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- Accredited laboratory in line with DIN EN ISO / IEC 17025, to qualify and validate new non-destructive testing (NDT) processes for industrial applications
- Accelerated time-to-market and opportunity for qualified, norm-compliant deployment in industrial applications as well as for new in-house developments or custom adaptation of innovative NDT technologies, even in fields where norms have not been established
- Certification of the corresponding quality management system in accordance with DIN EN ISO 9001



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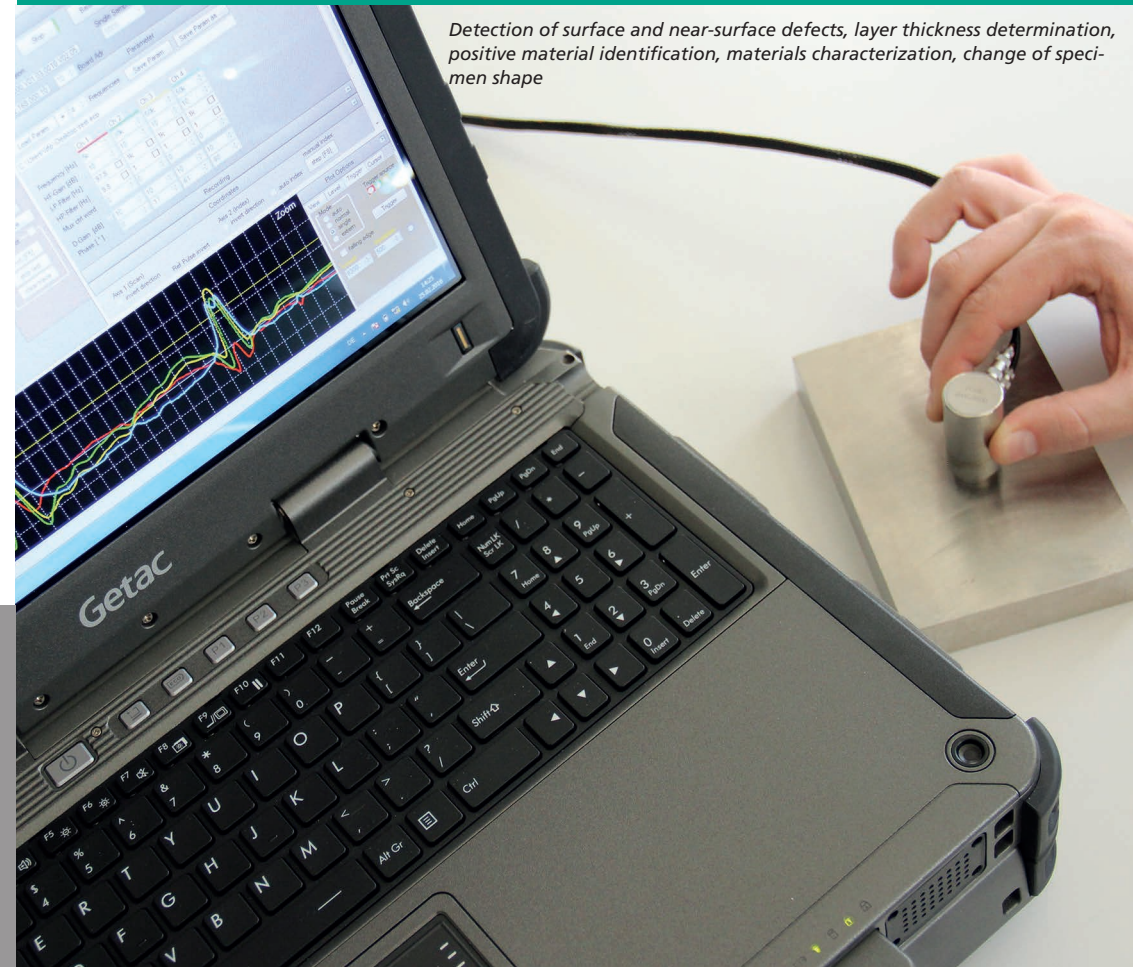
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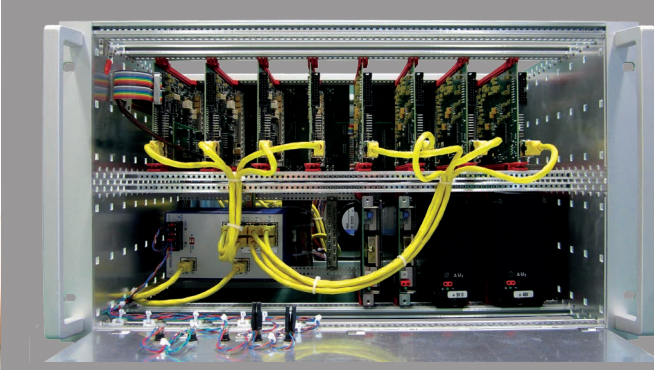
**MULTICHANNEL MULTIFREQUENCY EDDY CURRENT
INSPECTION ELECTRONICS**



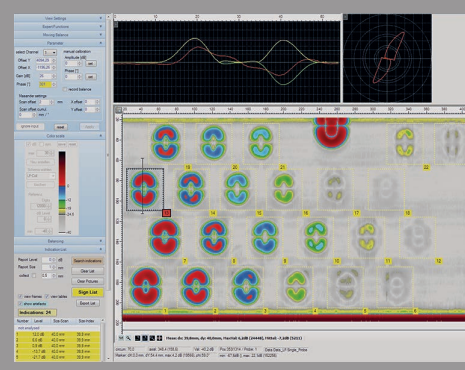
Detection of surface and near-surface defects, layer thickness determination, positive material identification, materials characterization, change of specimen shape



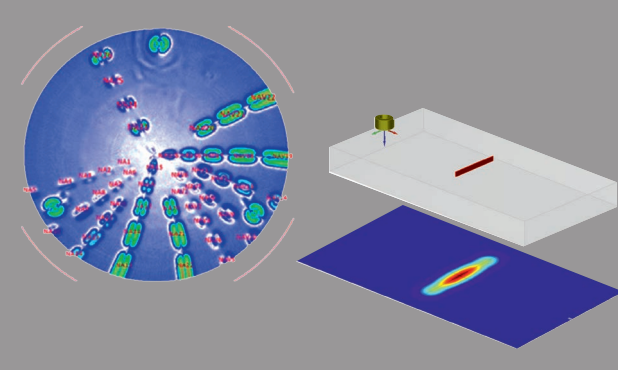
Mobile eddy current inspection system



Customer-specific multichannel inspection system



Evaluation software



Left side: C-scan representation in polar coordinates
Right side: Simulations for sensor optimization

Situation

Due to its high potential for automation and the extensive range of applications the nondestructive testing (NDT) by eddy current methods is an inherent part of NDT applications. The method can be applied to any electrically conductive materials. Electrical conductivity and magnetic permeability are the relevant physical material properties which influence the test and, therefore, include the information content. These parameters depend on material's quality characteristics such as

- heat treatment and texture formation,
- texture differences such as case and nitriding hardness layers, liquations etc.,
- mechanic properties such as firmness, hardness, residual stresses etc.,
- mixing ratio of alloys.

Besides material properties, eddy current inspection is able to inspect changes of specimen shapes and material defects, e.g.

- surface and near-surface defects,
- lift-offs and layer separations,
- corrosion layers, subsurface corrosion,
- diameter deviation of wires, rods, pipes, balls etc.,
- thickness of metallic and nonmetal layers, layer thickness of multiple conductive layers and thickness of interlayers, pipes, sheets etc.

Task

The goal was to develop an eddy current electronics for easy adjustment to different applications while preserving flexibility of use and adaptability to customer requirements. Any limits should be defined solely by the test speed and the test frequency as being necessary for the inspection. The electronics should be fit for use as both, a mobile single-channel device for manual inspection and as a fully automated in-line inspection system with a huge number of parallel channels.

Realization

The basic version of the inspECT® eddy current testing board comprises all necessary components of an all-purpose eddy current testing system. The inspECT® board is able to operate in single- or multifrequency multiplex mode, in sensor multiplex mode or in combination of both procedures. The main features are

- Single- or multifrequency operation with up to 16 testing frequencies from 100 Hz up to 10 MHz
- Multiplex sensor operation with up to 16 sensors realized by external multiplexer which also enables flexible positioning of the sensor-near electronics including far reaching testing distances
- Setup of multichannel systems by cascading multiple inspECT® testing boards is guaranteed by the modular customer-adapted concept
- High sample rate: 25,000 samples/s in single-frequency mode, up to 700 samples/s in operation mode at 16 frequencies and/or 16 multiplexed sensors
- Integrated triaxial coordinate interface (optional with differential receiver)
- Real-time accessible inputs and outputs for process control
- High-performance hardware enables signal processing in real-time already on the inspECT® board
- 100 Mbits full duplex ethernet interface for testing data and parameters
- High-performance software with integrated regression analysis

Applications

- Mobile eddy current testing system realized inside a rugged industrial notebook with IP65 protection class
- OEM kit – comprising inspECT® board, backplane, power supply, coordinate interface and multiplexer – for integration in customer systems
- Compact eddy current system with external input device for industrial use with IP65 protection class
- Integration of any customer-adapted inspection electronics into customer systems