

Using full flight sensor data for Predictive Maintenance

Prognos[®] for AIRCRAFT

Rob Stolk

 Fly Responsibly

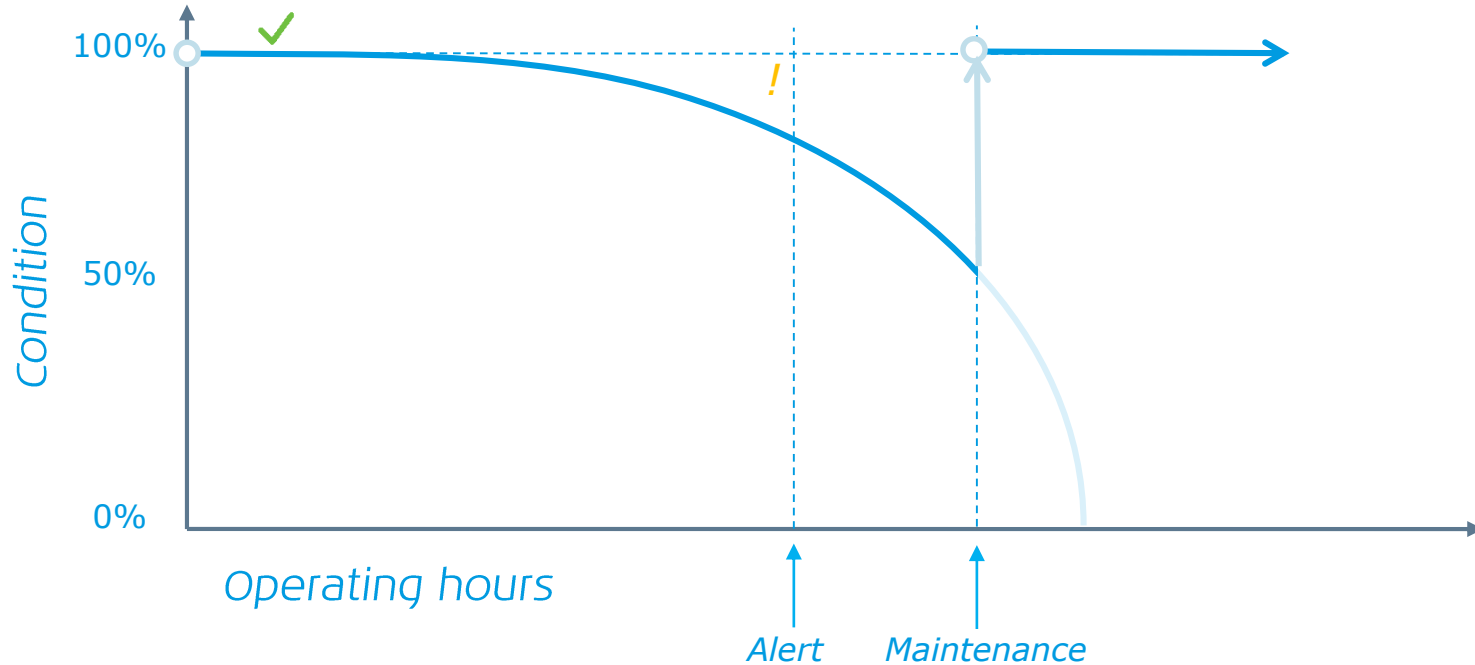
Royal Dutch Airlines



The idea



Track system health over time



Data or data?



Which data source to use?

Full flight data
40.000 meas. per sensor

Snapshot data
1 or 2 meas. per sensor

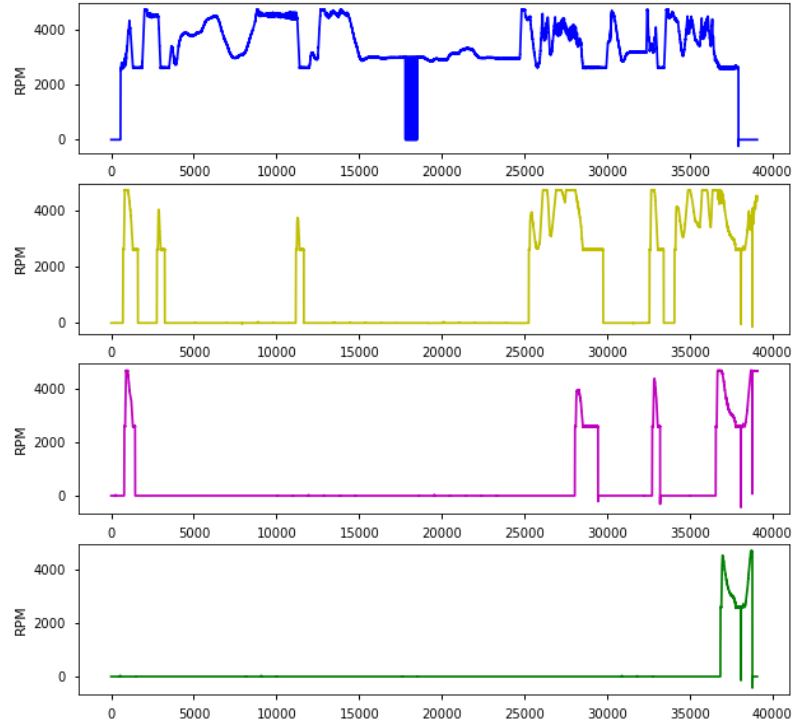
Which data source to use?

Full flight data <i>40.000 meas. per sensor</i>	Snapshot data <i>1 or 2 meas. per sensor</i>
Rich information	Poor information

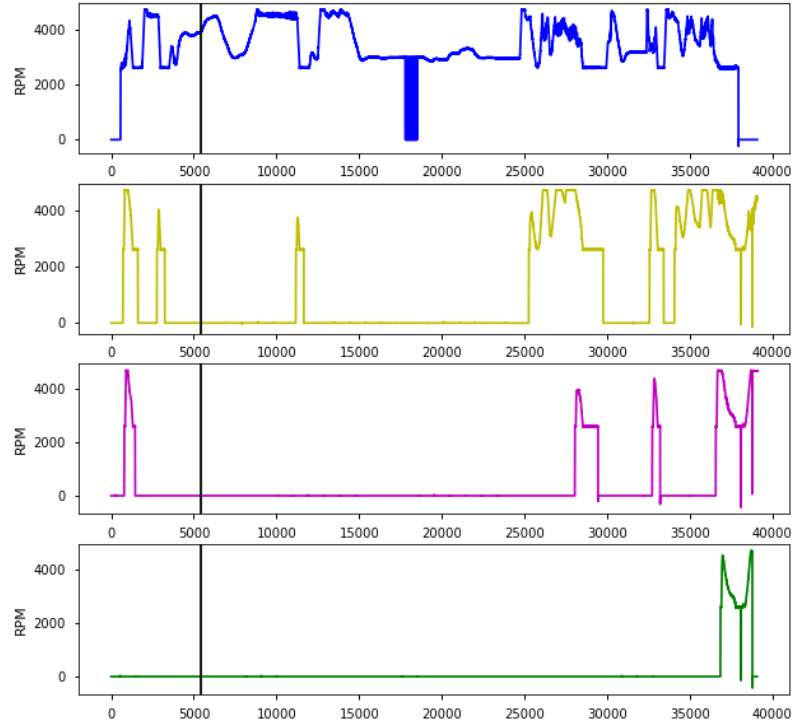
Which data source to use?

Full flight data <i>40.000 meas. per sensor</i>	Snapshot data <i>1 or 2 meas. per sensor</i>
Rich information	Poor information
Data offload at gate	Transmission over ACARS
Requires decoding	Directly readable
Heavy infrastructure	Light infrastructure
Sensitive to share	Allowed to share

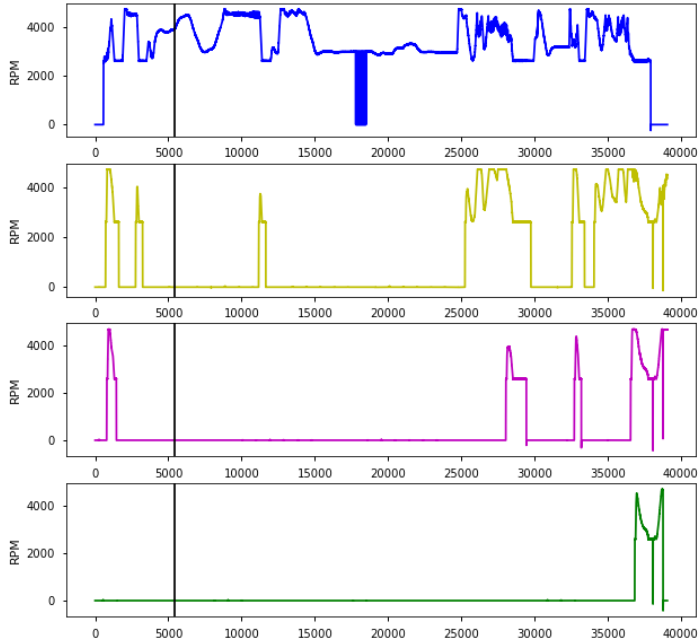
Predictive Maintenance using snapshots



Predictive Maintenance using snapshots



Predictive Maintenance using snapshots



MEASUREMENTS

C1SPD C10TM

3896 229

C2SPD C20TM

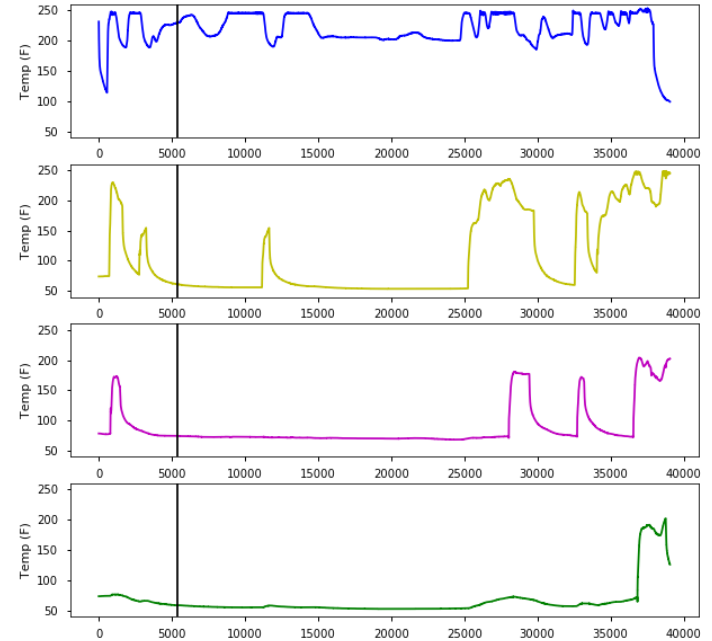
0 61

C3SPD C30TM

0 75

C4SPD C40TM

0 59



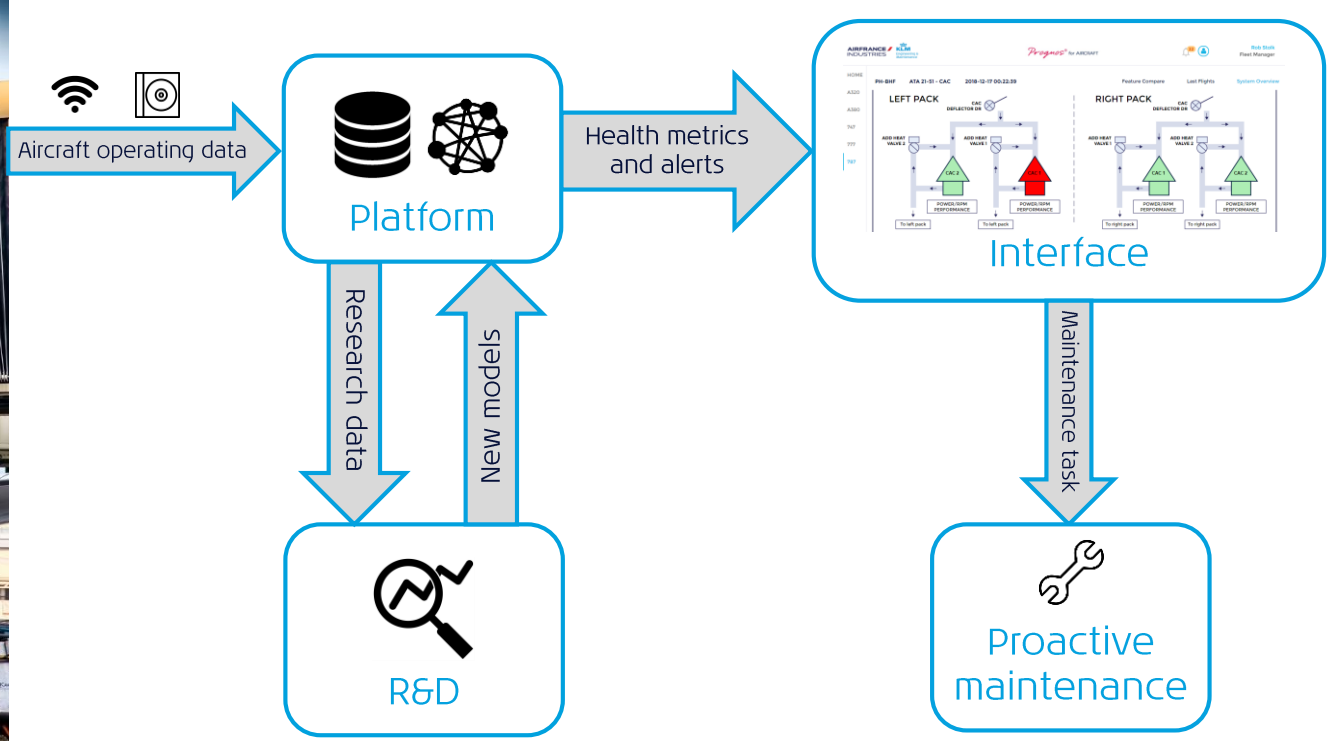
Which data source to use?

Full flight data <i>40.000 meas. per sensor</i>	Snapshot data <i>1 or 2 meas. per sensor</i>
Rich information	Poor information
Data offload at gate	Transmission via SATARS
Requires decoding	Directly readable
Heavy infrastructure	Light infrastructure
Sensitive to share	Allowed to share

Prognos for Aircraft



Prognos[®] for AIRCRAFT



Research & Development



Browse through full flight data of historic flights before and after a failure



Construct features (aggregations) from raw signal



Label flights according to proximity to failure



Apply machine learning to find important features

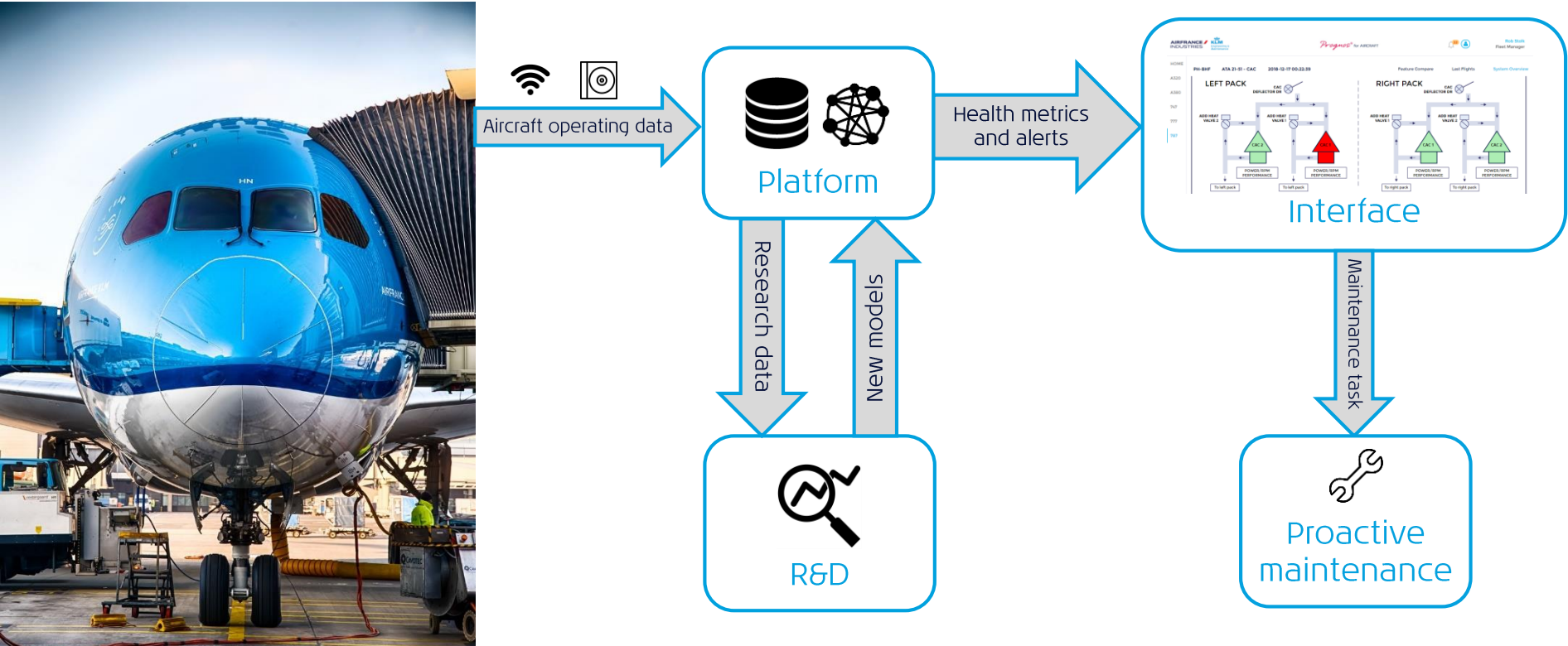


Apply machine learning to optimize alerting thresholds

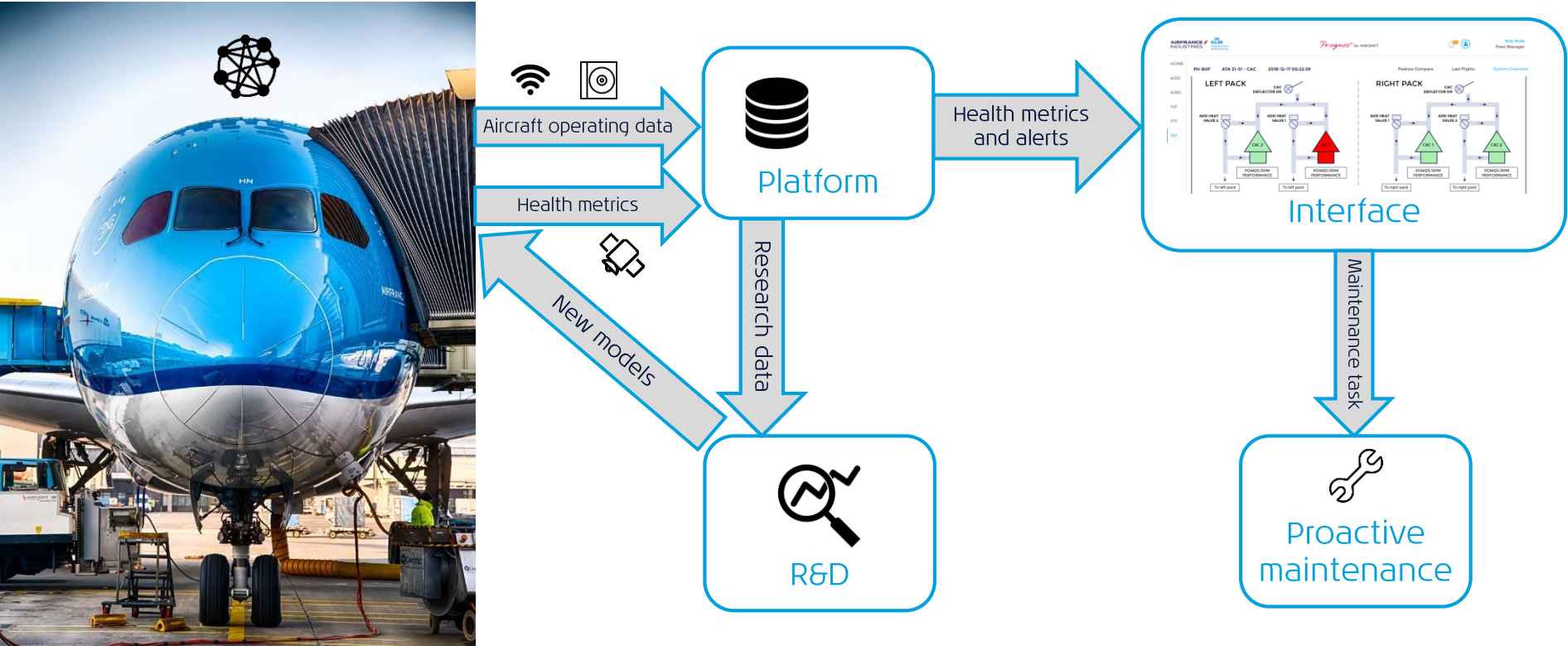
To the edge!



Prognos with Big Data flow



Prognos with Edge computing



Edge computing

Full flight data <i>40.000 meas. per sensor</i>	Snapshot data <i>1 or 2 meas. per sensor</i>	Edge computing Aggregated measurements
Rich information	Poor information	Rich information
Data offload at gate	Transmission over ACARS	Transmission over ACARS
Requires decoding	Directly readable	Directly readable
Heavy infrastructure	Light infrastructure	Light infrastructure
Sensitive to share	Allowed to share	Allowed to share



Thank you