



SOLA CONFERENCE 2019
2019 Sept the 16th

HELICOPTERS

G.BRUNIAUX VP Head of Product safety

AVIATION SAFETY & QUALITY



Agenda:

- AH Fleet overview and accident statistics
- AH Aviation Safety Ambition & Governance
- Examples of AH Aviation Safety enhancements
- Drones



MAIN FIGURES

HELICOPTERS



19 524 Built
helicopters



11 901 In-service
helicopters



2 991 100
Yearly flight hours



3 064 Operators



96 702 100
Total cumulated flight hours



148 Operating Countries

AIRBUS

Fleet families size

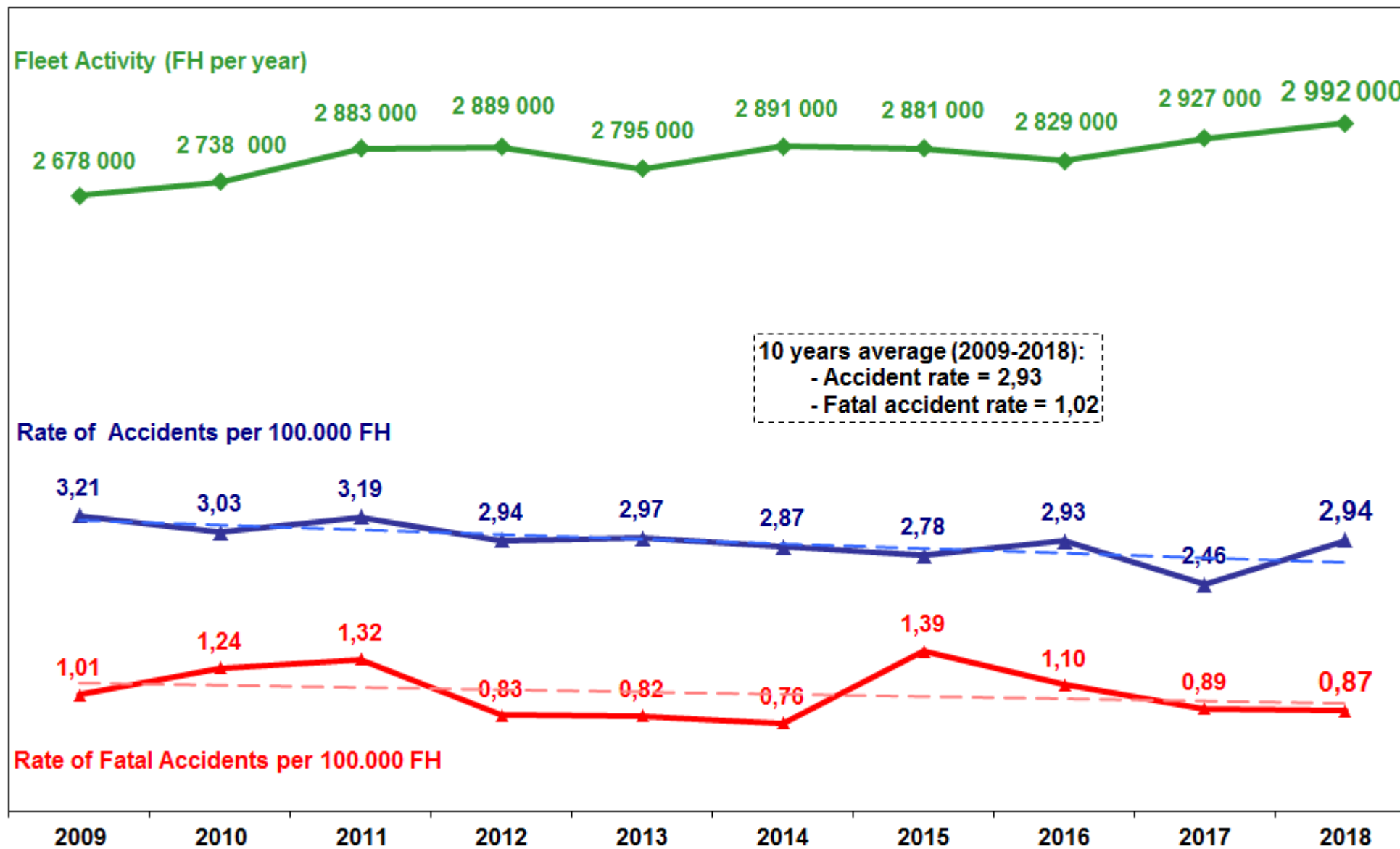
Percentage of in-service helicopters quantity



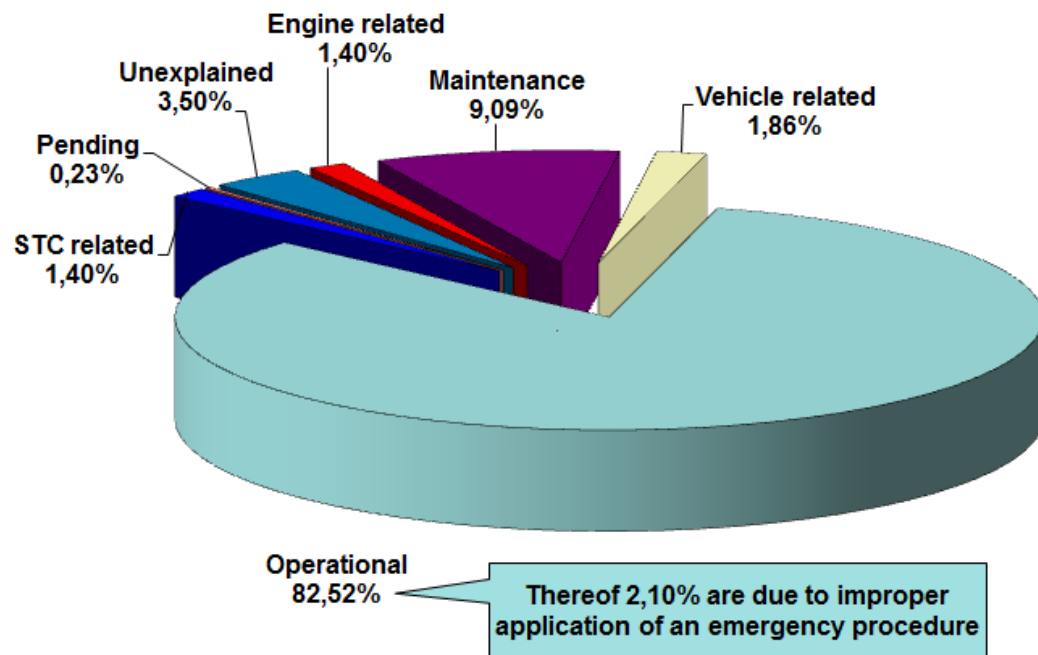
Different types of AH Flight Operations



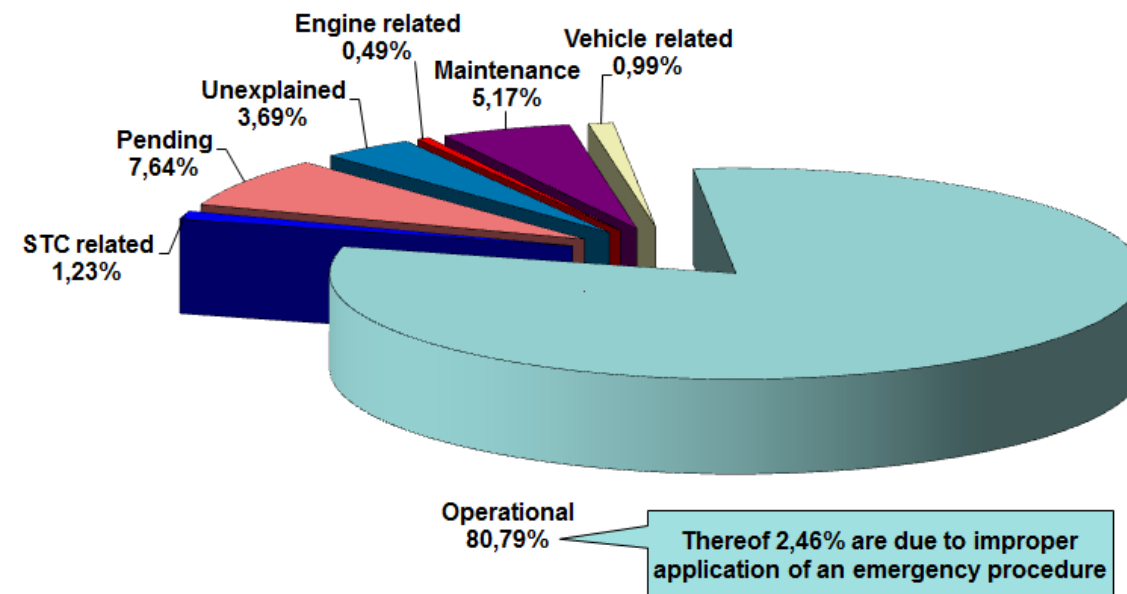
Accidents Rate Evolution (All aircrafts)



Accidents breakdown 2009-2013 by causes
429 accidents



Accidents breakdown 2014-2018 by causes
406 accidents



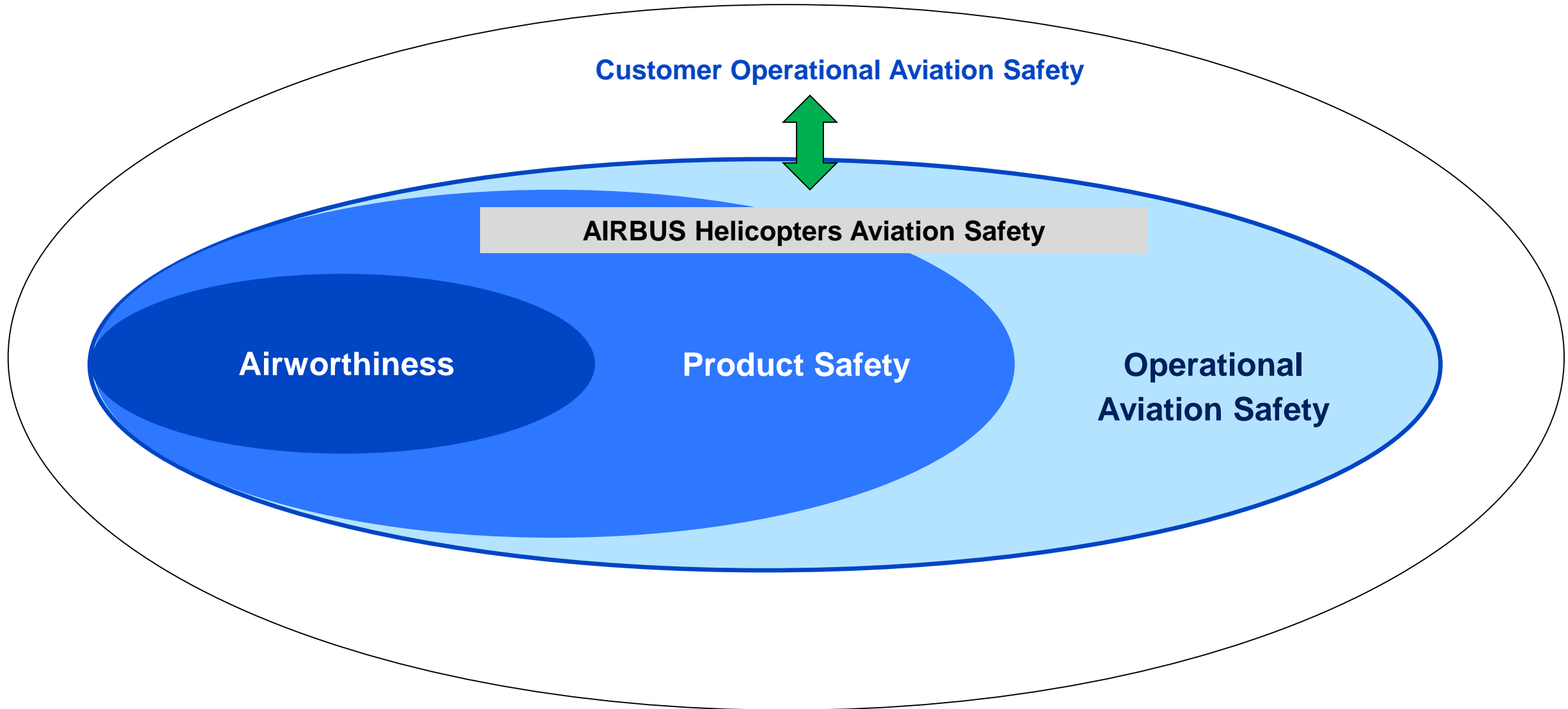
AH Aviation Safety ambition

- **0 accidents/ serious incidents in AH internal flight operations**
- **50% reduction of AH accident rate 2018 2028**
- **0% technical root cause in AH helicopter accident in 2023**
- **0% technical contribution to AH helicopter accident in 2028**
- **Enhancing survivability of AH helicopters**
- **Collaboration with all Aviation Safety stakeholders**

A dark, semi-transparent rectangular box with a yellow vertical bar on the left side. It contains three white icons (calendar, calendar, and speech bubbles) and text describing safety goals for rotorcraft. The background of the box shows a silhouette of a rotorcraft against a light sky.

- >  Improve Rotorcraft Safety by 50% in the next 10 years
- >  Make positive and visible changes to Rotorcraft safety trends within the next 5 years
- >  Develop performance-based and proportionate solutions that help maintain competitiveness, leadership and sustainability of the European industry

Aviation Safety within AIRBUS Helicopters



Corporate Aviation Safety Governance

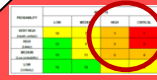
Level 3



quarterly

Chair: CEO + EXCOM

Corp. Av Safety Committee (CASC)

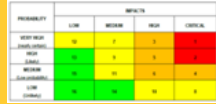


Level 2



Chair: EQ
+ Representatives Level 1
monthly

Corp. Av Safety Review Board (CASRB)



Level 1

Lubrilon® 3 Phase Vortex Separator

HELIONIX

Continued Airworthiness and Investigations

Program AvSafety Plan, Top Safety Enhancers

Product Safety Technology

Aviation Safety Management System

S&S Support of Operators

Q&AS Transfo Module



Aviation SMS - SMS deployment in AIRBUS Helicopters

Every Organization has to manage its own

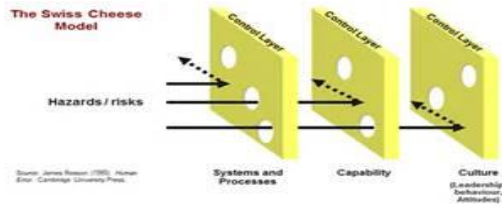
technical,

process,

organizational &

Human Factors risks

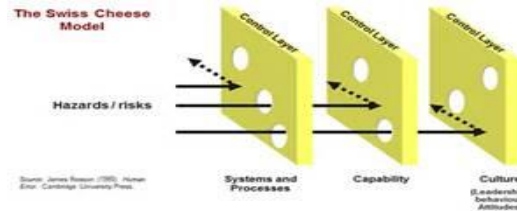
Design Org



Source: James Reason (1987), Human Error, Cambridge University Press.

PROBABILITY	SEVERITY			
	LOW	MEDIUM	HIGH	CATASTROPHIC
VERY HIGH (RED)	1	2	3	4
HIGH (ORANGE)	2	3	4	5
MEDIUM (YELLOW)	3	4	5	6
LOW (GREEN)	4	5	6	7

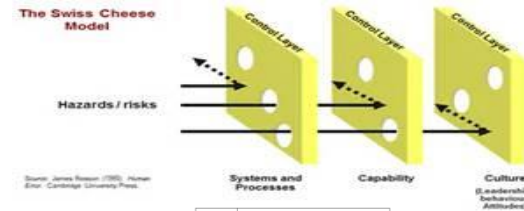
Prod Org



Source: James Reason (1987), Human Error, Cambridge University Press.

PROBABILITY	SEVERITY			
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Flight test activities

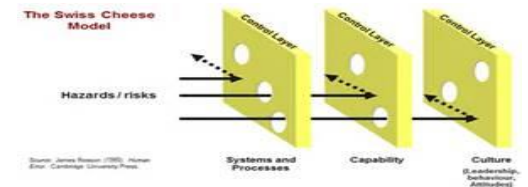


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S&S Org

Part 145 & Part M
ATO, Part 66



Source: James Reason (1987), Human Error, Cambridge University Press.

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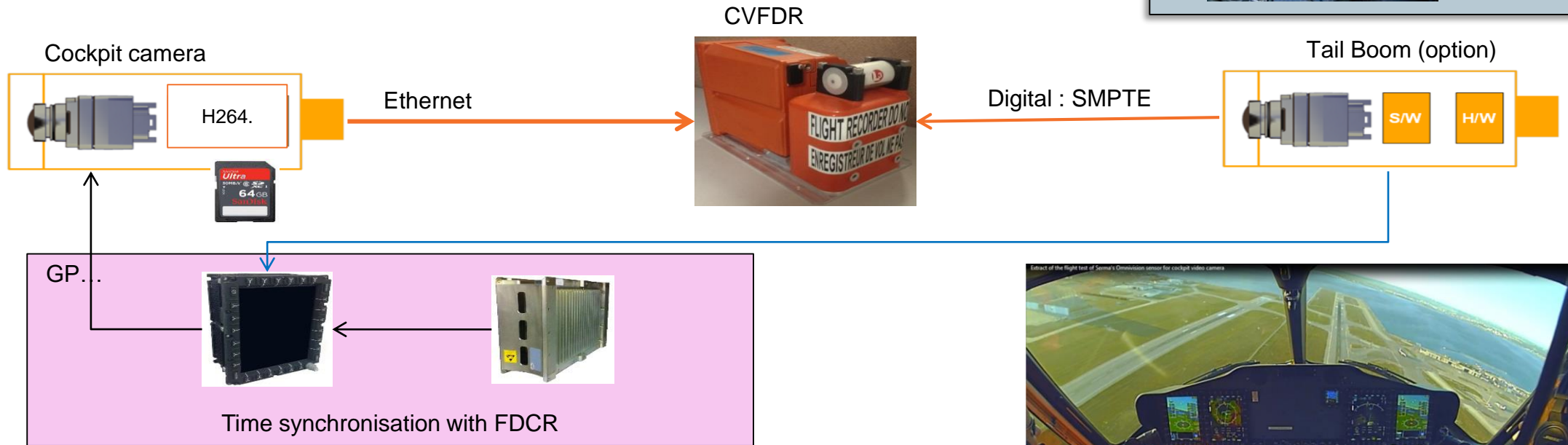


AIRBUS HELICOPTERS AVIATION SAFETY DEPARTMENT & NETWORK

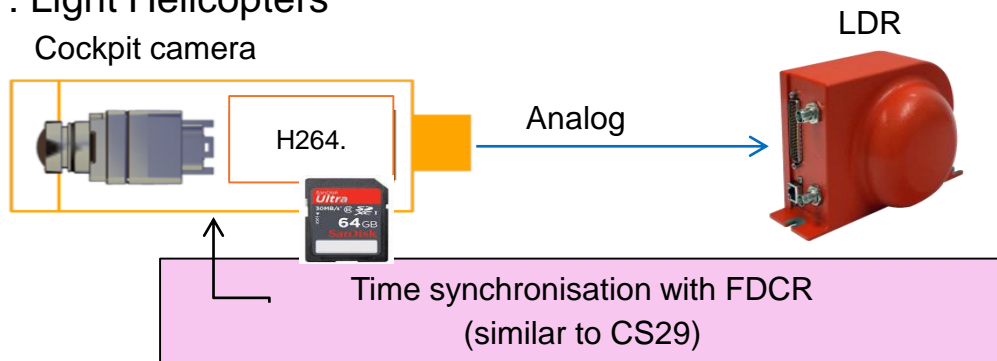


Recorder & Camera Policy (Step 2)

CS29 :



CS27 : Light Helicopters



- Analog video
- Digital video (SMPTE)
- ETHERNET
- ARINC 429

H175 Main gear box – Three main improvements (available end 2019)

An upgraded version of the main gear box is introduced in order to increase the reliability of the bearings and to reduce risks of leakage due to human factors.

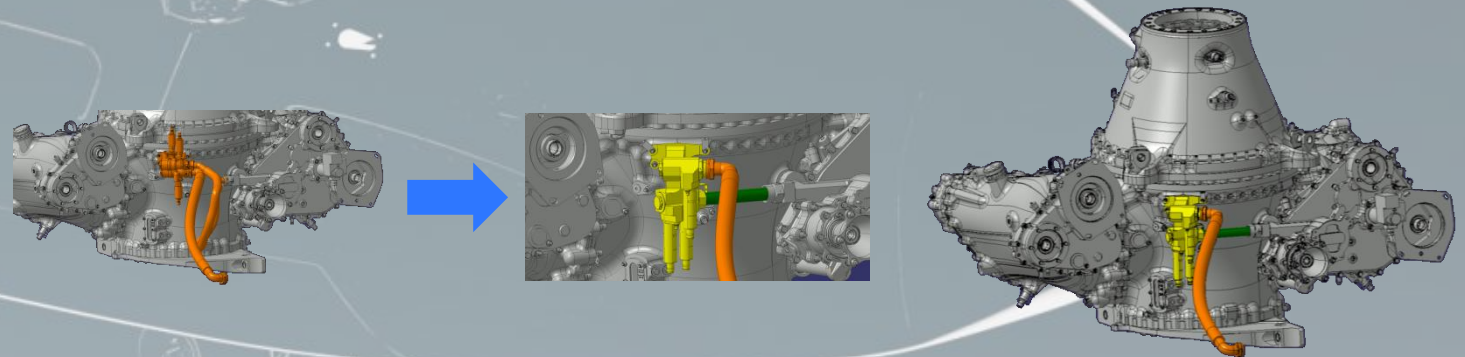
1. Bearings

New design with improved mechanical characteristics for 11 bearings



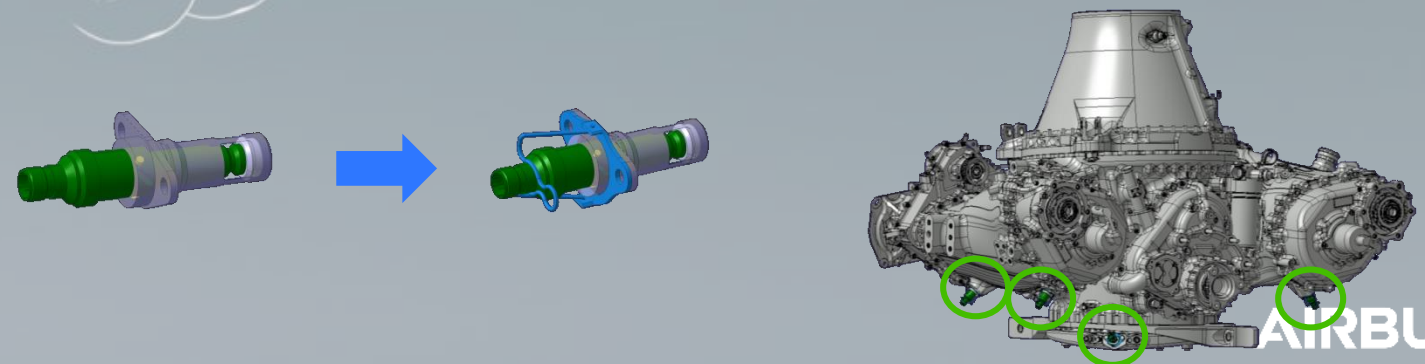
2. Back-up oil circuit

Robustness improved



3. Magnetic plug

Introduction of a lock system for better human factors tolerance



Industrial means & Transport improvements

MANUFACTURE

ASSEMBLY

TEST

DELIVERIES

NEW MACHINES FOR CLEANING (2020)



Small Parts cleaning



Housings lubrication lines



Big Parts cleaning
(Main housings, planet carrier, fixed ring gear...)



Extraction / Analysis

Industrial means & Transport improvements

MANUFACTURE

ASSEMBLY

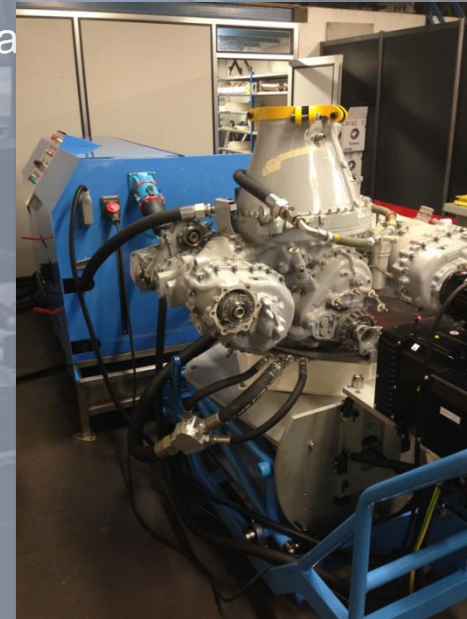
TEST

DELIVERIES

MGB FLUSHING BENCH

- Expected for end 2019
- Prototype bench developed in 2018 (hydraulic pumps and rotations without power)
- Promising results have been seen with attitudes variations of the main gear box
- Another bench will be launched

to deal



Industrial means & Transport improvements

MANUFACTURE

ASSEMBLY

TEST

DELIVERIES

SAFELOG

- Casing improvement
- Shock level monitoring during handling and transportation
 - A monitoring visible on the packaging



Main gear box
(since 2018)



Intermediate gear box
(expected for end 2019)

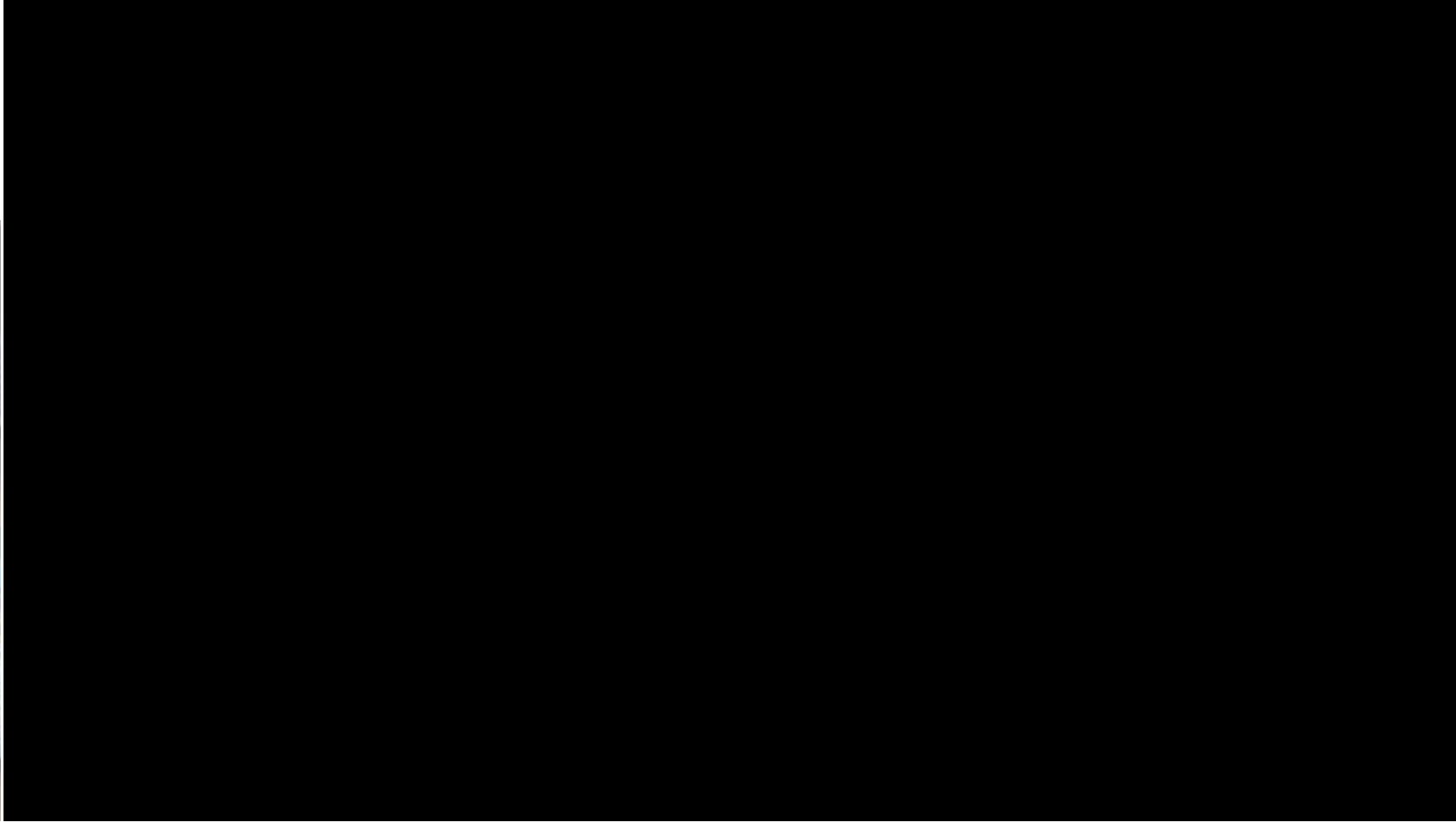
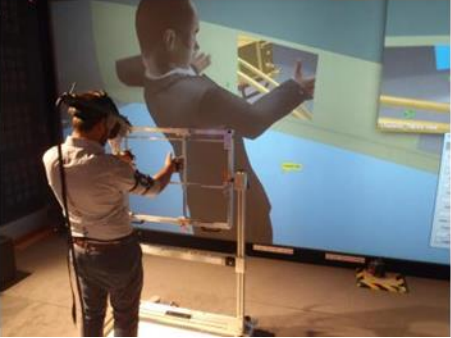
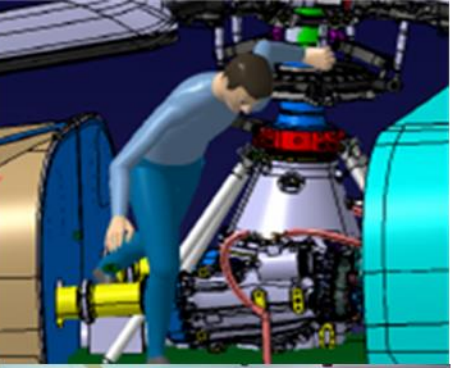
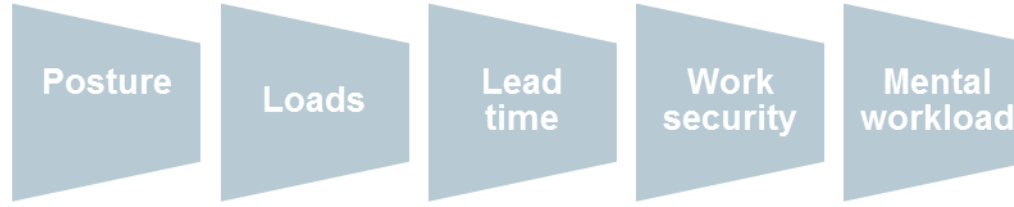


Tail gear box
(expected for end 2019)

HELICOPTERS

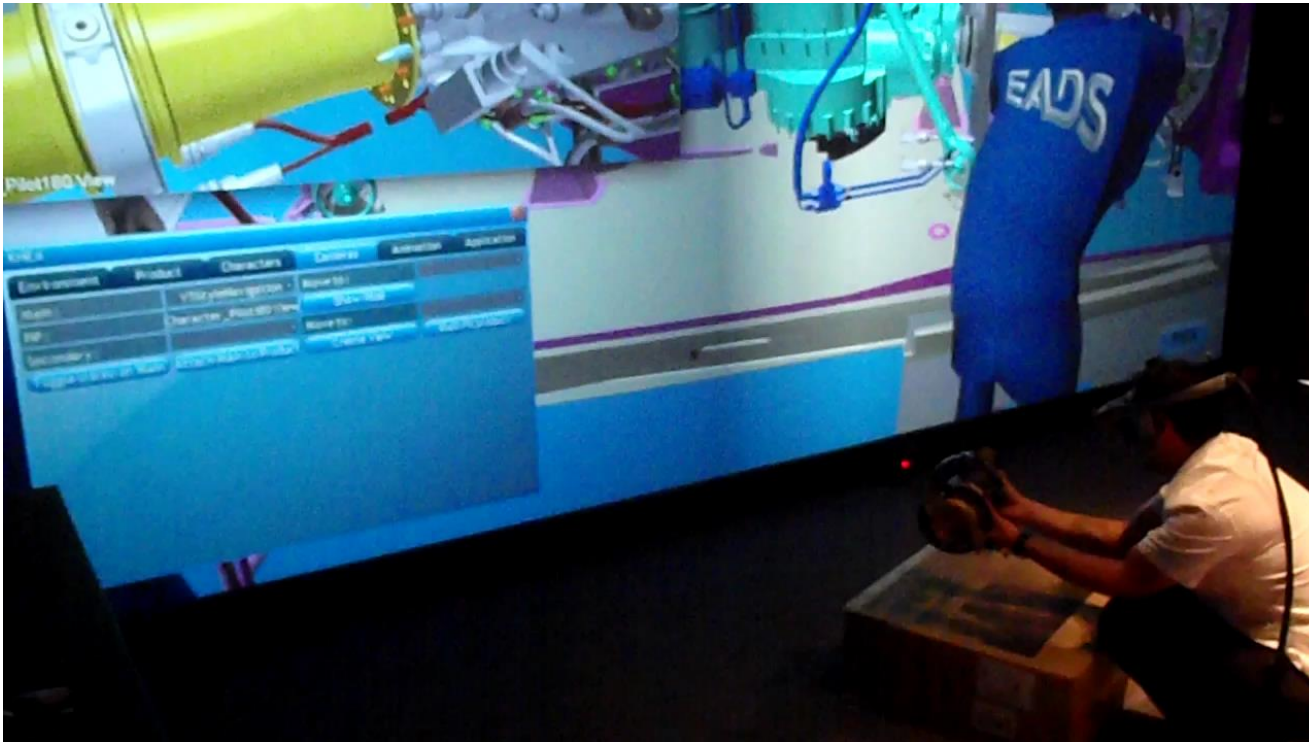
Human Hazard Analysis (HHA)

Main criteria observed



Use of Virtual Reality for Human Factors analysis

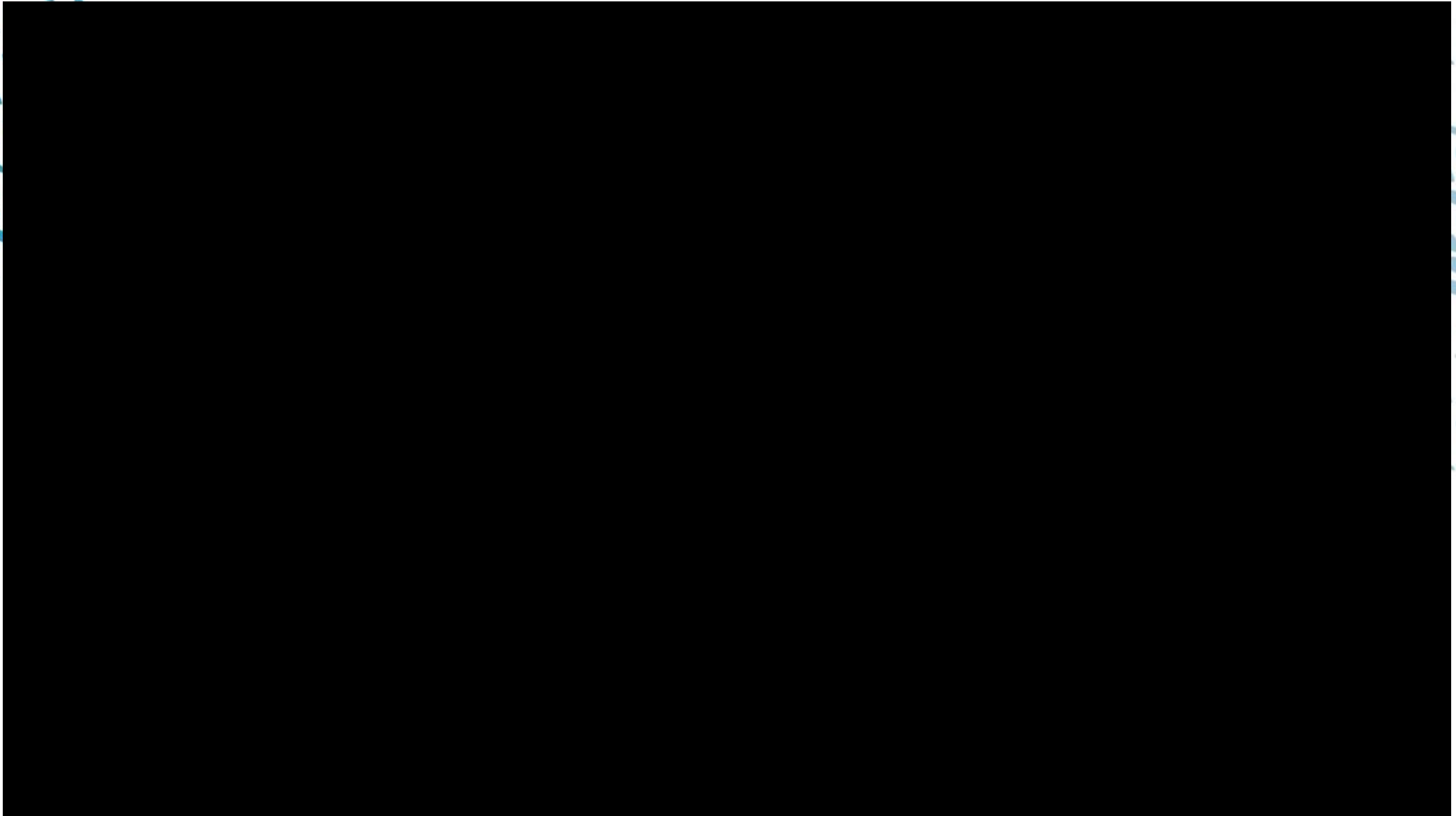
H160 Architecture study - 2011

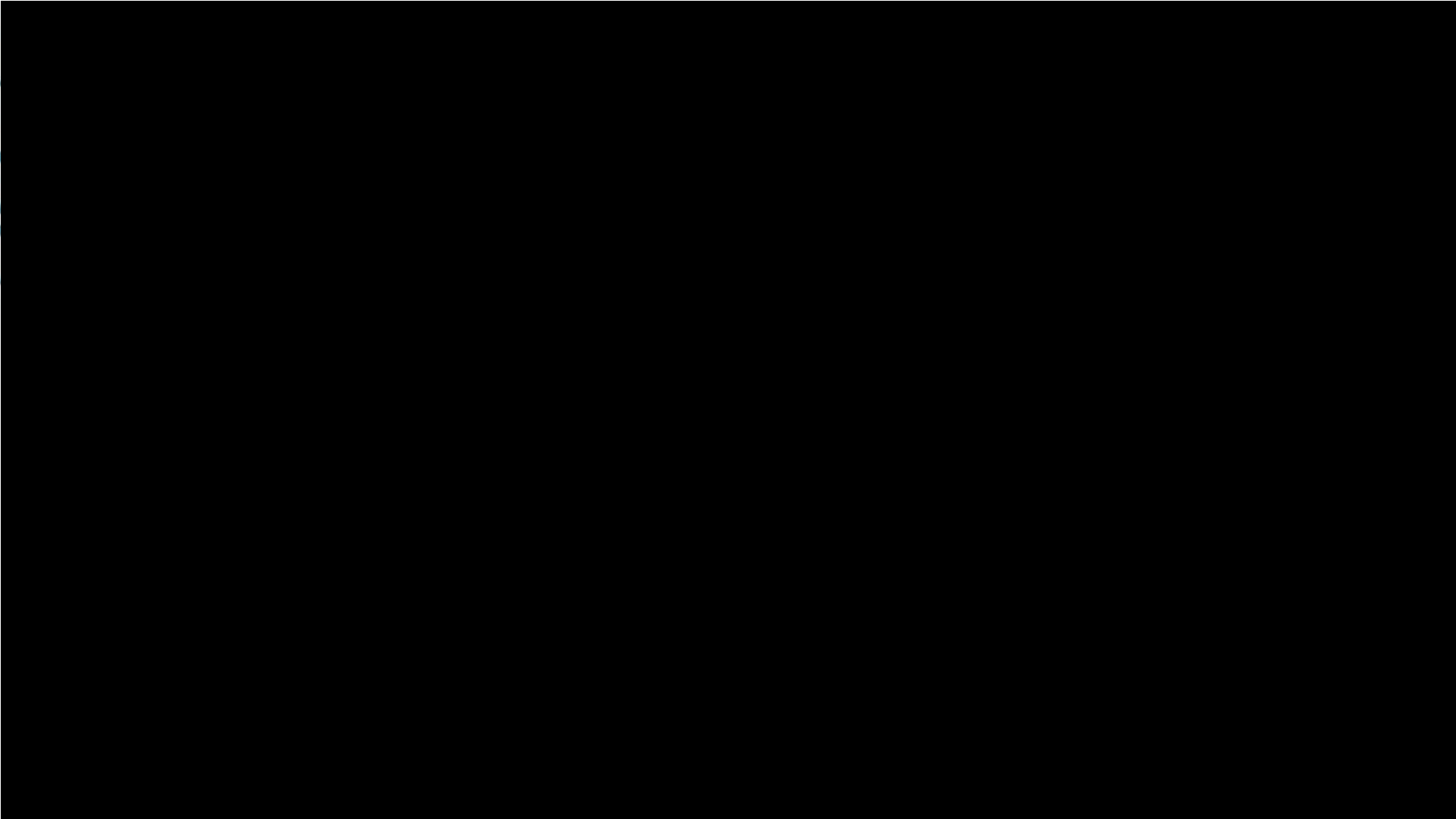


Installation/removal of shaft between Engine & Main Gear Box



Inspection of rear transmission shaft





Operational Safety: AH solutions

- ❑ Training and support to flight operations: Flight Operations Briefing Notes, FCOM
- ❑ Pre Flight Risk Assessment App : « Before Your Flight »
- ❑ Flight Data Monitoring solution : « Flight Analyzer »
- ❑ Ground Rescue Booklets
- ❑ ...

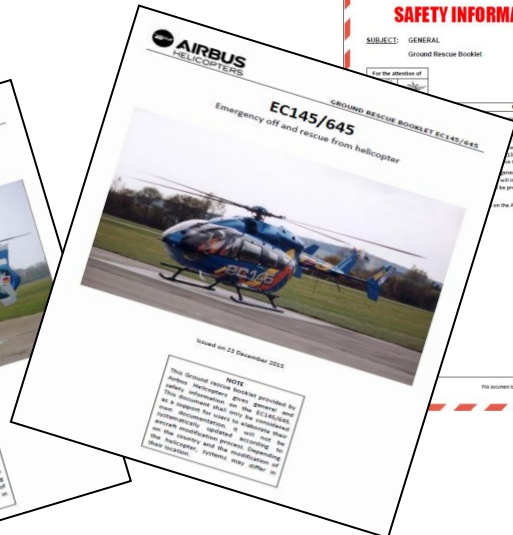
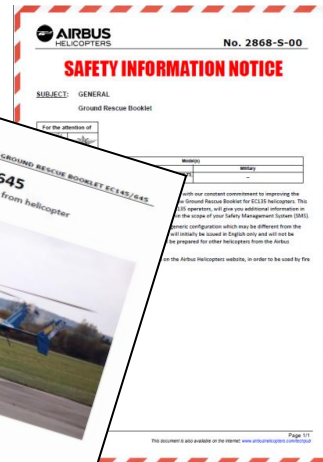
PFRA is going AIRBUS GROUP wide standardized



AIRBUS



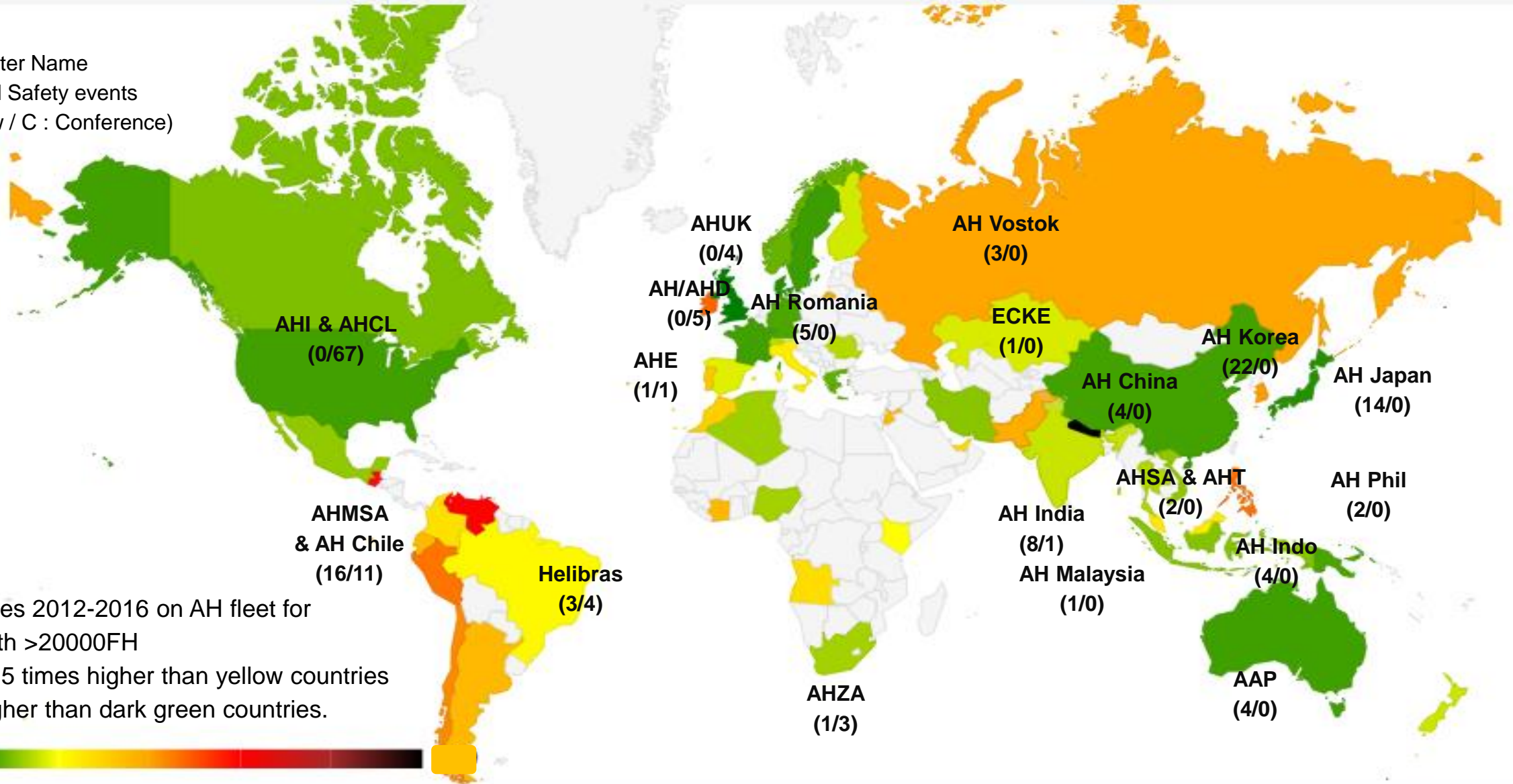
AIRBUS



Aviation Safety worldwide 187 external Safety events



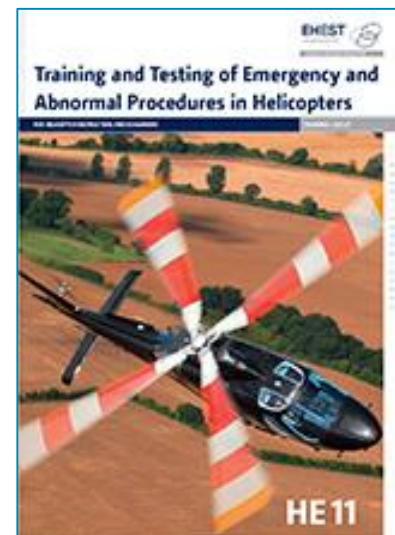
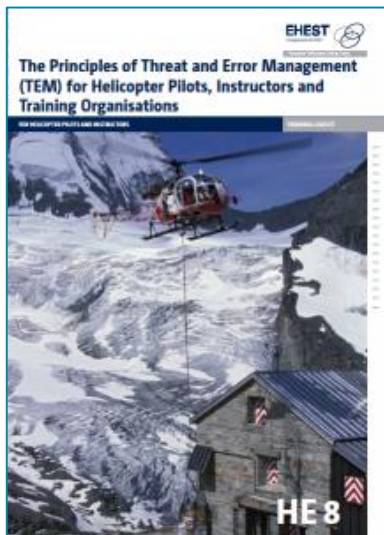
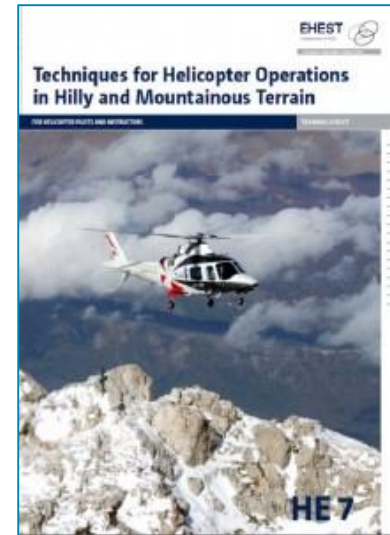
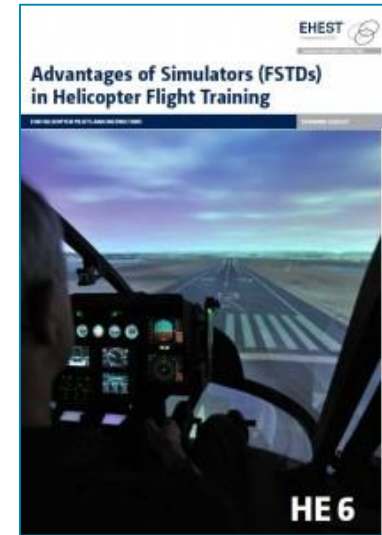
Customer Center Name
 Qty of external Safety events
 (R : Roadshow / C : Conference)



Accident Rates 2012-2016 on AH fleet for countries with >20000FH

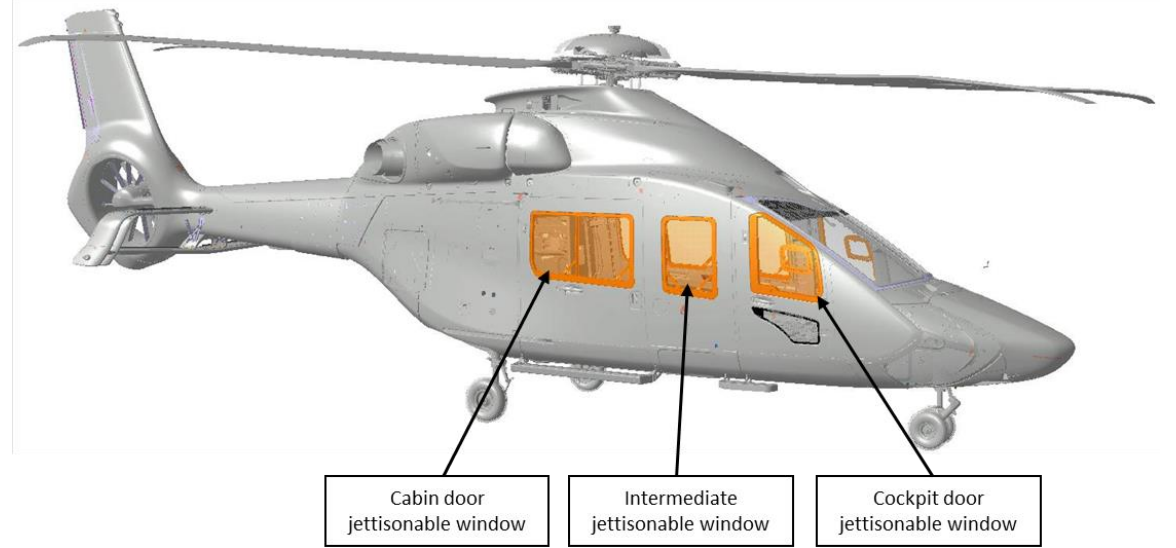
Black/brown 5 times higher than yellow countries & 8 times higher than dark green countries.

Being part of European Safety Promotion Network – Rotorcraft (ESPN-R)

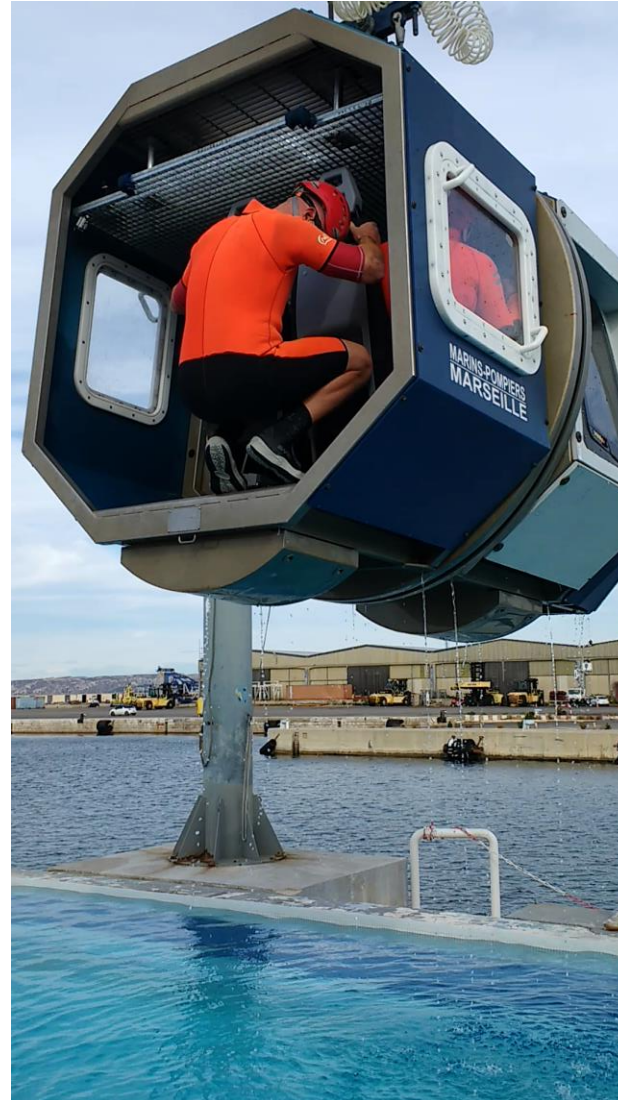


Many Safety leaflets issued and more to come...

Survivability – Emergency Exits H160



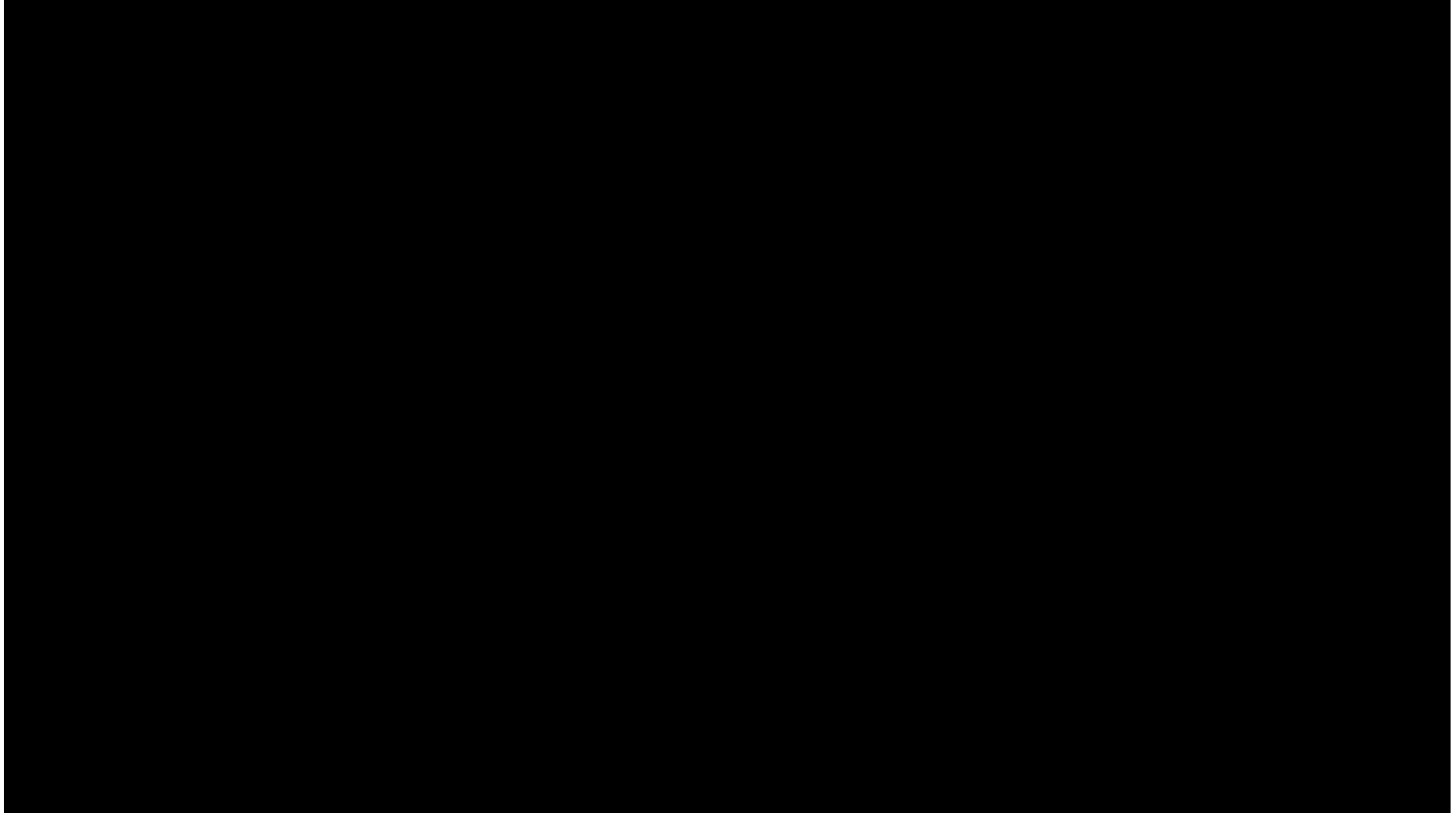
Survivability – Emergency Exits H160



Drones and UAM



Drones and UAM



Questions?