PORTRAIT FLEET

FOR ENHANCED ENGINE REMAINING USEFUL LIFE QUANTIFICATION.

A case study regarding work done for a leading engine original equipment manufacturer (OEM).

Decisions must be made on how many engines are available for lease in any given maintenance centre. Similarly, repair parts for multiple engine classes and their associated accessories must be readily available at every service centre to ensure that engine downtime is minimise. An engine's degradation profile will clearly be strongly dependent on the typical usage patterns of that engine, which depends on when, how and where the engine is used. Engine OEMs have the capability to track this information, as it has access to flight trajectory, engine telemetry during the flight as well as service record data.

The OEM required a service which enables them to exploit this available information to provide insight on the degradation profiles of different engines, based on the geographic and commercial factors. The PORTRAIT **FLEET** software provided a service which aggregates telemetry data from the OEM's engines, combined with external data from various sources to provide detailed predictive models for engine remaining useful life, automatically.

To do so, PORTRAIT **FLEET** builds a fleet-level model of the engines currently in service, linking together heterogeneous data sources including engine telemetry with flight trajectory data, atmospheric composition data, airport busyness levels based on flight tracking services, as well as text-based service records. The ability to assimilate data at the fleet level permitted it to identify common usage patterns and use them to provide an enhanced uncertainty-quantified assessment of engine health, along with an explanation of key drivers for accelerated engine degradation. Finally, PORTRAIT **FLEET**'s monitoring module enabled fleet-level monitoring of the typical usage patterns of each engine, identifying and highlighting shifts in behaviour, or changes in trends which might be only visible at the collective level.

The OEM valued PORTRAIT **FLEET** 's tool as having the potential to save £10-£15 million a year by reducing engine downtime leading to substantial savings.

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