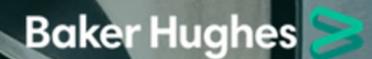




# Reliable and Proven Ultrasonic Inspection Solutions for Aero Engine Composite Fan Blades

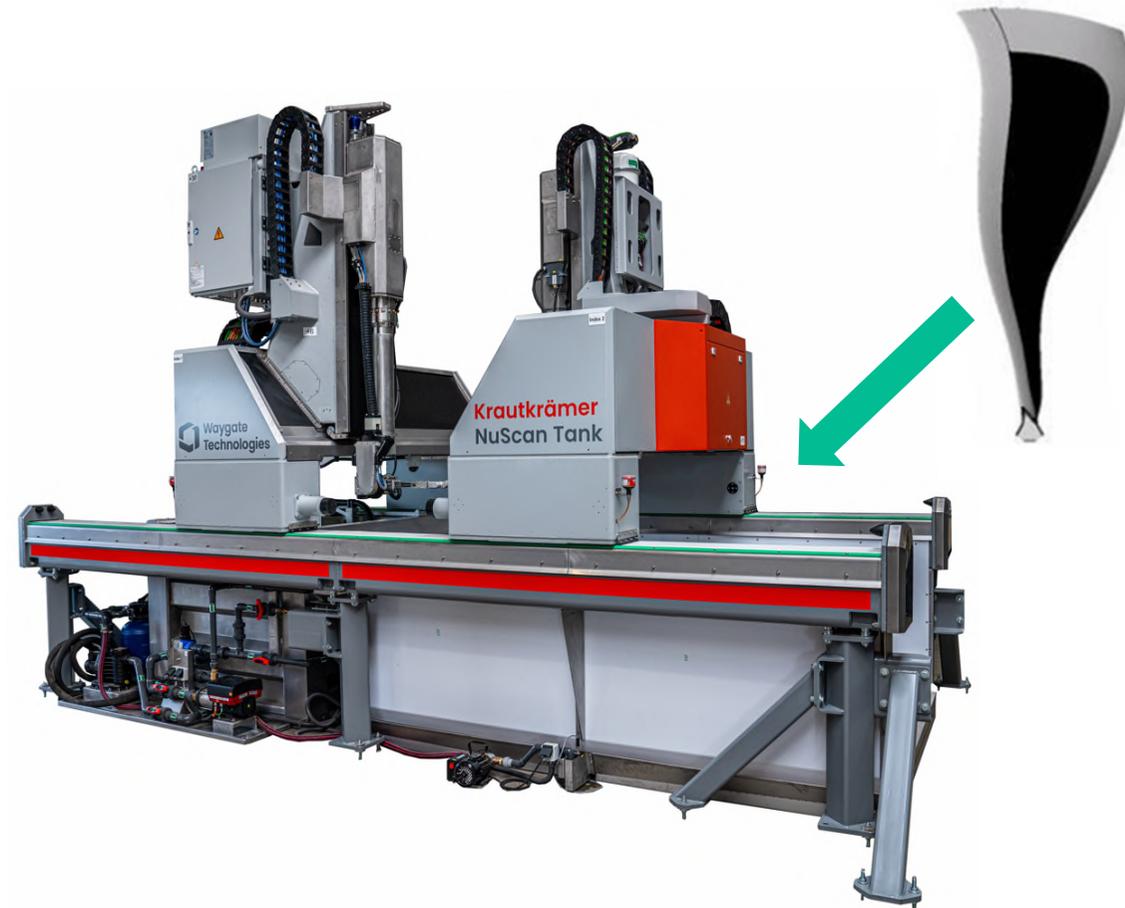
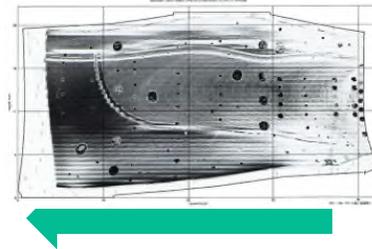
Kai Sun  
Dubai, Feb. 2026

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# Automated Inspection Solutions for Aero Engine Blades

- From Development to Production and In-Service Inspection
- Complete lifecycle Ultrasonic Testing solution for composite blades
- Trusted by leading aero engine OEMs



# The Reality: Blade Diversity, Processes, and Defects

- **Blade types:**  
Large fan, Small fan, Outlet Guide Vanes (OGV) etc.
- **Manufacturing:**  
RTM, RFI, Prepreg Layup, Bonding, Co-curing, Repairs etc.
- **Defects:**  
Delaminations, voids, fiber distortion, bonding defects etc.
- **Complex shapes:**  
Different inspection requirements on specific areas

→ **Different defect mechanisms require different UT inspection approaches**

→ **Inspection strategy must be defined based on material behavior, geometry, manufacturing method and defect mechanism—not one generic setup.**



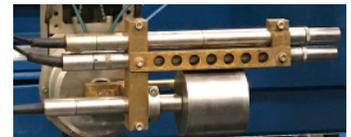
# Challenges: Geometry, Fixturing, and Inspection Complexity

Highly curved (Twisted) surfaces and variable thickness. Area-specific (Leading Edge, Airfoil, Root etc.) inspection sensitivity.

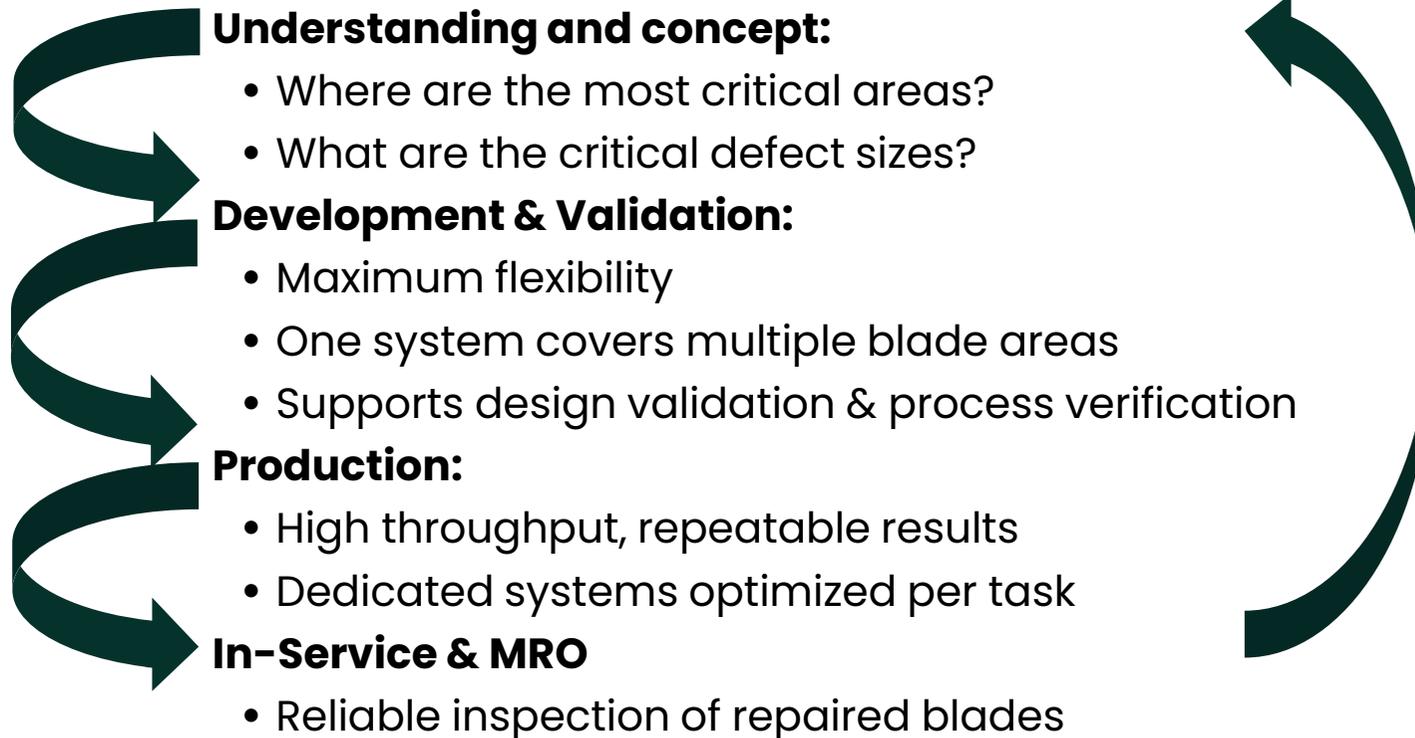
## Tricky challenges:

- Which surface to follow for scan trajectories?
- How to ensure full ultrasonic sound field coverage in thick/curved areas, 3D data acquisition and imaging?
- How to design motion range and mechanics structure for complex 3D paths and ensure precise probe positioning and orientation?
- How to ensure precise and repeatable fixturing to maximize access for fast and efficient testing?
- Which probe type (frequency, focusing, etc.) to be applied for what specific area
- .....

→ Inspection requires comprehensive solutions/strategies: mechanics, motion, ultrasonics. **Not just “sweep a probe over the blade!”**



# Inspection Requirements Across the Lifecycle



→ **Adaptable to varying part conditions. A simplified solution often fails to meet real inspection requirements.**

# Our Comprehensive Solution Concept

## Multiple architectures and inspection configurations:

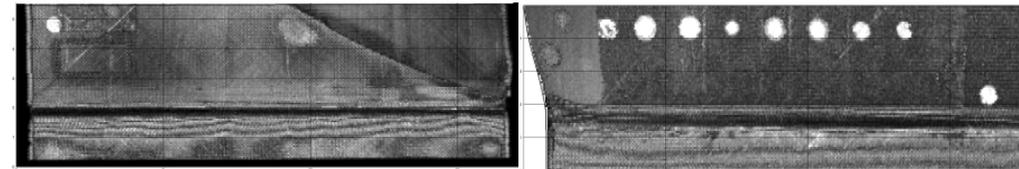
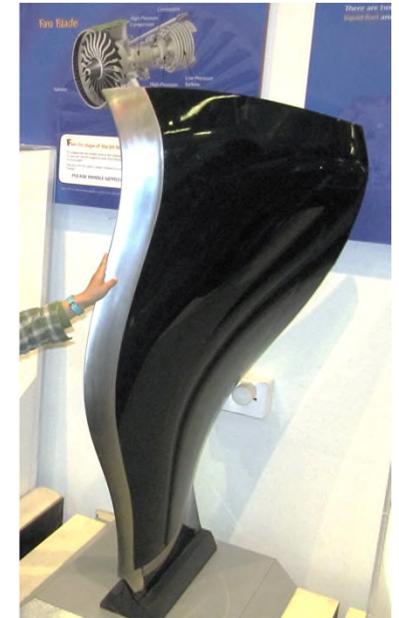
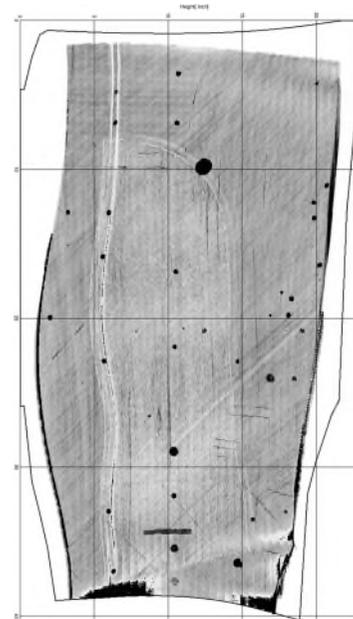
- Conventional UT, Phased Array UT
- Through-transmission, pulse-echo
- Immersion, water-jet

## Tricky challenges addressed:

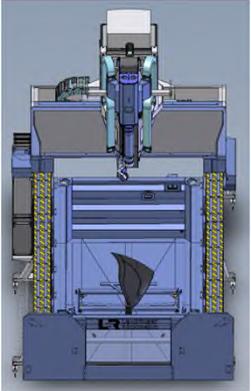
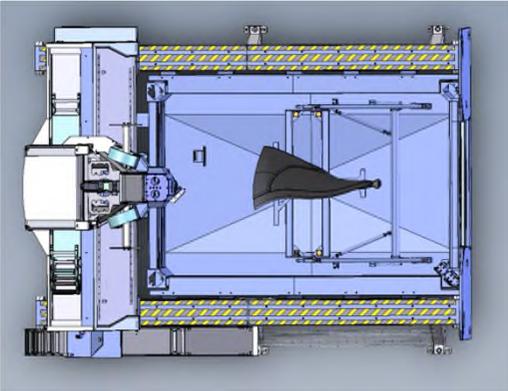
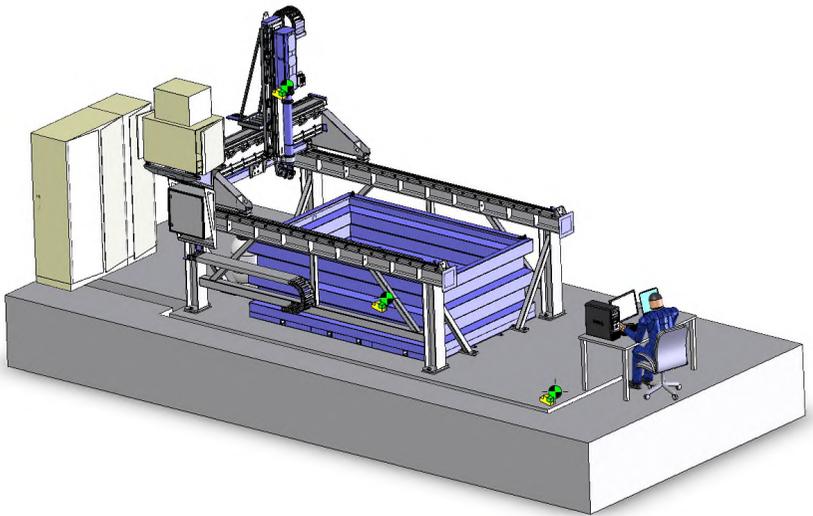
- Scan trajectory on curved/thick areas and correction
- Probe sound field deployment
- Motion and positioning accuracy & repeatability
- Software & data management

→ **One application** → **Multiple system architectures & configurations**

→ **Tricky technical problems solved, proven in real industrial blade inspection programs**

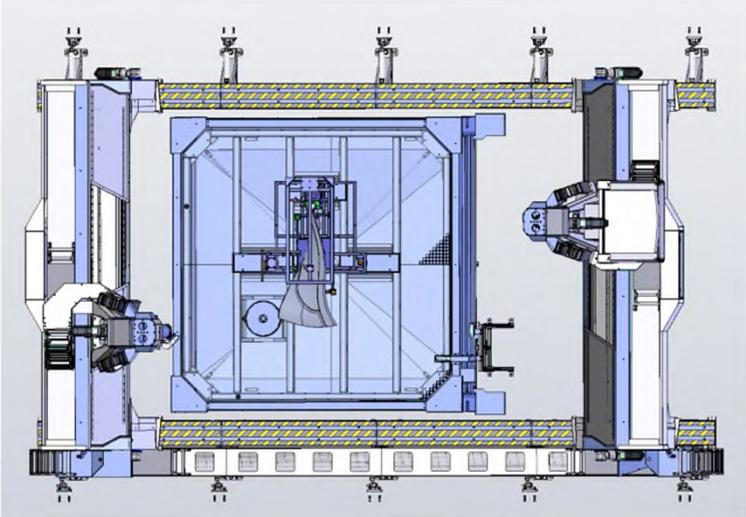
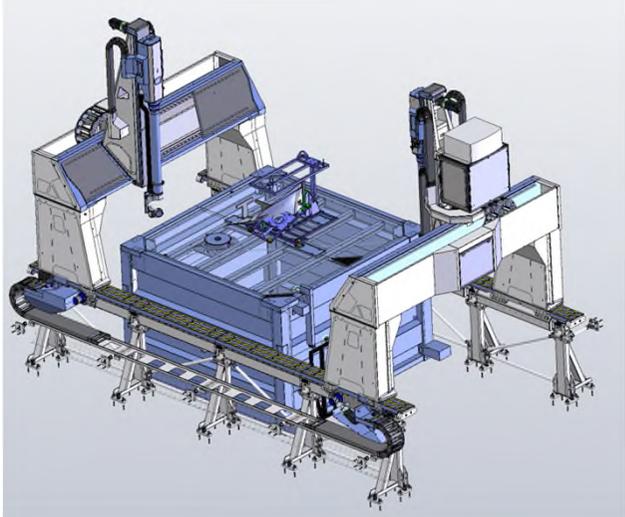
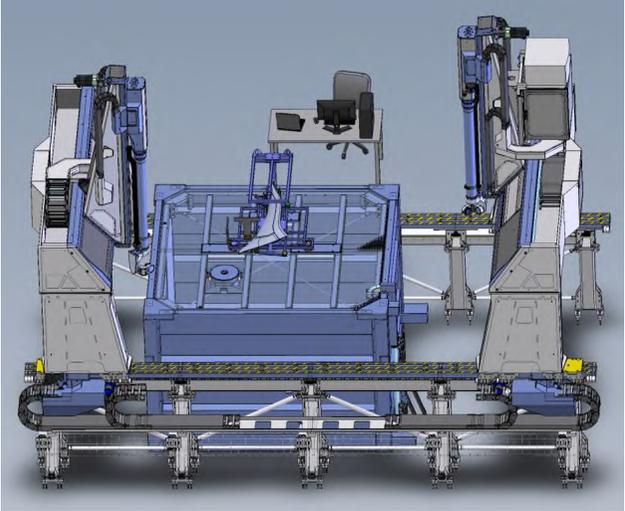


# Our Comprehensive Solution Concept: Variable designs



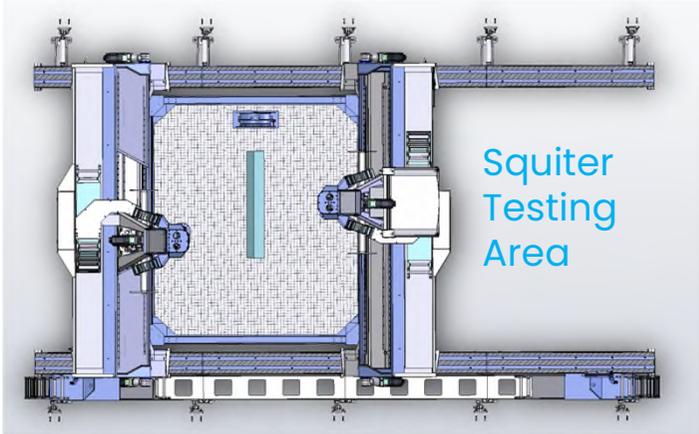
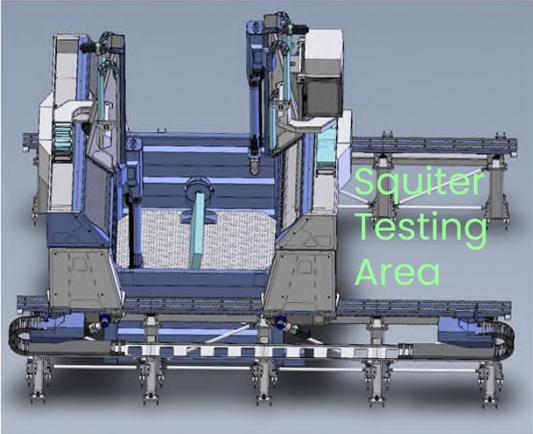
Single Bridge with Semi-Auto loading

# Our Comprehensive Solution Concept: Variable designs



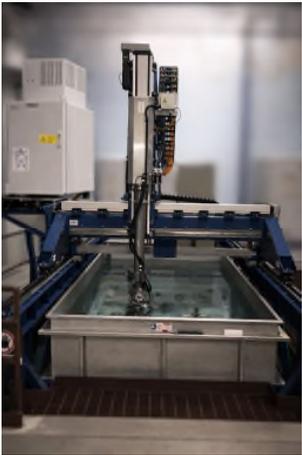
Dual Bridge with Semi-Auto loading

# Our Comprehensive Solution Concept: Variable designs



Hybrid with Semi-Auto loading: Immersion + Water Jet

# Our Comprehensive Solution Concept: References



# 3D Ultrasonic Inspection in Operation



Precise and stable multi-axis scanning • Adaptive probe orientation  
High-quality 3D UT imaging

# Global Service, Application Lab & Proven Performance

## Application Lab:

- Analyze your specific blade application
- Provide customized inspection strategy & system configuration



## Proven Performance:

- 20+ years of experience accompanying the development, production, and in-service inspection of today's mature composite fan engines
- **Only system of its kind certified by GE for this purpose**
- Used for manufacturing quality, process feedback, and in-service inspection



## Global Service ensures reliable operation:

- Fast on-site & remote support
- Spare parts & upgrades

 Your personal safety in commercial flight relies on reliable blade inspection solutions like ours.



## Are Your Blades Reliably Inspected?

- Which surface defines scan path for variable thickness area?
- How to ensure sound field coverage in thick/curved areas?
- Can your motion system follow complex 3D paths precisely?
- Can the handling/fixing system make sure of precise positioning?
- Is it secured to have full coverage of all areas with the fitting soundfield?
- .....

**We, as Baker Hughes/ Waygate, know these challenges and tricks-  
because we have solved them and provided proven solutions already.  
Let us help you!**

## Contact & Next Steps

Let's talk about your inspection challenges!

We are happy to discuss your specific blade or any other inspection challenges.

Contact Us: **Waygate Technologies, a Baker Hughes business**

Contact persons: **Regional Sales / Channel Partners, or:**



Name: **Kai Sun**

Email: [kai.sun@bakerhughes.com](mailto:kai.sun@bakerhughes.com)

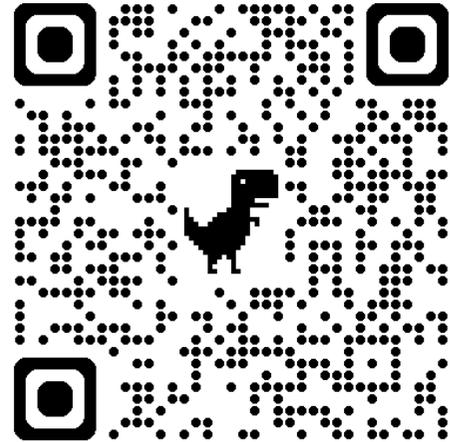
Phone: +49 1734781179



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→ More NDT solutions here: <https://www.bakerhughes.com/waygate-technologies>



## Slide 14

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### STMO

Design suggestion

- 干净正式背景
- 背景可淡化叶片轮廓

Strauss, Michael, 2026-01-26T15:03:27.516



# Waygate Technologies

a Baker Hughes business