

What the Future holds - Emerging Safety Technologies and How This Affects Training

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Together4Safety





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AUTOMATION AND FLIGHT PATH MANAGEMENT



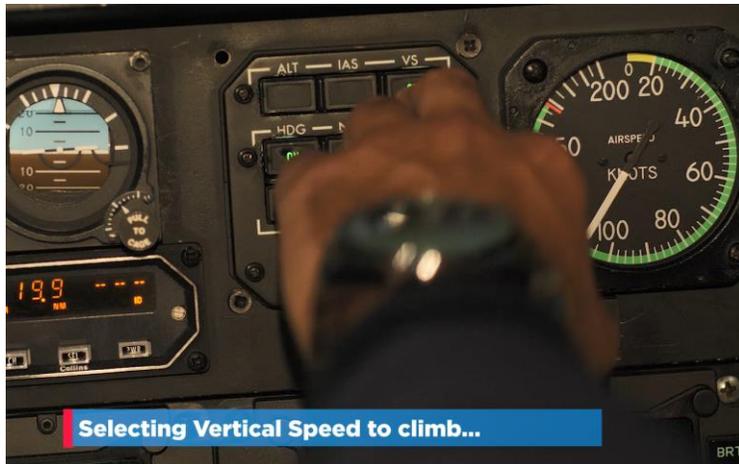
Automation and Flight Path Management



Avoid distraction, pay attention!



Unexpected event, like weather degradation, could generate an initial confusion affecting the situational awareness



Selecting Vertical Speed to climb...



Unusual Attitude Recovery: follow recommended procedures



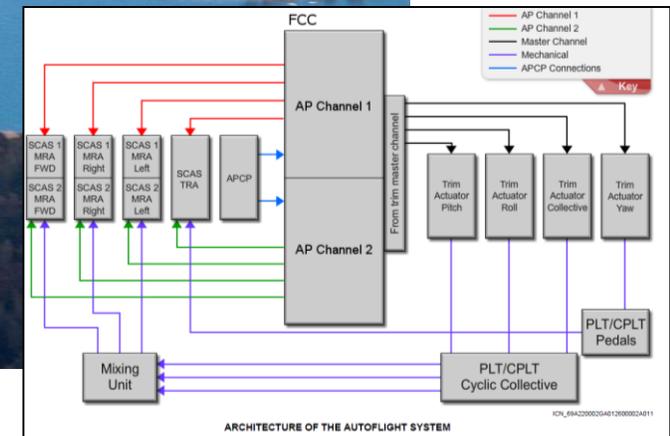
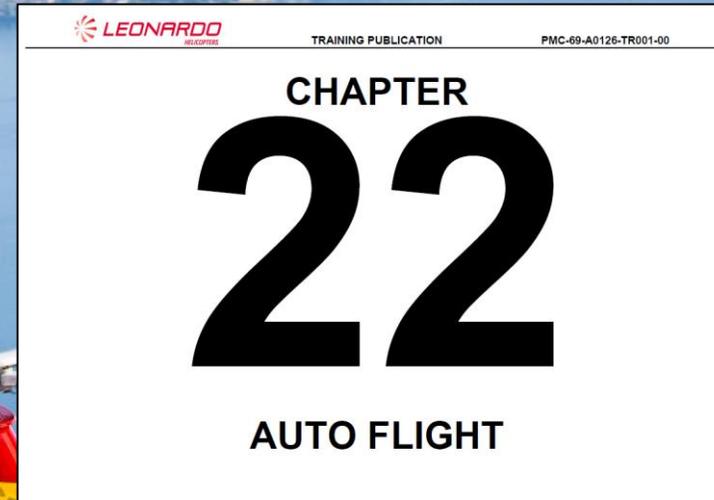
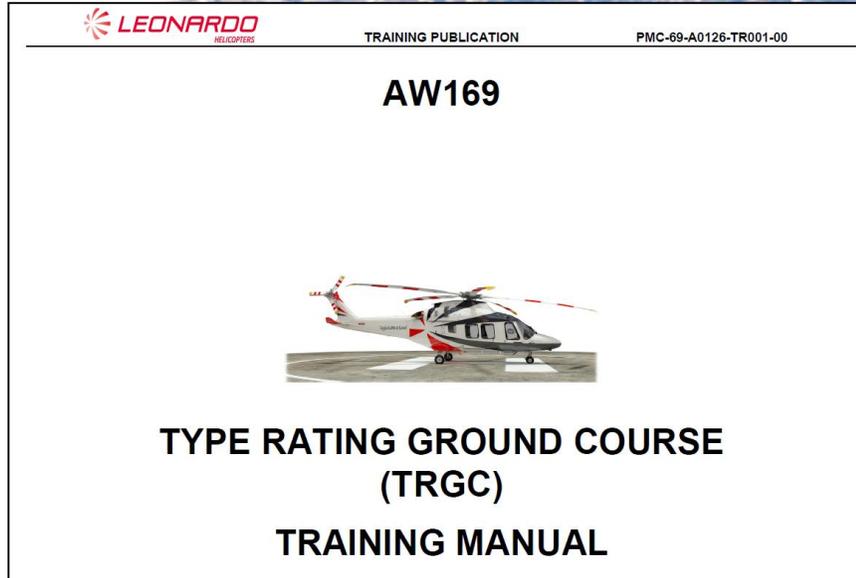
Automation and Flight Path Management



The accident has been avoided and the consequences have been limited to **exceedances of aircraft limitations**



Automation and Flight Path Management

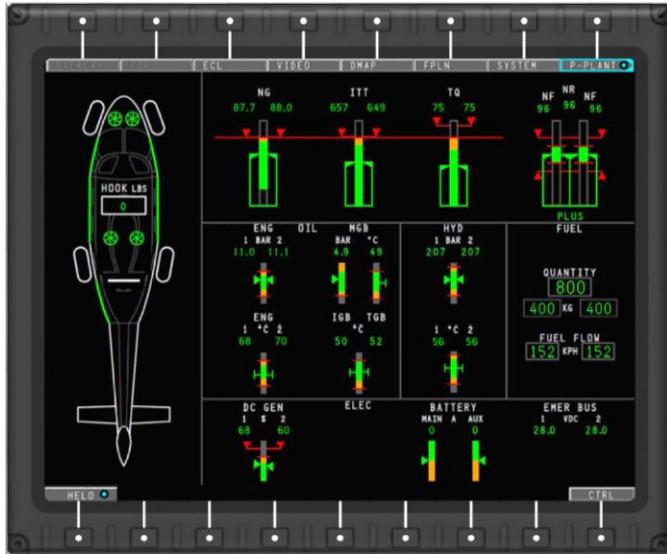
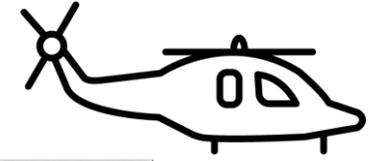






Automation and Flight Path Management

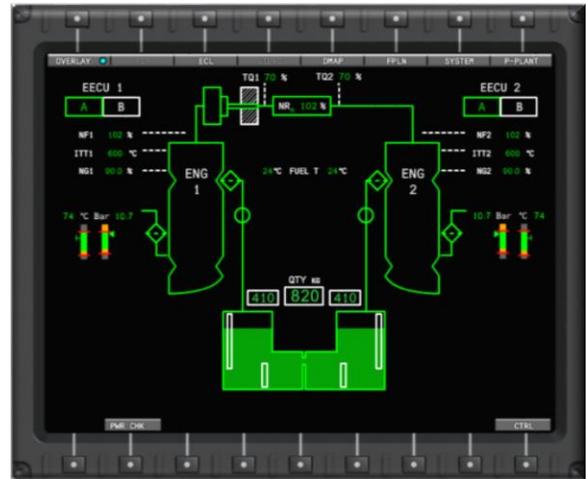
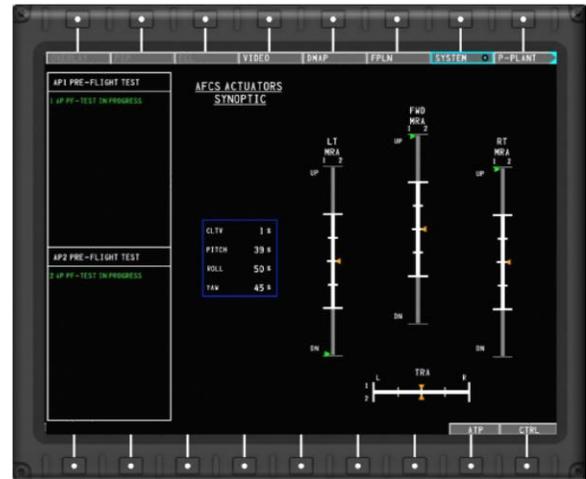
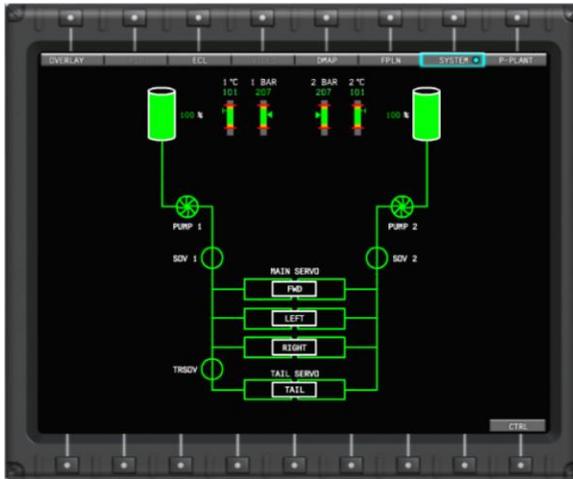
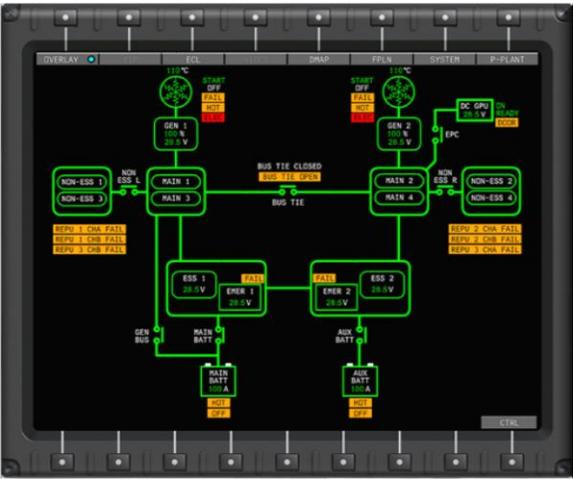
The abundance: how to find/display what I need and take full vantage of it?



**AW169
PFD**



**AW169
MFD**





Automation and Flight Path Management



Scan pattern shall include FMA when using Upper Modes

Mode awareness → Enhance the Situational Awareness



GLAM – Glass Cockpit and Automation Management



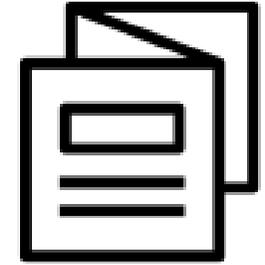
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Company General Use



Glass Cockpit and Automation Management

Aims and objectives of the course



With a GLAM we facilitate trainees in achieving:

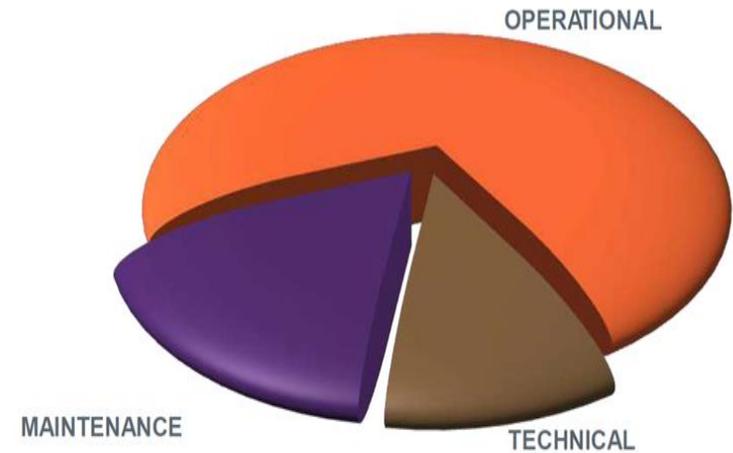
1. a broad perspective on the design philosophy and how to operate the advanced avionics and automation that are features of the so called Glass Cockpit Helicopters;
2. a basic knowledge of the system and to improve the effectiveness of Type Rating and Conversion Courses;
3. a broader understanding of how to take best advantage of the automation, having regard to Manufacturer's design philosophy and Operator's SOPs.



Helicopter accident primary causes (operational)

- **Loss of situational awareness;**
- **Inadvertent entry in IMC;**
- **Poor flight planning** (Weather, fuel management, performance calculation, etc.);
- **Fixed obstacles: vertical** (power lines, wind farms, etc) **and horizontal** (wires, etc.);
- **Mobile obstacles** (drones, base jumpers, wing suites, other aircraft, etc.).

Helicopter accident causes



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Controlled Flight into Terrain (CFIT)
continues to be
a major category of helicopter accidents worldwide

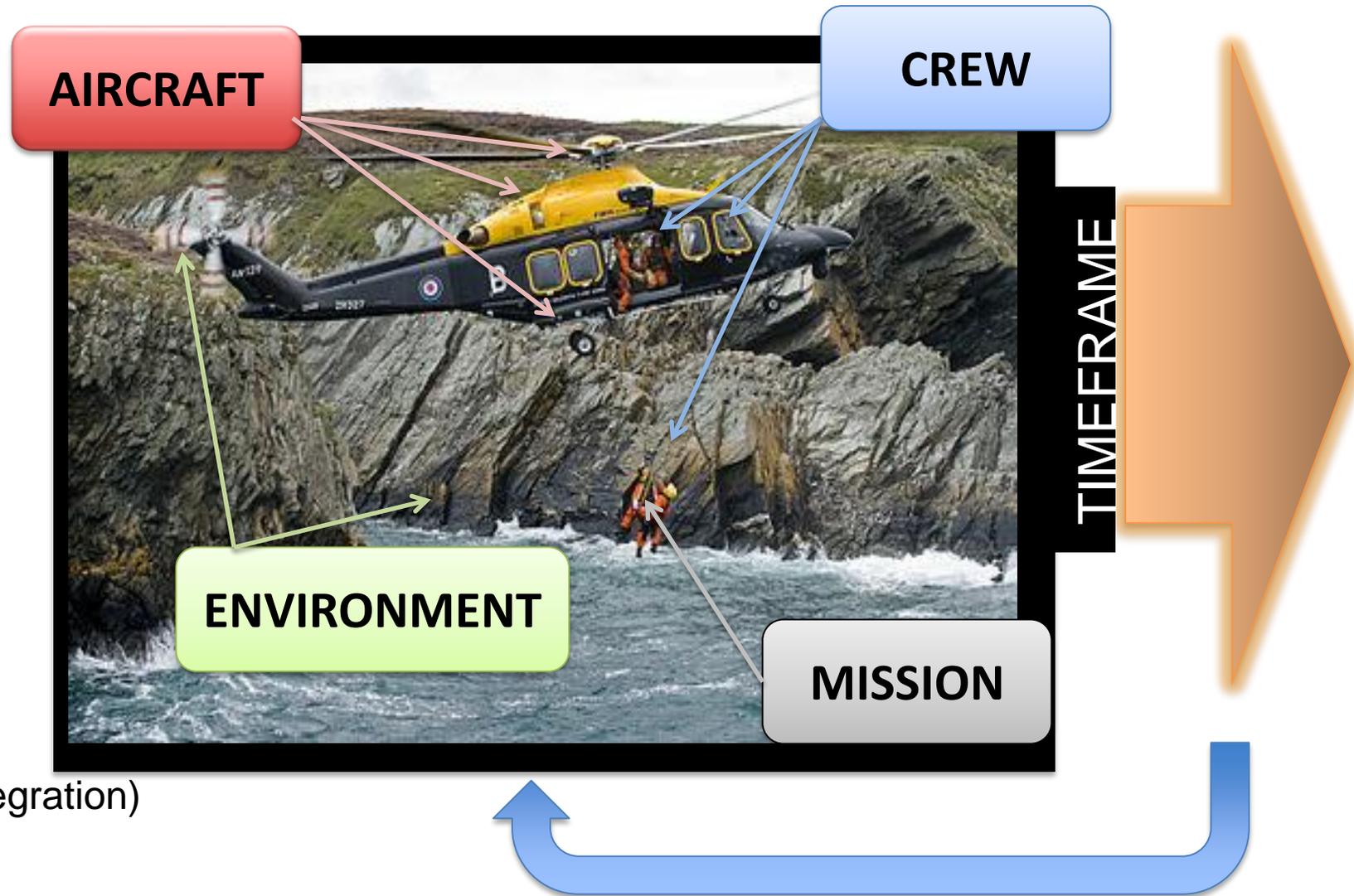
Source: *Flight Safety Foundation Published on Nov 15, 2013



with **poor survivability characteristics** and as such remains an area for targeted
Safety Awareness.



Situational Awareness



Perception
Comprehension (integration)
Projection
Feedback



Technical Features and Equipment Designed to enhance SA

H-TAWS

TCAS II

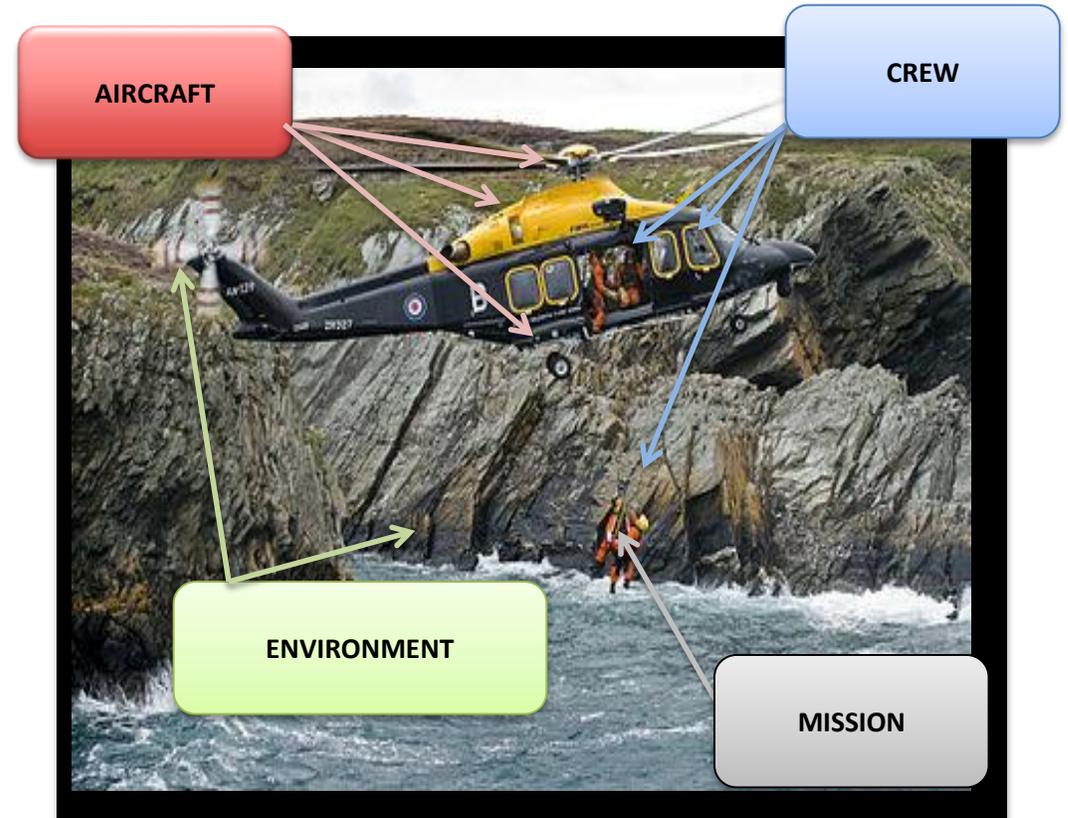
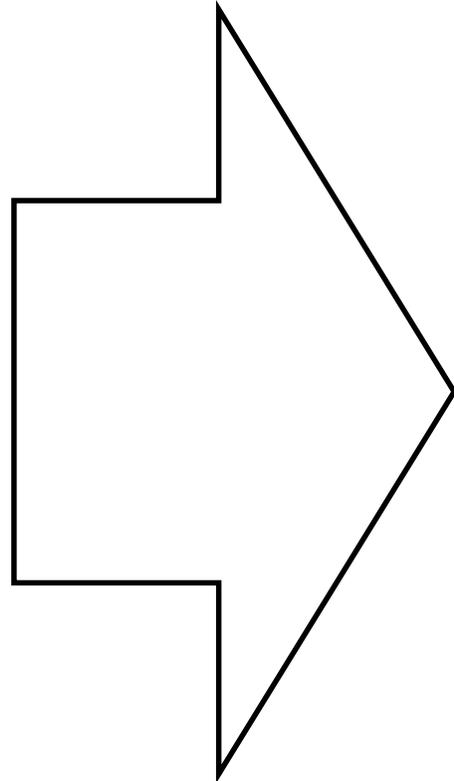
DMAP

SVS/EVS

LIDAR

RADAR

POWEWRLINE DETECTION





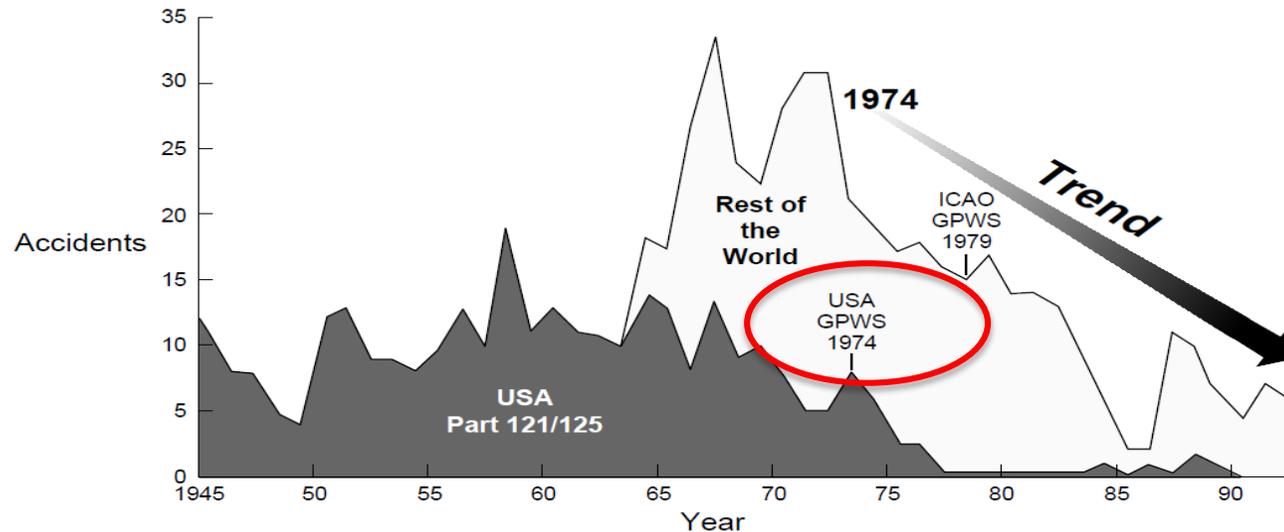
Helicopter terrain awareness and warning system (HTAWS)





Defences Against CFIT - Introduction of GPWS

CFIT Accidents Per Year USA and World Carriers



Some EMS and offshore **helicopter** CFIT accidents from recent years were studied and their accident profiles were simulated using a Helicopter EGPWS. The analysis results show a helicopter **EGPWS** would have provided sufficient **warning and situational awareness to the pilots** if the system was installed.



Helicopter terrain awareness and warning system (HTAWS)

The TAWS warning is normally the **flight crew's last opportunity to avoid CFIT.**

Incidents and accidents have occurred because flight crews have failed to make timely and correct responses to the GPWS warnings.

Except in all but clear daylight VMC, when the flight crew can immediately and unequivocally confirm that an impact with the terrain, water, or obstacle will not take place:

- **React immediately to a TAWS warning.**
- **Positively apply maximum thrust, and rotate to the appropriate pitch attitude for your helicopter.**
- **Pull up with wings level to ensure maximum airplane performance.**



*Continue the escape maneuver until **climbing to the sector emergency safe altitude** or until visual verification can be made that the aircraft will clear the terrain or obstacle, even if the TAWS warning stops.*



Helicopter Terrain Awareness and Warning System (HTAWS)

HTAWS includes a database with terrain elevation (and obstacles), and acquires the helicopter position and velocity from helicopter navigation systems.

HTAWS OPERATES BY CONTINUOUSLY:

1. Monitoring the helicopter distance above the ground (height), and
2. Analyzing the terrain elevation contour in front of the helicopter route (Look-ahead function).





Helicopter Terrain Awareness and Warning System (HTAWS)

Most of the factors that have been identified are the result of deficiencies in flight crew training programs.

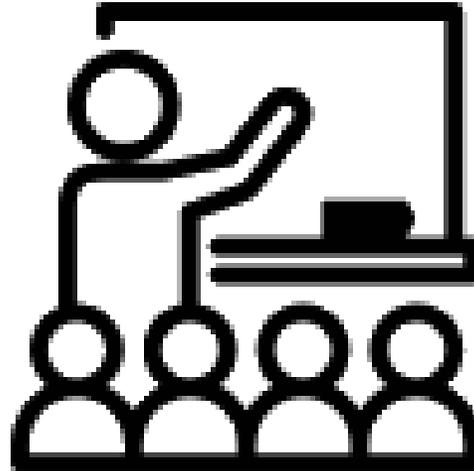
Therefore, training becomes a significant factor that contributes to CFIT.

- Well-designed equipment,
- comprehensive operating procedures,
- extensive runway approach aids,
- and standardized charting
- or altimeter setting procedures and units of measurement

will not prevent CFIT
unless flight crews are properly **trained and disciplined.**



Helicopter Terrain Awareness and Warning System (HTAWS)



Operating modes:

Mode 1: Excessive Descent Rate

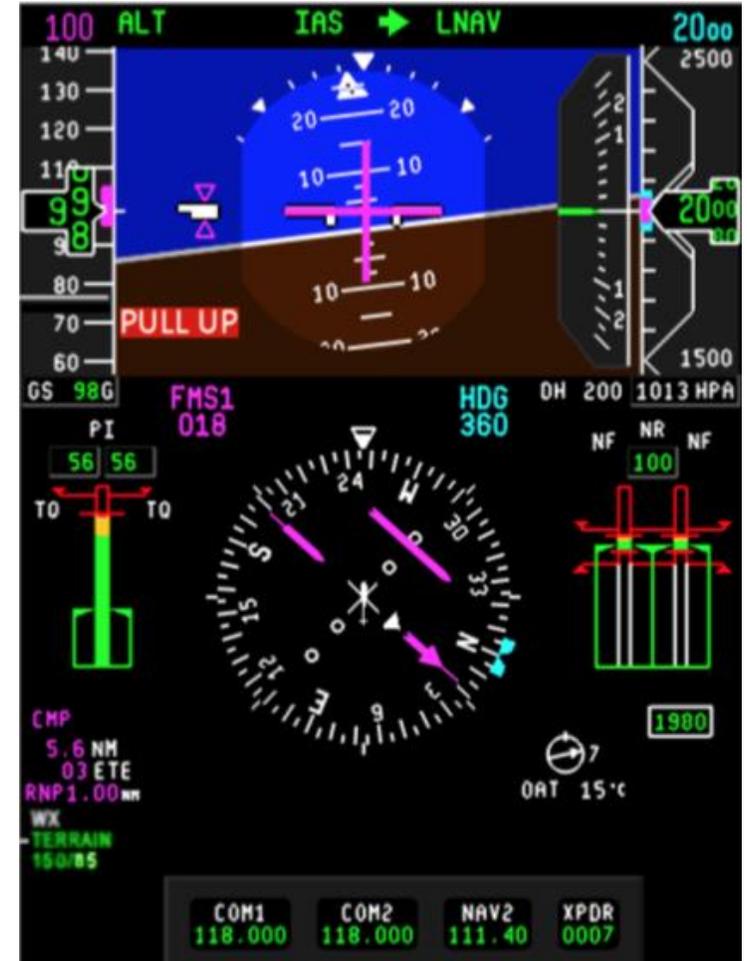
Mode 2: Excessive Terrain Closure Rate Mode

Mode 3: Descent after Take-Off Mode or Missed Approach

Mode 4: Flight into terrain when not in Landing configuration

Mode 5: Descent Below Glideslope

Mode 6: Altitude Callout





AW139 Helicopter CFIT Education Programme



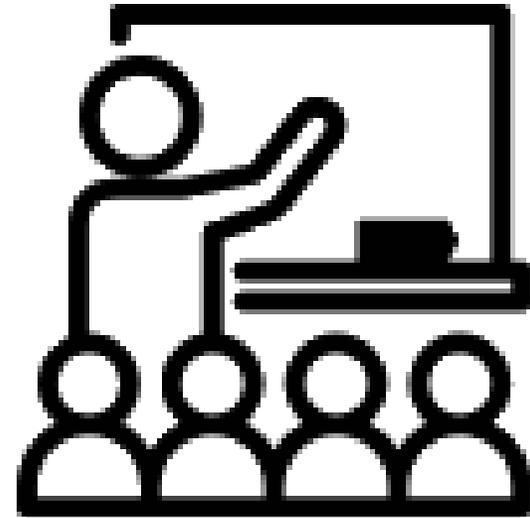
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CFIT Theoretical Instruction

CFIT Awareness and Avoidance

- a. Defining and understanding CFIT
- b. Analysis of helicopter CFIT case studies
- c. How does CFIT happen?
- d. How to avoid CFIT?
 - Risk Management
 - Technical features



Brown Out / White Out Emergency Procedure

HTAWS / EGPWS

Low Level Navigation in marginal weather conditions

IFR Recovery

Inadvertent Instrumental Meteorological Ingress Procedure



CFIT Practical Training

- a. Demonstration of TAWS
- b. Flying in Degraded Visual Environment (DVE)
- c. IIMC recovery techniques
- d. Brown Out and White Out escape techniques

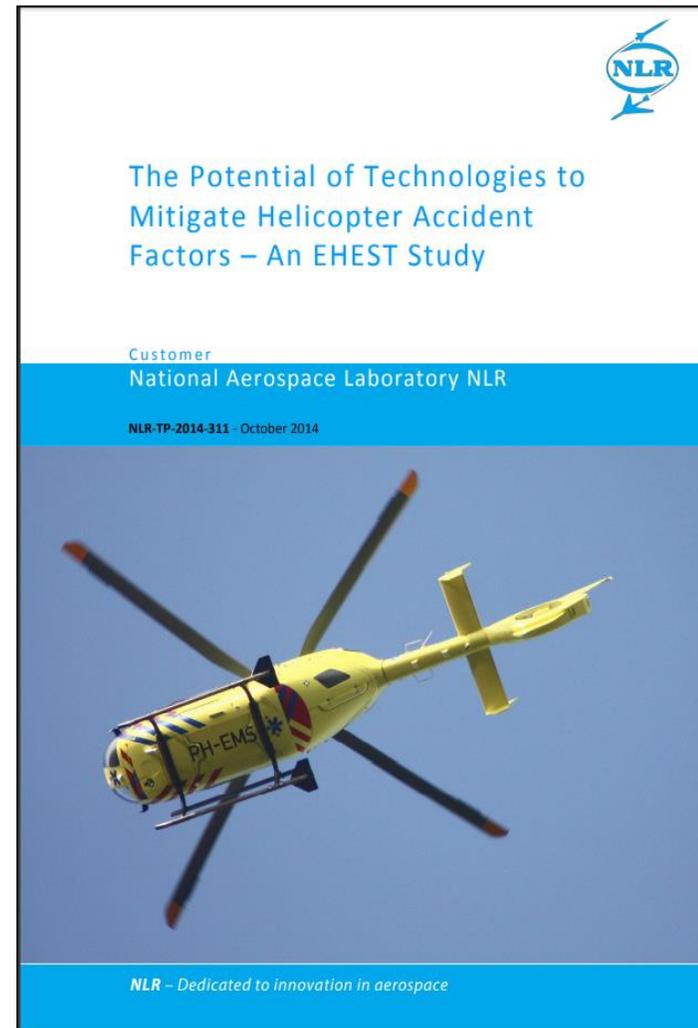


Flight training Course
2 + 2 Hours Simulator Sessions



Conclusion

The Potential of Technologies to Mitigate Helicopter Accident Factors – An EHEST Study





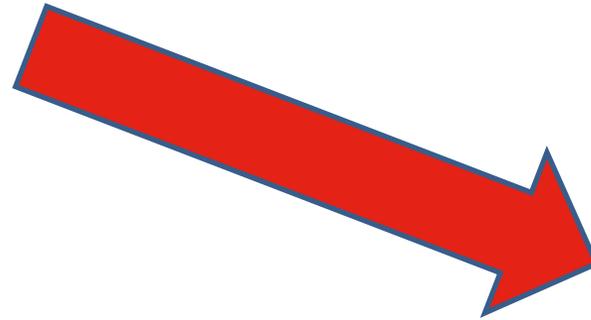
Conclusion



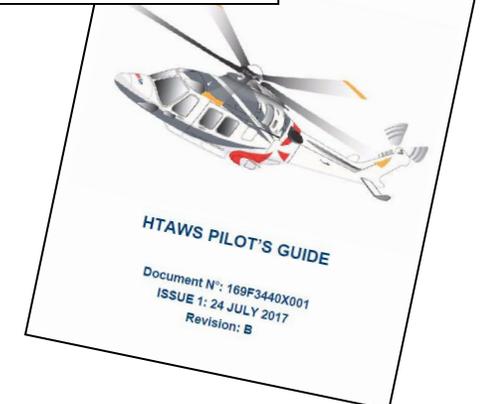
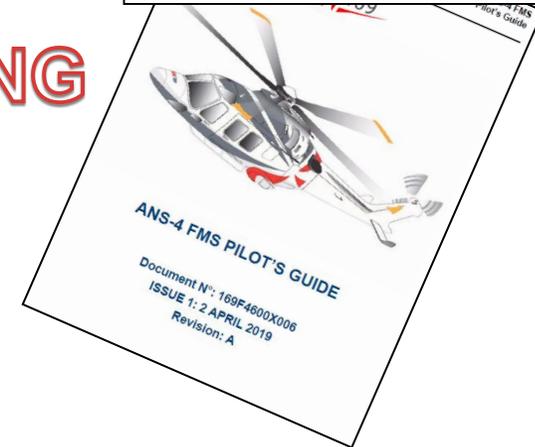
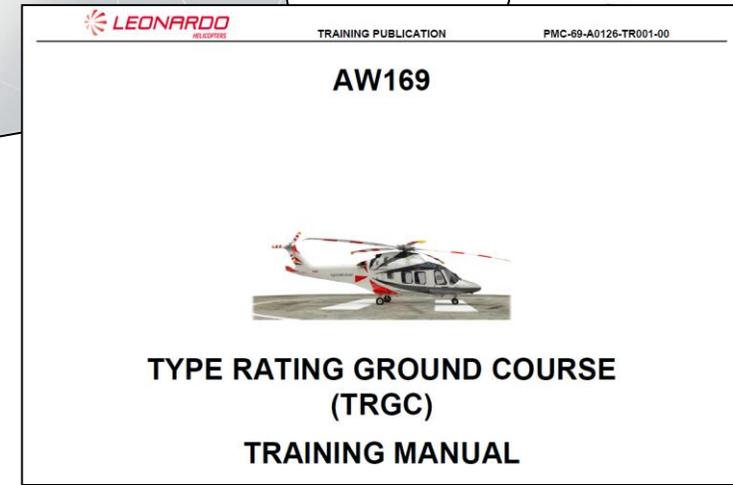
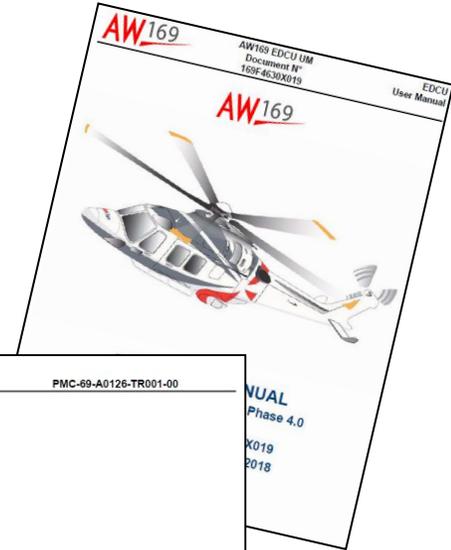
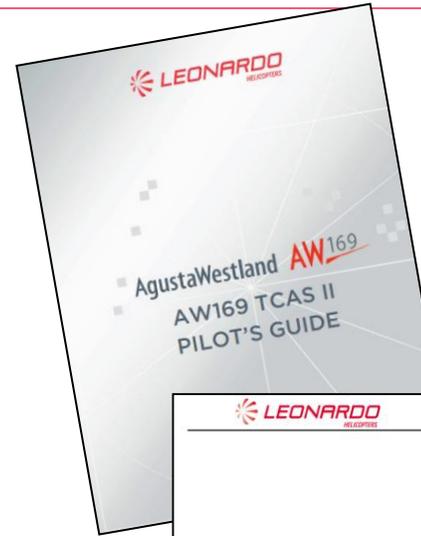
Whereas **Technology, Safe Operation, Experience and Training** all introduce safety barriers, their combined use appears much more effective when it comes to increasing flight safety.



NEW TECHNOLOGY



NEW TRAINING



HELICOPTERS DIVISION



THANK YOU
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