



Evolution of the Airbus NTM's to include recent developments in NDT technologies

Airbus Customer Service
Structure Engineering Support

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AIRBUS

Evolution of Airbus NTM's to include recent developments in NDT technologies

NTM Part 5 – Changed to cover Structural Health Monitoring (SHM) topics

A350 NTM Improvements, to be retrofitted

Rototest Improvement's
(NTM 51-10-01).



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NTM Part 5 – Structural Health Monitoring (SHM)

Introduction to Airbus philosophy

Content will be “Damage Monitoring”
(Ref.: SAE ARP6461).



AEROSPACE RECOMMENDED PRACTICE

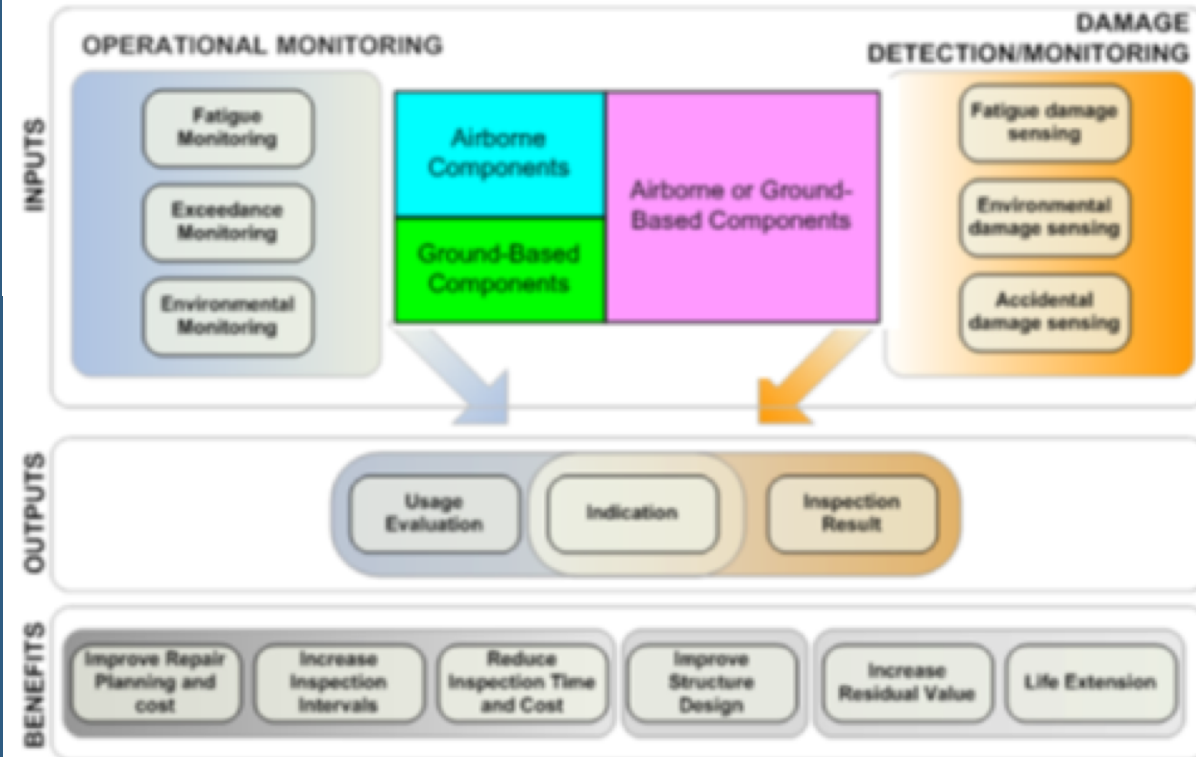
ARP6461

Issued 2013 09

Guidelines for Implementation of Structural Health Monitoring on Fixed Wing Aircraft

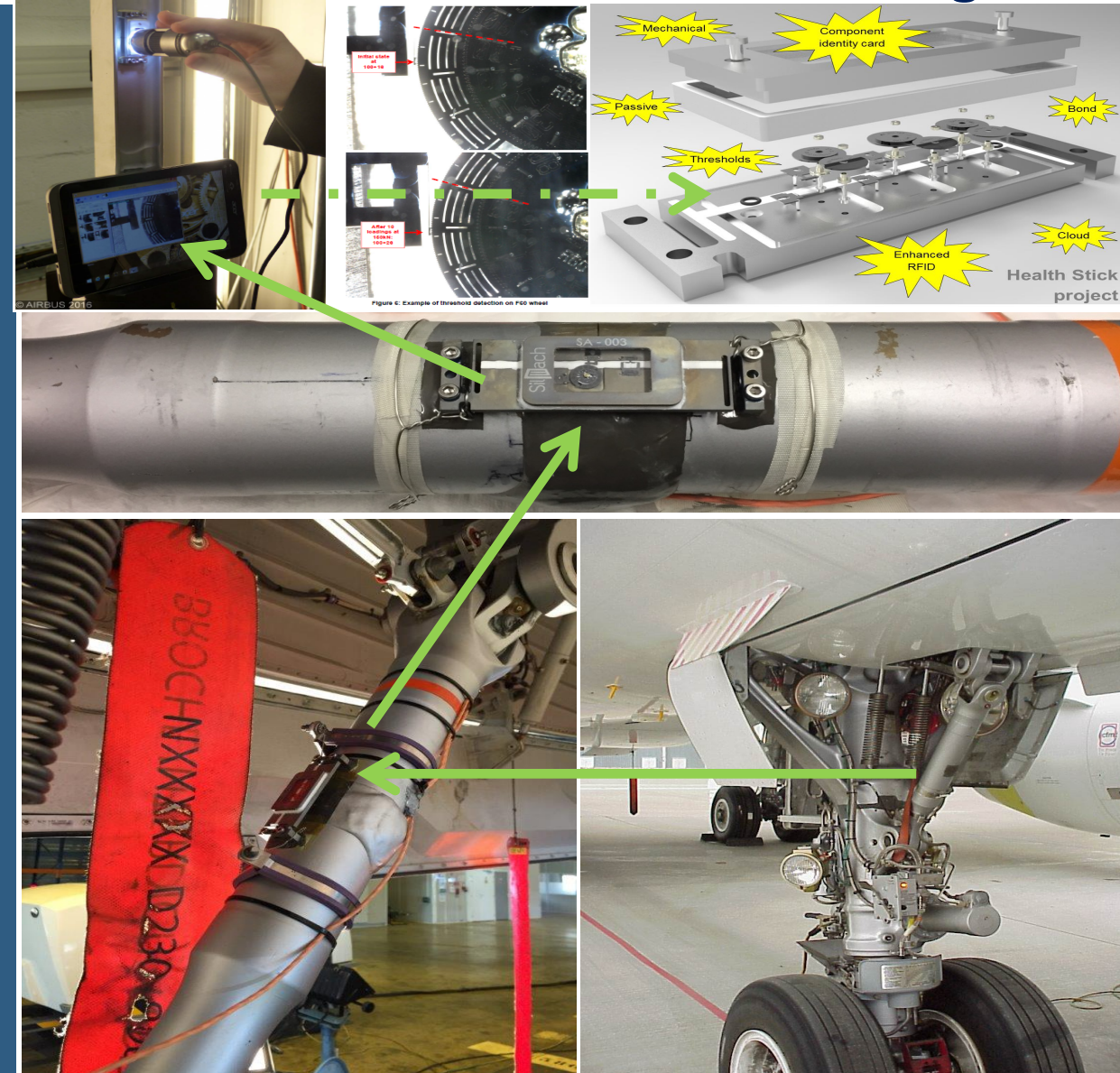
RATIONALE

The development of Structural Health Monitoring (SHM) technologies to achieve Vehicle Health Management objectives in aerospace applications is an activity that spans multiple engineering disciplines. It is also recognized that many applications of SHM require a combination of ground-based and airborne components.



NTM Part 5 – Structural Health Monitoring (SHM)

ChronoMEMS/HealthStick



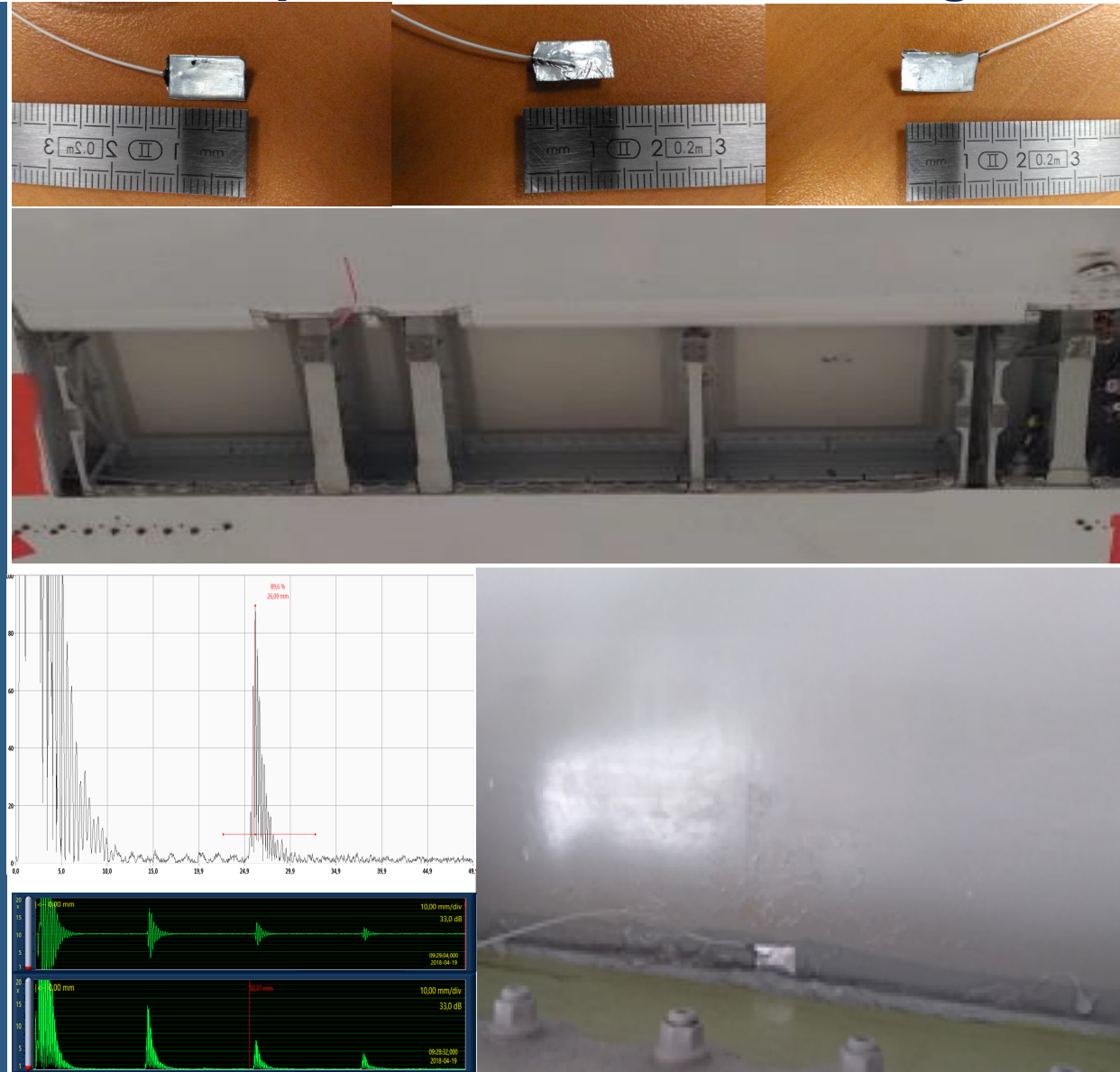
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NTM Part 5 – Structural Health Monitoring (SHM)

General descriptions of the technologies

Stick-on UT and ET, sensors

(UT sensors already installed on FT a/c.)



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For the A350 ANDT, we introduced

Tooling code to ease operator selection of alternate tooling.

(This example is from A350 ANDT 51-90-01)

(1) Tool Codes

(a) The tooling codes consist of seven digits. The first three digits give the Method, General Type and the Technical breakdown. Digits four to seven are for technical parameters that depend on the first three digits.

1 First Digit (Method):

- U - Ultrasonic
- E - Eddy Current
- O - Other Methods
- X - Radiography

2 Second Digit (General Type):

- I - Instrument
- P - Probe

3 Third Digit (Technical) depends on the First Two Digits for Example:

- D - Delamination
- T - Thickness Measurement
- C - Crack Detection

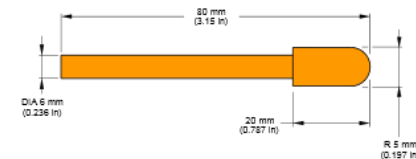
OMD-T

RESONANCE FREQUENCY TOOL

1. BASIC SPECIFICATION

USE	DELAMINATION AND DISBONDING
TECHNIC	TAP TEST

2. DRAWING



MATERIAL: CORROSION RESISTANT STEEL, TEMPERED
(LN-1.4044; MIL-S-18732)

3. SUPPLIER

PART NUMBER	SUPPLIER NAME
98A5T103013000	AIRBUS SPARES SUPPORT AND SERVICES

xt sheet

UIP-CD3A

ULTRASONIC INSTRUMENT

1. BASIC SPECIFICATION

USE	PHASED ARRAY
MODULE	16.128
FREQUENCY	20Hz - 6MHz
SCAN	C-SCAN

2. DRAWING

FOR EXAMPLE:



3. TOOLING

PART NUMBER	VENDOR NAME
OMNIPPA16128	OLYMPUS NDT UK LTD

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Harmonised UT & ET requirements
(to improve interchangeability
reduce instrument references)

C. Instrument Adjustment

- (1) Calibrate the ULTRASONIC EQUIPMENT (USK75) in accordance with the manufacturer's instructions.
- (2) Select 250 mm (9.843 in) test range.
- (3) Using CALIBRATION BLOCK (V2(K2)) as illustrated in [FIGURE 53-30-01-991-003](#), couple the SEARCH UNIT (SMWB70-6) as shown in Detail A.
- (4) Adjust the search unit position to get the maximum reference signal on the instrument screen.
- (5) Adjust the instrument sweep and range controls to position the first and second backwall echoes (BEs) at 1.0 and 4.0 on the instrument screen time base, as illust B.

Instrument Adjustment

- (6) Select 50 mm
 - (7) Position the fi base, as illust
 - (8) Reverse the d
 - (9) Optimize the screen time b
- (1) Set the frequency to 5 MHz.
 - (2) Set the delay to zero.
 - (3) Set the range to 100 mm (3.937 in).
 - (4) Set the velocity to 3.1 mm/μs.
 - (5) Connect the SEARCH UNIT (0508941 (WK45-5S)) to the instrument.
 - (6) Use the appropriate step as per [Table n° 3](#).

NOTE: The t
repre

Item	Inspection Area	Reference Block	Nominal Skin	Nominal Hole Dia
1	MLI attach holes near pump aper			
2	Water drain attachment holes at fuel pump			
3	Fuel pump attachment holes			

(7) Calibration for Item

- (a) Couple the SEARCH UNIT (99F5)

C. Instrument Adjustment

- (1) Operate the equipment in accordance with the manufacturer's instructions.
- (2) Time-Base Calibration (See [FIGURE 55-30-00-991-005](#)).
 - (a) Select 15 mm (0.59 in) test range.
 - (b) Position the echo from the delay line at 0 scale division (SD) on the display screen time-base, and adjust the amplitude to 80% full screen height (FSH).
 - (c) Couple the SEARCH UNIT (MSWQC242-591) on the 1 mm (0.039 in) thick plate of CALIBRATION BLOCK SET (99D51407291001) (multidirectional fabric), adjust the amplitude to 80% FSH and position it to 0.66 SD on the display screen time-base, as shown in Position A.
 - (d) Couple the SEARCH UNIT (MSWQC242-591) on the 9 mm (0.354 in) thick plate of CALIBRATION BLOCK SET (99D51407291001) (multidirectional fabric), adjust the back-wall echo to 80% FSH and position it to 6 SD, as shown in Position B.
 - (e) Confirm time-base linearity with 5 mm (0.195 in) thick calibration block.

NOTE: The sensitivity adjustment is done at the inspection area on the vertical stabilizer (See [SUBTASK 273-001](#)).

- (3) Adjustment and Evaluation Curves (See [FIGURE 55-30-00-991-006](#)).

NOTE: Electronic DAC should not be used.

- (a) Adjustment Curve and Evaluation Curve

NOTE: Draw the curves on a transparent self-adhesive foil placed on the face of the instrument screen.

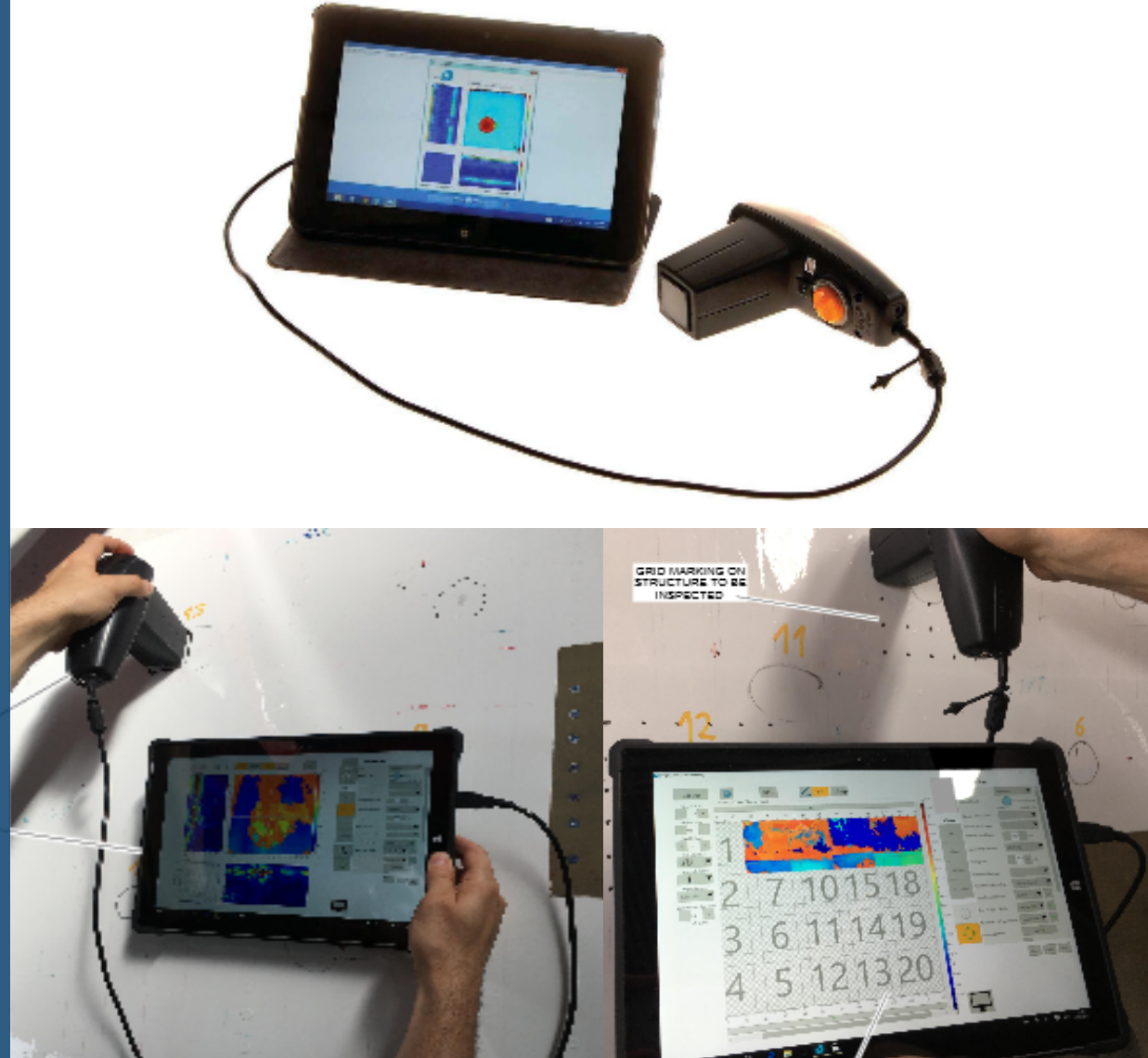
- 1 Draw the adjustment curve and the evaluation curve as shown in

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Included 2D compact PAUT systems
(for damage assessment)

(This example is from A350 ANDT 51-54-45)



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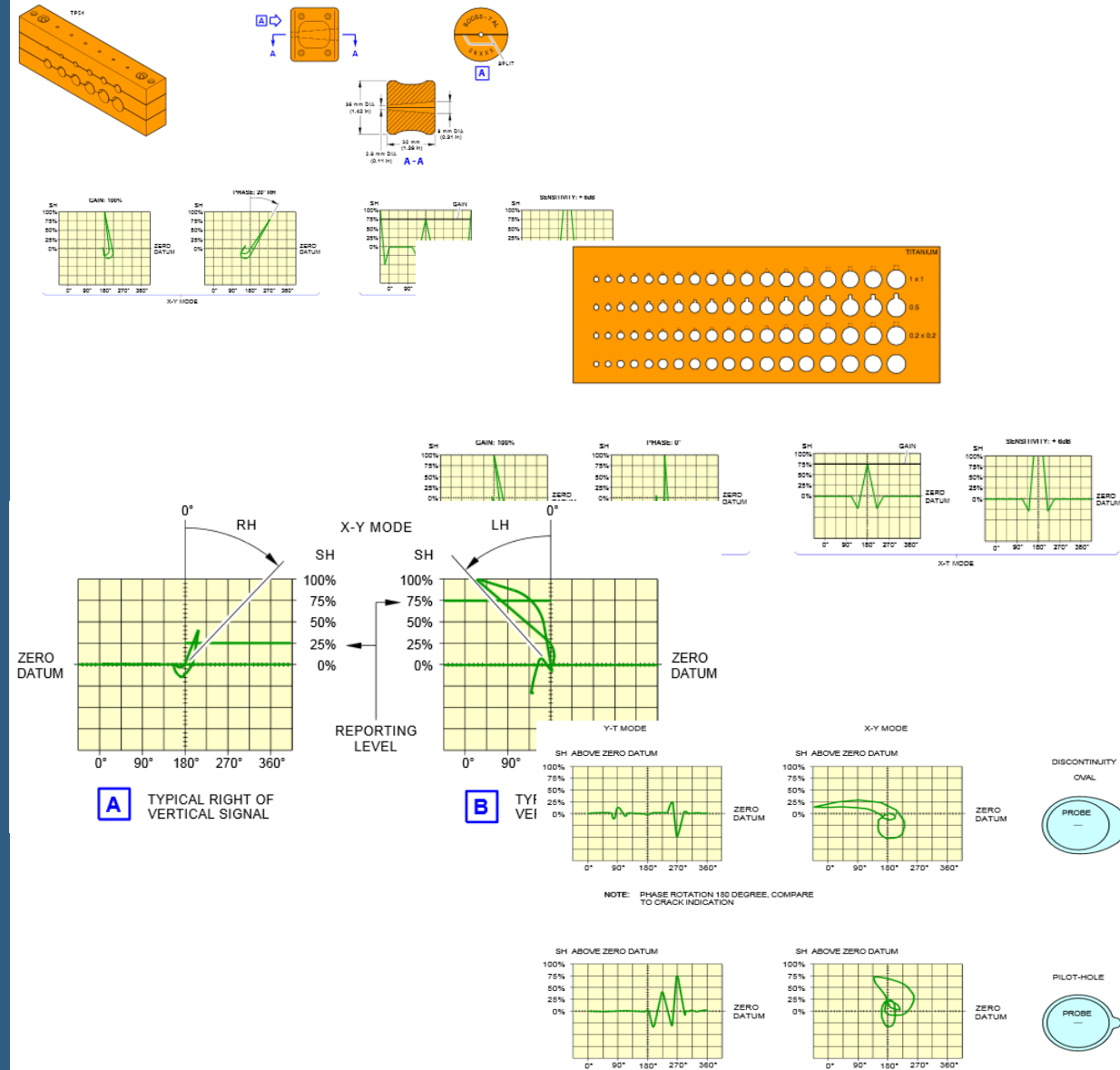


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Rototest NTM 51-10-01

Existing procedure to be revised to provide clearer examples (photo's) of possible indications

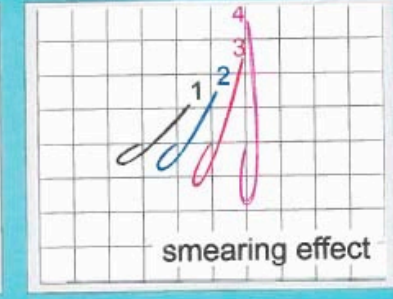
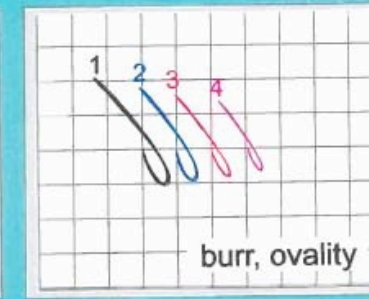
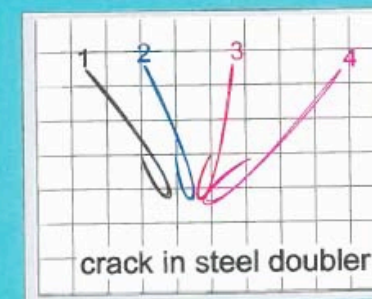
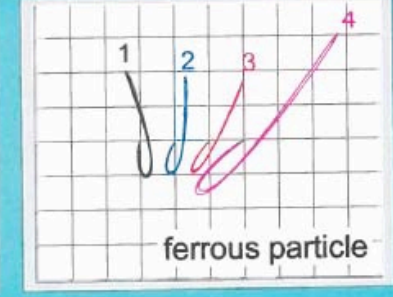
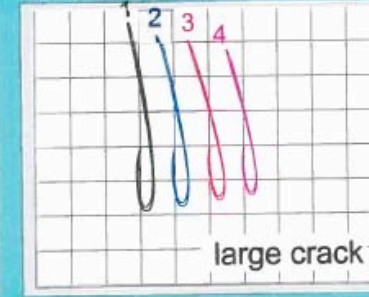
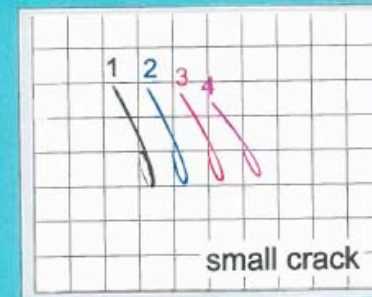
New procedure for after repair/re-work



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Rototest NTM 51-10-01:

Multi-frequency rototest.



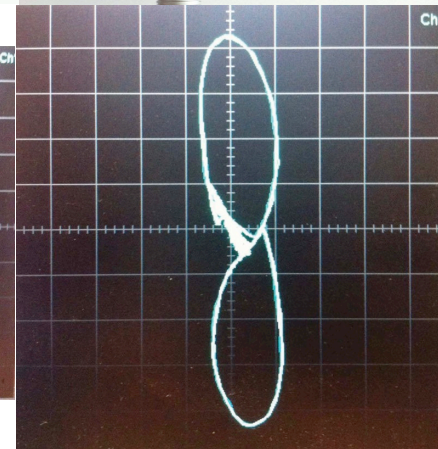
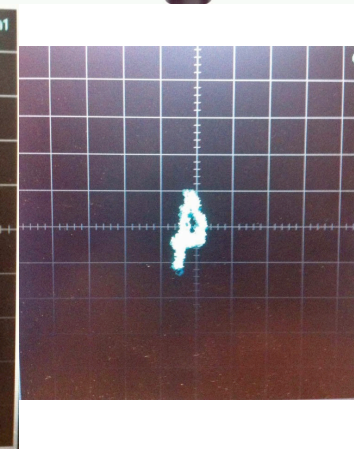
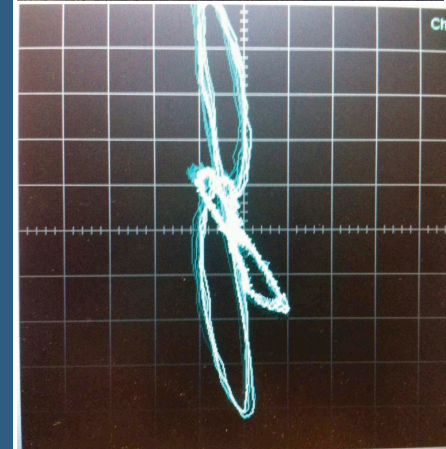
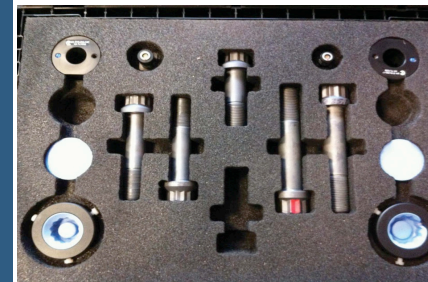
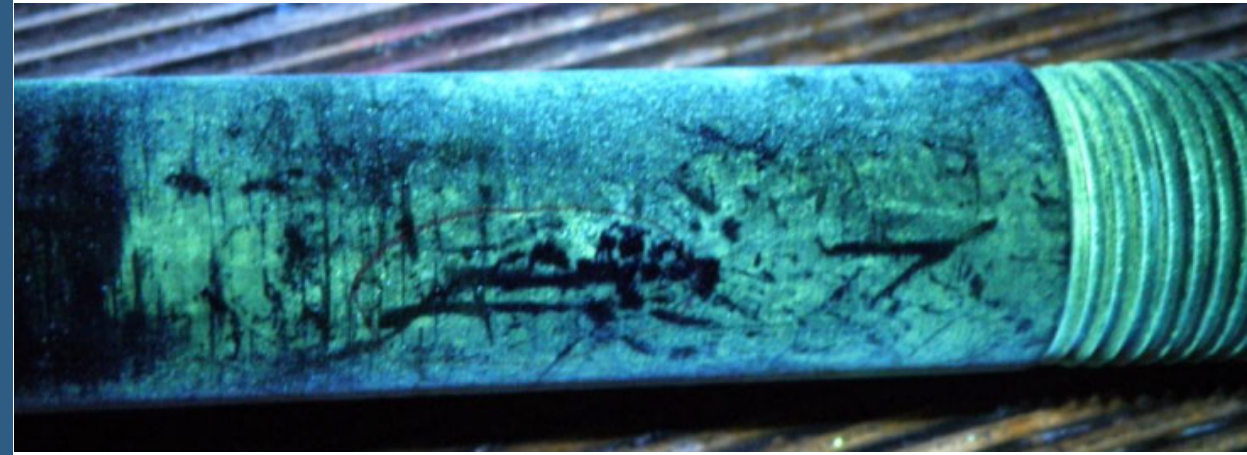
1: 400 kHz 2: 133 kHz 3: 67 kHz 4: 22 kHz

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Rototest NTM 51-10-01:

“Reverse Rototest” to replace FPI

A320 54-53-90
&
A380 54-51-12
(TFU 71.00.00.056_17)



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CONCLUSION!

A step ahead to new technologies

Airbus is continuously looking for **innovation and improvement in NDT technics and tooling** to always support our customers in Aircraft Maintenance activity.

Your feedback remains key for our progress.

Airbus customer support remains at your disposal for:

- Daily Technical Request
- On-site assistance
- Engineering Workshops

Thank you