EASA managed projects

Helicopter Safety Research Management Committee

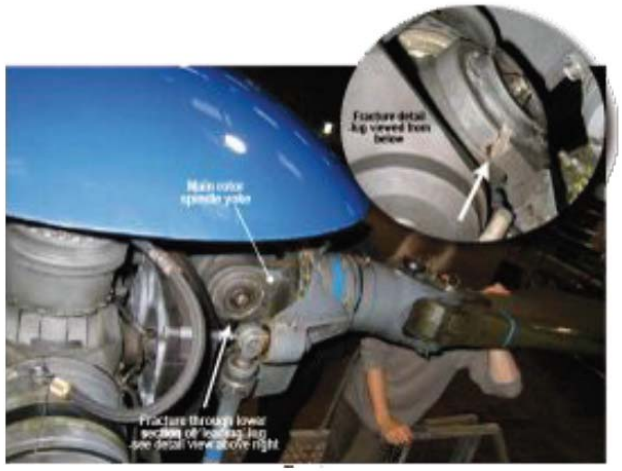
18 Nov 2014

Your safety is our mission.

VHM

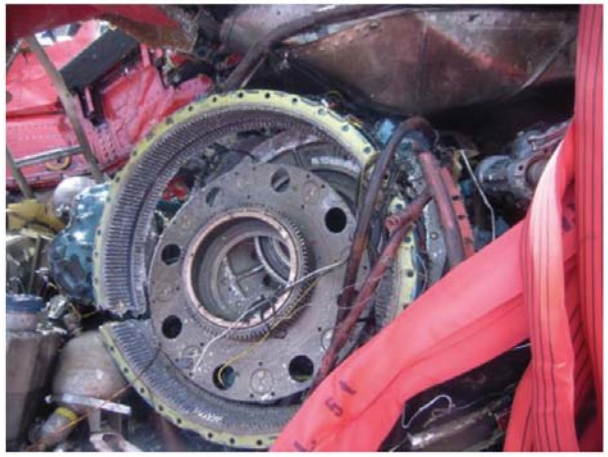
G-PUMI UNKG-2010-027

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.



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

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

- AgustaWestland RTVP

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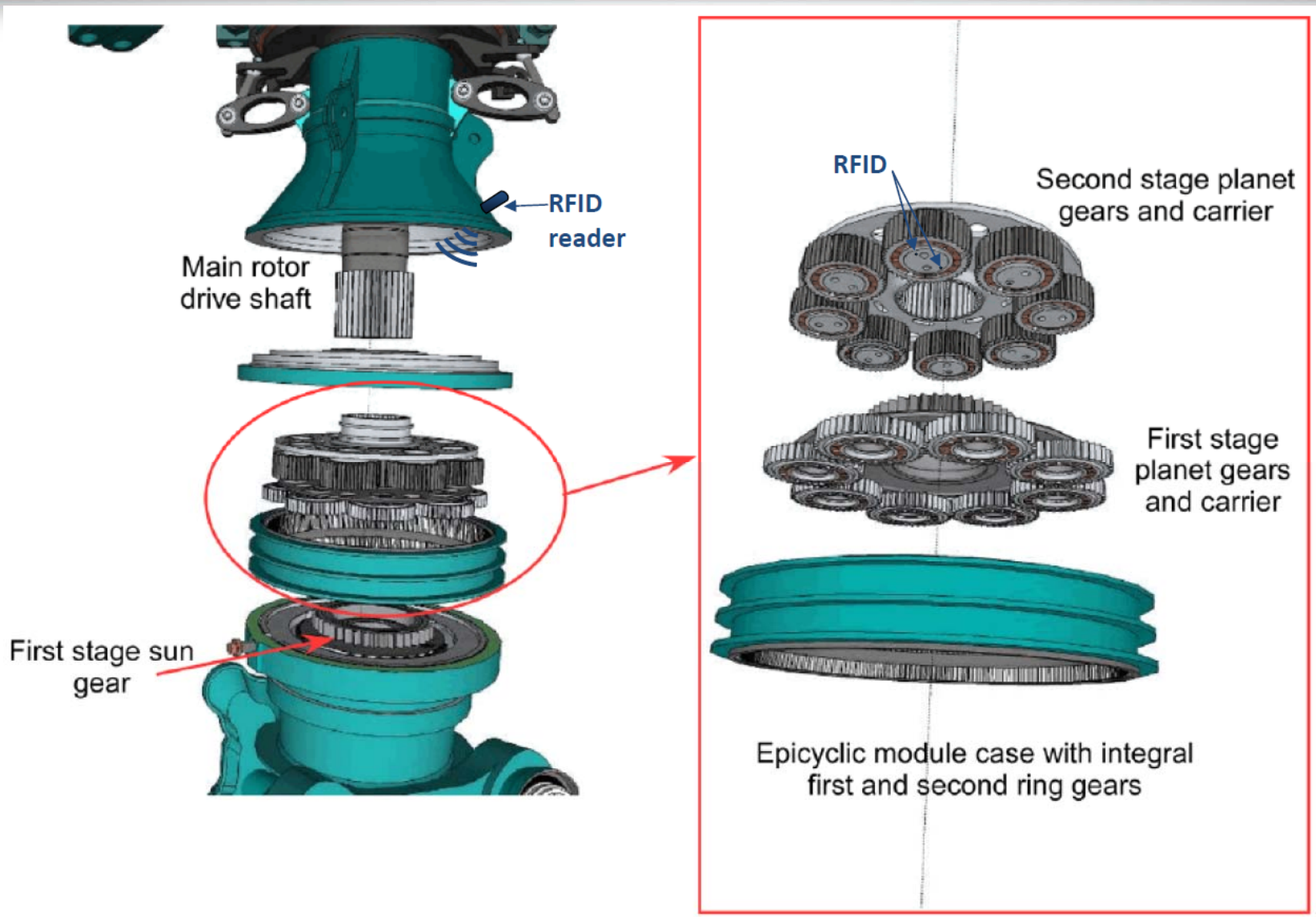
RFID
reader
Main rotor
drive shaft
First stage sun
gear
RFID
Second stage planet
gears and carrier
First stage
planet gears
and carrier
Epicyclic module case with integral
first and second ring gears

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Challenges:

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

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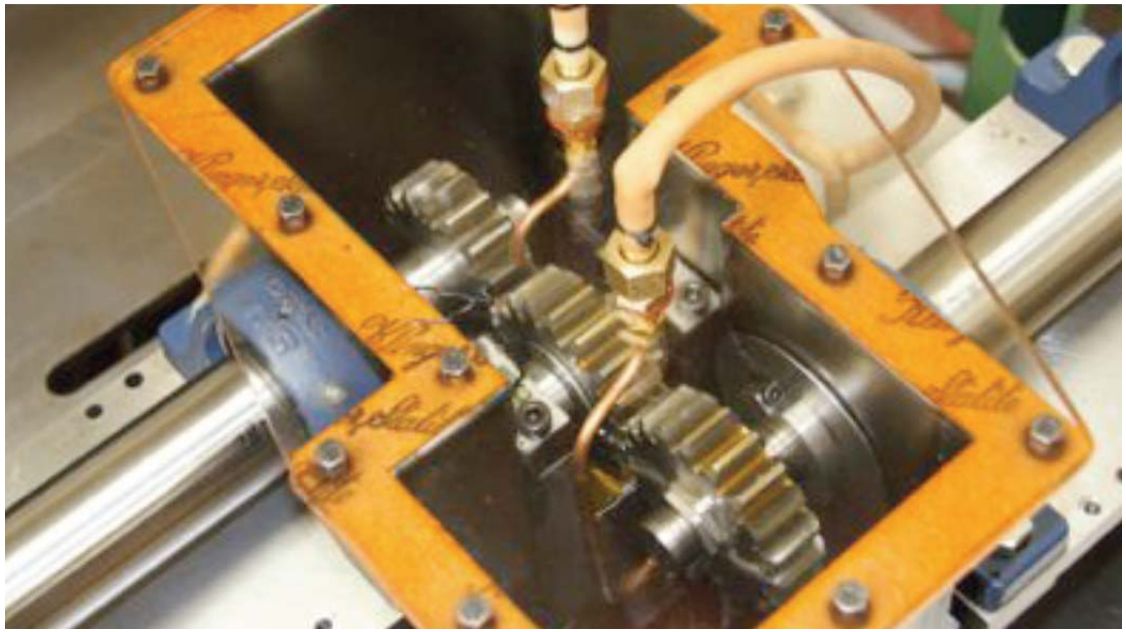

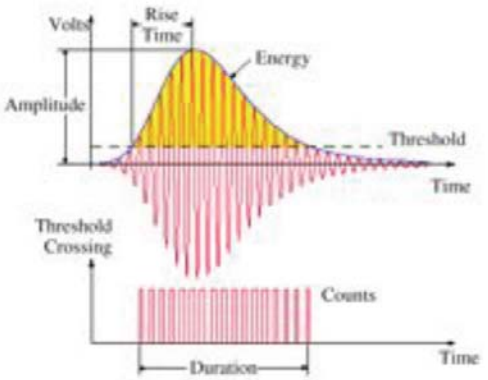

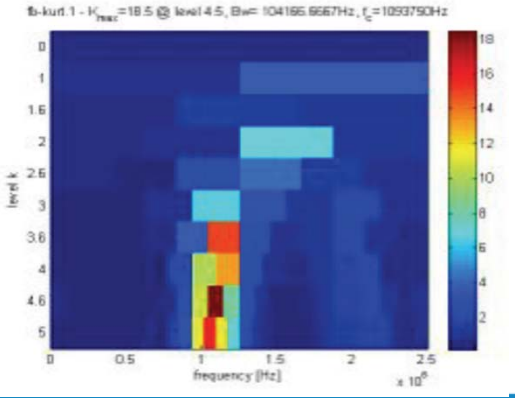

- **Acoustic Emission sensor selected**

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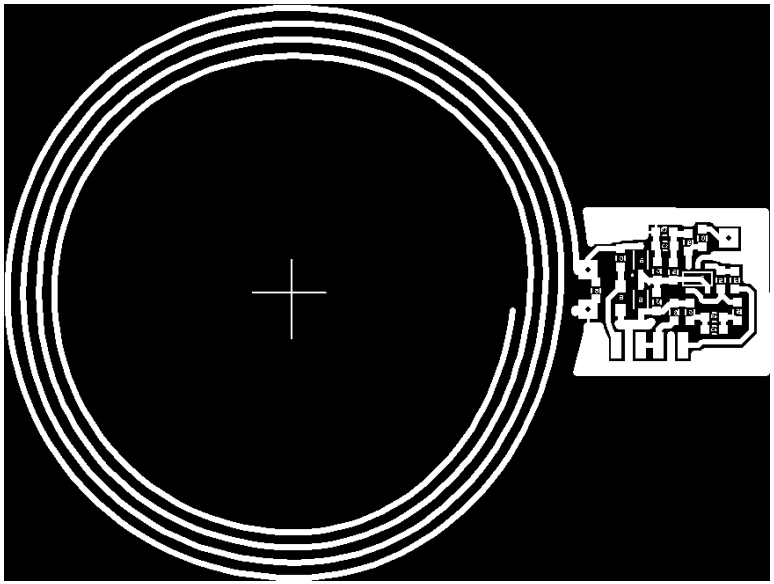
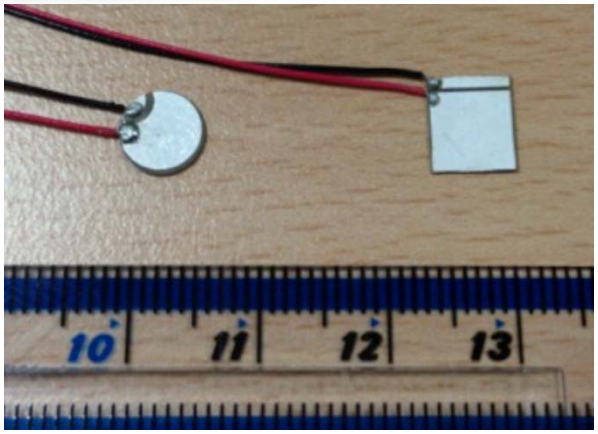
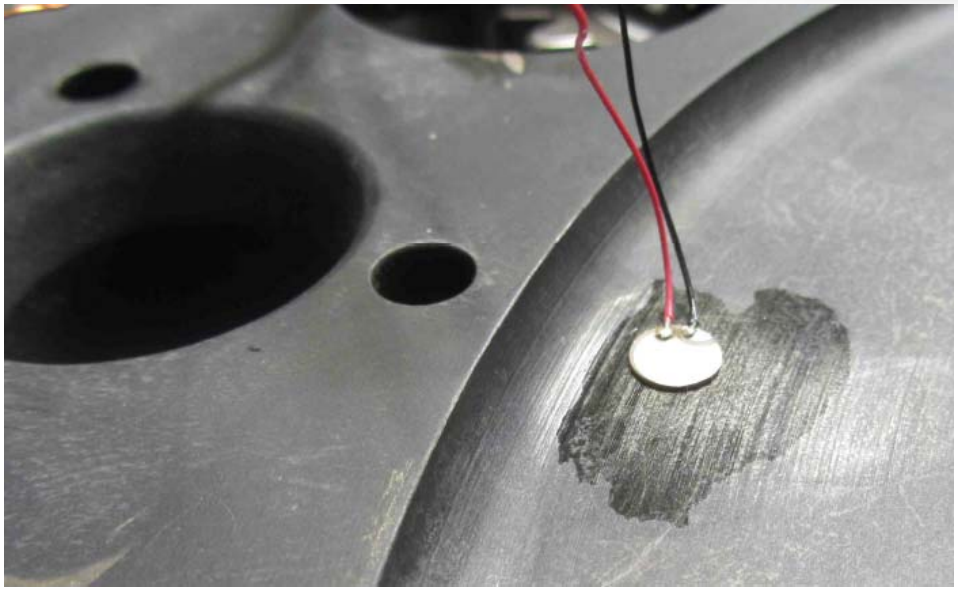
	WiFi	Bluetooth	ZigBee
Standard	IEEE 802.11	IEEE 802.15	IEEE 802.15
Max range	50-100m	10-100m	10-100m
Frequency	2.4 and 2.5 GHz	2.4 GHz	868 MHz Europe 900 - 928 MHz US 2.4 GHz World
Power consumption	High	Medium	Low
Max network speed	>11 Mbps	700 kbps – 1 Mbps	20 kbps - 250 kbps
Network join time		3 s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

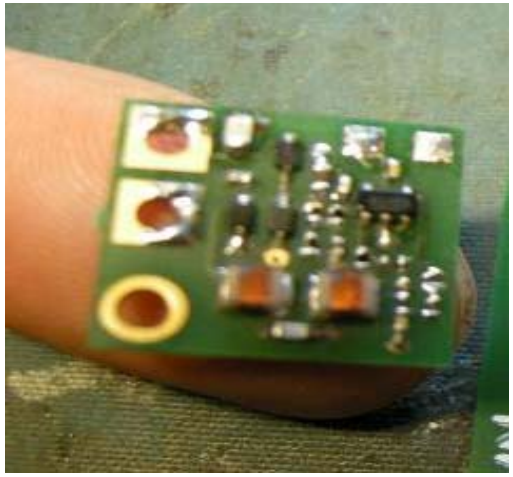


- **Homodyne receiver for RF power-scavenging and analogue wireless link**

VHM







- **Acoustic Emission sensor installed**

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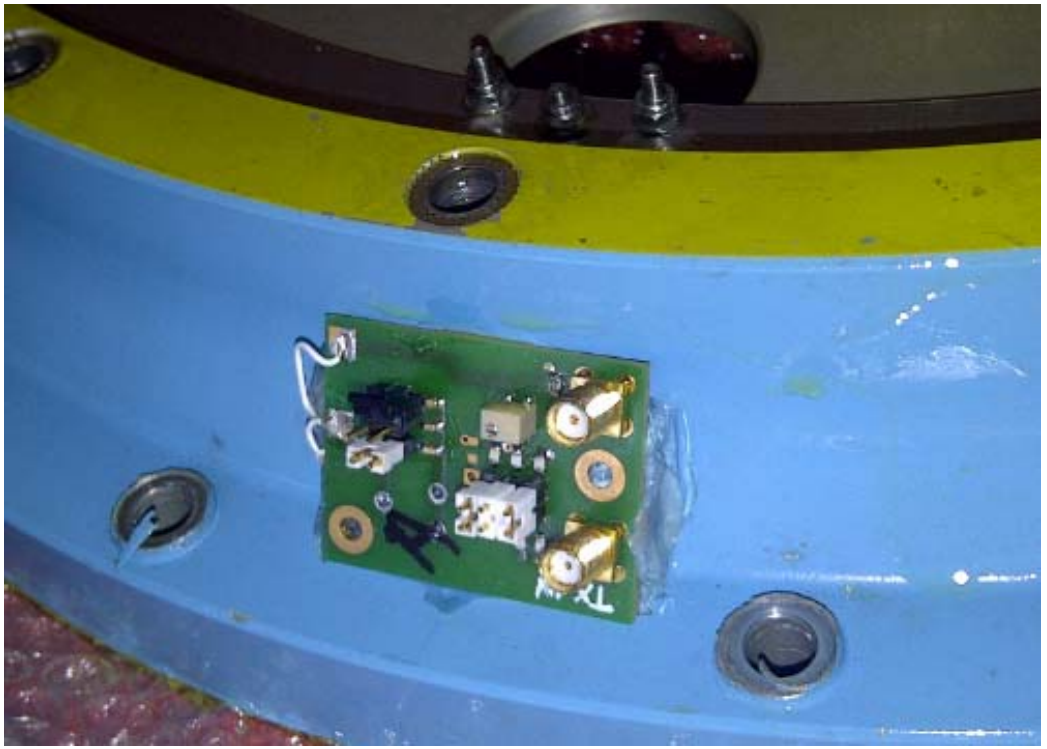

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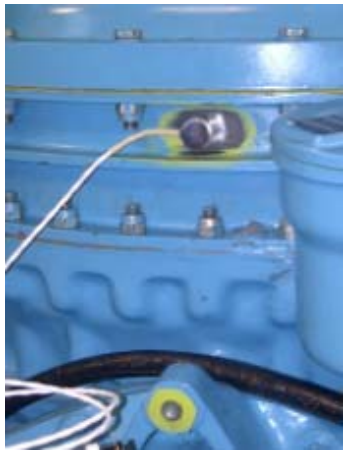


- **HUMS**

VHM

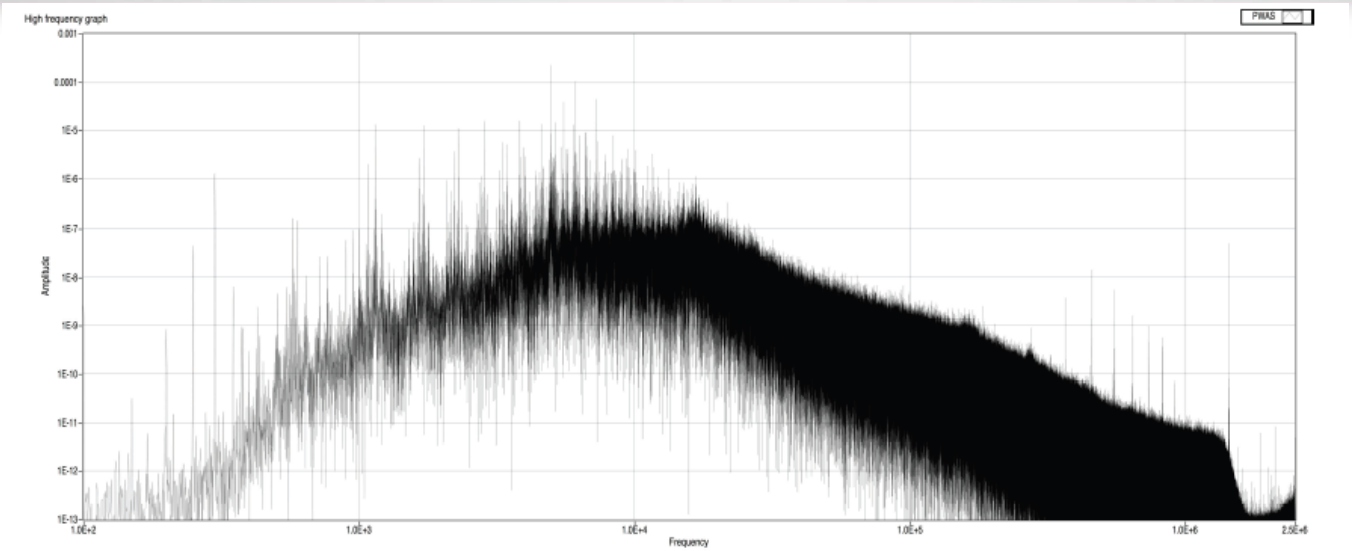
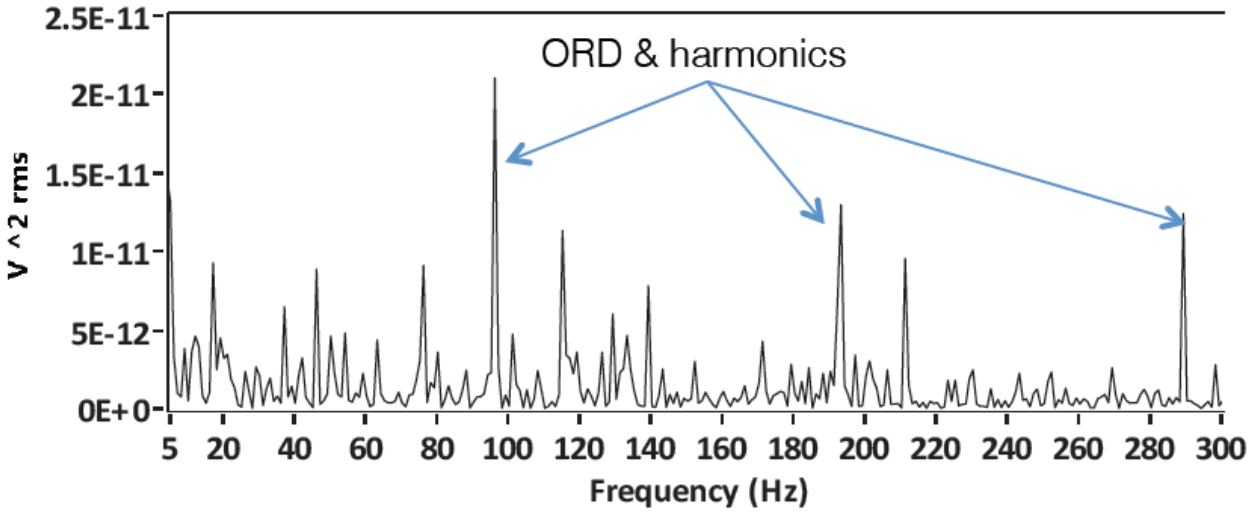
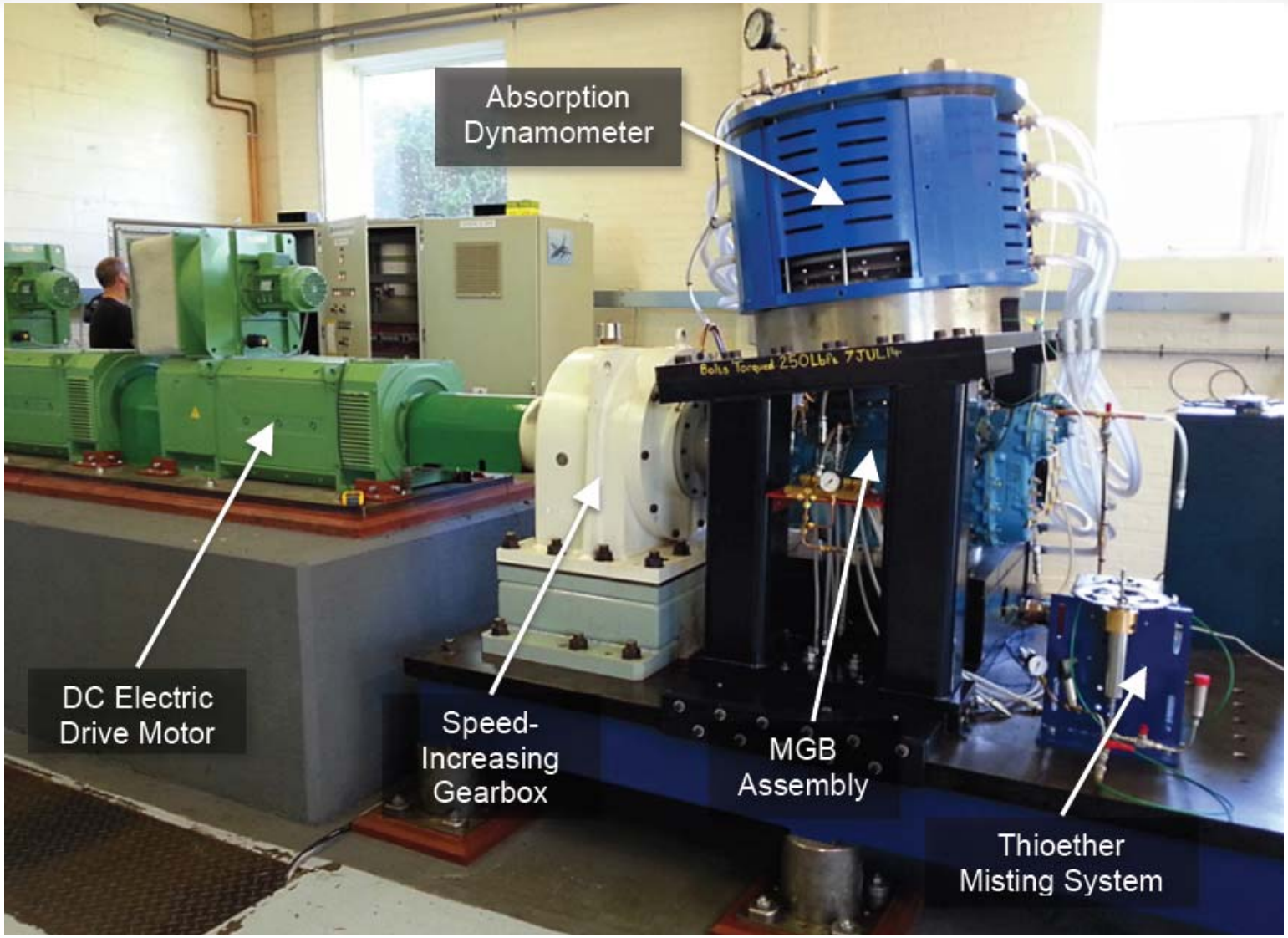


Figure 13. Frequency spectrum of PWAS signal



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
HEALTH
FLAMMABILITY
REACTIVITY
500 ml

HELMGOP II

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

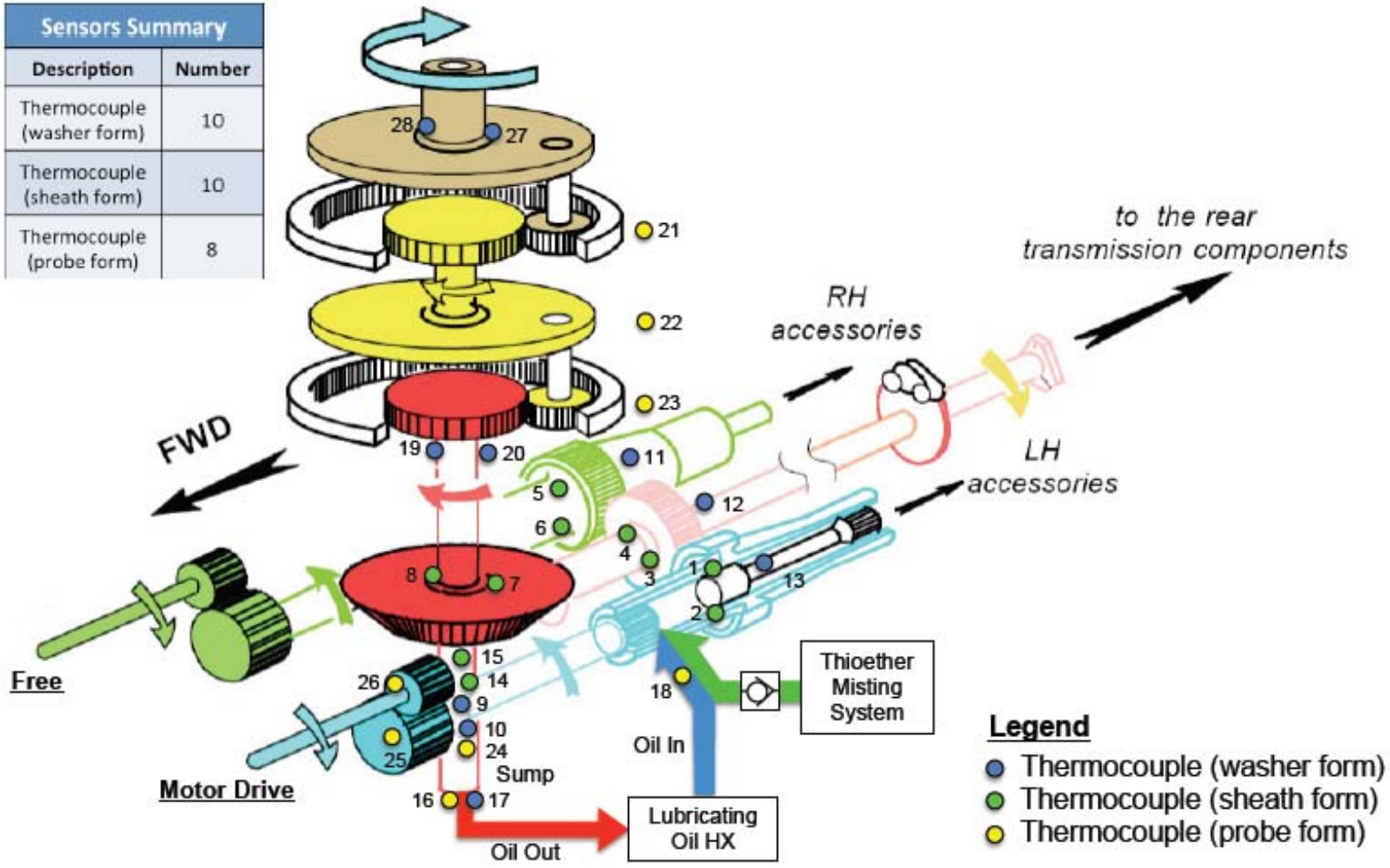


Figure B.62 Thermocouple Locations on MGB (Source: Helicopter Manufacturer and Author)

MGH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Agency organisation structure
Member states
Management Board & Advisory Board
Key facts & figures
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

Helicopter Low Airspeed Sensor

- Precision airspeed measurement
- 2D probe immune to rotor down wash
- 3D probe provides down wash component
- Aircraft attitude compensation
- No calibration required
- Anti-ice design

Curtiss-Wright Avionics & Electronics

EASA Research Plan

Crew immersion suits conspicuity

EASA
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Questions?

Your safety is our mission.

EASA is an agency of the European Union