A SHM- Damage Monitoring
Eddy Current solution results

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A-SHM - Damage Monitoring - Context

The use case

Damages Monitoring replacing classical NDTs

Keeping access for it!

Other drivers: Robustness – Business Case - Certification - Retrofit ability Digitalization & Self Sustaining

Questioned on demand & on ground - Durability for 15 to 20 years!
A-SHM DM Application - Metallic structure – Sensing solutions News

Status “Generation 1”
- Ultrasonic (UT) sensors for longitudinal waves: Qualification program process is launched
- Eddy current (ET) sensors High Frequency: Is under evaluation phase - Qualification will follow

Solution offers retrofit ability!

Generation-1 Qualification program by end 2019
Fist Generation Prototype Sensor

- Two sensor layers, each having 12 coils, each coil having 8 windings
- Sensor layers are rotated for full coverage
- Each coil can be used as driver, receiver+ or receiver- coil
ASHM – DM- Eddy Current- High Frequency – Sensing concept

Fist Generation Prototype Sensor Multiplexing Sequence

• Sensor is used in differential mode
• For each multiplex channel:
  • 1 Coil is used as driver
  • The two neighbouring coils on the other layer are used as differential receivers
• Two types of „virtual differential sensors“

Type 1:
- Driver Bottom
- Receiver+ CCW Top
- Receiver- CW Top

Type 2:
- Driver Top
- Receiver+ CCW Bottom
- Receiver- CW Bottom
Balance:
- For evaluation - on H6
- On aircraft - Edge effect signal on selection of sensors used for comparison
ASHM – DM- Eddy Current solution- High Frequency – Evaluation results

As “Sorting” signal processing:

Here:

All impedance plane signals are in an acceptable range

Balancing on H6
ASHM – DM- Eddy Current solution- High Frequency – Evaluation results

H1 : 3x1x0,3 mm in 5 mm thick

11/12 and 13 sensor signals are not in acceptable range
ASHM – DM- Eddy Current solution- High Frequency – Evaluation results

H1-H2-H3 : in 5 mm thick

ScanAlyzer Software

Results from RT3 # 9 with 2.5 MHz

EDM notch 3 mm x 3 mm x 0.3 mm
EDM notch 1 mm x 3mm x 0.3 mm
EDM notches 2 mm x 2 mm x 0.3 mm
ASHM- DM
Ultrasonic and Eddy Current signals will be transferred by wireless to a Smart phone

Smart Phone tool from Lecoeur:

Signal signatures will be accessible by Inspectors on ground

To day
- Signal signatures will be captured by NDT Inspectors on ground

Next step
- Signal signatures will be automatically interpreted
- All details accessible for doubtful analysis, inspection traceability and predictive maintenance
THANK YOU