

In-situ Gas Turbine Visual Inspections: taking it to the next level...



Sheldon McCrackin

Senior Software Manager



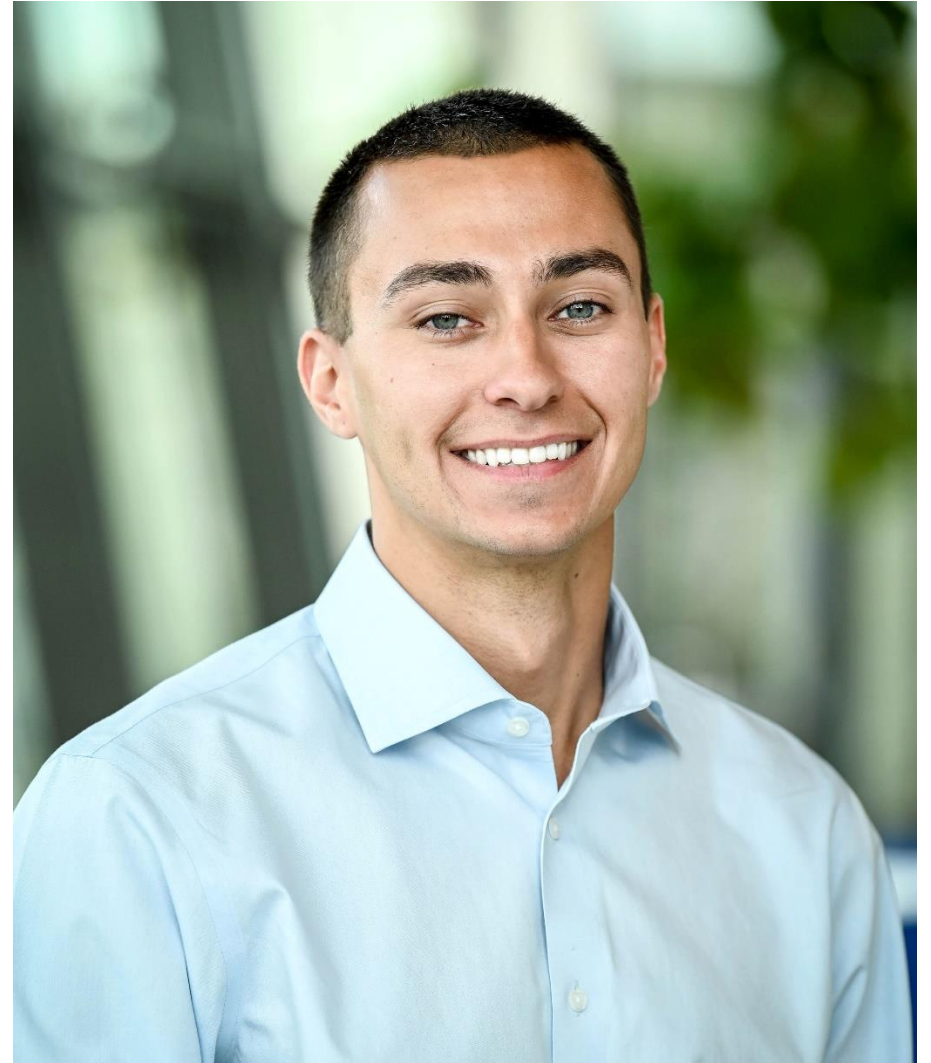
Presenter Bio

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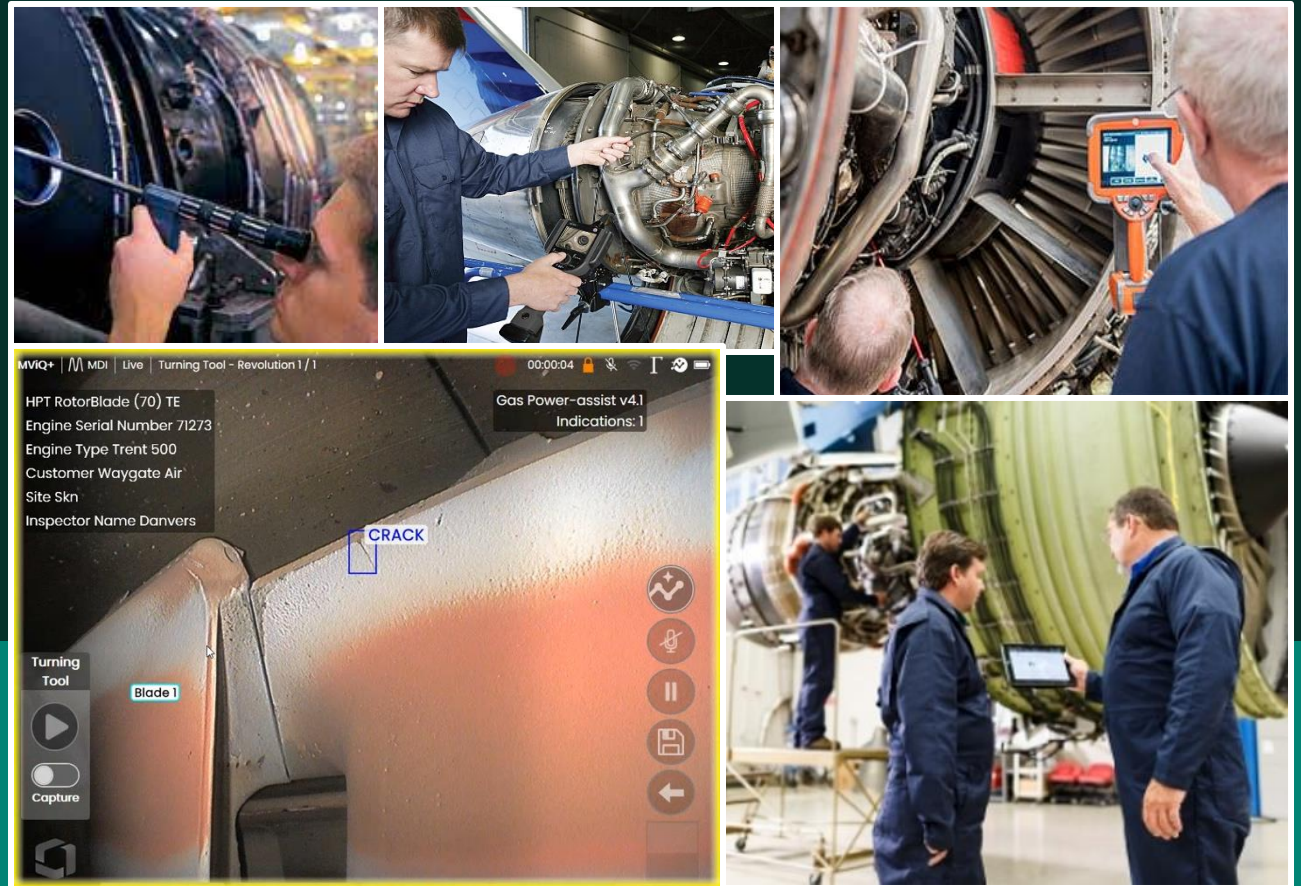
Mechanical Engineer with a background in Research and Development focused on computer vision, deep learning and accelerated edge computing. Responsible for RVI software on device and in the cloud.

Motivated to develop and deliver solutions that reduce maintenance burden, optimizing asset availability, and driving down cost of ownership for all Waygate Technologies RVI customers.



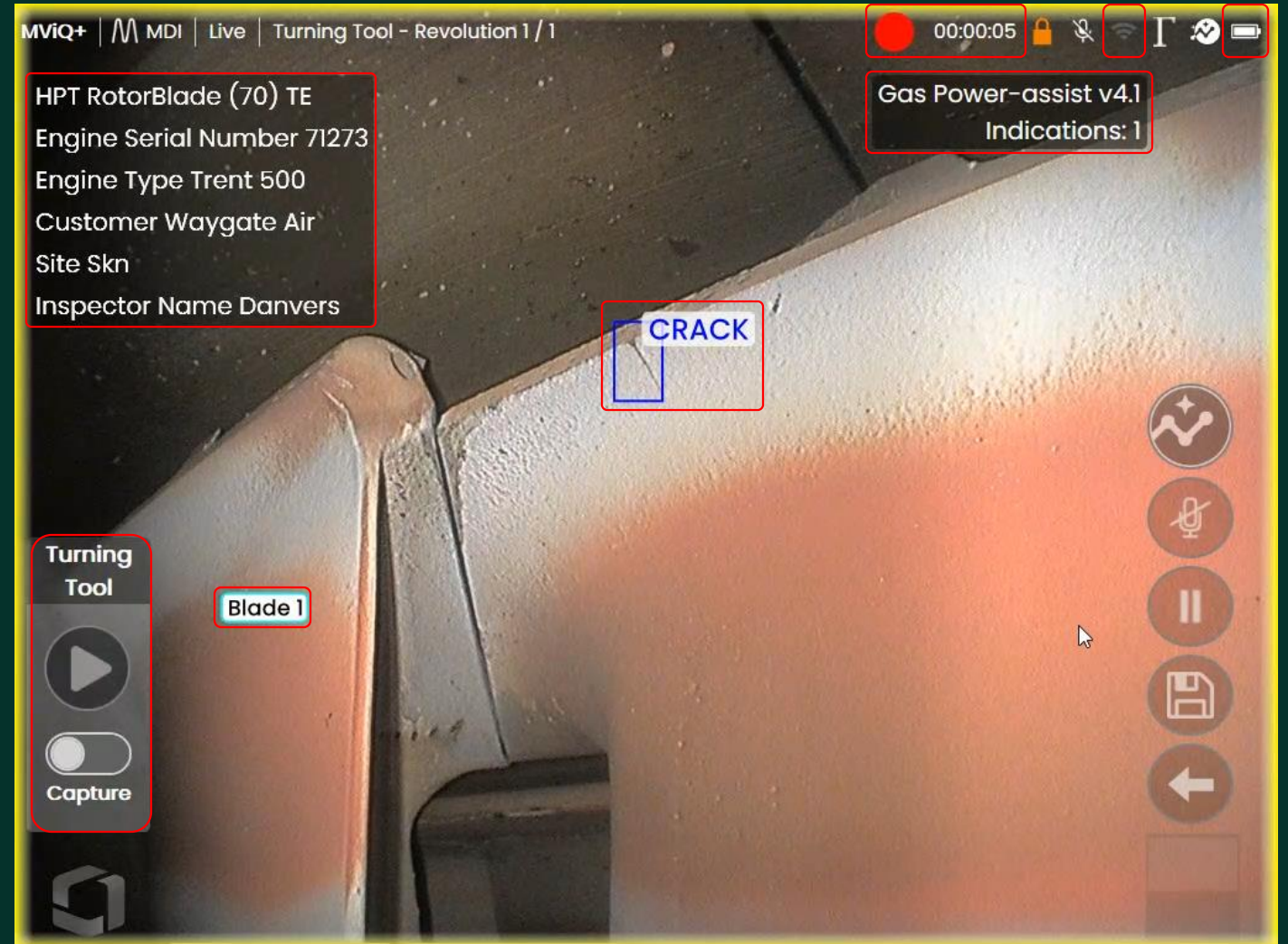
Modernizing Aerospace Inspections

Continuous
Advancements for
Efficiency and Accuracy



A lot is going on here

- Standardized inspections
- Controlling 3rd party turning tool
- Onboard AI to detect blades and defects
- Live HD image
- HD recording
- Measurement on-demand
- Battery operated
- Connected device for automatic cloud backup and sharing



1.2 MP resolution

Overview

It's recognised that in-situ visual gas turbine inspections are critical for determining continued asset serviceability.

Demand is increasing for tools to make inspection tasks simpler, standardized and efficient.

Aim:

Gain appreciation of latest updates in the World's most advanced borescope, the *Everest Mentor Visual iQ+*

Tools exist to help alleviate:

- Making notes using tablets/notepads/paper!
- Ensuring on-screen annotation is accurate/up to-date
- Were all blades inspected?
- Did I miss any defects?
- Ensuring your measurements cursors are accurately positioned and you're making the right decisions
- Time taken to create the inspection report?
- How can I share my output?



An MDI digitally tags images with contextual data, at the time of capture.

Eliminate note-taking

Menu Directed Inspection (MDI)

- Capture comments
- Eliminate need for manual annotations: live annotation support (new)
- Consistency with annotations, defect classifications, file naming and report generation

Standardise

- Adopt use of templates for each asset type
- Access reference materials (acceptance limits, component zones, component geometry details)

Efficiency

- Automatic file-naming and report generation
- Automatic ingestion and categorization into InspectionWorks (network connection req.)



Updated MDI & Builder

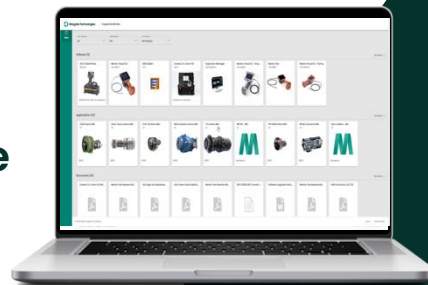
Method to create your MDI template just got updated!

- Refreshed user interface
- Pre-populated templates
- Live persistent text on device (up to 5 lines)
- Analytic support
- Leaf node increase to 3000
- Language support (18)

Resources:

[InspectionWorks.com/store](https://www.inspectionworks.com/store)

(download for free)



Have I inspected all the blades?

Blade Counter – powered by AI

- Allow yourself to focus on the job, let the device count the blades
- Need to move the probe? No problem
- Change direction, change blade number, change total blade count? Ok!

Automate

- Inspect hands-free
- Use with 'TT2.0' feature to control Turning Tool (optional)



Gas Power Assist – *Powered by AI*

Truly Intelligent

- Detects and classifies 9 defect classes in gas turbines (TBC Loss, Oxidation, Erosion, Crack, Dent, Nick, Tear, Rub, Deposit)
- Latest version (5.0) trained on 35,289 images from aviation and power turbines
- Powered by deep learning AI models running on device with no internet connection



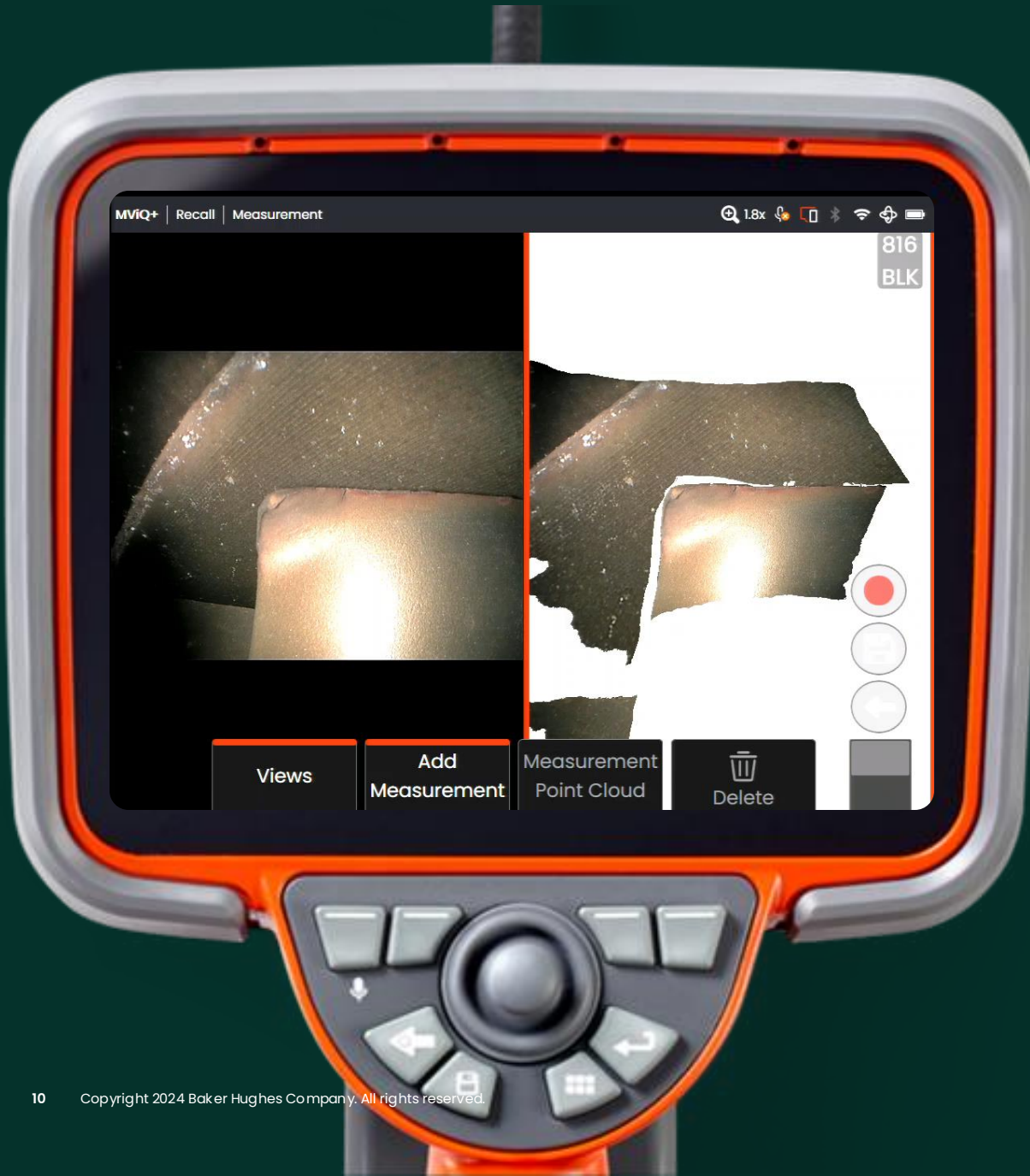
Real 3D: World-class Measurement

Constantly innovating and delivering new features

- Total number of measurement types now up to 12
 - Length, Pt-to-line, Multi-segment
 - Depth, Blade Tip Clearance, Depth Profile, Area Depth Profile
 - Area, Missing Corner
 - Radius Gauge, Angle and Surface Angle (shown here)

Trusted around the World to provide precision, accuracy and reliability

Onboard 'learn more' feature provides detailed guidance



Creating an Inspection Report

Menu Directed Inspection reports

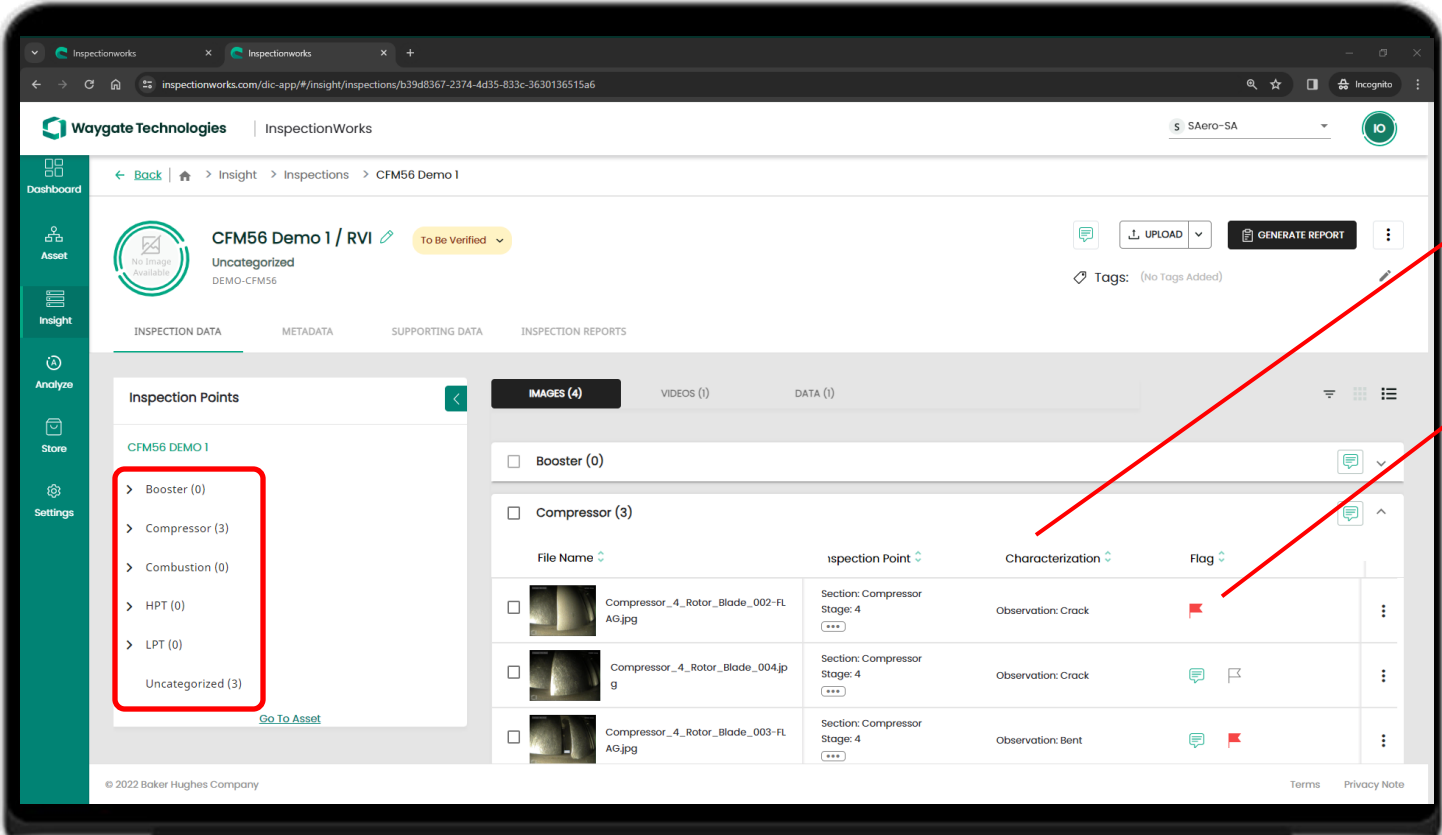
- Onboard report generation facility
- Walk away from asset with a report in your pocket
- Up to 4+hours saved

Customizable, user friendly and standardized workflow



InspectionWorks

Secured, cloud, inspection data management solution



Native data integration for faster report generation

Characterization is captured by the inspector during the inspection.

Image/document flagged during inspection.



Summary – the technology is here...

- Capture contextual information
- Leverage AI for defect recognition
- Count blades, control blade rotation
- Measure with confidence
- Generate reports
- Share your data and unlock yet more value from utilising InspectionWorks platform



Handbooks, Application Notes, User Guides and more...
Waygate-tech.com



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