

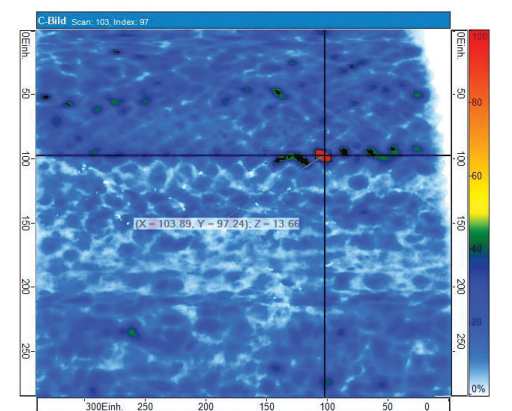
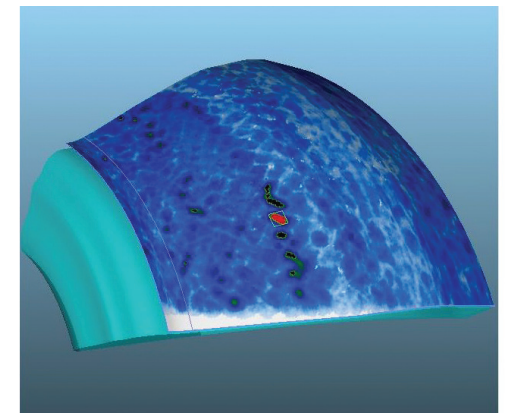
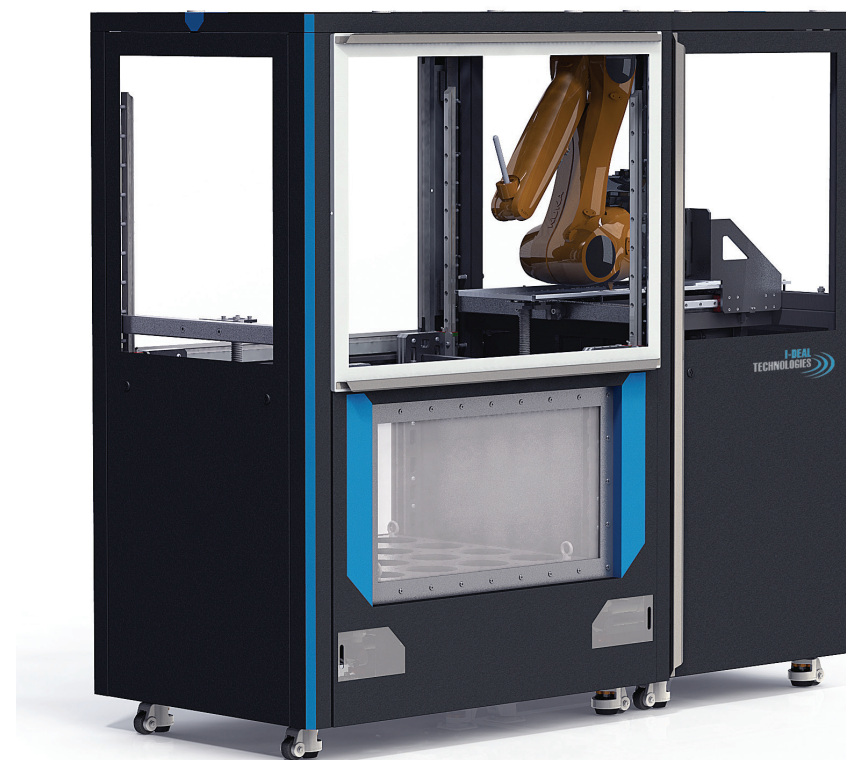


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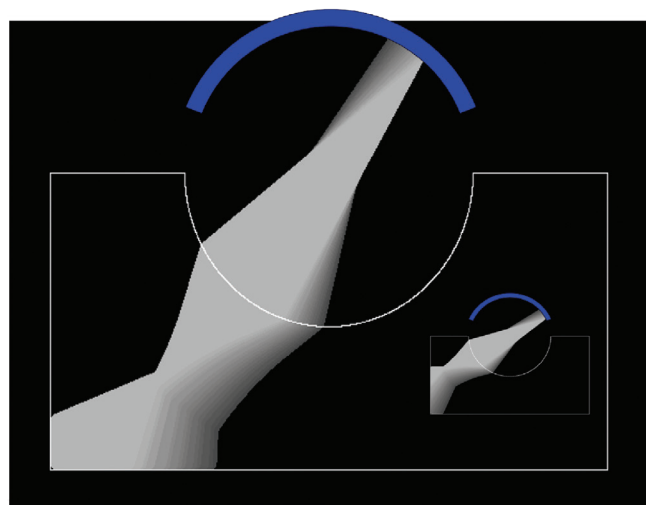
## ROBOT-BASED AUTOMATED UT TOMOGRAPHY SYSTEMS FOR INDUSTRIAL APPLICATIONS



## LEADING UT TECHNOLOGY

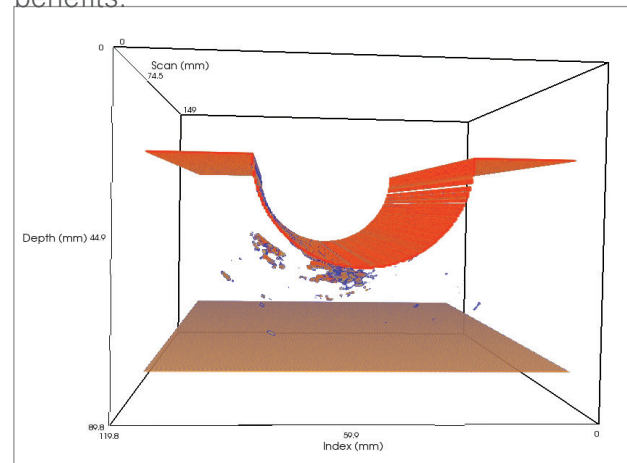
I-Deal Technologies GmbH & Co. KG has developed a novel ultrasonic testing technology and equipment for quantitative non-destructive evaluation of complex components during production.

Our robot-aimed inspection manipulator, in combination with Adaptive TFM technology, combines leading-edge automation solutions with high-end ultrasonic signal processing. This both expands conventional ultrasonic testing (in the areas of system engineering and application technology), and provides technological leadership to its users.



▲ Simulation of sound propagation and reconstruction of 3D image of complex shape test object

The basic principle of this technology is this: ultrasonic signals measured by transducer arrays can be calculated for any angle of incidence and focus depth using synthetic aperture focusing technique. The Adaptive TFM technology is thus equivalent in physical terms to the conventional technique of sound field control, but offers significant additional benefits.



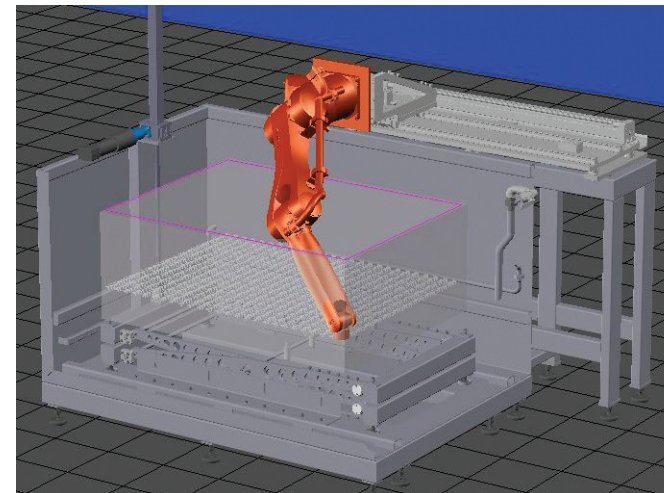
▲ 3D representation of an inspection object with material flaws

These additional benefits include substantial acceleration of the testing process, and improved flaw detectability by using synthetic focus in every point of the test volume, even in anisotropic materials. Also, quantitative ultrasound testing results are produced by using three-dimensional imaging.

A further advantage of the TFM platform is its modularity. That is, because of the universal measurement principles and the modular hardware and software design, it is possible to use this new technology while implementing any proven technique.

## MODERN ROBOTICS

The most effective ultrasonic testing by TFM technology is accomplished by combination of 3D tomographic reconstruction and robot-aimed scanning of test objects. Quick and precise generation of scan-plans for free-form objects, and real-time capturing and visualization of inspection volume allow flexible design and individual implementation of customized inspection solutions for industrial and educational purposes.



▲ Simulation of the robot cell



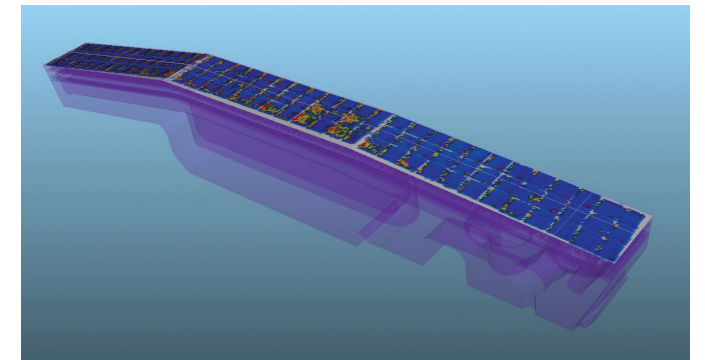
▲ Automated Immersion Testing Machine for free forming objects

### SYSTEM PARAMETERS

- » Fully automated robot-aimed inspection procedure based on CAD model of the inspection object
- » Phased Array unit with up to 256 channels
- » Motion control unit up to 6 axis robotic system
- » Robust manipulator system
- » Real-time 3D visualization of inspection volume
- » Automated evaluation of inspection results.

## PRODUCT

This universal robotized inspection machine for ultrasonic testing of free-form components is capable of rapid capturing, visualization and evaluation of free-forming metallic or composite components with water-gap or immersion coupling.



▲ Visualization of inspection results on First-Wall panels of ITER

## APPLICATIONS

The following components are inspected by TFM technology:

- » CFRP components of aircraft and automobile industry;
- » austenitic weld joints on thick-walled pipes;
- » large casting components;
- » bimetallic joints of fusion reactor ITER;
- » diffusion weld joints;
- » heavy steel slabs.

## REFERENCES

The TFM technology of I-Deal is successfully applied by the following world leaders in industry:

- » Chevron Corporation
- » BMW AG
- » ThyssenKrupp AG
- » AREVA NP
- » MT Aerospace
- » TÜV SÜD
- » ZF Friedrichshafen

## ABOUT US

I-Deal Technologies is an international provider of innovative system developments and professional engineering services in the field of nondestructive ultrasonic testing. In the field of ultrasonic testing, I-Deal Technologies has over five years of experience developing procedures and automated systems for non-destructive evaluation of lightweight components, casting and forging products. I-Deal Technologies is active in state-promoted research and development projects, as well as bilateral projects with industry customers in the aerospace and automotive industries.