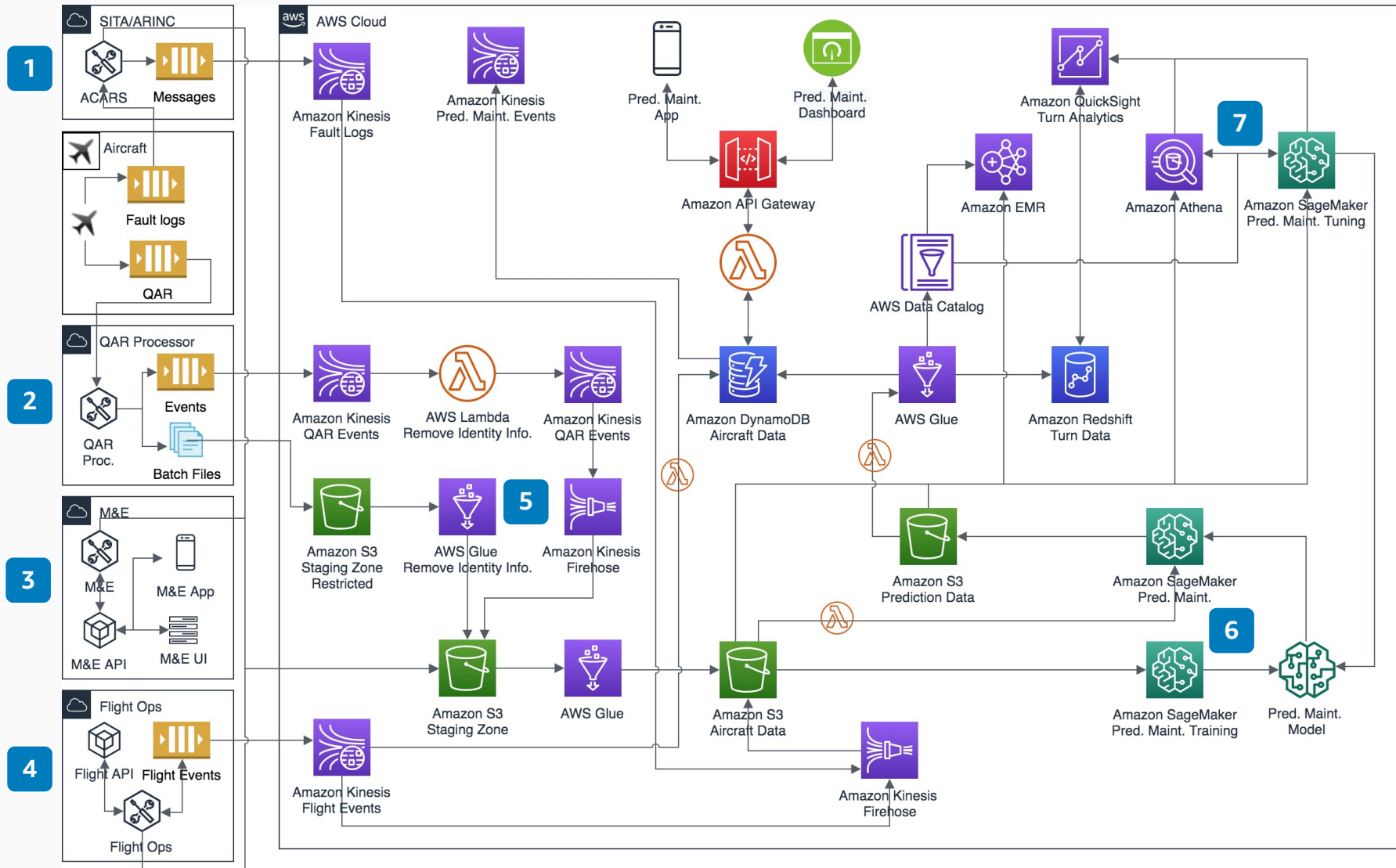


# Aircraft Predictive Maintenance

## Reducing Unscheduled Maintenance Delays and Cancellations using AI/ML



Flight delays and cancellations caused by unscheduled maintenance issues cost airlines \$120K — \$300K per aircraft per year; potentially translating to \$60M — \$150M annually for an airline with 500 aircraft. Implementing predictive maintenance solutions that leverage the aircraft log, sensor, and maintenance data can reduce this cost by up to 25%.

- 1** The ACARS system collects fault logs and pilot reports in real-time.
- 2** QAR data is collected and uploaded into AWS based on aircraft capability. The frequency of data collection varies based on the connectivity package installed on the aircraft. The ACARS system can send selected signals on a limited basis.
- 3** Maintenance logs, part removals, and part repair history from the maintenance & engineering systems are collected periodically based on the capability of the system.
- 4** The flight operations system provides the scheduled and actual flight information. This is critical for correlating delays and cancellations with component failures.
- 5** Identifying information must be deleted from the QAR data before it is used.
- 6** Amazon SageMaker trains the model to correlate delays and cancellations to fault logs, maintenance logs, part removals and QAR data. Feature engineering identifies the most significant and predictable chapters and components.
- 7** Models are tuned periodically to improve predictions and reduce false positives.



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**AWS Reference Architecture**