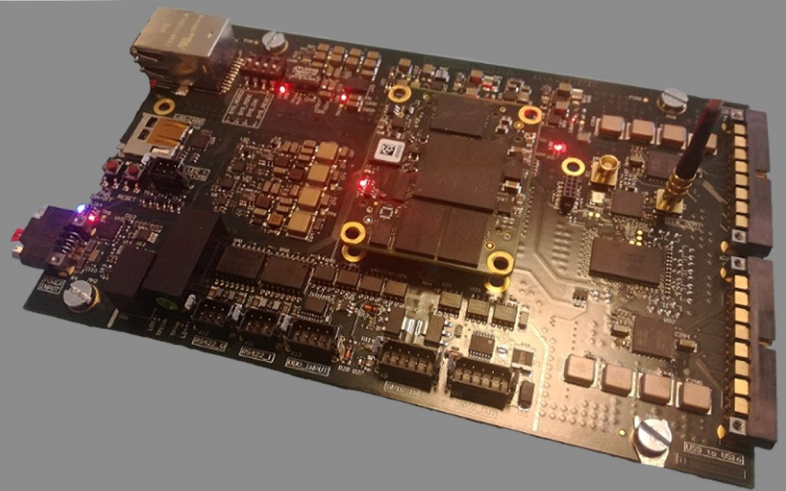


BRINGING NDT TO A HIGHER LEVEL



The USI01 board measuring 160 x 100 mm and weighs 127 grams

Properties of USI01

No of parallel transmit channels
No of parallel receive channels
Capabilities
Power consumption
Interface

Memory

16
8 (+8 multiplexed)
wall thickness, ToFD, FMC
7W
1Gb/s Ethernet with real time data transmission
1Gbyte for ultrasonic data storage

Z.E.S. and SchirraTech have jointly developed specialized NDT instruments during the last four years. In that collaboration it was noted that the robotization of NDT imposes special demands on NDT electronics and software.

Therefore, we decided to develop NDT OEM modules specifically for application on robots. We started with the USI01, a 16 channel ultrasonic instrument that can be used for corrosion and crack inspection.

Improved CML testing using drones

Corrosion Monitoring Locations (CML's) are used for corrosion inspection using ultrasonic thickness measurements. Originally (prior to the 9th edition of API 510 and 3rd edition of API 570), thickness measurements at a single examination point were to be taken. This however is not a good practice because:

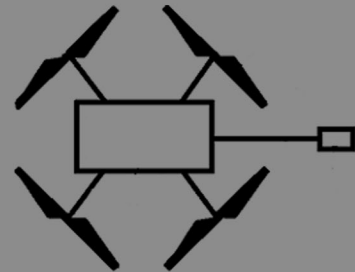
- There may be a point with deeper corrosion close to the examination point.
- Corrosion makes the surface rough, which amongst other factors means that the ultrasonic measurements is distorted and does not give a reliable wall thickness reading, when testing at one point only.

API 510 and API 570 now include the method of taking multiple measurements at a CML, and record the lowest or the average reading. The CML is often a small area, two to three inch in diameter.

Recently, various drones have been developed for corrosion inspection using ultrasonic wall thickness measurements. These drones however take only single point wall thickness measurements. Hence, this is not a thorough CML inspection. More complex drones are being developed that can make linear scans. But scanning takes more time and will restrict the number of locations that can be inspected during one flight.

Lets first consider a manual CML inspection. It is done by placing a transducer on a steel wall. Then, by moving the transducer around a little, a spot can be found where the roughness does not interfere much with the measurement.

we have developed a special transducer that can mimic this action. It does 60 independent wall thickness measurements within 0.1 seconds on slightly different positions. This transducer is somewhat larger compared to traditional ultrasonic transducers. An embedded processor analyses the 60 measurements and selects the best wall thickness value for corrosion inspection. The trick is that the transducer has 16 ultrasonic elements, and there are 16 parallel ultrasonic channels in the electronics. This is partly comparable with phased array technology. The transducer and electronics are optimized for low weight and low power consumption, as needed for application by drones. The drone only has to bump into the wall and the CML is inspected in a fraction of a second.



If needed, we can simultaneously use three of these transducers to further increase the coverage on a CML and get a better value for the lowest wall thickness. Advanced wall thickness algorithms are implemented in our embedded system, which give reliable results in real time. Also, all A-scan data is stored which provides the option of post processing in critical cases. The system is to be brought to the market in 2020 under the name CML-XVI.



Various ultrasonic, eddy current and pulsed eddy current OEM modules are currently under development by Z.E.S. – ShirraTech. Low power electronics, proper interfacing and dedicated software makes it easier to apply these in robots. In addition to that, specific NDT knowledge and experience is needed to make your robotic NDT successful. Therefore, we also provide the NDT expertise to assist you in your innovation program.

RIMA

RIMA supports the development and deployment of robotics for inspection and maintenance with grants (see:<https://rimanetwork.eu/open-call-2>). If you have a new application that might get funded by RIMA and you need an OEM module for that, then we would be interested to discuss it further.

For more information see

<https://zes.nl>

<http://schirratech.nl>