HIGH-PERFORMANCE RACING ANALYTICS

PRODRIVE WINS WITH ALTAIR DATA ANALYTICS

About the Customer

Prodrive was founded in 1984 with a focus on motorsports, and today develops innovative engineering solutions for businesses within the automotive, aerospace, defense, and marine sectors. The firm has been behind some of the greatest names in motorsports. For example, it has built nearly 400 Aston Martin GT cars and continues to support the company through each race it runs. Its composite materials division manufactures lightweight carbon fiber-reinforced polymer and visual carbon components. Prodrive is the largest company of its kind in the U.K. and is a world leader in motorsport technology, resulting in its long list of wins in Formula 1, The Dakar Rally,

> “We’ve got a massive library of log data from our cars. We want to work our way through that and the sheer volume of it is almost overwhelming. Altair Panopticon was the ideal candidate for us. It gives us the tools we need to recognize hidden patterns, clusters, and anomalies in our historic data and in the real-time data streaming in directly from the car.
>
> Alistair Grimshaw, Senior Data Analysis Engineer Prodrive

Le Mans, and the World Rally Championship.

Their Challenge

Prodrive's legacy analytics system collected sensor data from its cars, but like most motorsport analytics systems, it struggled with large datasets collected over long periods of time. However, analyzing engine data over a car's lifetime would provide valuable insight into design and manufacturing tweaks that could improve vehicle performance. In addition, accurately predicting when critical components are likely to fail helps racing teams optimize pit stop timing during races.

Given the number of sensors in Prodrive-built cars and their sampling frequencies, the amount of data collected over a car's lifetime is significant. Each car can produce about half a terabyte of data during an average race weekend and five to ten terabytes of data every week during test runs. Prodrive needed data analytics software that could manage very large volumes of data, provide better management capabilities, and support fast development and implementation cycles.

Our Solution

In addition to the ability to process and visualize multiple streams of high frequency, real-time data, the Prodrive engineering team sought to improve communications about important findings with the executive staff. They had been using Python and similar tools to develop custom dashboards and stream processing applications, but the tools couldn't meet their capacity demands, weren't user friendly, needed long development times, and required a team of experienced coders.

Altair had been a trusted Prodrive supplier for over 16 years and Prodrive's team investigated whether Altair's data analytics platforms were the solution they needed. The team selected Altair Panopticon™ to address the data visualization and stream processing requirements and then worked with Altair to conduct a proof of concept deployment – which proved successful.

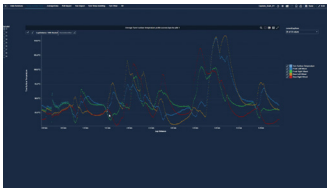
Today, Prodrive uses Panopticon to display historic and real-time data streaming in from its cars in dashboards the Prodrive engineers can design, deploy, and maintain without IT assistance. Its stream processing applications make on-the-fly comparisons and apply sophisticated statistical functions to data to identify outliers and anomalies automatically. With Panopticon in place, the Prodrive team can look at long-term metrics and make improvements based on those insights. For example, instead of examining only limited amounts of data, the team can now evaluate every piece of data collected over the 15,000-kilometer life of an engine.

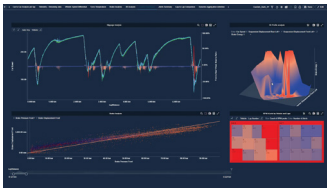
Results

Prodrive uses Panopticon to generate easy-to-comprehend visualizations that help its engineers pick out trends, identify potential health problems, and inform design and build improvements. For example, at the 24 Hours at Daytona race in 2022, Prodrive's customer, Magnus Racing, had a car that suffered an accident that caused significant rear-end damage. The team noticed that the gearbox temperature was rising, which signaled a problem. Panopticon allowed them to determine the gear duct box was causing the temperature increase. At the next pit stop, the team made a quick repair, and the car went on to finish the race even with a missing bumper. The ability to use this data in live situations has made Prodrive one of the premier competitors in the racing world.

With Panopticon in place, Prodrive runs every race with a clear view of each engine's performance and capabilities. Panopticon also helps the team identify design and manufacturing problems quickly, evaluate new components and materials, and develop new designs that keep them at the top of the rankings.

To learn more, please visit altair.com/data-analytics





FIRST: Dashboard displays tire surface temperatures over a series of laps. **SECOND:** Dashboard correlates data on slippage, braking, suspension displacement, and engine RPMs. **THIRD:** Live streaming data on key engine, suspension, and performance parameters. **FOURTH:** Comparison of two cars' performance using live streaming data.