

# *The Leader in Eddy Current Testing Performance*

JENTEK® Sensors



# JENTEK's Innovative Products

JENTEK Sensors Inc. manufactures and delivers high performance magnetic field and electric field-based nondestructive testing (NDT) solutions for the oil & gas, petrochemical, aerospace & defense and industrial sectors. JENTEK was founded in 1992 to commercialize the MWM<sup>®</sup> eddy current sensor. The MWM sensor leads a family of inductive (MWM-Arrays), capacitive (IDED<sup>®</sup>), and magnetoresistive (MR-MWM-Array) sensors and arrays as well as the impedance instrumentation and software to realize their capability. With the launch of the GridStation<sup>®</sup> 8200 product line in 2015, JENTEK has raised these sensors to an unprecedented level of performance.

JENTEK has many commercial off-the-shelf (COTS) applications available for near-term delivery. We also work with our customers to develop affordable solutions to replace costly alternatives or to address unsolved inspection (NDT) and structural health monitoring (SHM) problems. Our commitment to our customers doesn't end with delivery; we offer comprehensive engineering support, technical support, and warranty plans to help you make the most of your investment. Please visit our website, call or email us today and start solving your most challenging problems.



Dr. Neil Goldfine, PhD.,  
President and Chief Engineer

## JENTEK's 8200 Instrumentation

JENTEK's GridStation<sup>®</sup> 8200 impedance instrument is a dual mode system that supports both magnetoresistive (MR) and inductive sensing arrays. The system supports up to 119 fully parallel impedance channels (offered in 20 channel increments, including one dedicated drive channel) and operates at frequencies ranging from 2.5 Hz to over 20 MHz. The 8200 is offered with an integrated touchscreen computer or as a non-integrated box for connection to a computer. The impedance instrument connects to a probe electronics unit (PEU) that itself connects directly to the selected sensor. The PEUs are modular, each supporting up to 20 channels, with MR and inductive PEUs currently available.





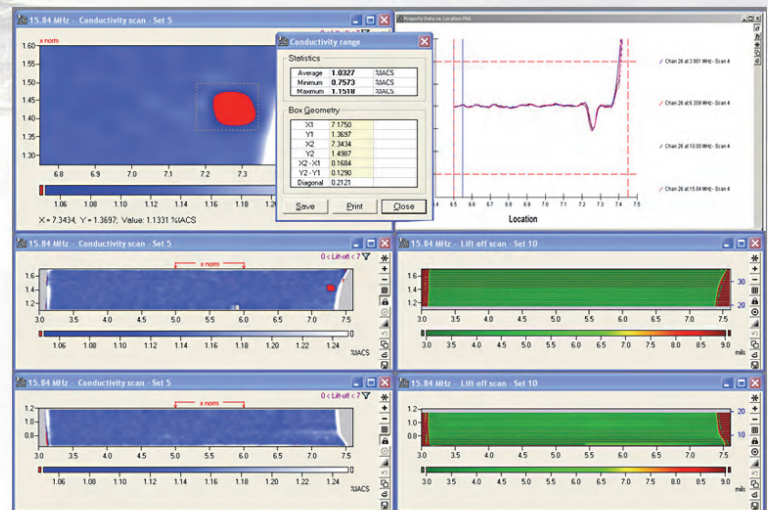
## Sensors & Probe Electronics

Each JENTEK solution uses inductive (MWM, MWM-Array, MWM-Rosette), magnetoresistive (MR-MWM-Array), or capacitive (IDED) sensors to address the NDT or SHM need. JENTEK maintains an inventory of standard sensors for our COTS solutions and has the capability to rapidly prototype solutions to new applications. When the highest level performance is needed, these sensor technologies can be endlessly adapted to unique customer needs, whether it be to inspect a tight fillet, a unique thread geometry, a knife seal, bolt hole, an expansive and curved surface, or whatever the case may be.



## GridStation Software

JENTEK's sensors and impedance instruments can support dozens or even hundreds of fully parallel channels. With data rates at 10's, 100's or 1,000's of samples per second on each channel, rapid processing is critical for data analysis. Using a multivariate inverse method (MIM), the GridStation software rapidly processes the raw impedance measurements into absolute material properties such as conductivity, permeability and thickness, which in turn are related to defect size, stress, or other dependent properties of interest. The key to the GridStation software's speed is its precomputed HyperLattice<sup>®</sup> databases. The HyperLattice database stores the answers as a non-linear look up table that is searched by the patented MIM in or near real-time.



## Tech Support and Services

JENTEK offers full service and support for all products and application development processes. We hire, train, and maintain the best qualified people in the industry. While not limited to these applications, JENTEK can provide services in the following areas – either directly, or through Goldfine Technical Services (GTSI), or through a customer-selected service provider:

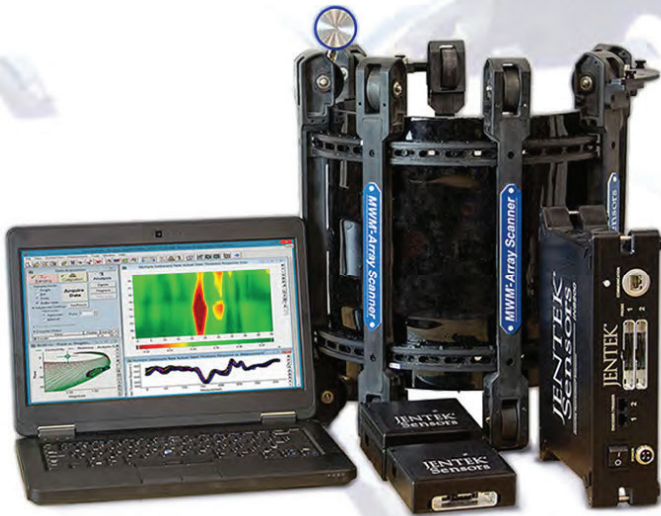
- Piping & Vessel Internal and External Corrosion Imaging through insulation and fireproofing (CUI and CUF)
- In-ditch Pipeline Services
- SCC Mapping with and without coatings
  - SCC Crack depth measurement
  - Mechanical Damage Mapping
  - Internal & External corrosion mapping with and without coatings
  - Permeability mapping for determination of bending stresses
- NEW In-Line-Inspection tools and services to be available in 2016





# Oil & Gas, Petrochemical

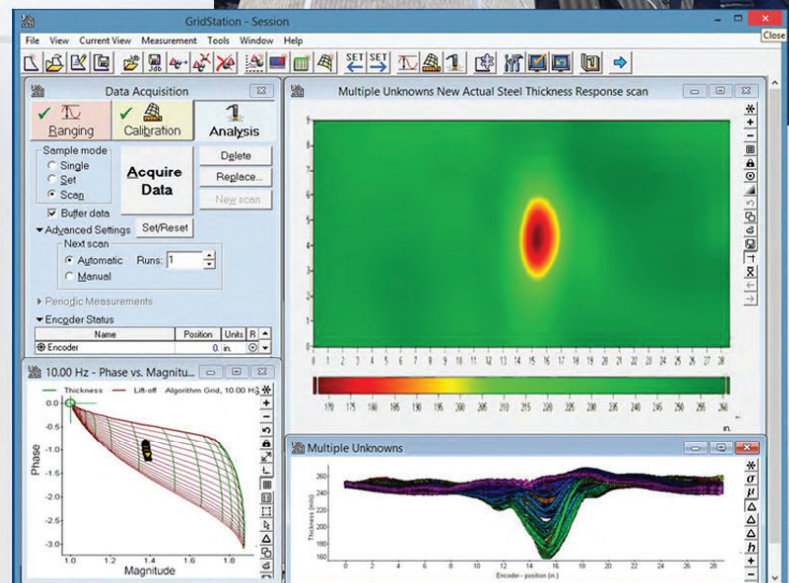
JENTEK offers industry leading solutions for NDT and SHM of Oil & Gas and Petrochemical piping, pipelines, vessels, and other infrastructure. Off-the-shelf solutions are available for measuring corrosion under insulation (CUI), corrosion under fireproofing (CUF), and stress corrosion cracking (SCC). In-line inspection solutions are also becoming available. Other applications of the MWM and MR MWM-Array sensor technologies include: stress, crack and corrosion monitoring; accelerated damage test monitoring; inspection of off-shore risers for corrosion; and maritized solutions for offshore pipeline inspection are coming soon.



## CUI & CUF

JENTEK's CUI and CUF packages provide rapid, high-resolution imaging of internal and external corrosion through insulation and weather jacket or through fire proofing with wire mesh. Analysis results provide quantitative sizing and real-time reporting. Solutions are available for piping and vessels in a wide range of diameters, insulation thickness, and wall thickness.

The JENTEK solution with the new 8200 series product offers distinct advantages over alternative methods for CUI, such as pulsed ET. See our corrosion imaging flyer for more details.



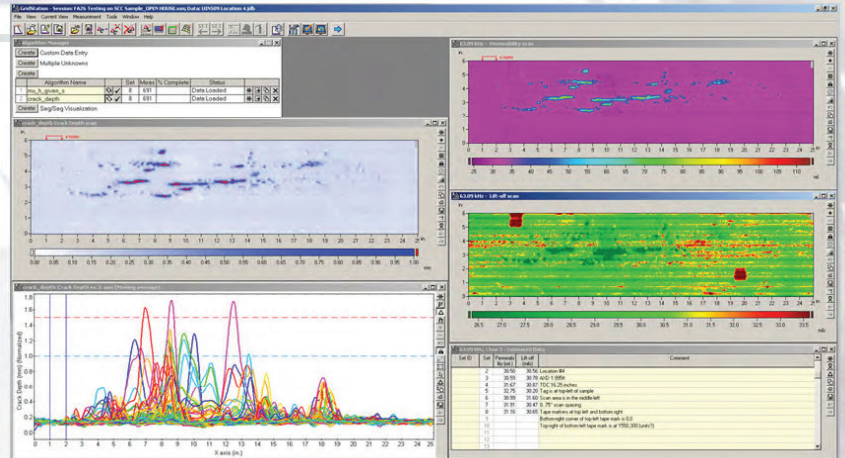




## SCC

MWM-Array, flexible eddy current sensing provides a reliable alternative to magnetic particle inspection (MPI) for SCC crack colony mapping. In addition, MWM-Arrays provide crack depth sizing and digitized records that enable more practical in ditch inspection services. Inspections can be performed through coatings under many conditions.

This method is now available for sale, lease, field trials and field services.



## SHM

JENTEK sensors can also be mounted permanently with wired (ethernet) or wireless data offload for corrosion monitoring (wall loss internal or external) or for crack initiation and growth monitoring, as well as for stress monitoring. Systems are being developed for both above ground and underwater, and are suitable for monitoring in a contact and noncontact configuration, as well as through coatings and insulation.

## ILI

Rapid, high-resolution imaging of internal corrosion, internal initiated cracks and relative stresses is provided using MWM-Array technology in an ILI tool.

Unique capabilities include extremely high data rates capable of high resolution imaging at up to 10 m/s variable travel speeds with no sensor contact required and tolerance for variable sensor to pipe wall gaps.

The JENTEK PIG-IT™ product is being tested under DOT and JENTEK funding, (and other industry funding) and will be available soon.



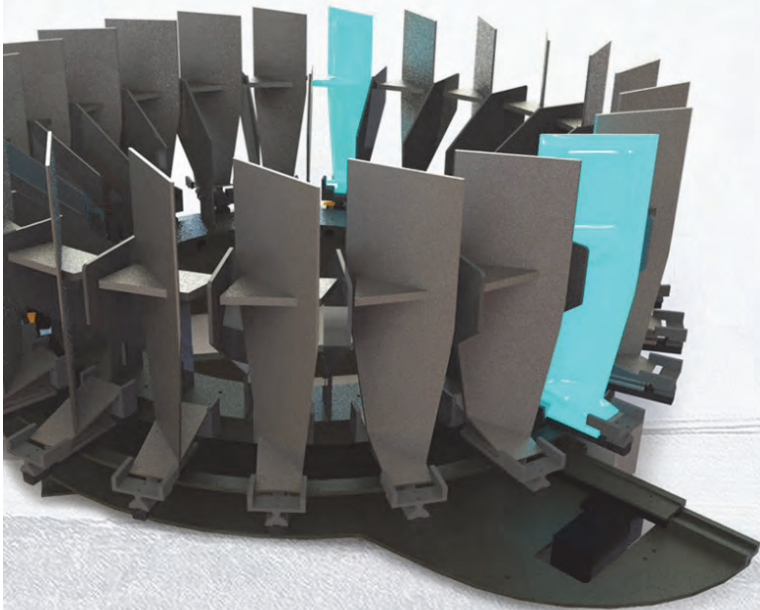
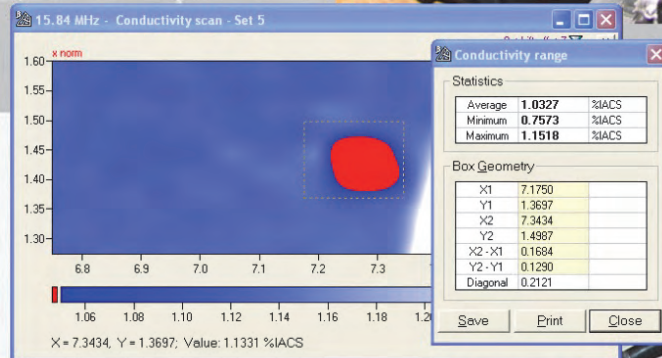
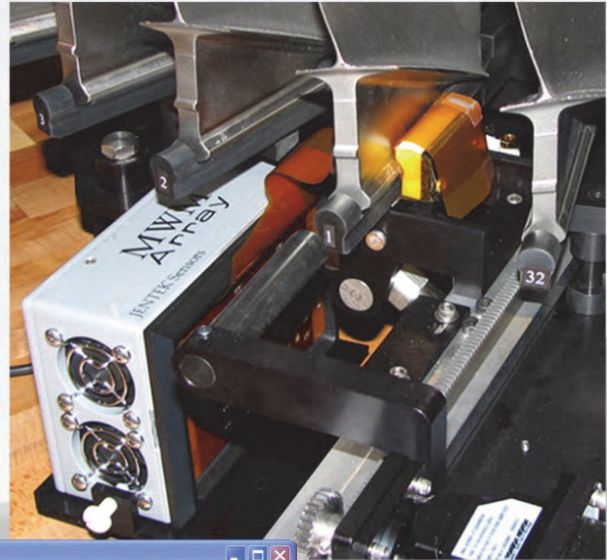


# Aerospace & Defense

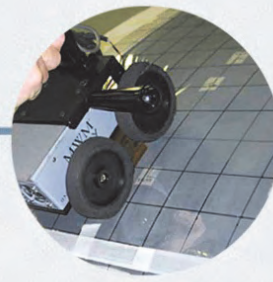
JENTEK offers industry leading solutions for NDT and SHM of high-value Aerospace & Defense, and other industrial assets as well as quality assessment and NDT for high-value added manufacturing processes. The new 8200 series product line provides a leap in capability over our previous award-winning GridStation® systems.

## Engine NDT

The MWM-Array technology, winner of the FAA/ATA “Better Way” Award for crack detection in engine components, is the established market leader in eddy current testing (ET) performance. The new 8200 GridStation systems provide a 10x improvement in crack detection performance and over 5x improvement in scan speed. With 18-119 parallel channels (no multiplexing), these systems can inspect an aircraft engine disk or an entire set of aircraft engine blade dovetails in much less than an hour. Furthermore, demonstrated false indication rates are far lower than any competitive ET solution on the market, and the MWM-Array allows minimal surface preparation compared to other ET solutions and LPI, saving time and resources.







## Structures NDT & SHM

The 8200 GridStation systems with MWM-Arrays are the first ET solution for structures that provides very rapid and reliable C-scan imaging for cracks in bolt holes with fretting damage, grind burns under coatings on landing gear, hidden corrosion in lap joints, and inspection of damage through composite skins. Furthermore, the 8200 GridStation systems offer the first practical and extremely rapid ET solution for wide area impact damage imaging in complex-shaped carbon fiber reinforced composites. The MWM-Array was one of two NDT technologies implemented at NASA KSC for inspection of the RCC thermal protection material along the leading edge of the Space Shuttle prior to its return to flight.

The permanently installed JENTEK linear MWM-Arrays and circular MWM-Rosettes offer convenient inspection of difficult-to-access locations. After initial installation, no disassembly is required to inspect fatigue critical locations, thereby eliminating the high cost of disassembly for inspection and the common occurrence of collateral damage. This proven solution is currently undergoing flight testing with the US military and is available for commercial aerospace and other defense applications. Capability includes detection of surface and buried cracks for material thicknesses up to 0.75 inches.



## Torque & Stress Monitoring and Imaging

The non-contact and surface mountable JENTEK magnetic stress/strain gages (MSGs) offer the first strain gage replacement technology that requires no bond integrity and can provide reliable strain measurement through coatings and even without contact. This revolutionary technology offers customers a practical solution for local strain monitoring, direct load monitoring and imaging of stresses on complex surfaces for life management, and provides sufficient data rates (e.g., up to 10,000 samples/second per channel) for real-time diagnostics. Non-contact torque sensor variants are transitioning to flight testing for target platforms and are available to OEMs for fully integrated testing. No modification to shafts/structures (such as coatings/cuffs) is required. Also, for composites, the MWM-Arrays and Quadri-Directional Magnetic Stress Gages (QD-MSGs) enable volumetric stress imaging and monitoring.





***JENTEK solutions offer high  
Return on Investment (ROI)  
to owners and operators of  
high-value assets and high  
value-added processes.***

## **JENTEK® Sensors, Inc.**

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JENTEK Issued patents include U.S. Patent #s: 8,981,018, 8,960,012, 8,928,316, 8,803,515, 8,768,657, 8,494,810, 8,237,433, 8,222,897, 8,050,883, 7,994,781, 7,876,094, 7,812,601, 7,696,748, 7,589,526, 5,533,575, 7,528,598, 7,526,964, 7,518,360, 7,467,057, 7,451,657, 7,451,639, 7,411,390, 7,385,392, 7,348,771, 7,289,913, 7,280,940, 7,230,421, 7,188,532, 7,183,764, 7,161,351, 7,161,350, 7,106,055, 7,095,224, 7,049,811, 6,995,557, 6,992,482, 6,952,095, 6,798,198, 6,784,662, 6,781,387, 6,727,691, 6,657,429, 6,486,673, 6,433,542, 6,420,867, 6,380,747, 6,377,039, 6,351,120, 6,198,279, 6,188,218, 6,144,206, 5,966,011, 5,793,206, 5,629,621, 5,990,677 and RE39,206 (other patents pending).

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