

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

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Together4Safety





# PROPRIETARY NOTICE

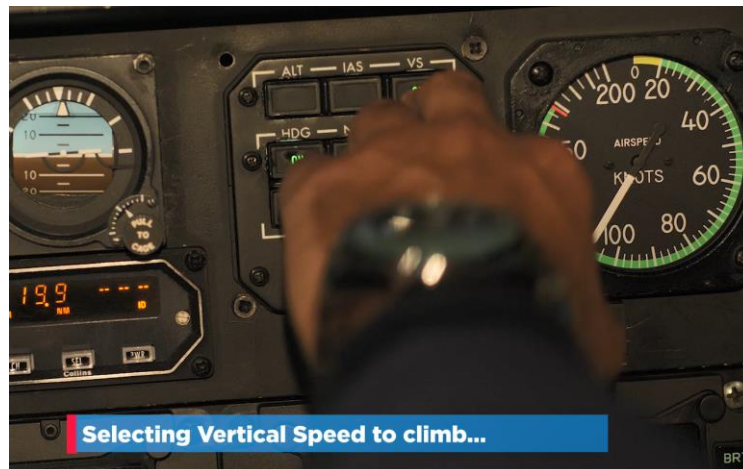
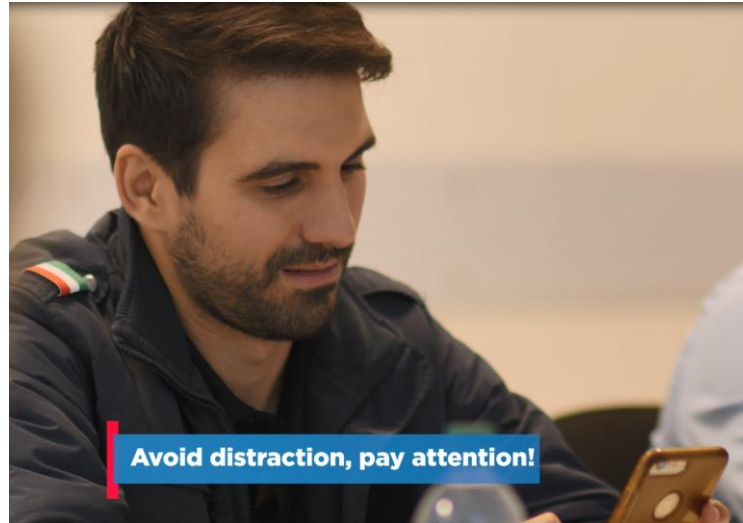
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# AUTOMATION AND FLIGHT PATH MANAGEMENT



# Automation and Flight Path Management





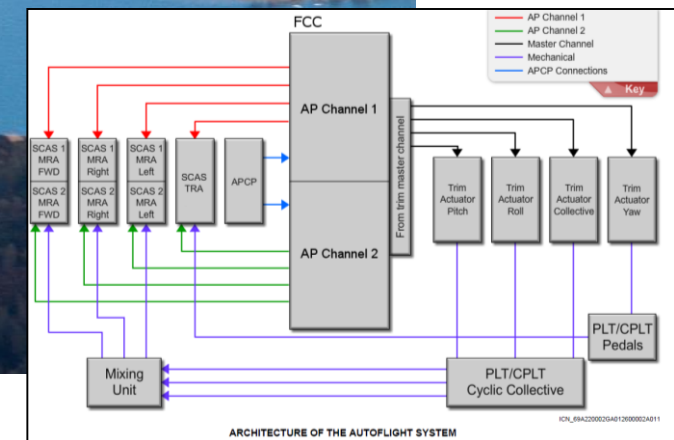
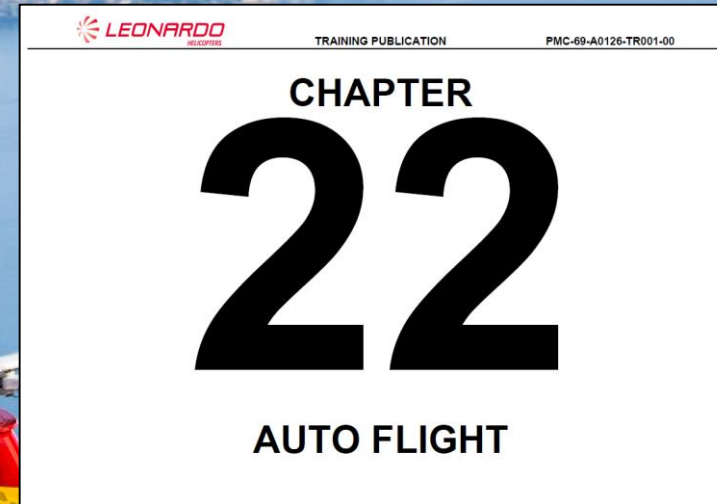
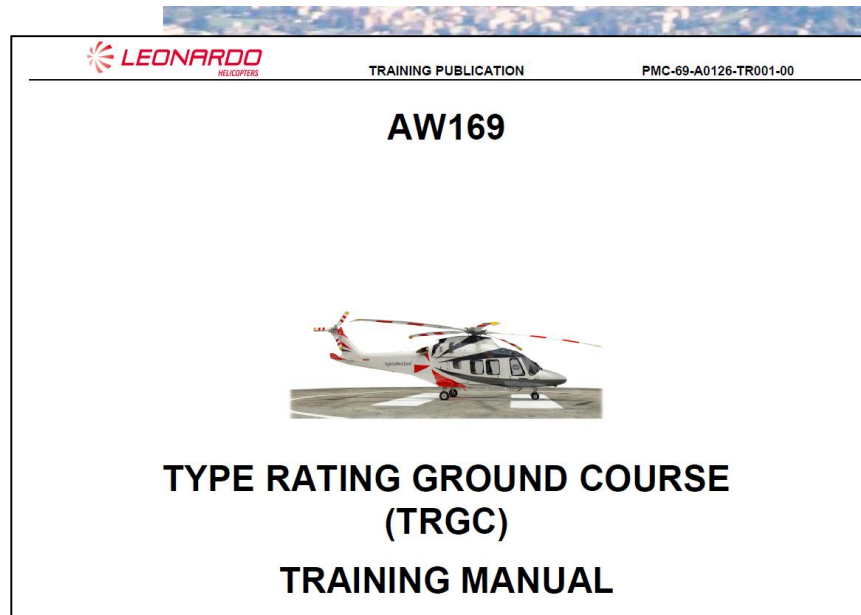


# Automation and Flight Path Management





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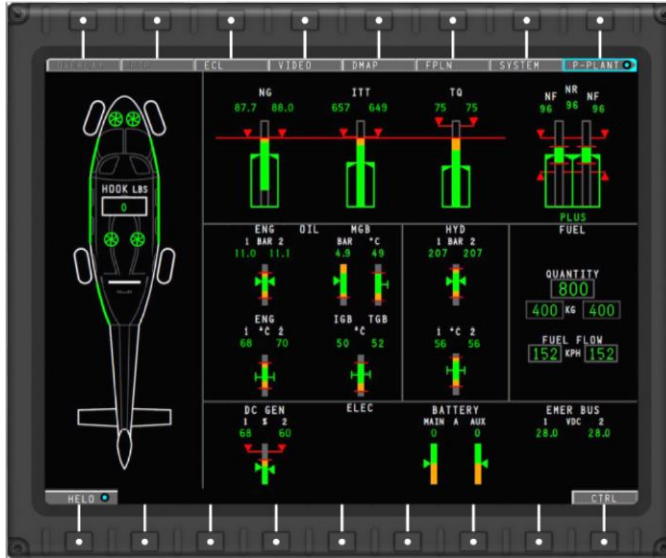
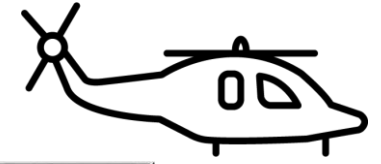






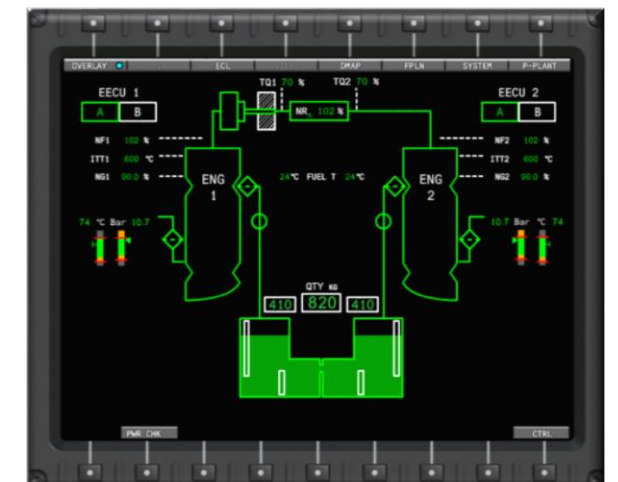
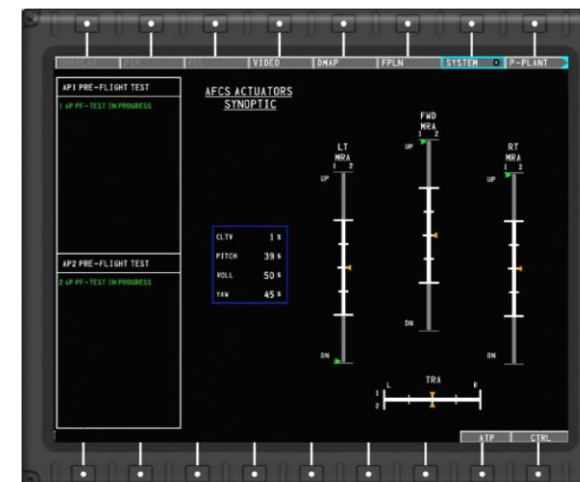
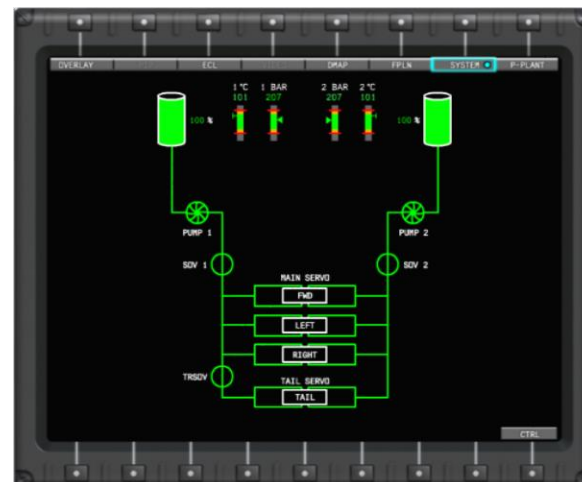
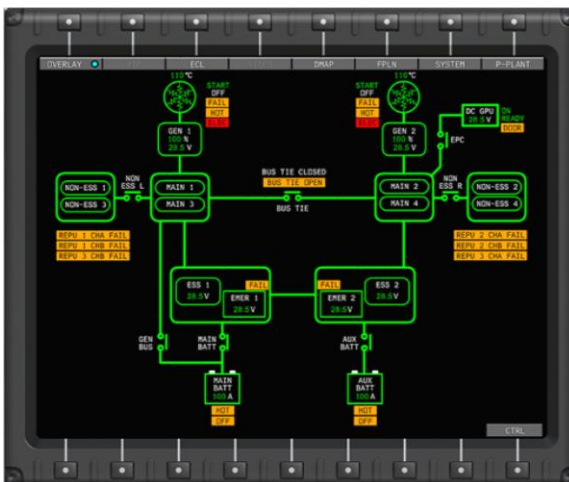
# Automation and Flight Path Management

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



AW169  
PFD

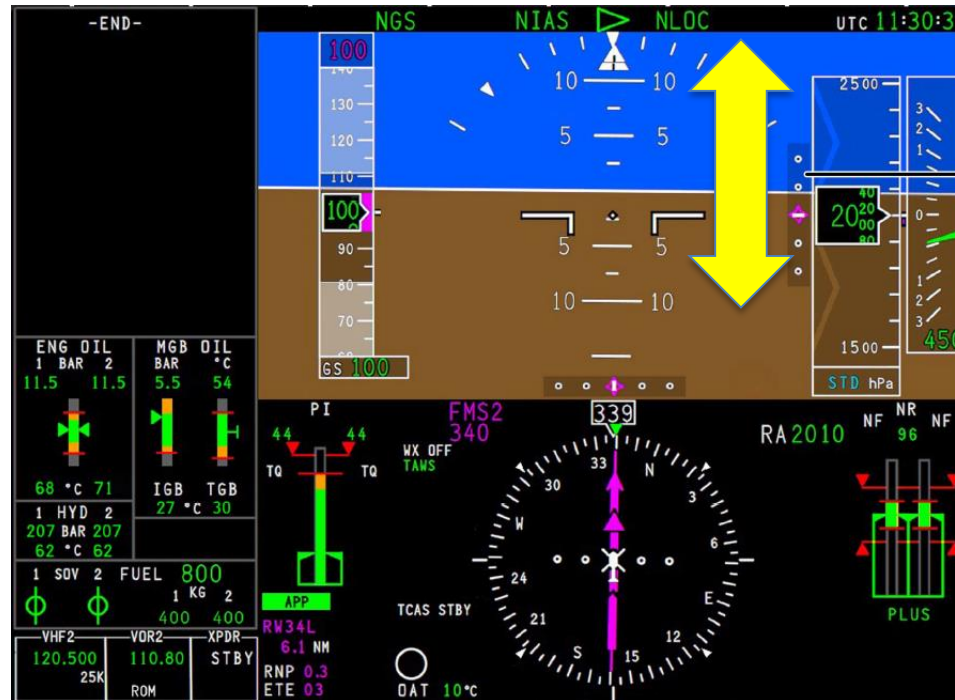
AW169  
MFD







# 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



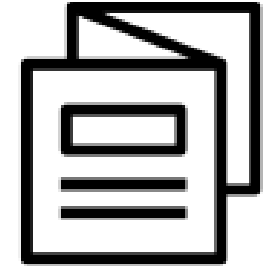
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Company General Use



# Glass Cockpit and Automation Management

## Aims and objectives of the course



With a GLAM we facilitate trainees in achieving:

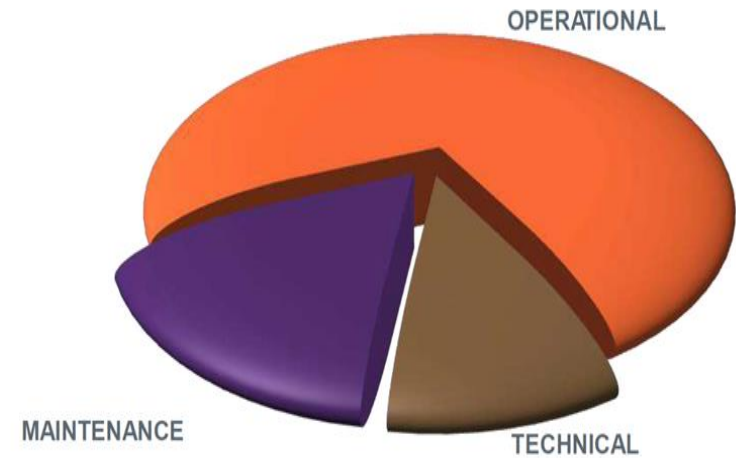
1. a broad perspective on the design philosophy and how to operate the advanced avionics and automation that are features of the so called Glass Cockpit Helicopters;
2. a basic knowledge of the system and to improve the effectiveness of Type Rating and Conversion Courses;
3. a broader understanding of 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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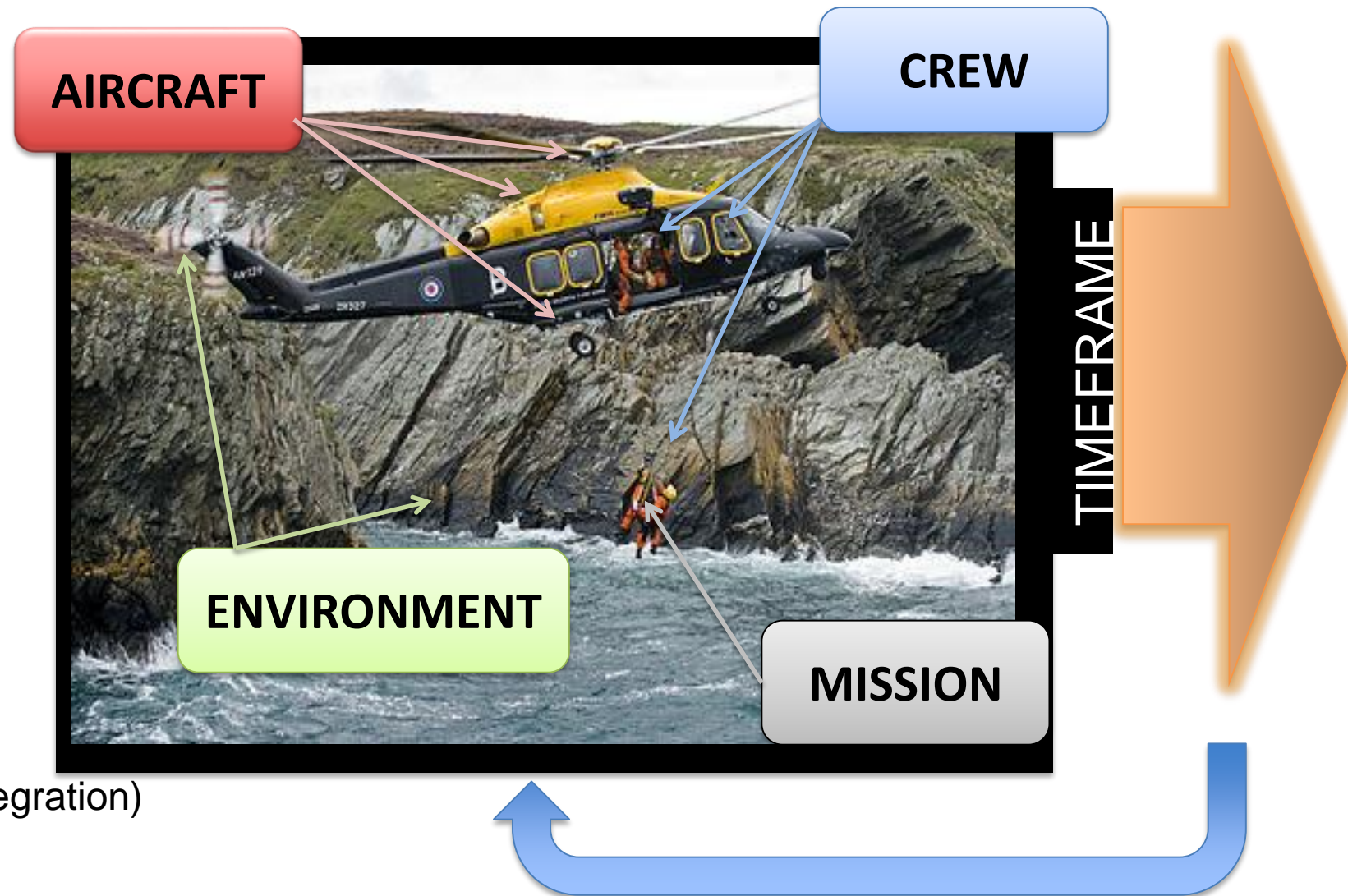
Controlled Flight into Terrain (CFIT)  
continues to be  
a major category of helicopter accidents worldwide

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

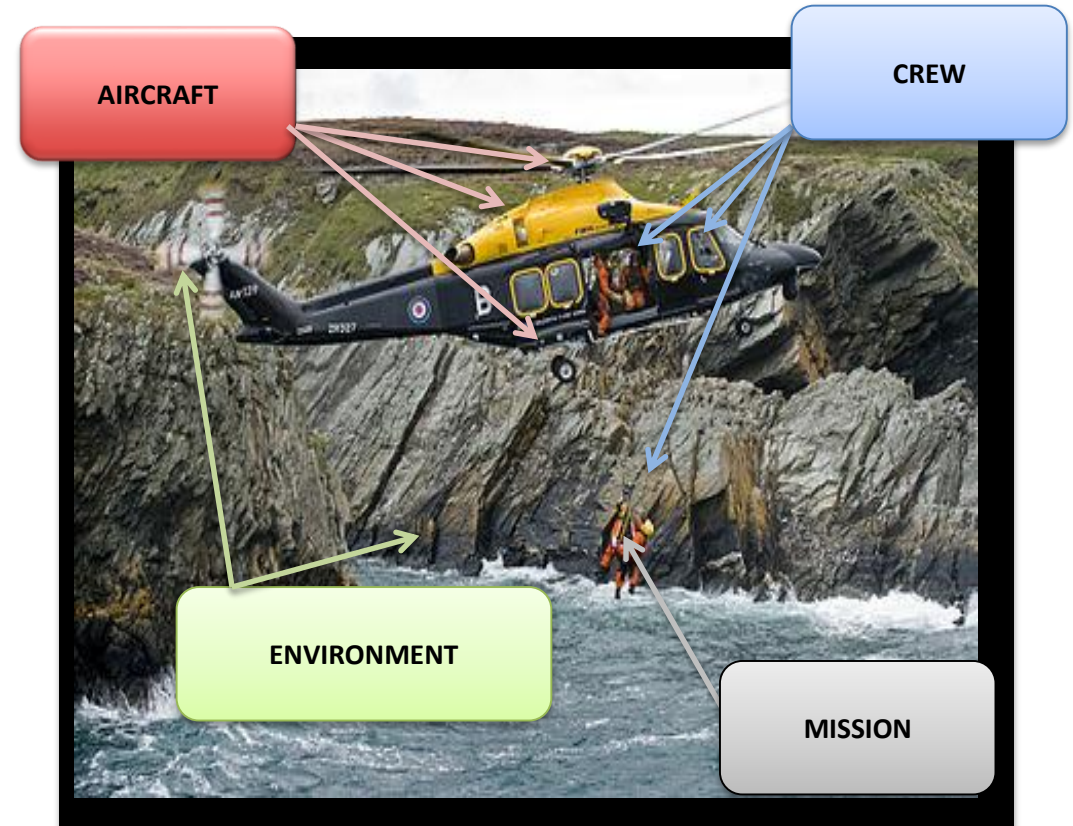
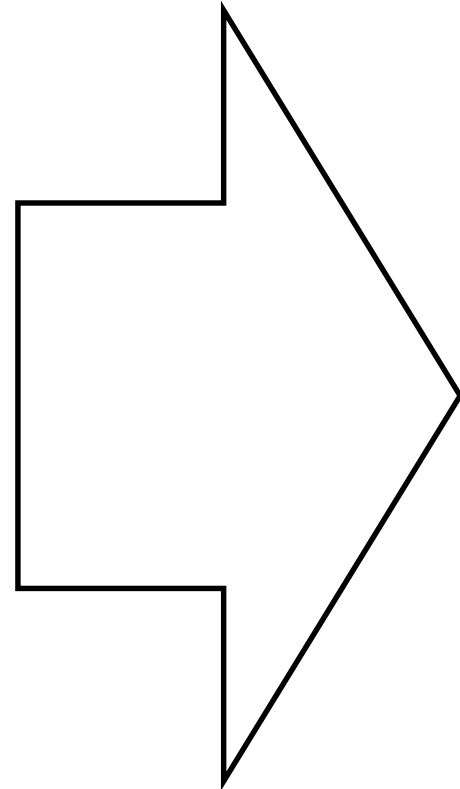
DMAP

SVS/EVS

LIDAR

RADAR

POWEWRLINE DETECTION





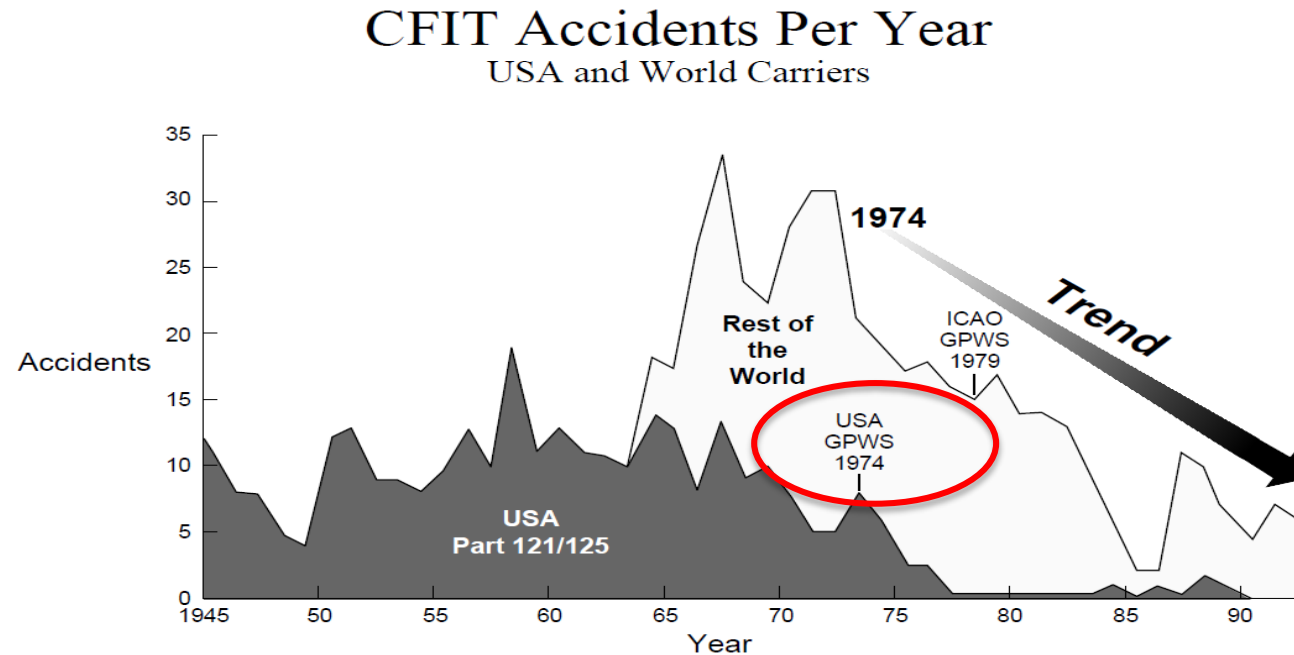
# Helicopter terrain awareness and warning system (HTAWS)







# Defences Against CFIT - Introduction of GPWS



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.

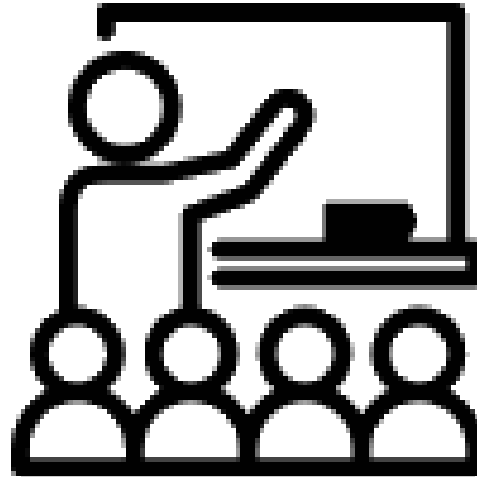
- Well-designed equipment,
- comprehensive operating procedures,
- extensive runway approach aids,
- and standardized charting
- or altimeter setting procedures and units of measurement

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

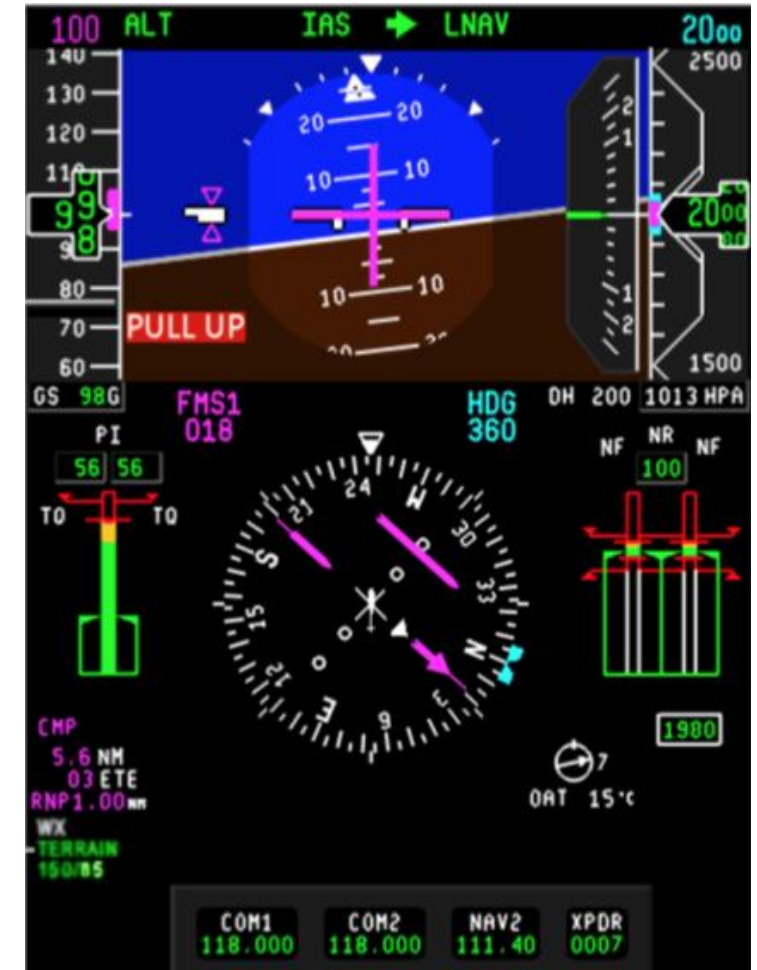
**Mode 2:** Excessive Terrain Closure Rate Mode

**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



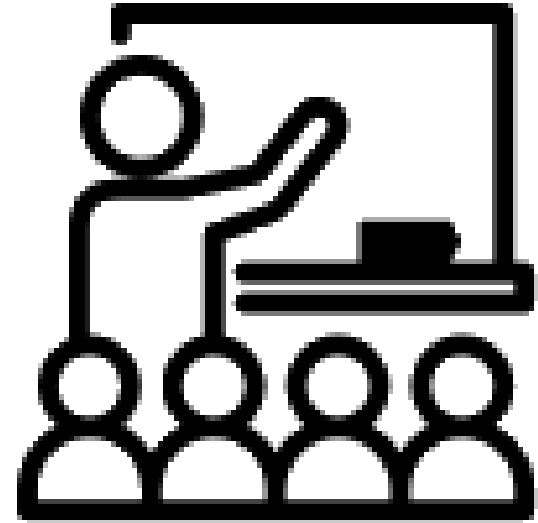
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# CFIT Theoretical Instruction

## 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

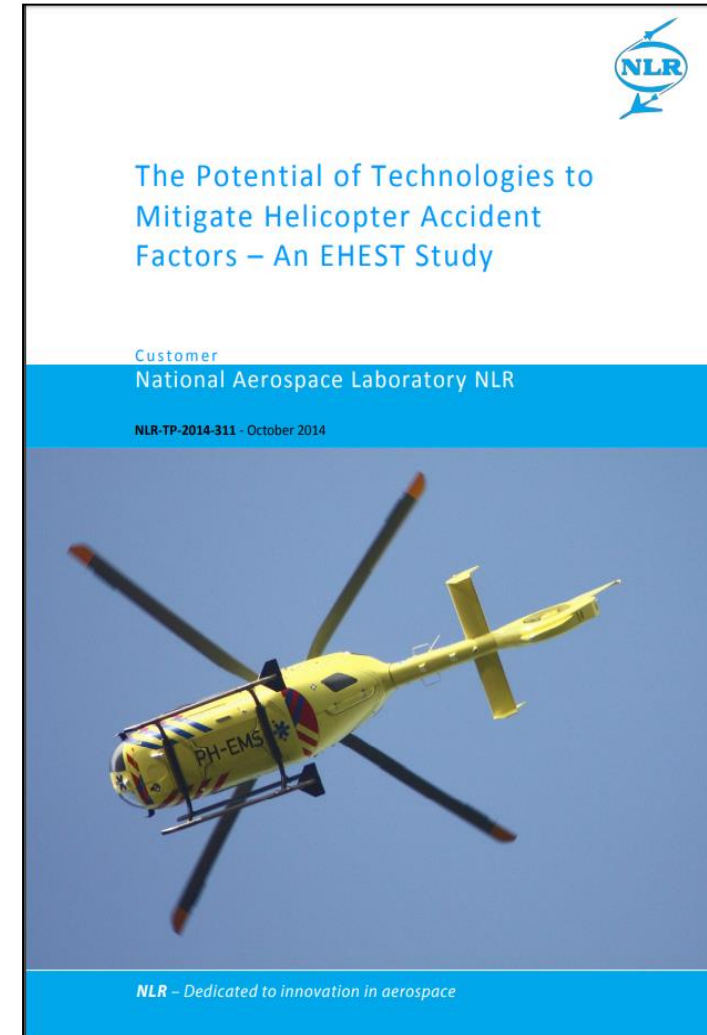
- a. Demonstration of TAWS
- b. Flying in Degraded Visual Environment (DVE)
- c. IIMC recovery techniques
- d. Brown Out and White Out escape techniques



**Flight training Course**  
**2 + 2 Hours Simulator Sessions**

## Conclusion

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







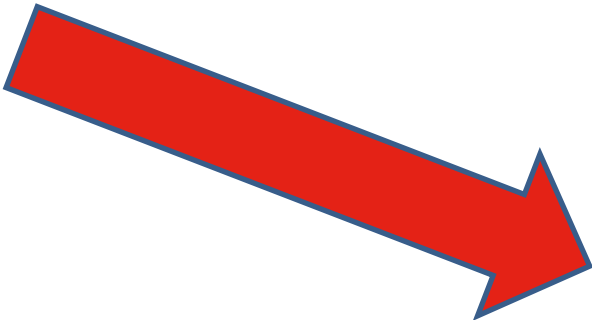
## Conclusion



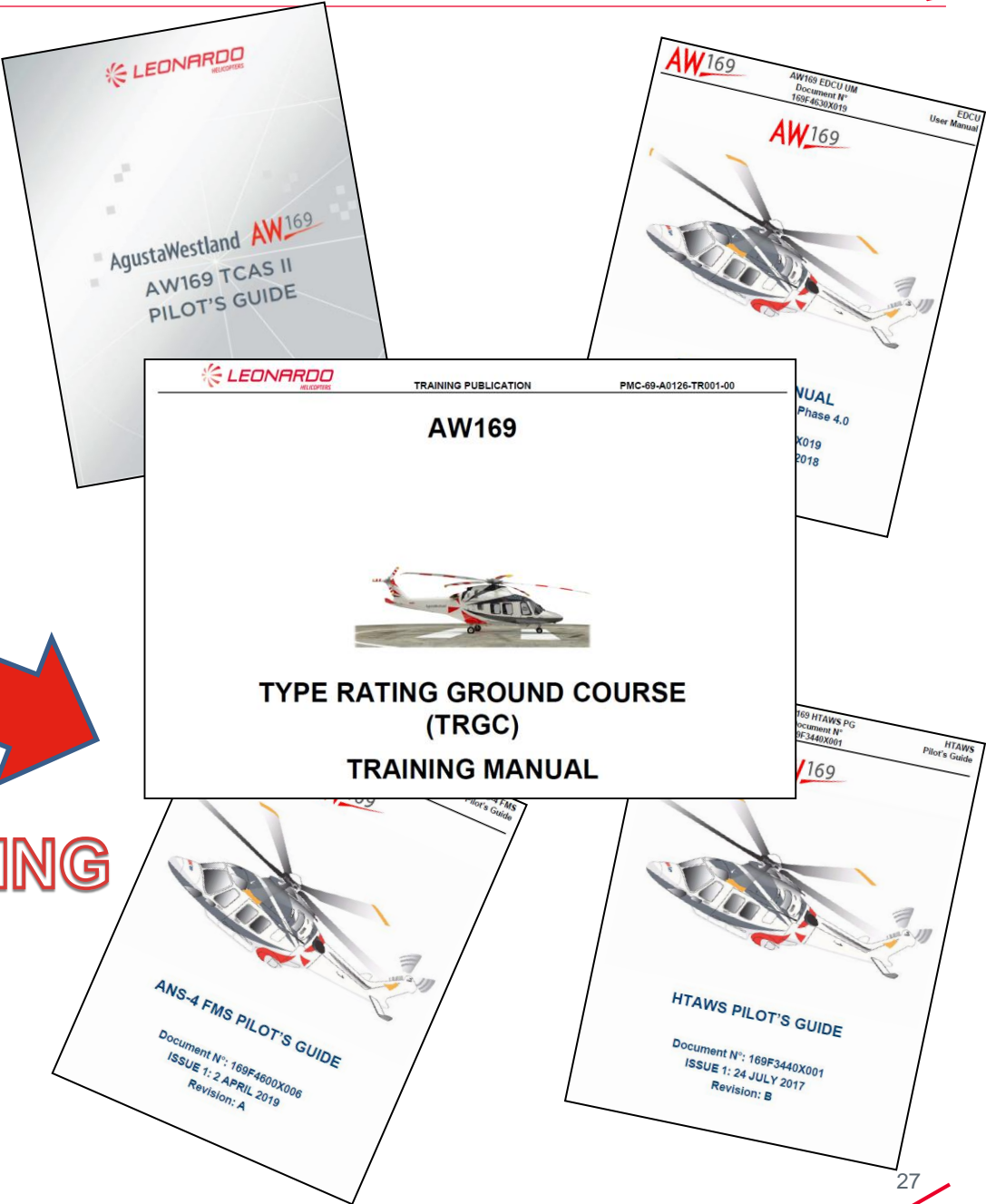
Whereas **Technology, Safe Operation, Experience and Training** all introduce safety barriers, their combined use appears much more effective when it comes to increasing flight safety.



# NEW TECHNOLOGY



# NEW TRAINING



HELICOPTERS DIVISION



THANK YOU  
FOR YOUR ATTENTION

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