EASA
European Aviation Safety Agency

Helicopter Offshore Safety in the north-sea

CASIAs Annual Meeting

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12 May 2015

Your safety is our mission.

UK CAA Safety review

- UK CAA initiated a review of 25 UK incidents & accidents between 1992 and 2013 in September 2013:
  - offshore public transport helicopter operations in support of the exploitation of oil and gas
- CAP 1145 was published on February 2014 .
- CAP 1243 was published on Jan 2015.

UK CAA report conclusions

- Actions & Recommendations :
  - Operations; Certification; Training; Maintenance; HF
  - Harmonisation of procedures
  - Information exchange & dissemination
  - Immediate actions to be taken by the UK CAA to improve the survivability of accidents.

Although the above actions are related to the UK CAA CAP 1145 report, EASA actions follow AIBs' SRs and also take advantage of information from their investigations.

UK CAA report conclusions

- Actions & Recommendations:
  - 32 addressed to UK CAA,
  - 16 addressed to the Industry,
  - 14 addressed to EASA.

- Note:
  - Initial Agency replies provided on 10 April 2014.
  - Seven replies were closing replies and seven contained actions that are in progress.
  - UK CAA is informed via interim replies whenever substantial progress is made.

Safety Action Project

- Addressing the Recommendations needs expertise needed on structure, gearbox, systems, Rulemaking and involve Safety promotion and Research, …
- New EASA internal process set-up to coordinate the Agency response across organisational boundaries
- Safety improvement actions covering:
  - Oversight,
  - Rulemaking,
  - Safety promotion.

Example of actions: Rulemaking

- Helicopter Accident Data Coding and Analysis Group (HADCAG)
  - Offshore Sub-Group created with Operators, Investigators, Manufacturers and EASA.
  - Initial analysis performed of 16 occurrences (9 Accidents, 7 Serious Incidents), 2009-2013
  - Test session for new Events Taxonomy

Example of actions: Rulemaking

- **Rule Making Task 0120**
  "Ditching Occupant Survivability"; development of enhanced design standards associated with helicopter ditching on water (changes to CS-27 & CS-29)

- **CRD-2013-10** (NPA 2013-10; RMT.0409 & RMT.0410)
  "Helicopter offshore operations" addresses safety risks identified and proposes changes to Commission Regulation (EU) No 965/2012 OPS.093(a)&(b))

Conclusions

- The Agency committed to support the UK CAA in improving UK offshore helicopter safety.
- The Recommendations were managed as Safety Recommendations and a new internal process was created.
- We will launch additional actions and a Research study to have a better picture of potential underlying systemic issues.

Helicopter Offshore Safety - Research

CASIAs Annual Meeting

12 May 2015

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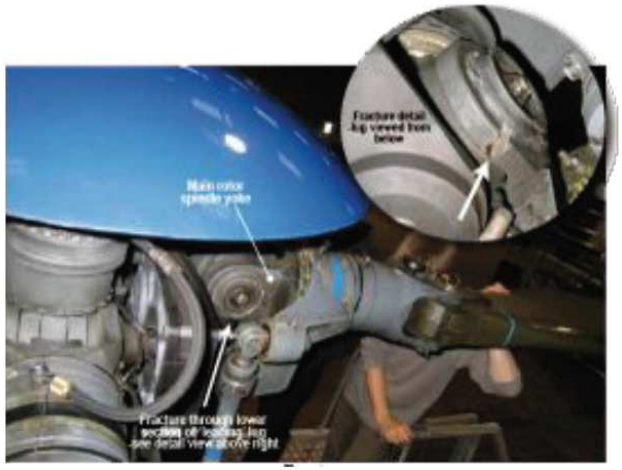
VHM

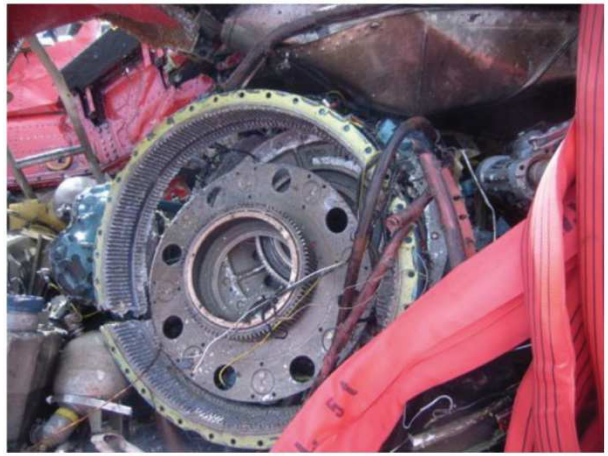
G-PUMI UNKG-2010-027

It is recommended that the European Aviation Safety Agency, with the assistance of the Civil Aviation Authority, conduct a review of options for extending the scope of Health and Usage monitoring Systems (HUMS) detection into the rotating systems of helicopters.



G-REDL UNKG-2011-041

It is recommended that the European Aviation Safety Agency research methods for improving the detection of component degradation in helicopter epicyclic planet gear bearings.



VHM

- Wireless strain sensor installed on the MH-60S pitch link

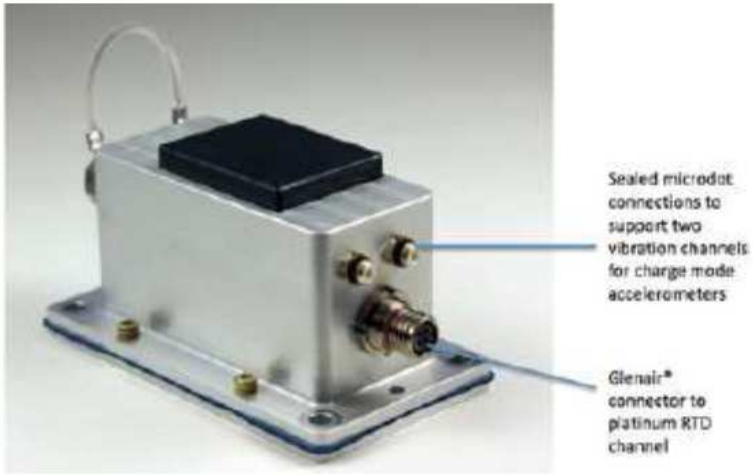
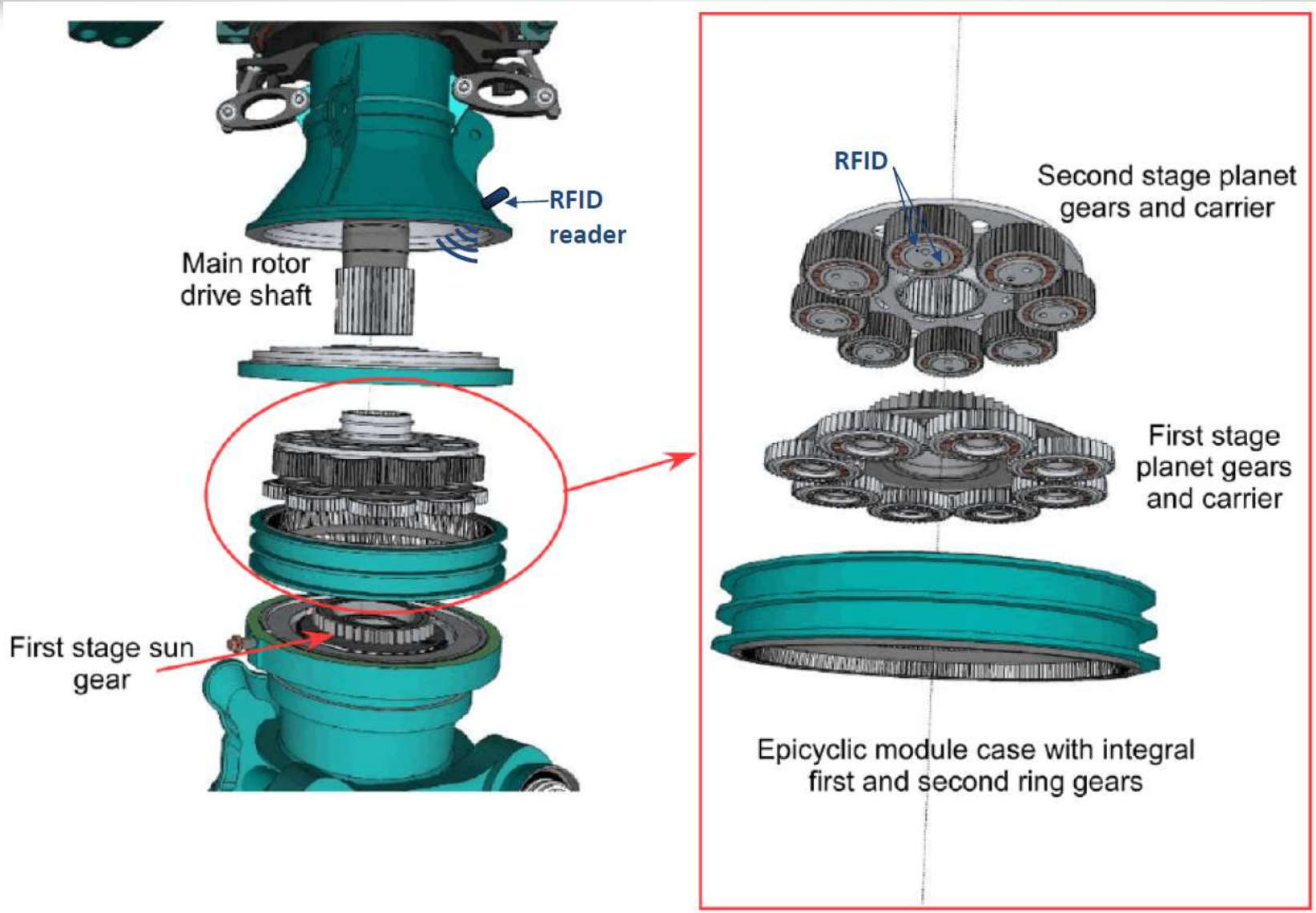


Figure 2. Energy-harvesting wireless sensor node for vibration and temperature monitoring.

- AgustaWestland RTVP

VHM

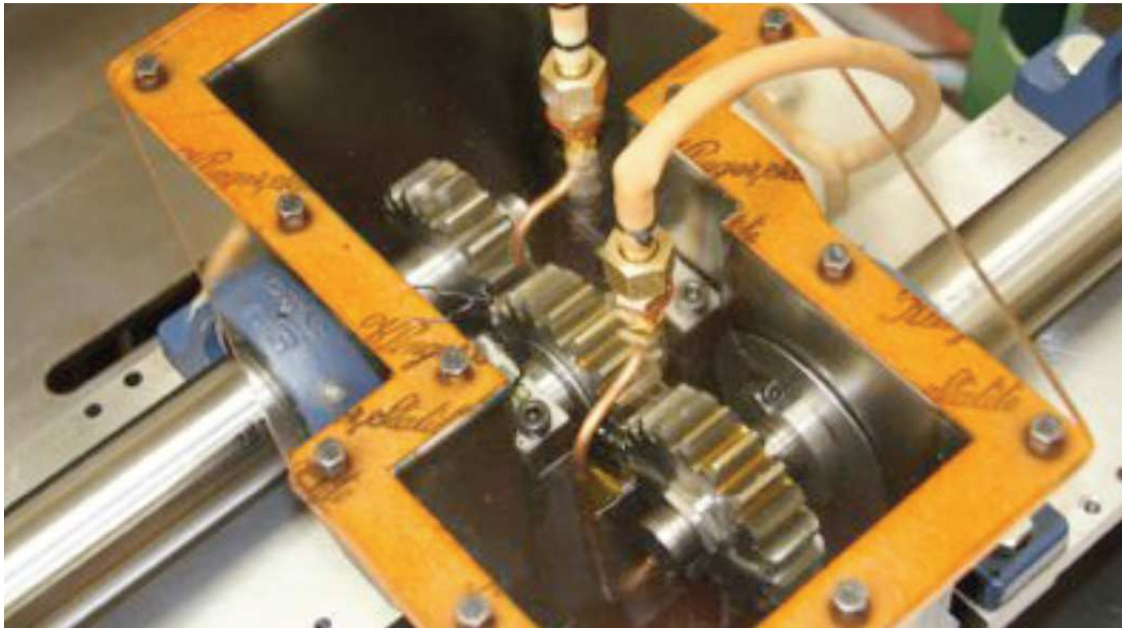

RFID
reader
Main rotor
drive shaft
First stage sun
gear
RFID
Second stage planet
gears and carrier
First stage
planet gears
and carrier
Epicyclic module case with integral
first and second ring gears

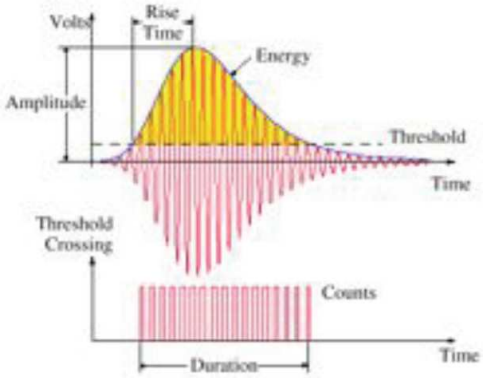
VHM

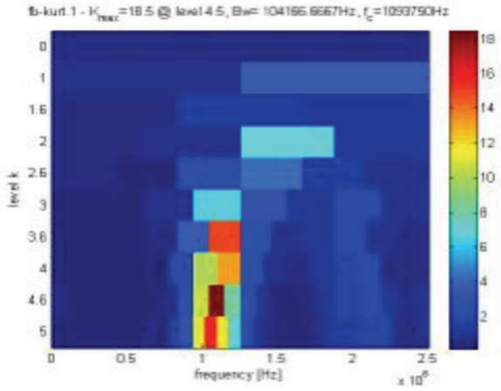
Challenges:

- Rotation
- Oil
- Faraday cage
- Large rotating metallic components
- Temperature
- Vibration levels
- Power transfer
- Space
- Risk of damage to MGB

VHM



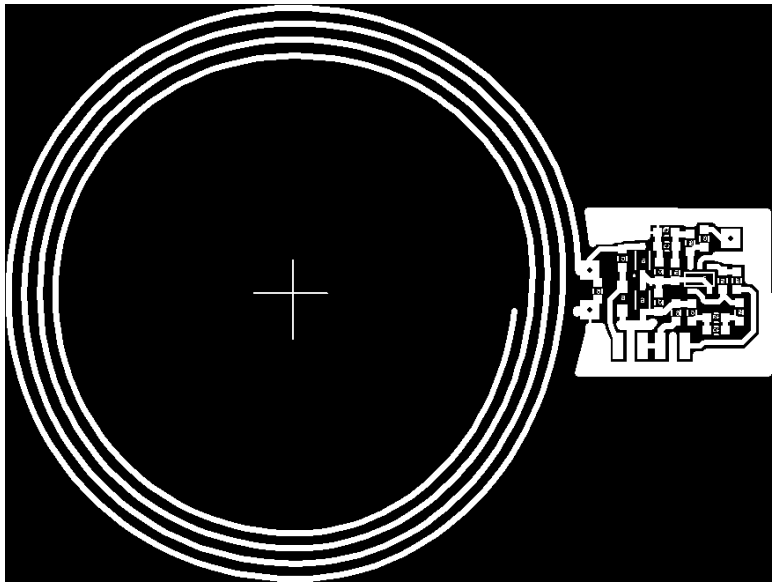




» Acoustic Emission sensor selected

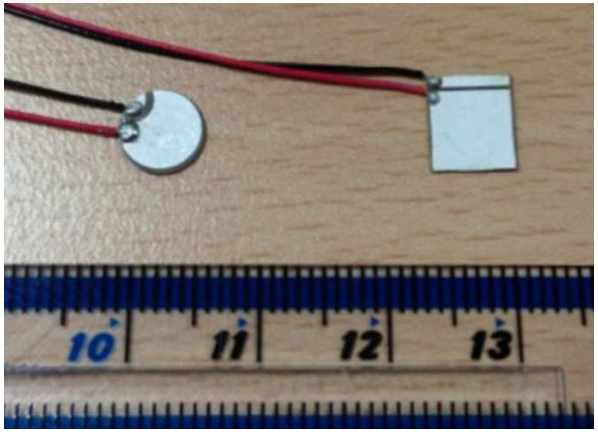
VHM

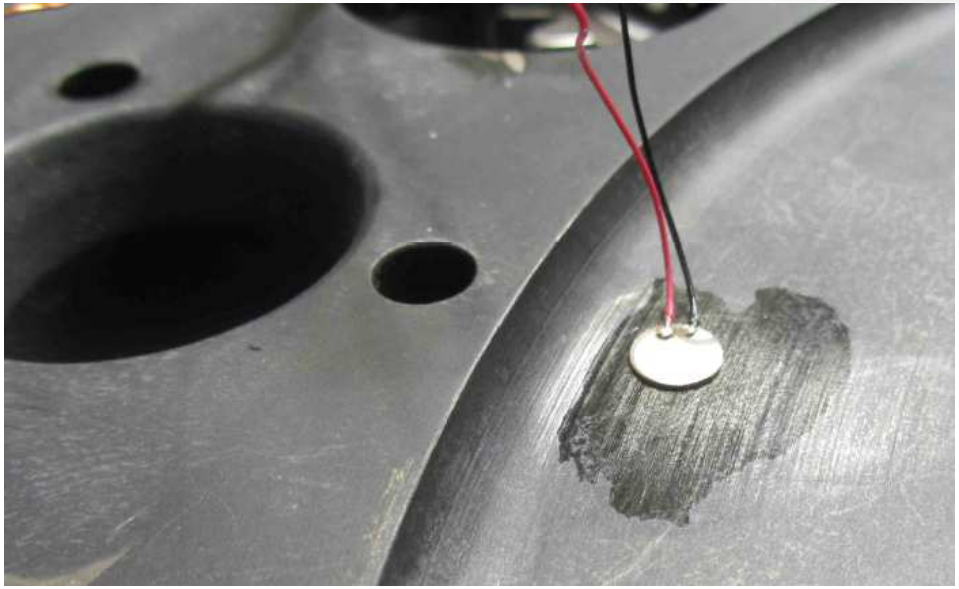
	WiFi	Bluetooth	ZigBee
Standard	IEEE 802.11	IEEE 802.15	IEEE 802.15
Max range	50-100m	10-100m	10-100m
Frequency	2.4 and 2.5 GHz	2.4 GHz	868 MHz Europe 900 - 928 MHz US 2.4 GHz World
Power consumption	High	Medium	Low
Max network speed	>11 Mbps	700 kbps – 1 Mbps	20 kbps - 250 kbps
Network join time		3 s	30 ms

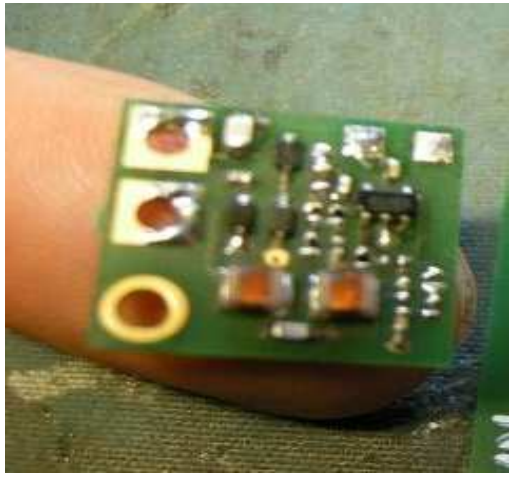


- **Homodyne receiver for RF power-scavenging and analogue wireless link**

VHM

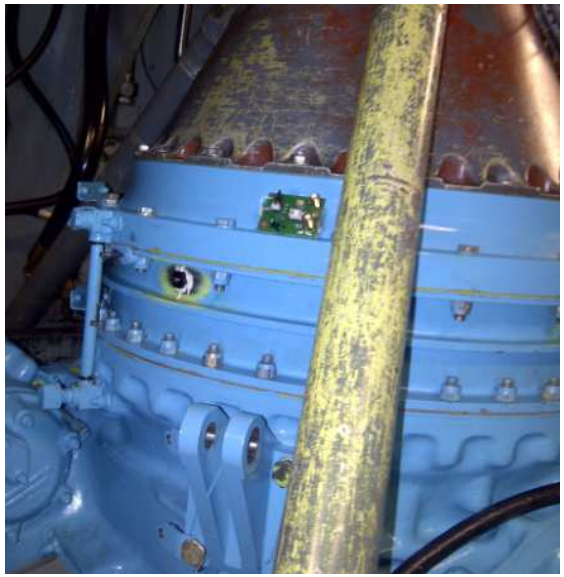


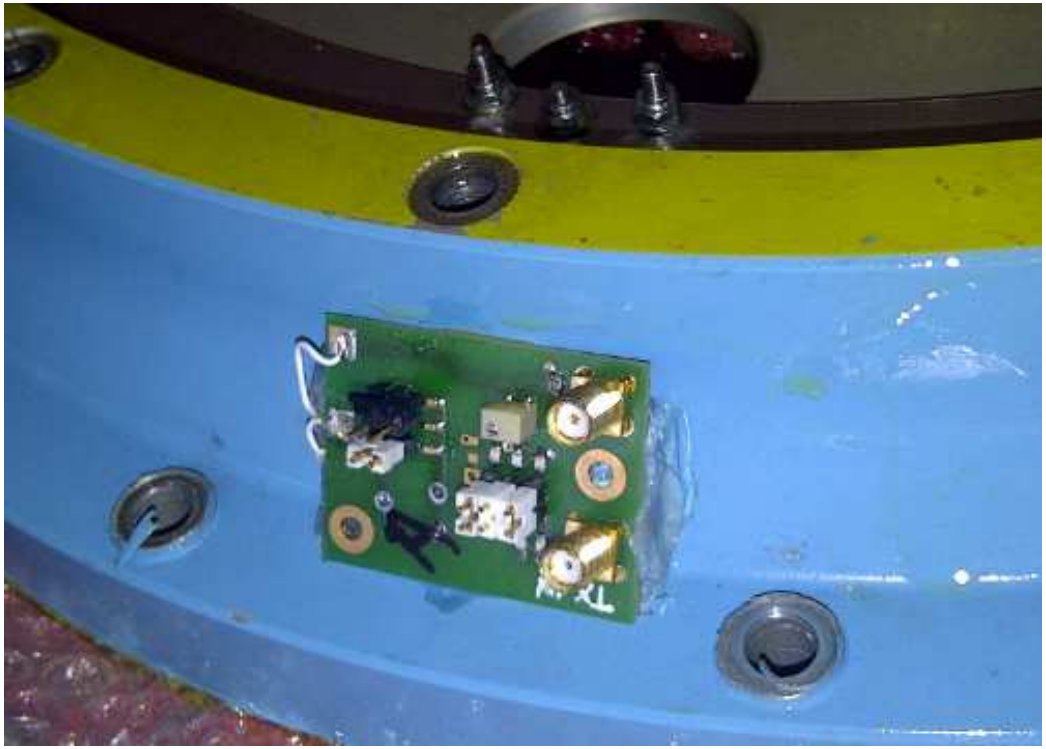




- **Acoustic Emission sensor installed**

VHM





VHM

- **HUMS**

VHM

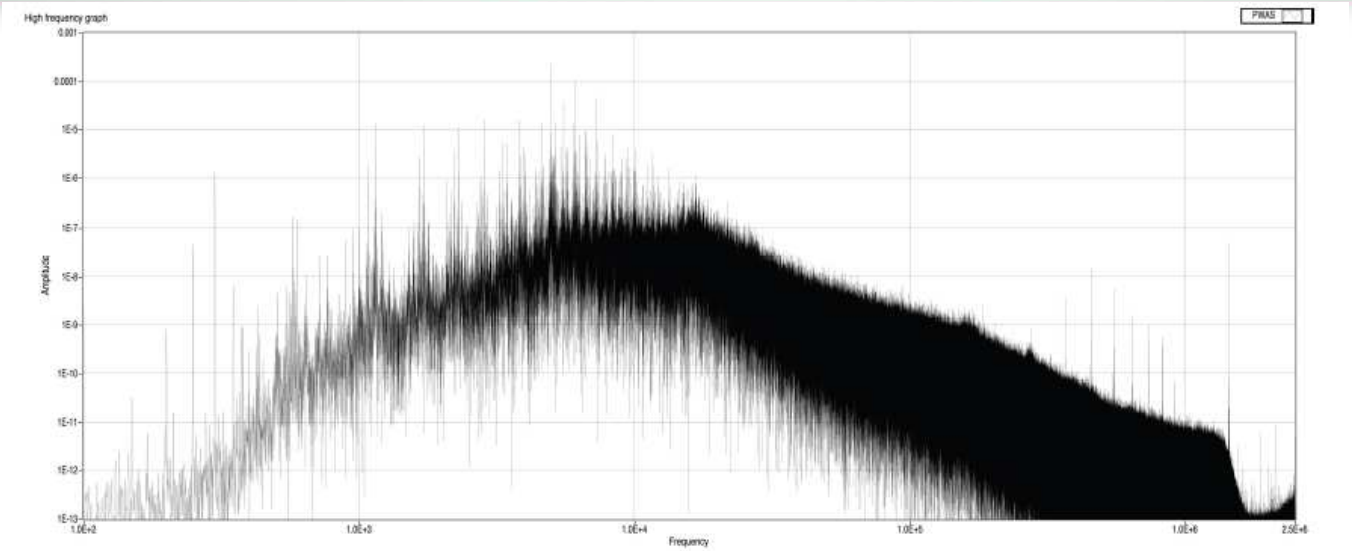
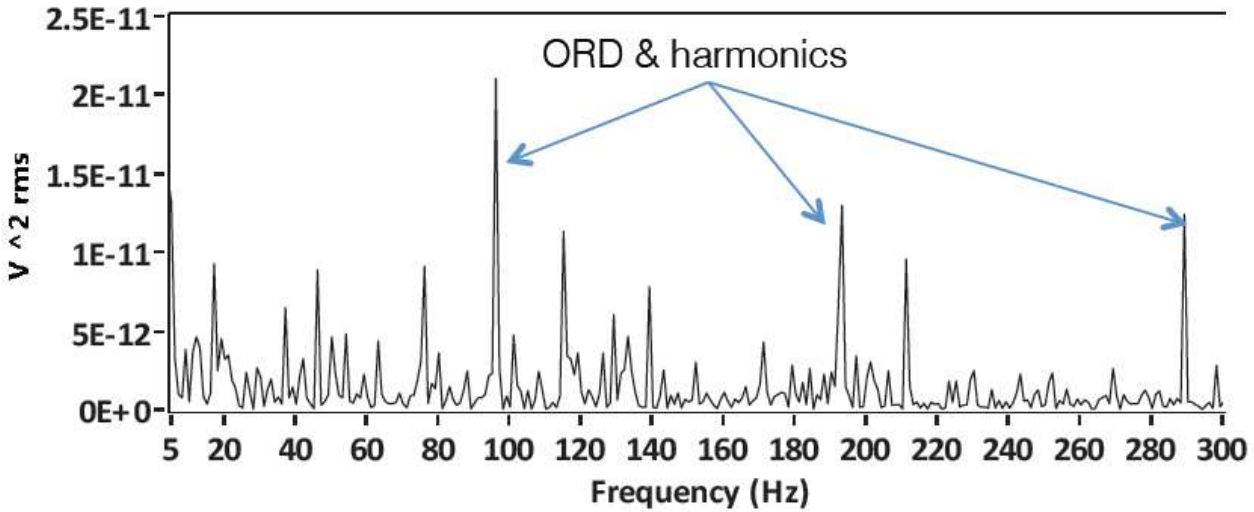
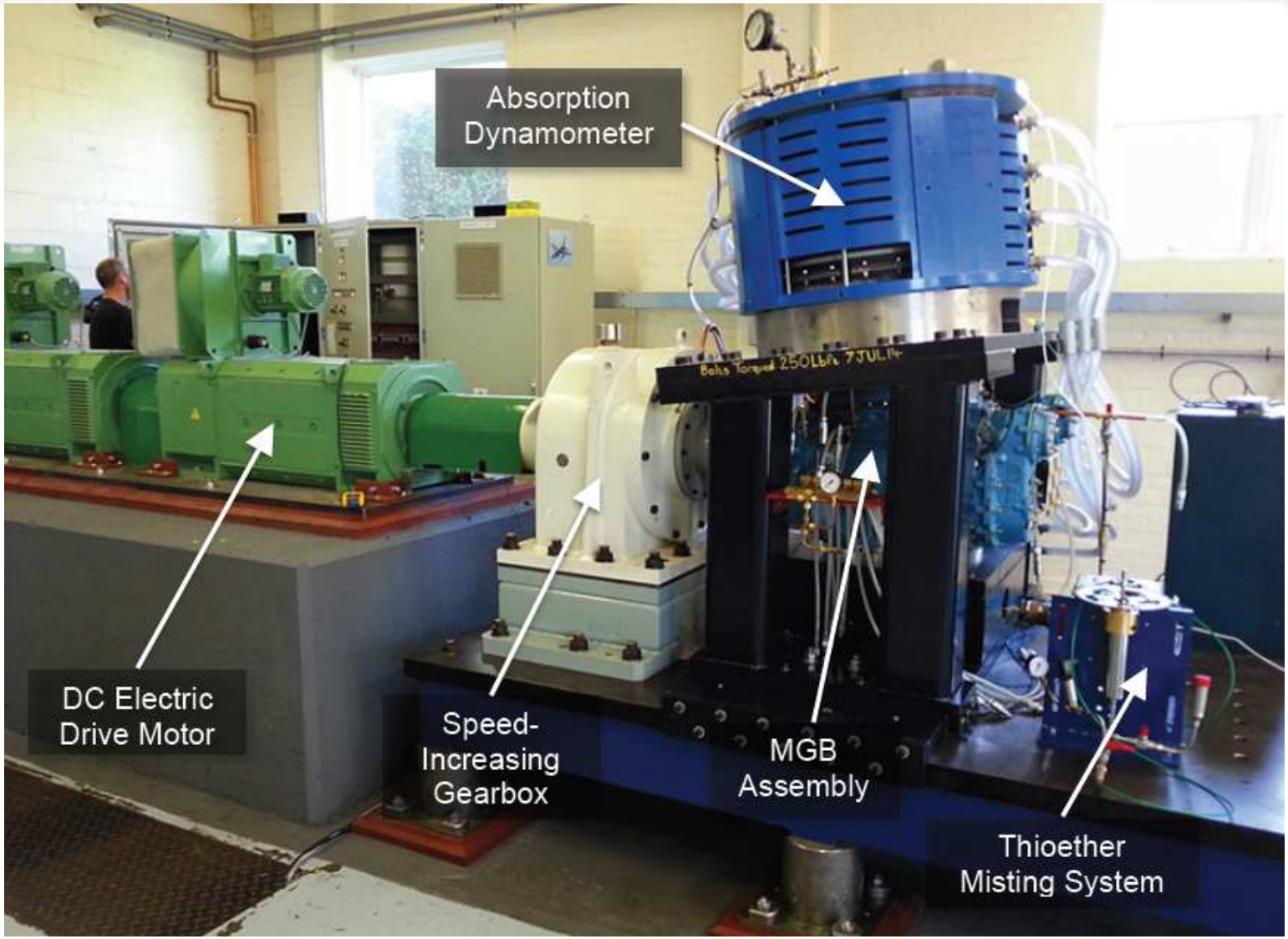


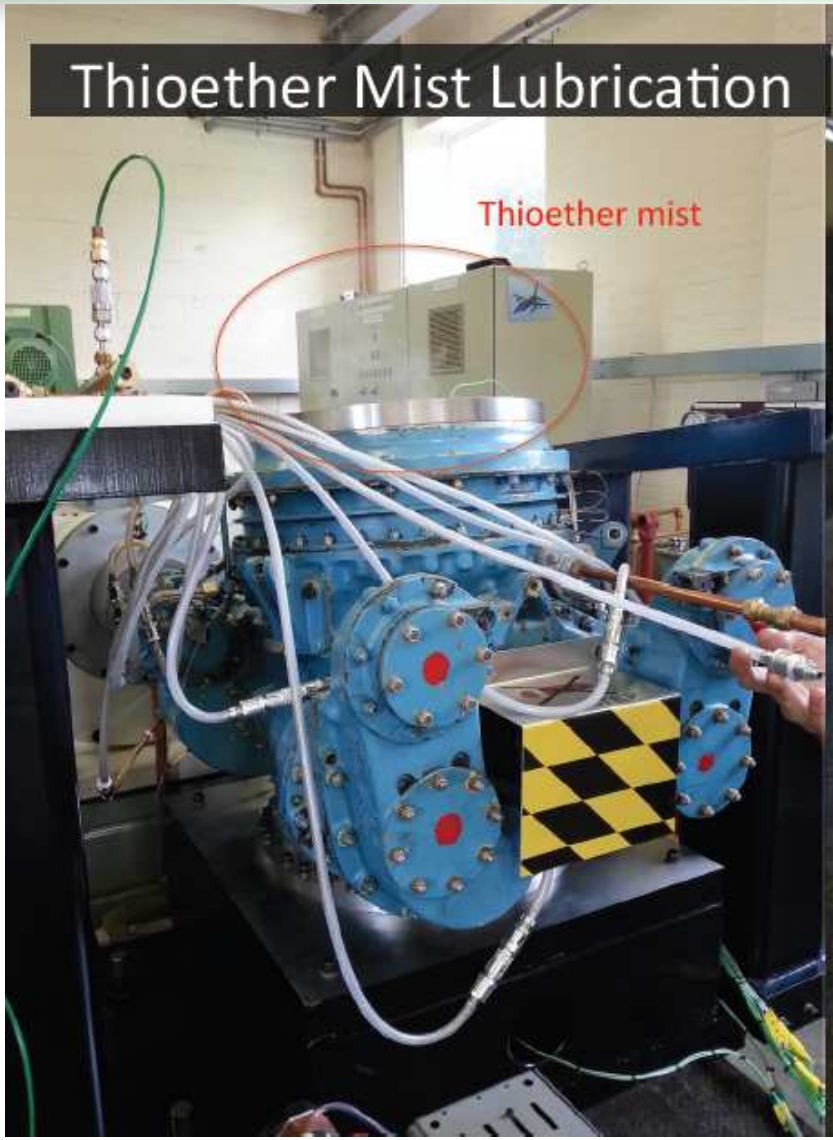
Figure 13. Frequency spectrum of PWAS signal



HELMGOP II


Absorption Dynamometer
DC Electric Drive Motor
Speed-Increasing Gearbox
MGB Assembly
Thioether Misting System

HELMGOP II


Thioether Mist Lubrication
Thioether mist


MCS-293
Polyphenyl Ether
by
SANTOLUBES
500 ml

HELMGOP II

Sensors Summary	
Description	Number
Thermocouple (washer form)	10
Thermocouple (sheath form)	10
Thermocouple (probe form)	8

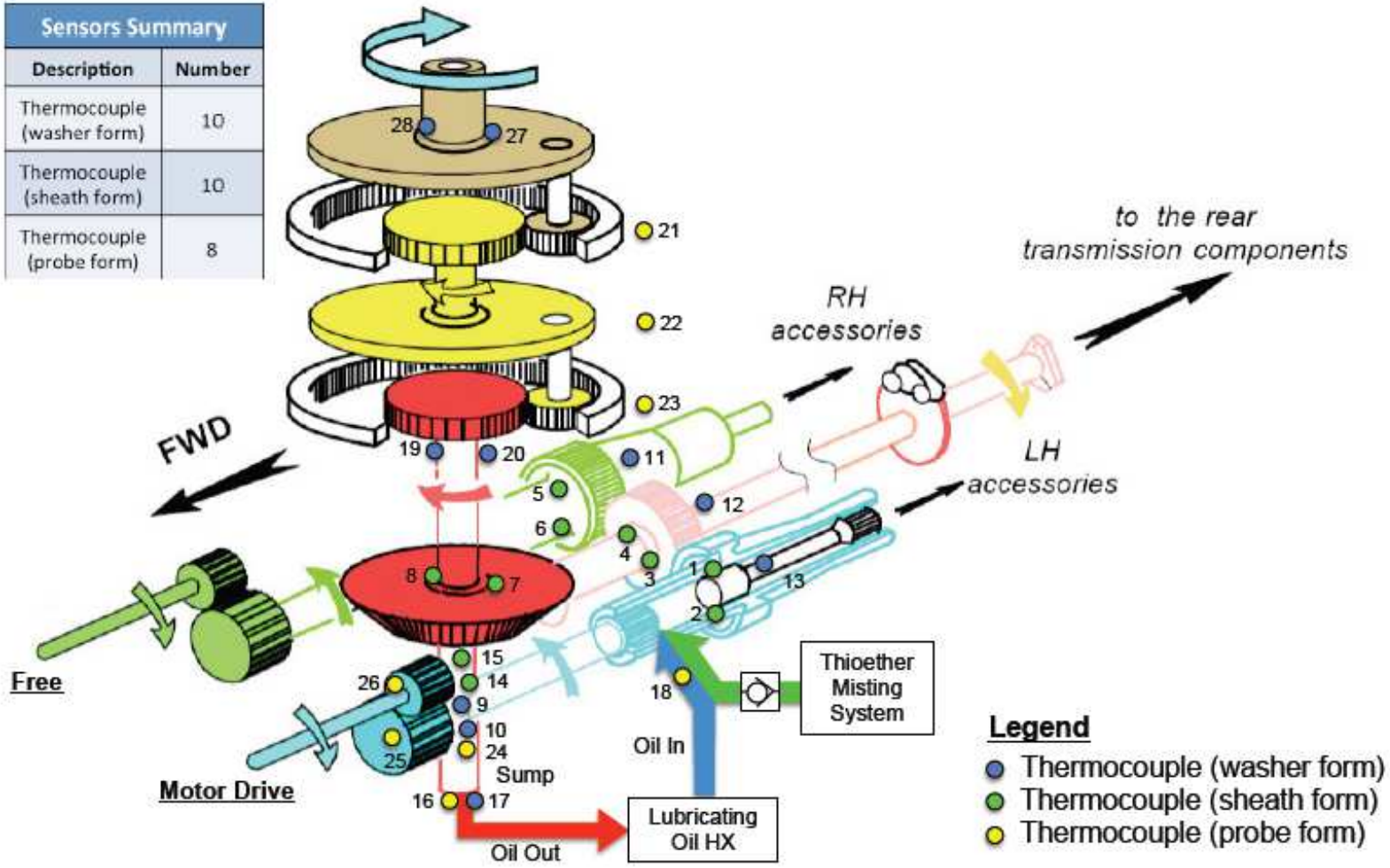


Figure B.62 Thermocouple Locations on MGB (Source: Helicopter Manufacturer and Author)

MGH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Agency organisation structure
Member states
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Recruitment
Procurement
24 SEP 2014
EASA.2014.OP.15
Helicopter main gearbox health (MGH)
Closed
Closing Date: 28/10/2014
Downloads
EASA.2014.OP.15 Procedural Documents
EASA.2014.OP.15 - Questions and answers

EASA Research Plan

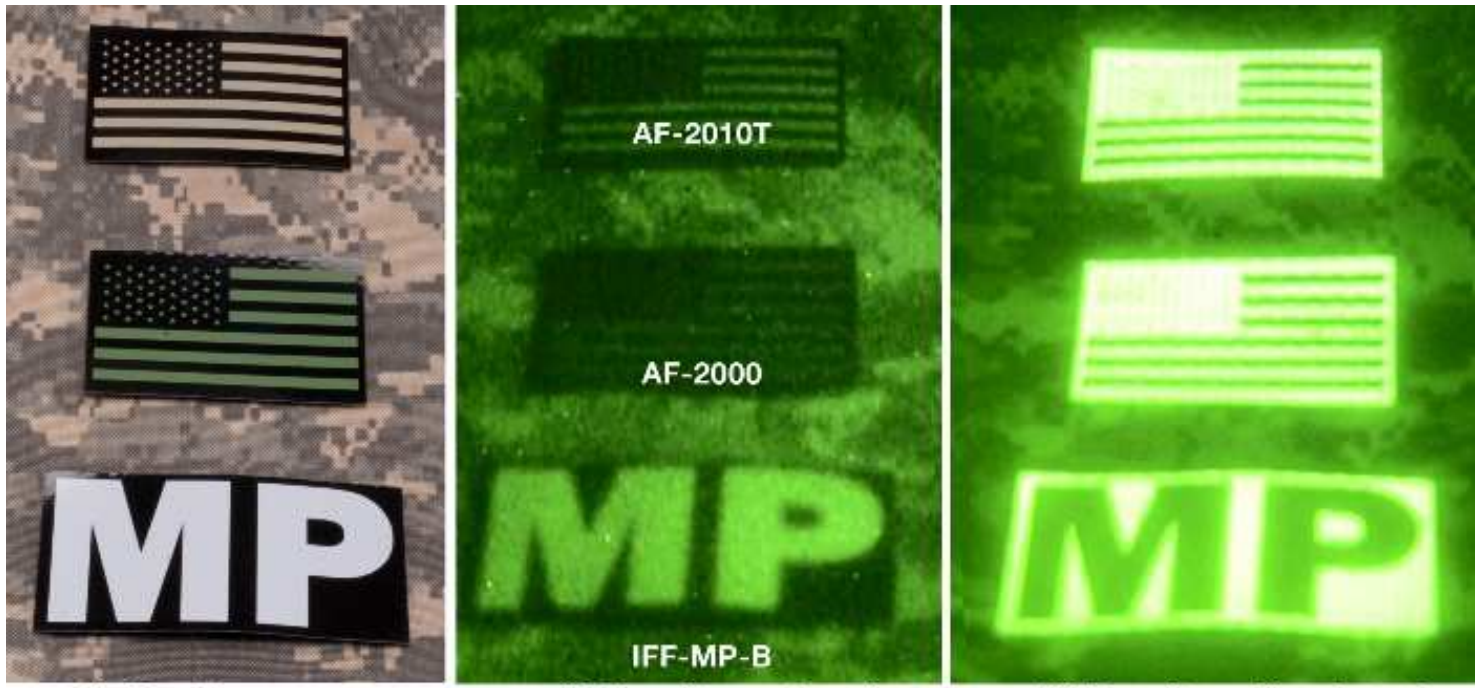
G-BLUN UNKG-2008-036

"It is possible that enhancing the infra-red reflectivity of the survival suit would provide the most beneficial results since most SAR helicopters use infra red sensors to assist the search;"

It is recommended that the European Aviation Safety Agency (EASA) investigate methods to increase the conspicuity of immersion suits worn by the flight crew, in order to improve the location of incapacitated survivors of a helicopter ditching.

EASA Research Plan

- **GLINT tape widely used by the US military to Identify Friend or Foe**



GloTape items seen normal view.

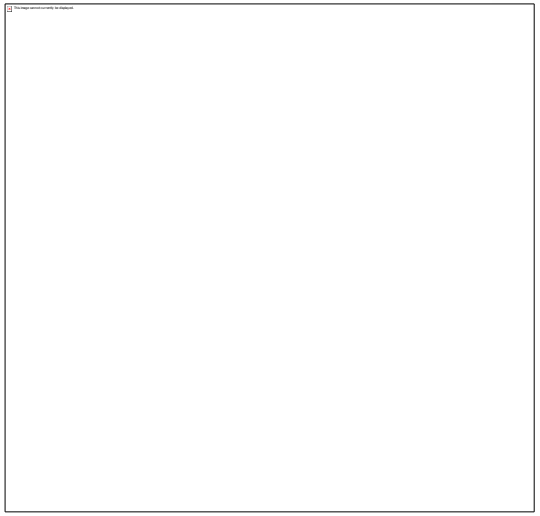
GloTape items viewed through ENVIS.

GloTape items illuminated viewed through ENVIS.

Source

EASA Research Plan

- **The tape does not reflect visible light thus it seems to be adapted to the cockpit environment**



EASA Research Plan

- **Search in IR only**

(and )

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European Aviation Safety Agency

Questions?

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