By the way, you already know our industrial grade accredited inspection services?

- 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 complete 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
**Situation**

A decisive advantage of EMAT technology (ElectroMagnetic Acoustic Transducer) over conventional piezoelectric ultrasonic technology arises from EMAT’s ability to excite and pick up shear waves in form of bulk waves for both polarization directions, SV (shear vertical) and SH (shear horizontal), and pure-mode guided waves in form of plate, surface, rod or tube waves which is of interest to applications in the field of long-range ultrasonic inspection.

EMAT operates couplant-free and contactless and is thus of applicational relevance particularly for sensitive, hot or cold surfaces, but also for coated test objects.

**Task**

Here we provide a way to harness EMAT technology at lower device-technical effort and thus at lower costs for the user. For this, the “EMAT VG” adapter system was developed at Fraunhofer IZFP: EMAT probes are connected to conventional ultrasonic devices thus enabling significant inspections without need for expensive specialized electronics. Due to the modular design also multichannel device versions are easy to implement. In particular, EMAT phased array applications become available.

**Results**

A conventional ultrasonic device provides sufficient functionality for many applications concerning representation, amplification, filtering, delay measurements, etc. In the case of a phased array device this implies the required transducer delay and the signal processing. These functions can be used “out of the box” without need for implementation in a separate hardware. Hence, the EMAT VG essentially “only” assumes the generation of an excitation signal suitable for EMAT transducers plus the pre-amplification and band filtering of the received signals which are significantly smaller and narrowband compared to the piezoelectric ultrasonic technique. Via USB interface the inspection parameters such as operating frequency, excitation burst length, amplification, band filters, etc. can be parameterized using the EMAT VG. The measuring operation is possible even without a computer. The parameters are stored non-volatile, so that they can be used immediately in the last valid form even after switching off / switching on without need for re-parameterization of the EMAT VG.

**Benefits of the EMAT technology**

- Ultrasonic transmission by electromagnetic interaction
  - No couplant required / contactless
  - Low influence of surface condition
  - Ultrasonic inspection for cold and hot components
- Direct excitation of shear waves
- Selective excitation of guided ultrasonic modes (Lamb / Rayleigh / SH waves etc.)
- Application for universal inspection tasks
- Hardware
  - Up to eight parallel EMAT transmitter/receiver channels
  - Suitable for phased array
  - Working frequency 50 kHz – 10 MHz
  - Four selectable band filter
  - Four selectable receiver gain settings
- Parameterization
  - Parameterization via USB
  - Measurement operation possible without PC
  - Non-volatile storage of parameters
  - Automated probe detection

**Possible fields of application**

- Inspection of pipelines and ductwork
- Weld seam inspection notably of austenitic and dissimilar weld seams
- Wall thickness measurement and corrosion inspections
- Characterization of rolled textures and mechanic stresses