



Krautkrämer HydraStar

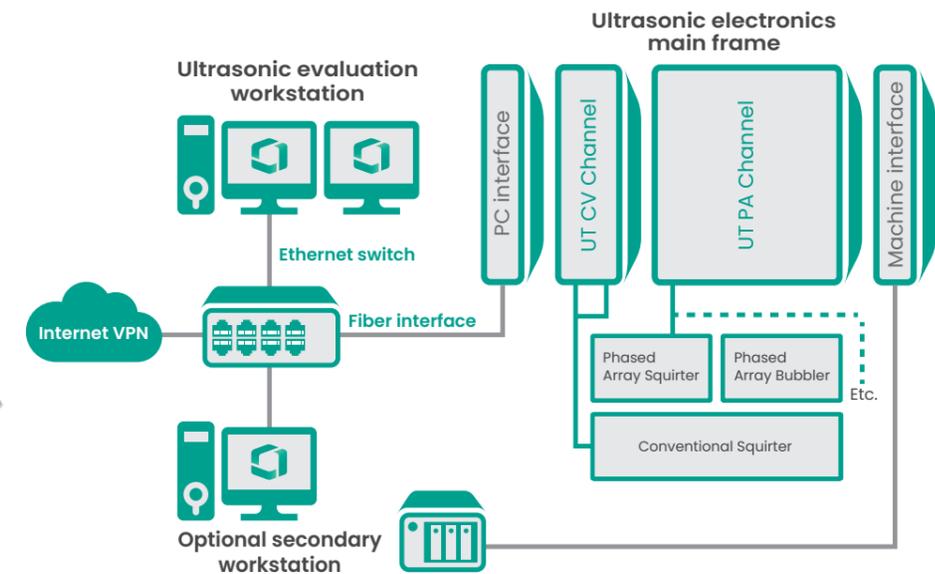
Automated robotic ultrasonic inspection solution for small to medium sized aerospace composite parts

- Leading accuracy values
- Broadest application flexibility
- 40+ years experience in composite inspection
- Improved serviceability and global support

Innovation starts here.

 **Waygate
Technologies**
a Baker Hughes business

Have a safe flight with advanced composite inspection



Configuration flexibility to match your precise application

Krautkrämer HydraStar systems are available in a wide array of constructions for specific customer application needs. Operators can choose from a variety of phased array and conventional ultrasonic application tools to efficiently conduct Pulse Echo or Through Transmission Testing of both planar and complex three-dimensional composite parts performance.

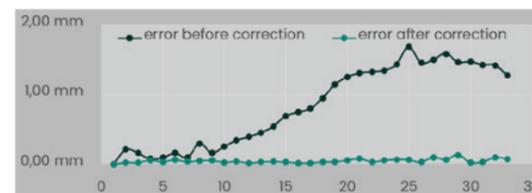
The use of composite materials has surged across industries over the past several years. Composites are now used in a variety of safety-critical parts from aircraft wing sections to complex 3D components. Waygate Technologies designs composite inspection systems to meet demanding inspection requirements at very high throughput rates. So you can inspect parts at speeds that keep up with your industry.

Krautkrämer HydraStar is a complete turnkey solution platform available in single and dual robot configurations with optional linear slides, turntables, customized toolings and extender solutions to inspect a wide variety of component geometries like fan cowls, flaps, winglets, elevators or different type of stringers, stiffeners, fairings on defect types like delaminations, inclusions, debondings, voids, porosity etc.

Bringing standard robots to high performance accuracy

Krautkrämer HydraStar comes with the new Adaptive Accuracy Control (AAC) feature to measure deviations between cooperating robots dynamically and compensate them to achieve the best possible tool alignment for Through Transmission Testing.

With the patented AAC feature the accuracy of cooperating robots can be improved to <0,2mm which enables an uniformity of 99% within +/- 1dB.



Service when and where you need it

Krautkrämer HydraStar is equipped with standardized robots relying on a global service and support structure. To reduce downtimes and operational costs, operators can use its patented accuracy compensation feature to realign the system without the need of external tools or special expert knowhow. In addition, UT instrument calibration, Remote Service Agreements (RSA) and Supporting Service Agreements (SSA) are available.

High performance UT instruments to boost your operations

Based on a common platform and installed in an air-conditioned cabinet a multitude of modular UT electronics, from high-precision single-channel applications with outstanding dynamic range performance, to external high-power transmitters, to multi-channel phased array packages for critical application needs and highest test speed requirements complement the Krautkrämer HydraStar.

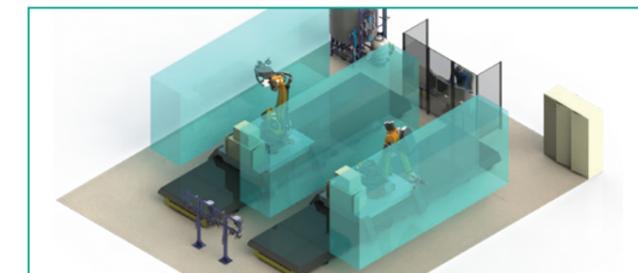
To maximize productivity, Pulse Echo and Through Transmission Inspection capabilities (also in combination) can be added.

Application expertise

Our large team of experts draws on the experience of more than 100 installed ultrasonic testing machines for the aerospace industry and is therefore able to support our customers worldwide in solving their application problems. If necessary, we can carry out feasibility studies in our application laboratory with our double robot system in order to work out the highest quality and most effective solution to specific test requirements.

The HydraStar dual configuration

consists of two robots mounted on linear slides that can operate in our patented synchronous motion for TTU inspection or be controlled independently for Pulse Echo applications.



The HydraStar single configuration

consists of one robot mounted in either a fixed location with a turntable or mounted on a linear slide employing a yoke tool for TTU inspection and a complete set of Pulse Echo application tools.



Key Highlights:

- Automatic tool changer
- ALOK data compression
- Patented Reverse Phasing Contour Adaptation (RPCA)
- UT instruments compliant to all relevant NDT standards
- Compliant to main aerospace manufacturing standards
- On site UT instrument certification with our CERT-2 system
- Digital interfaces to Manufacturing Execution System (MES)
- Data analysis to main aerospace manufacturing standards
- One software to cover scan plan set-up and scan data evaluation
- Use of standard robots with unmodified mechanics and controllers
- Geometry teach-in from CAD models, laser metrology and manual methods
- Local service support incl. global Tech-Support Team, RSA and tailor made SSA
- Use of patented AAC (Adaptive Accuracy Control) for best possible tool alignment for TTU inspection

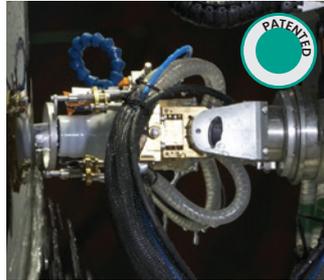
Flexible answers for all application needs

The Krautkrämer HydraStar design incorporates several Waygate Technologies patents including wide area phased array squirters and our patented Reverse Phasing Contour Adaptation (RPCA) which result in industry leading testing performance and improve productivity for all application needs.



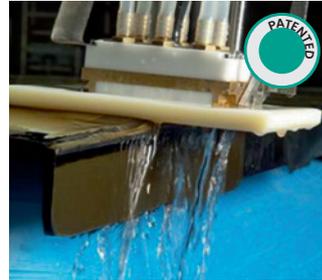
Conventional TTU squirters

Dual frequency inspection in a single pass using Waygate Technologies annular ultrasonic transducer design, achieving twice the throughput of conventional single channel squirters.



Wide area phased array TTU squirters

Waygate Technologies patented phased array squirters provide up to a 15 mm wide scan area in a single pass.



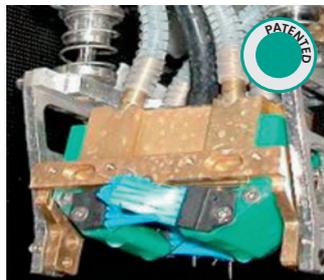
Phased array skin bubbler

Provides Pulse Echo inspection with up to a 86 mm track width in a single pass. Geometrical variations within the test part are compensated by Waygate Technologies patented RPCA (Reverse Phasing Contour Adaptation) method.



Phased array inside radius bubbler

Inspects concave (inner) radii in a single scan track/ path. Geometrical variations within the test part are compensated by Waygate Technologies patented RPCA (Reverse Phasing Contour Adaptation) method.



Phased array outside radius bubbler

Inspects convex (outer) radii in a single scan track/path. Geometrical variations within the test part are compensated by Waygate Technologies patented RPCA (Reverse Phasing Contour Adaptation) method.



Stringer tool

Provides Pulse Echo inspection of the stringer web of T-shaped stringers or variations of it typically in a single pass at 100% coverage using a phased array probe with up to 128 elements.

For more detailed information, please visit our website or contact your local sales representative.

waygate-tech.com

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BHHK60028 (07/2021)



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