

CASE STUDY

Accelerating Aerospace Test Analysis Across Large Engineering Datasets

An aircraft manufacturer generates large volumes of engineering data through flight and ground testing. These tests capture thousands of measurement channels across many hours of operation, combining digital avionics data with measurements from analogue sensors. The collected information includes strain, force, acceleration, temperature and video data.

Analysing this information is essential for evaluating test results, comparing performance across tests and supporting engineering decisions throughout the testing process.



Challenge

Flight and ground testing generated vast, complex datasets containing thousands of channels. Processing this information and comparing results between tests was time-consuming, making it difficult to obtain engineering insights quickly.

Solution

Advantage Insights by nCode enabled rapid data processing and engineering analysis, while Aqira provided advanced search capabilities to locate and compare results across projects, aircraft models and test types.

Result

Engineers could process datasets containing more than 4,000 channels, rapidly compare test results and access existing analyses, helping answer engineering questions faster and potentially avoid repeating costly tests.

Extracting Insights from Vast Volumes of Aerospace Test Data

Aircraft flight and ground testing generates enormous quantities of engineering data, making efficient processing and analysis a significant challenge. For this manufacturer, test datasets could contain more than 4,000 measurement channels, with data collected across thousands of flight hours. The information combined digital avionics data with analogue sensor measurements, including strain, force, acceleration, temperature and video.

The volume of data was substantial. With an aircraft lifetime of approximately 8,000 flight hours, test datasets could represent the equivalent of three aircraft lifetimes, creating a considerable amount of information to process and interpret. Without appropriate tools, analysing these large and varied datasets was time-consuming.

Engineers needed to extract meaningful insights as quickly as possible, sometimes between successive test iterations, to answer important questions such as:

- **Test outcomes:** Has the test passed or failed?
- **Performance comparisons:** How do the results compare with previous tests of the same nature?
- **Historical data:** Can relevant results from earlier projects, aircraft models or test types be found and reused?

With aerospace testing being expensive, the ability to efficiently access and compare existing test data was particularly important.

The manufacturer needed a faster way to analyse large datasets and make previous test results easier to find and compare.

Combining Rapid Engineering Analysis with Advanced Test Data Search

To address these challenges, the manufacturer used Advantage Insights and Aqira to process, analyse and explore large volumes of aerospace test data. Advantage Insights enabled engineers to rapidly enrich raw flight and ground test data with calculated engineering metrics, spectra and histograms.

These capabilities allowed engineers to process extensive datasets and generate meaningful results quickly, supporting analysis between test iterations. Combined with Aqira, the solution also provided advanced search capabilities, enabling engineers to locate results

from specific projects, aircraft models or test types and compare them with previous analyses.

This approach enabled engineering teams to:

- **Process large engineering datasets:** Analyse thousands of measurement channels from flight and ground tests.
- **Generate engineering analyses:** Enrich raw data with meaningful calculated metrics, spectra and histograms.
- **Access previous test results:** Search for relevant information by project, model or type of test.
- **Compare engineering results:** Compare current test outcomes with those of previous tests of a similar nature.
- **Support faster decisions:** Quickly access the information needed to answer engineering questions and assess test results.

By combining rapid data processing with advanced search and comparison capabilities, Advantage Insights and Aqira made it easier for engineers to extract value from extensive aerospace testing datasets.

Faster Analysis and More Effective Use of Test Data

The combination of Advantage Insights and Aqira enabled the manufacturer to process large engineering datasets more efficiently and make better use of existing test results. Key results include:

- **4,000+ channels - Large-scale engineering data analysis:** The solution supported the analysis of test datasets containing more than 4,000 measurement channels, including a mixture of avionics data and analogue sensor measurements.
- **3 × 8,000 hours - Extensive test data coverage:** Test datasets could represent three times the approximate 8,000-hour lifetime of an aircraft, illustrating the substantial volume of data requiring analysis.
- **Faster insights - Rapid test analysis and comparison:** Advantage Insights enabled rapid generation of calculated metrics, spectra and histograms, while Aqira made it easier to search for and compare test results across projects, models and test types.

Reducing the Need to Repeat Expensive Tests

Beyond faster data processing, the combination of Advantage Insights and Aqira helped engineers make more effective use of previously collected test information.

By quickly locating and comparing relevant results, engineers could investigate test outcomes, evaluate differences between test iterations and answer important engineering questions without having to manually work through large datasets.

In some cases, access to existing analyses and the ability to rerun them with different properties or additional metrics could help avoid repeating expensive physical tests.



Our tests are very costly. The fact that Advantage Insights is so quick at calculating results over big datasets enables us to rerun analyses with different properties or additional metrics. This and the advanced search capabilities in Aqira sometimes prevent us from redoing a test!

Test Data Analyst, Aircraft Manufacturer

Making Aerospace Test Data More Accessible and Actionable

By combining Advantage Insights and Aqira, the aircraft manufacturer gained a faster and more efficient approach to analysing large volumes of flight and ground test data. Advantage Insights enabled rapid engineering analysis across datasets containing thousands of measurement channels, while Aqira made it easier to locate, compare and reuse existing test results.

Together, these capabilities helped engineers answer critical testing questions more quickly, support decisions between test iterations and, in some cases, avoid the need to repeat expensive tests. The use case demonstrates how efficient engineering analysis and advanced test data search can help aerospace manufacturers make greater use of their existing test information.