



Neural Net based defect detection system using Long Range Ultrasonic Testing (LRUT) technology for Aircraft Structure Health Monitoring

Overview

SelfScan develops an integrated system to continuously monitor the condition of aircraft components.

Project Goals

- To remove the need to dismantle critical aircraft components during every scheduled inspection
- To detect cracks and crack growth in their early stages hence to increase product reliability
- To facilitate direct economic benefits for aircraft manufacturers and operators, insurance companies and the general public

Technical Approach

The interpretation of signals can be very complicated due to the

- presence of multiple wave modes
- dispersion of the ultrasound
- the complex geometry of the object under inspection
- and to the changing conditions such as temperature

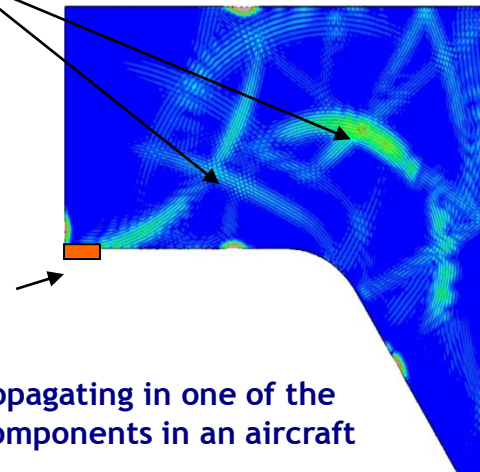
The approach used in this project is to gather data that is used to train a neural network, which can then be used to evaluate the health of the component throughout its lifespan.

This approach allows for complex, difficult to interpret signals, which means few sensors are needed and more complex objects can be tested.

Complex reflections

Transducer location

Sound propagating in one of the critical components in an aircraft



Project Partners

TWI Ltd, Cambridge (UK)

Optel (Poland)

Phillips Consultants (UK)

Isotest (Italy)

Smart Materials (Germany)

Cereteth (Greece)

NDT-Expert (France)



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Benefits

- Long Range Ultrasonic Testing technology provides large area coverage from a limited number of sensors.
- Neural network evaluates the health of the component by historical data interpretation
- Integration of two techniques provide high sensitivity for defect detection



Product applications:

- Aerospace
- Oil
- Gas
- Nuclear power generation