



CASE STUDY

## **TOUGHBOOK G2 Powers GE Aerospace's Next-Generation Rotor Diagnostics for Global Maintenance Teams**

Client: GE Aerospace

TOUGHBOOK G2 mk3

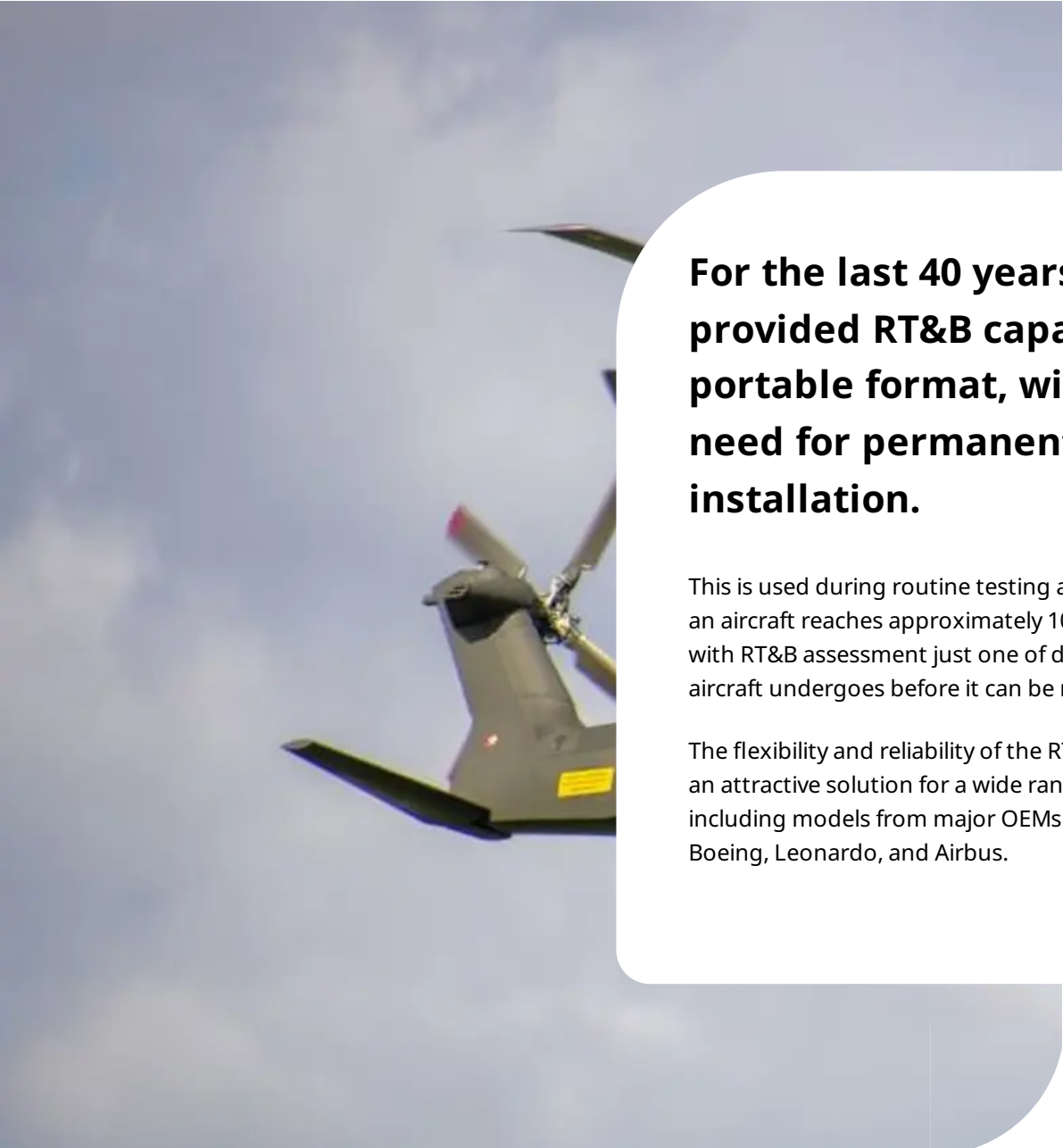
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## Challenge

Provide an intuitive and accessible PC-based application that allows aircraft maintenance teams to easily visualise rotor track and balance data, as part of GE Aerospace's refreshed Rotor Analysis and Diagnostic System (RADS-NG).

## An Industry Pioneer

GE Aerospace is a global leader in aircraft engines, avionics, and aerospace systems, providing advanced technologies and services for both commercial and military aviation. In 1985, it introduced the Rotor Analysis and Diagnostic System – Advance Technology (RADS-AT) is an industry-standard carry-aboard Rotor Track and Balance (RT&B) system for both civilian and military helicopters. This analyses the vibration levels of rotor blades and heads, allowing maintenance teams to perform diagnostics and take the required actions.



**For the last 40 years, it has provided RT&B capabilities in a portable format, without the need for permanent installation.**

This is used during routine testing and maintenance after an aircraft reaches approximately 100 hours of flying time, with RT&B assessment just one of dozens of tests that an aircraft undergoes before it can be returned to service.

The flexibility and reliability of the RT&B system has made it an attractive solution for a wide range of rotorcraft, including models from major OEMs such as Bell, Sikorsky, Boeing, Leonardo, and Airbus.

## Modernising Rotor Diagnostics

With aircraft OEMs recognising the need to upgrade, GE Aerospace needed to deliver an enhanced version of the system to bring it into a modern environment. This has led to the introduction of RADS-NG (Next Generation), that builds on four decades of proven reliability and accuracy of RT&B measurements.

As GE Aerospace's portable vibration diagnostics solution for maintenance flights, RADS-NG is designed specifically where permanent installation in aircraft is not practical, or where it's needed to supplement existing systems. It's compatible with more than 200 aircraft variants, including single and twin rotors; tilt rotors; tandem rotors, coaxial rotors, intermeshing rotors; and Electric Vertical Take-Off & Landing (eVTOL) aircraft.

RADS-NG primarily consists of a compact Data Acquisition Unit (DAU), and Optical Blade Tracker – which measures and monitors the movement and alignment of rotor blades as they pass through its field of vision. This enables the track and lag of each blade to be determined, allowing for accurate rotor track and balance adjustments to be made.

The DAU acquires data from all sensors and the Optical Blade Tracker, turning these raw signals into digitised data and condition indicators. These are subsequently processed and displayed by the Control and Display Unit (CADU).

*"Maintenance teams who have previously tried to use next generation rotor analysis and diagnostics on their own devices have quickly reverted to the G2. It's a fit-for-purpose solution that can withstand the rigours of challenging environments. Where other rugged devices are too big and bulky for operational use, the G2 was exactly what we were looking for."*

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**Paul Dunning**  
Senior Product Manager  
GE Aerospace

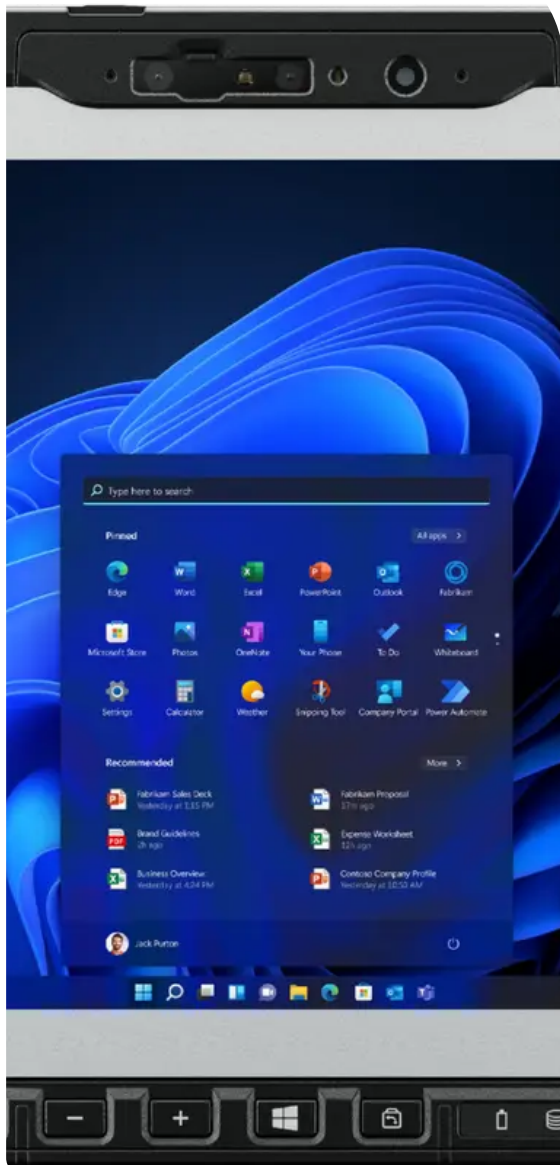
## **Redefining Rugged Computing with Panasonic**

To bring this to life, GE Aerospace needed a COTS solution that could run the modern interface offered through the new CADU application. After evaluating rugged devices from other manufacturers, GE Aerospace acquired approximately 60 rugged TOUGHBOOK G2 2-in-1 detachable devices from Panasonic-approved premier partner, Mem-Star Rugged.

The G2 features a 10.1-inch touchscreen and unrivalled modularity for extensive customisation. It's tested to MIL-STD-810H standards to survive drops, knocks, vibrations, and extreme temperatures – and is IP65-rated for water and dust resistance. Offering a long battery life of over 18 hours (which can be recharged through the aircraft's power supply) and state-of-the-art connectivity, it's perfectly suited for long-duration use in the most demanding environments.

Paul Dunning, Senior Product Manager at GE Aerospace, states: "Prior to selecting the TOUGHBOOK G2, Panasonic provided GE Aerospace with test devices for evaluation. Unlike other manufacturers, Panasonic demonstrated a strong commitment to developing an effective solution by collaborating closely with the GE Aerospace team throughout the entire process, from initial concept to final deployment. Panasonic has proven to be a valuable partner to GE Aerospace. Additionally, the G2 was offered at a competitive price point, and the support from Mem-Star has been outstanding."

Using the intuitive application-based CADU on the TOUGHBOOK G2, technicians can now balance the blades with the G2 in just a few clicks.



## Compared to the RADS-AT solution, the next-generation solution delivers:

- Faster measurements and instant diagnostic recommendations as adjustments are updated.
- An enhanced diagnostic editing tool, with new and powerful features that allow users to propose adjustments and evaluate the predicted and actual effects with clear visuals on polar, bar, and line charts.
- Improved dynamic measurement capabilities that enable vibration to be simultaneously measured, providing a high degree of performance and measurement accuracy.
- The same sensor suite and interconnections as RADS-AT – and the same level of flexibility and adaptability as its predecessor. This enables OEMs and technicians to design testing and maintenance procedures, tailored to the specific aircraft.
- The ability to download and export summary data for subsequent ground analysis.

*"The new, Windows-based CADU application interface allows maintenance teams to easily access visualised vibration data – and receive tailored recommendations on improving the track and balance of an aircraft's rotor blades. It features logical workflows and easy-to-understand displays that make it straightforward for any operator to use, with any level of experience – especially seasoned RADS-AT users."*

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**Paul Dunning**

Senior Product Manager

GE Aerospace

## **A Fit-for-Purpose Solution**

**With the CADU application interface mainly featuring black screens, the contrast, brightness, and clarity of detail provided by the G2's screen was crucial for maintenance flights taking part in any lighting conditions. To ensure this wouldn't be a problem, the G2s used as part of the RADS-NG solution have been customised with Panasonic's Day/Night Mode utility.**

Furthermore, the glove compatible touchscreens of the G2 enables it to be seamlessly operated at the same time as actual rotor maintenance is taking place. Compared to the previous solution, the form factor of the G2 and its ruggedised exterior makes it very easy to grip and use during maintenance flights.

Paul Dunning adds: "Maintenance teams who have previously tried to use RADS-NG on their own devices have quickly reverted to the G2. It's a fit-for-purpose solution that can withstand the rigours of challenging environments. Where other rugged devices are too big and bulky for operational use, the G2 was exactly what we were looking for."

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**Charlotte Langridge**

UK Defence Business Manager  
Panasonic TOUGHBOOK

## Future-ready

By leveraging Panasonic's TOUGHBOOK G2, RADS-NG has transformed critical RT&B system components into a future-ready, sustainable solution. Combining cutting-edge functionality with the familiarity operators rely on, the RT&B process is now streamlined – empowering maintenance teams with greater efficiency and reliability for years to come.