



AM e Leonardo are inviting you to a new challenge

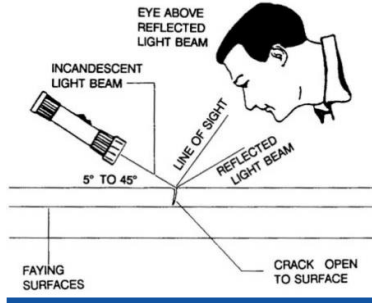
AIR  
— tificial  
Intelligence

# AIRtificial Intelligence Challenge

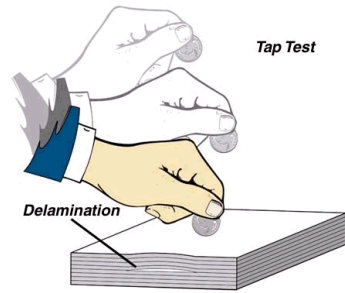


30 Ottobre 2019

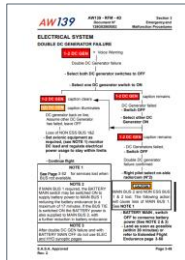
# Use Case per la Challenge



Ispezioni visive delle superfici dell'aeromobile.



Test diagnostici utilizzando tecniche non distruttive come il tap test (battitura) per il rilevamento di difetti interni.



Supporto alle procedure di manutenzione e ricerca guasti.

# Use Case 1: Visual Inspection

Per individuare parti danneggiate sulla fusoliera o sulle ali/pale dell'aeromobile il manutentore effettua una ispezione visiva della superficie. I danni riscontrati vengono riportati su un apposito modulo (Repair Instruction Query) inviato agli esperti della ditta produttrice che indicheranno la procedura di riparazione più opportuna. La corretta compilazione del modulo è fondamentale per fornire agli esperti tutte le informazioni necessarie; il manutentore deve quindi descrivere chiaramente quello che vede, utilizzare la corretta terminologia ed allegare immagini opportunamente commentate.

Ai team viene richiesto lo sviluppo di un prototipo, utilizzabile da mobile device (Tablet o Smartphone), che interagendo con il manutentore in linguaggio naturale lo aiuti nella compilazione del modulo anche facendo riferimento allo storico già esistente. Si richiede anche l'utilizzo della camera del device a supporto dell'ispezione visiva, ad esempio segnalando quando la superficie da esaminare presenta anomalie che possono sfuggire ad occhio nudo.

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(13) Mark the damaged area directly on the H/C (ref. information Letter)  
 (14) Insert a picture with the entire damaged area and indicate position references (FWD, AFT, LH, RH).  
 (15) Mark the damaged area directly on the H/C using a pencil or a marker to highlight the contour of the damaged area. Indicate the size of the damage reporting STA, BL, WL, the start and end points. Do not insert pictures with ruler placed on damaged area to show the approximate size. It is preferred to take the measurement, then bring back on the photo.  
 (16) Insert the picture in the corresponding boxes. Use a tool (suggested "stripping tool") as stamp to insert the picture (ref. information Letter).



# Use Case 1: Visual Inspection

**REPAIR INSTRUCTION QUERY**

AgustaWestland Products

Ref. TQ No  RESET FORM

**1. CUSTOMER INFORMATION**

Customer/Operator

Client Reference PoC

Contacts (e-mail/tel.)

Date

**2. HELICOPTER DATA**

H/C Model  S/N

F/H  Landing/Cycles

H/C Status  Specify

Civil  Military

**3. PLANNING INFORMATION**

Maintenance Capability

Repair Desired Delivery Date

Next Scheduled Maintenance

**4. DAMAGE ASSESSMENT**

Type of Damage  and

Exact Damage Position

STA  Damage Dimension

WL  Length  u.m.

BL  LH  RH  Width  [mm]

Depth

Main Damaged P/N

Description  and

S/N  and

F/H  or  and  or

Damage Description:

Some corrosion damage was found on Cabin floor panel(AFT Section). One of the corrosion is may be large damage, we think we should perform to repair by doubler. Because, that corrosion damage is slightly, but that damage contain peeling caused by may be corrosion.

Please tell us doubler repair procedure or some repair method.

Note: Fill out this form for each damaged P/N. If the damage covers adjacent P/Ns, fill a single form.

**5. OTHER DETAILS**

Repair already accomplished at same area (ASRP, SK, DWG, STC, etc.):

Attachment YES  NO

Repair suggested (ASRP, SK, DWG, etc.):

STC (Supplement Type Certificate)

(1) Select the applicable helicopter from the provided possibilities.

(2) Provide the helicopter's Manufacturer Serial Number.

(3) Provide the helicopter's Flight Hours at the time of discovery of the damage. For F/H format, use a decimal number.

(4) Provide the helicopter's Landings/Cycles at the time of discovery of the damage.

(5) Select the status of the helicopter at the time of discovery of the damage from the provided possibilities.

(6) Choose, from those provided, the Agency/Authority under which the helicopter is registered.

(7) Select the damage type from the dropdown list. Refer to applicable IETP.

(8) In case of multiple damages on same P/N, select the second damage from the dropdown list. Refer to applicable IETP.

(9) Select the unit measurement.

(10) If it is known, specify the damaged P/N or next higher assembly P/N. Refer to applicable IETP.

(11) If applicable, provide the damaged P/N/Serial Number (e.g. "Tail Boom S/N").

(12) If applicable, provide the damaged P/N Flight Hours at the time of discovery of the damage. For F/H format, use a decimal number.

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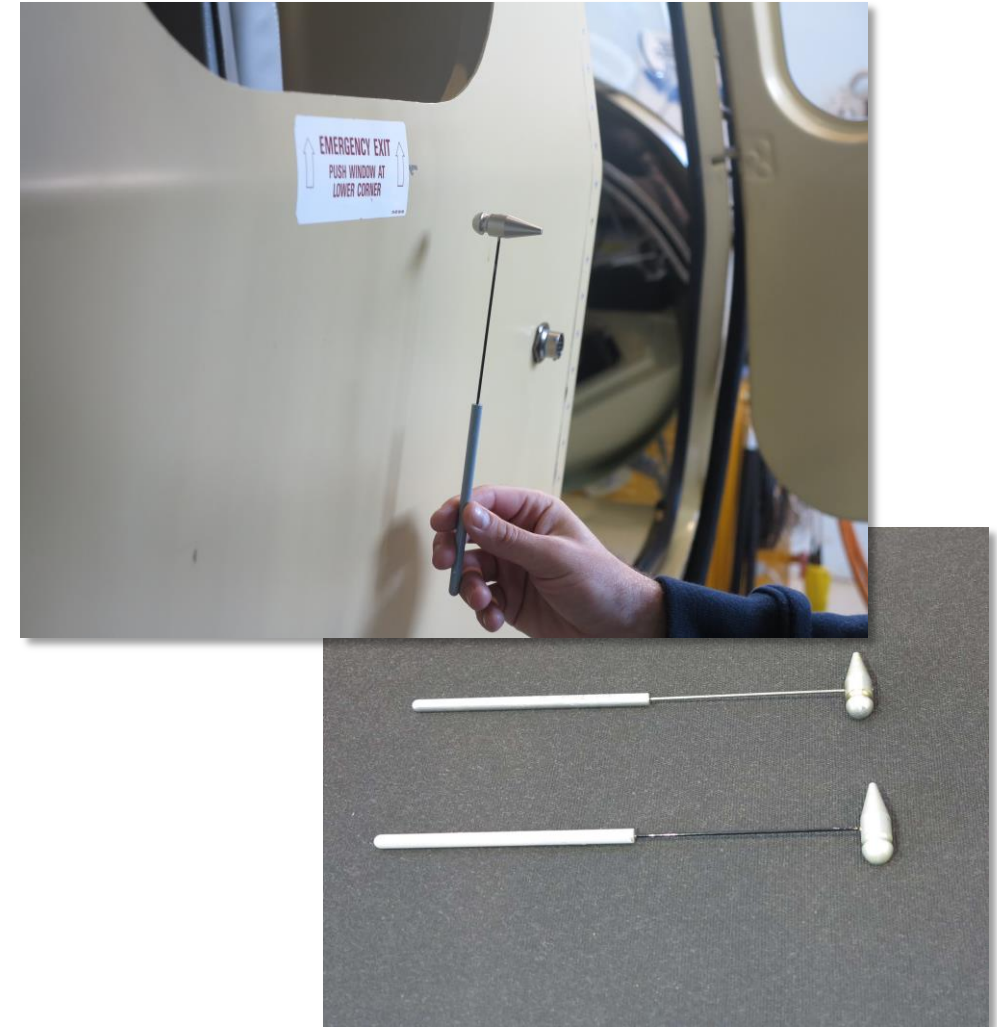
COMMON STRUCTURAL REPAIR PUBLICATION – TECHNICAL DATA	
Description	
<b>1 Repair categories</b>	Definitions of LH repair instructions used in CSRP and ASRP are provided below.
<b>Negligible</b>	The negligible repair is addressed to a damage that may remain as is, or may require a simple repair procedure not necessarily contained in this manual. Usually they are performed applying maintenance good practice rules.
<b>Standard</b>	The Standard Repairs are not referred to a specific component or part number but have a wide application. They can be used in many areas or on many parts, taking into account limitations provided in CSRP, in ASRP and in the applicable Standard Repair procedures. Standard Repairs are listed in Section 51-70 of the present publication. Applicability limitations for Standard Repairs are helicopter-specific and are provided in the applicable helicopter ASRP.
<b>Specific</b>	The Specific Repairs are addressed to a component or part number or a families of component or parts even if with different part number but grouped for technical similarity, use, application and technologies. Specific Repairs are listed in the helicopter ASRP.
<b>Dedicated</b>	The Dedicated Repair instruction is designed by Leonardo Helicopters on a case-by-case basis. The repair instruction is based on a complete damage description provided by the operator and is valid for one helicopter and/or a determined component/part only.
<b>2 Structure categories</b>	
The helicopter structure is classified in various categories according to the consequences to their failures to rotorcraft safety. For the purpose of this publication the structures, components or parts are classified as:	
Critical Parts	
Principal Structural Elements	

WORK CARD SOURCE DATA N.	1	REV N.		HELICOPTER TYPE	
DATE	2019-10-11	REV DATE			
TITLE					MARK
MAINTENANCE SERVICE TECHNICAL SUPPORT					
APPROVAL					Worksheet Reference:
REFERENCE MANUAL					Work Package Reference:
A) AW139 IETP	ISSUE N.	34th Issue	ISSUE DATE	2019-05-26	Note:
B) AMP	ISSUE N.	002	ISSUE DATE	2018-06-19	
OPERATIONS DESCRIPTION			SIGNATURE & A&P N.	DATE	WORK REQUIRED (YES/NO)
<b>Tail section - Bonded skin panels - Detailed inspection</b>					
<b>Table of contents</b>					
References					
Preliminary Requirements					
Procedure					
Requirements After Job Completion					
<b>List of tables</b>					
1 References					
2 Access points					
3 Zones					
4 Required Conditions					
5 Support Equipment					
6 Supplies					
7 Spares					
<b>List of figures</b>					
1 Tail section - Bonded skin panels - Detailed inspection (Sheet 1 of 6)					
1 Tail section - Bonded skin panels - Detailed inspection (Sheet 2 of 6)					
1 Tail section - Bonded skin panels - Detailed inspection (Sheet 3 of 6)					
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## Use Case 2: Tapping Test

*Tra i test diagnostici non distruttivi per individuare difetti presenti sotto la superficie della fusoliera o delle pale uno dei più importante è il Tapping Test. Il manutentore, utilizzando un apposito martelletto di alluminio, percuote la superficie da esaminare ed ascolta il suono che ne scaturisce, il cambiamento di tono o di frequenza indica un difetto sotto la superficie (scollamento, rotture, etc.) e al sua estensione. Per un corretto Tapping Test è fondamentale l'esperienza del manutentore nel percuotere la superficie (frequenza e forza dei colpi) ma soprattutto avere un orecchio allenato.*

*Ai team viene richiesto lo sviluppo di un prototipo, utilizzabile da mobile device (Tablet o Smartphone), che supporti il manutentore nell'effettuare il Tapping Test controllando l'azione di martellamento della superficie e che lo aiuti nell'interpretazione dei suoni prodotti (Virtual Ear).*



# Use Case 2: Tapping Test

WORK CARD SOURCE DATA N.	1	REV N.		HELICOPTER TYPE	
DATE	2019-10-11	REV DATE		MARK	
TITLE				Worksheet Reference:	
MAINTENANCE SERVICE TECHNICAL SUPPORT				Work Package Reference:	
APPROVAL				Note:	
REFERENCE MANUAL					
A) AW139 IETP	ISSUE N.	34th Issue	ISSUE DATE	2019-05-26	
B) AMP	ISSUE N.	002	ISSUE DATE	2018-06-19	
OPERATIONS DESCRIPTION		SIGNATURE & A&P N.	DATE	WORK REQUIRED (YES/NO)	
<b>Tail section - Bonded skin panels - Detailed inspection</b> Table of contents References Preliminary Requirements Procedure Requirements After Job Completion List of tables 1 References 2 Access points 3 Zones 4 Required Conditions 5 Support Equipment 6 Supplies 7 Spares List of figures 1 Tail section - Bonded skin panels - Detailed inspection (Sheet 1 of 6) 1 Tail section - Bonded skin panels - Detailed inspection (Sheet 2 of 6) 1 Tail section - Bonded skin panels - Detailed inspection (Sheet 3 of 6)					




Audio 1



Audio 2



Audio 3



# Use Case 3: Virtual Assistant

Le procedure di ricerca guasti e di manutenzione di un aeromobile sono attività complesse che vengono effettuate dai manutentori seguendo le istruzioni riportate in appositi manuali denominati IETP (Interactive Electronic Technical Publication).

Ai team viene richiesto lo sviluppo di prototipo di Assistente Virtuale che possa affiancare il Manutentore interagendo con lui in linguaggio naturale per facilitargli la comprensione dei compiti che deve svolgere e fornendo, quando necessario, opportuni suggerimenti scaturiti dalle Best Practice che il sistema è in grado di costruire trasformando l'esperienza del personale in conoscenza strutturata e codificata. La soluzione deve prevedere anche l'utilizzo in condizioni di scarsa connettività (off line).

WORK CARD SOURCE DATA N.	1	REV N.		HELICOPTER TYPE	
DATE	2019-10-22	REV DATE			
TITLE				MARK	
MAINTENANCE SERVICE TECHNICAL SUPPORT					
APPROVAL					
REFERENCE MANUAL					
A)AW139 IETP	ISSUE N.	34th Issue	ISSUE DATE	2019-05-26	
B)AMP	ISSUE N.	006	ISSUE DATE	2018-06-12	
OPERATIONS DESCRIPTION			SIGNATURE & A&P N.		
<b>Right main wheel - Remove procedure</b>					
Table of contents					
References					
Preliminary Requirements					
Procedure					
Requirements After Job Completion					
<b>List of tables</b>					
1 References					
2 Access points					
3 Zones					
4 Required Conditions					
5 Support Equipment					
6 Supplies					
7 Spares					
<b>List of figures</b>					

OPERATIONS DESCRIPTION	SIGNATURE & A&P N.	DATE	WORK REQUIRED (YES/NO)
SECTION Z-Z			
ICN 39-A-324104-G-00091-01439-A-031			

Figure 1 Right main wheel - Remove procedures





# Use Case 3: Virtual Assistant

AW139

AW139 - RFM - 4D  
Document N°  
139G0290X002

Section 2  
Normal Procedures

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**COCKPIT/ENGINE PRE-START CHECKS**

**SAFETY CHECKS**

1. Pedals and seats — Adjust.
2. Seat belt — Fasten and adjust.
3. Circuit breakers — All engaged.
4. ECL's — Confirm at FLIGHT.
5. All switches — OFF or closed.
6. ENG 1 and ENG 2 MODE switches — OFF.
7. ELT switch on instrument panel — Confirm ARM.
8. LDG GEAR lever — Confirm DOWN.
9. External Power Unit (if used) — Connect and switch ON.
10. Ground support personnel — Connected (if required).
11. BATTERY MASTER — ON.

**Note**

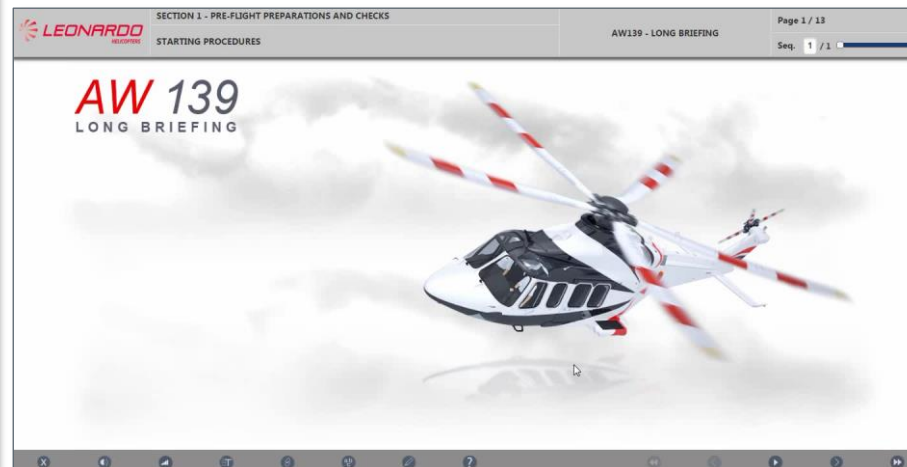
If External Power not available carry out checks marked with ♦ on BATTERY to conserve battery power. The remaining checks should be completed after the first engine start.

12. ♦ BATTERY MAIN and AUX — ON.
13. EXT PWR — ON (if required).
14. ♦ GEN 1 & 2 — ON.
15. ♦ BUS TIE — AUTO.
16. POSITION lights switch — Confirm functioning then leave as required.
17. ♦ ANTI-COLL lights switch — ON. (confirm functioning)

E.A.S.A. Approved  
Rev. 10

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WORK CARD SOURCE DATA N.	1	REV N.		HELIICOPTER TYPE	
DATE	2019-10-22	REV DATE			
TITLE				MARK	
MAINTENANCE SERVICE TECHNICAL SUPPORT					
APPROVAL				Worksheet Reference:	
REFERENCE MANUAL				Work Package Reference:	
A) AW139 IETP	ISSUE N. 34th Issue	ISSUE DATE	2019-05-26	Note:	
B) AMP	ISSUE N. 006	ISSUE DATE	2018-06-12		
OPERATIONS DESCRIPTION		SIGNATURE & A&P N.	DATE	WORK REQUIRED (YES/NO)	
<p><b>Right main wheel - Remove procedure</b></p> <p><b>Table of contents</b></p> <p>References</p> <p>Preliminary Requirements</p> <p>Procedure</p> <p>Requirements After Job Completion</p> <p><b>List of tables</b></p> <p>1 References</p> <p>2 Access points</p> <p>3 Zones</p> <p>4 Required Conditions</p> <p>5 Support Equipment</p> <p>6 Supplies</p> <p>7 Spares</p> <p><b>List of figures</b></p>					





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