



AW Obstacle Proximity LIDAR System (OPLS™)



AgustaWestland





SYSTEM BACKGROUND

Over **45 rotorcraft accidents** registered in Europe, just in the **HOVERING** flight condition

(European Helicopter Safety Team – 2008)



Almost **30 fatalities** occurred in USA, during helicopter **SAR/EMS** operations

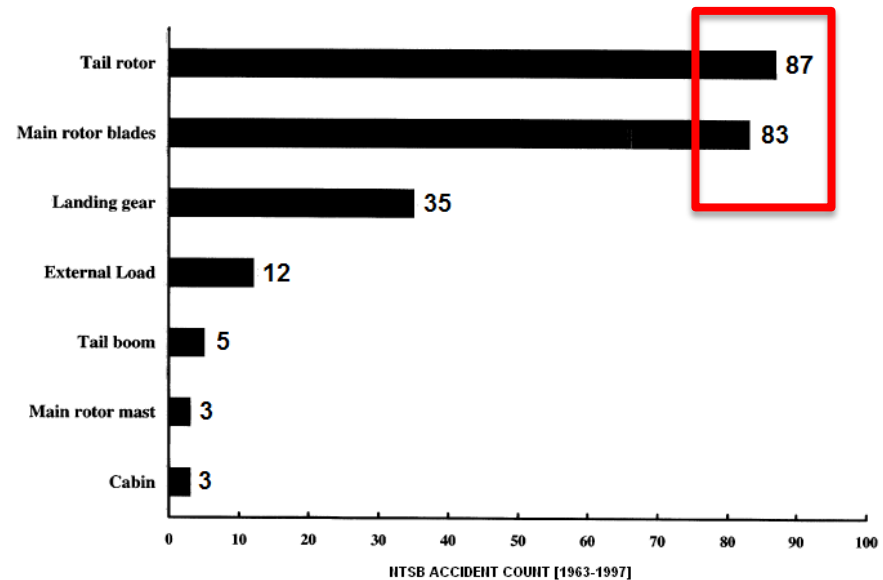
(US Joint Helicopter Safety Analysis Team – 2008)



SYSTEM BACKGROUND (ctd)

AW OPLS (**Obstacle Proximity LIDAR System**) aims at avoiding main and tail rotor strike against peripheral obstacles which jeopardize the aircraft during low speed manoeuvres, in confined spaces.

Preliminary investigations started in 2009 and suggested to invest in optical sensors as compact and effective countermeasure to assist pilots in this scenario.



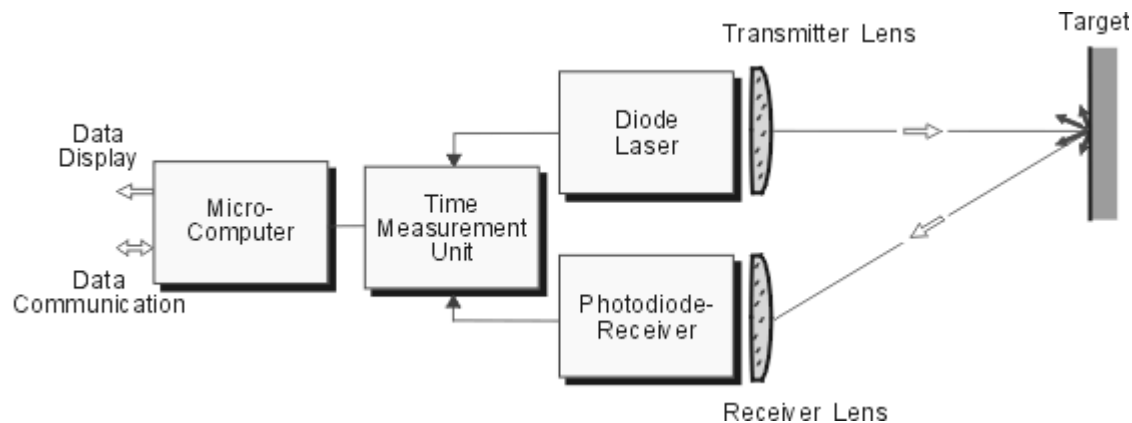


PRINCIPLE OF OPERATION

AW **OPLS™** is based on LIDAR technology.

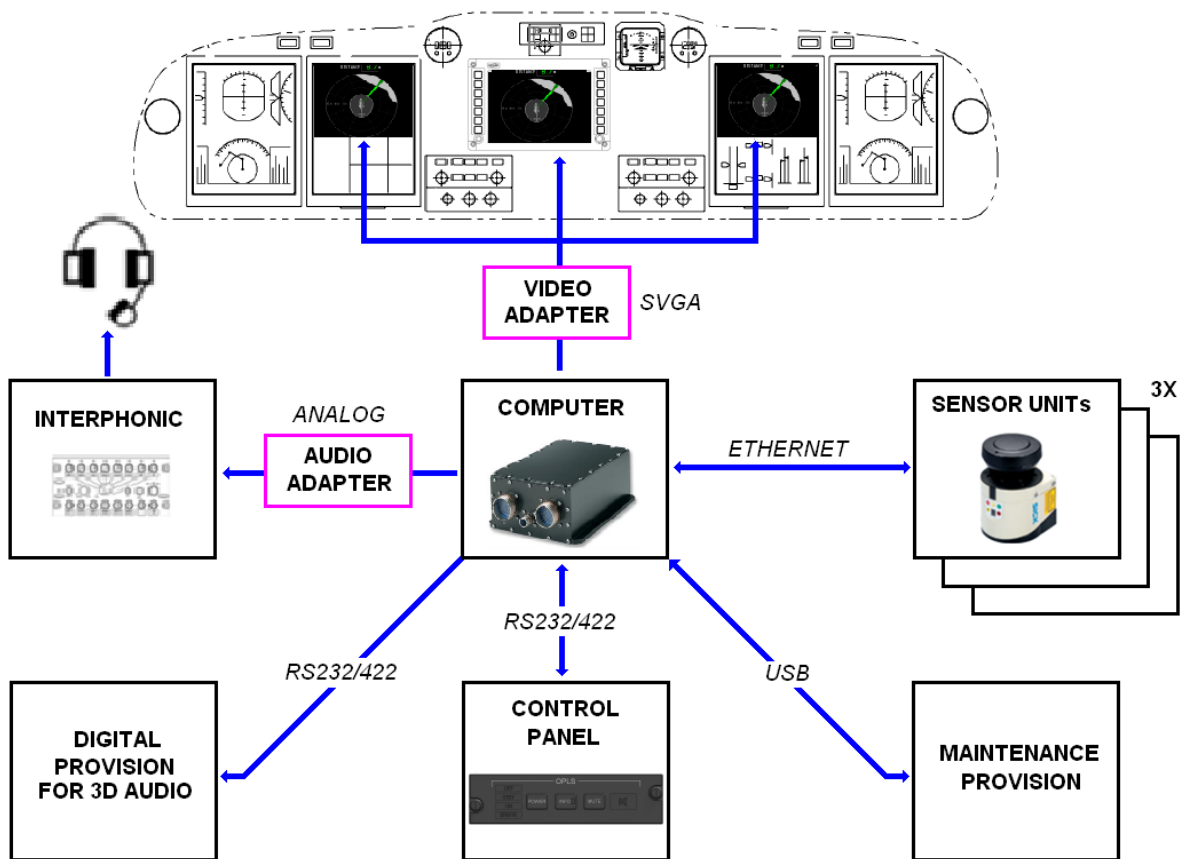
LIDARs (Laser Imaging Detection and Ranging sensors) are exploited in several engineering fields (automotive, surveillance, robotics) for metrology.

When installed on board a helicopter, LIDARs can deduce obstacle's position from light pulse "time-of-flight".





SYSTEM ARCHITECTURE



AW OPLS includes three independent LIDAR sensors, a central computer and a dedicated control panel.

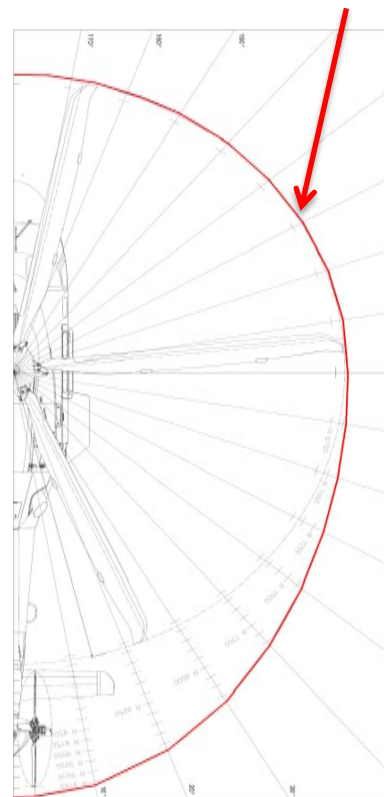
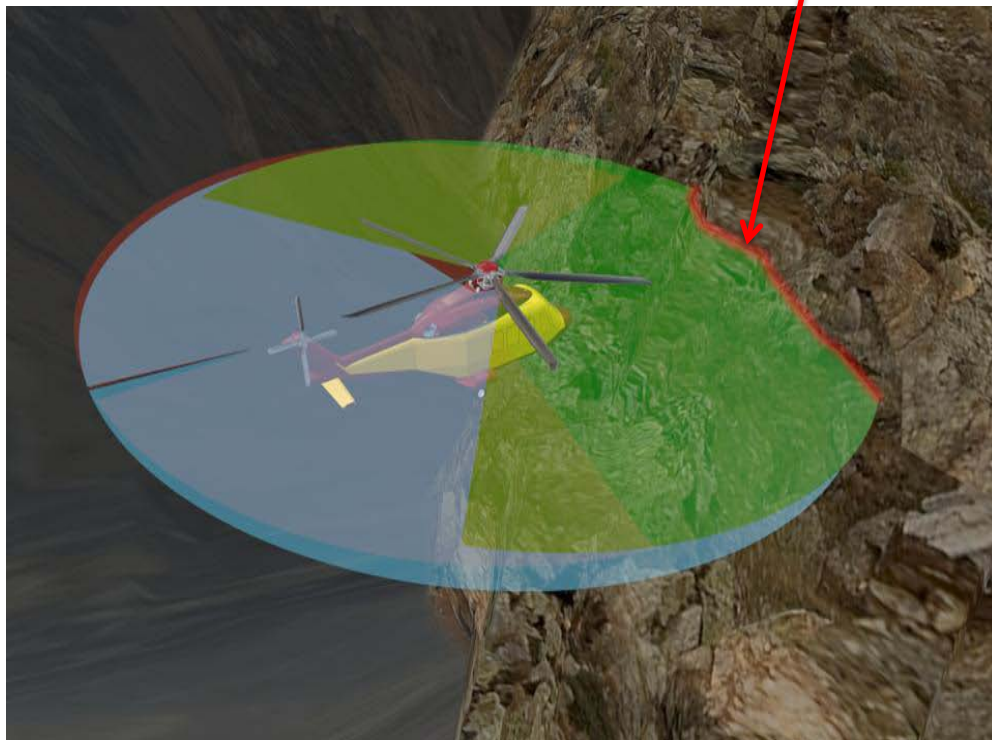
Pilots can operate and monitor the system status from the control panel.

Video & audio indications are provided on **MFDs** and through **ICS**.



DISTANCE COMPUTATION

System indications are based on aircraft **Distance Margin**. Distance margin is computed as difference between the **Obstacle Profile** and the **Rotor Profile**.





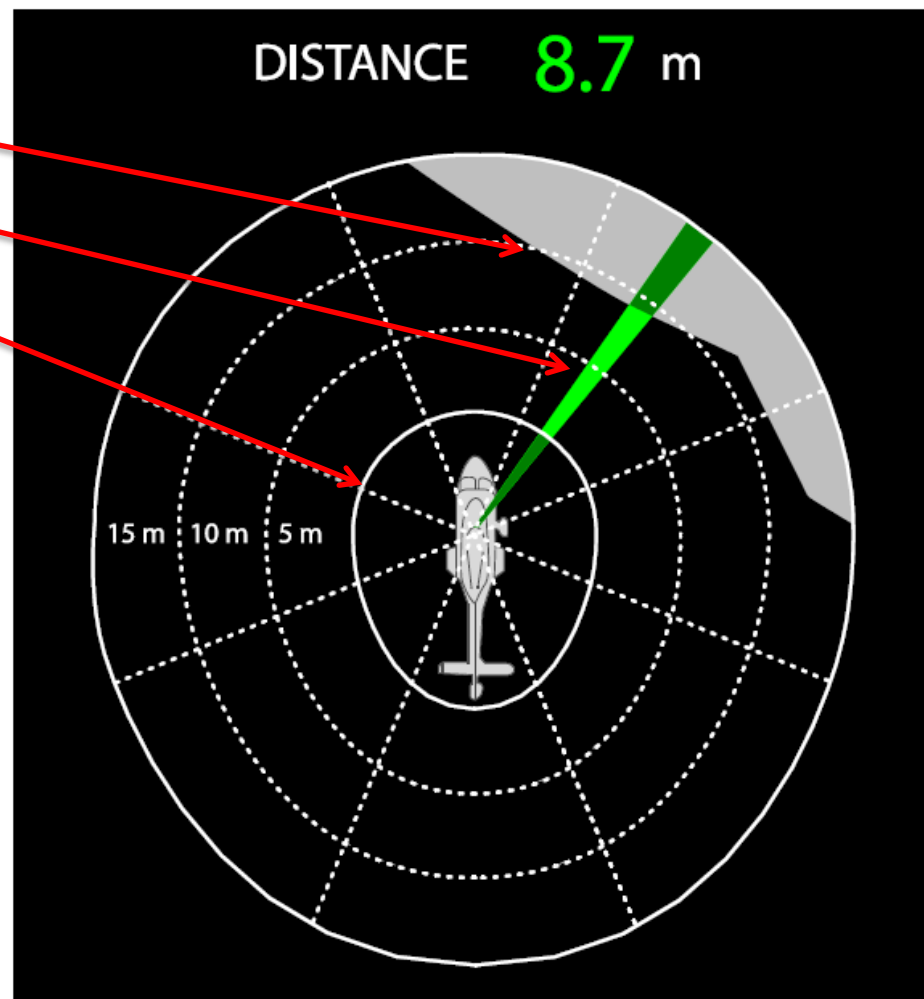
SYSTEM INDICATIONS

Obstacle Profile

Distance Margin

Rotor Profile

- Realistic 360 top-view representation
- Obstacle profile on polar grid
- Range captions
- Critical radial indication
- Distance numerical indication
- Distance color coding (red/amber/green)





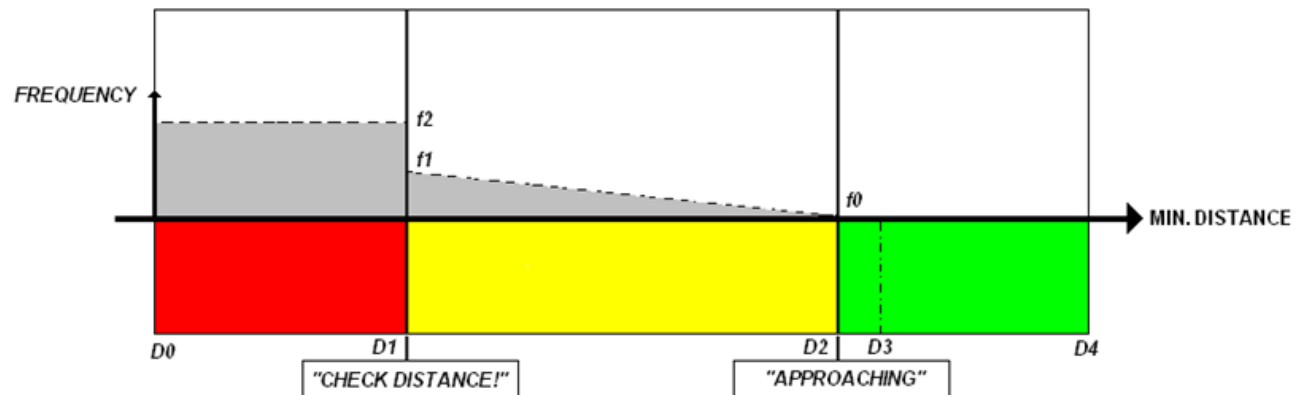
SYSTEM INDICATIONS (ctd)

In addition to the colour coded indication an audio tone is also heard in the intercom which increases in frequency as the distance decreases.

An audio annunciation is heard passing from Green to Yellow “APPROACHING” and from Yellow to Red “CHECK DISTANCE” zones.

The audio tone and annunciations can also be selected to MUTE with an indication when in MUTE. The MUTE function can be selected when in the yellow band by either pressing the MUTE button on the panel or the CAS RST button on the collective. (The MUTE function does not activate if selected whilst in the Green or Red band).

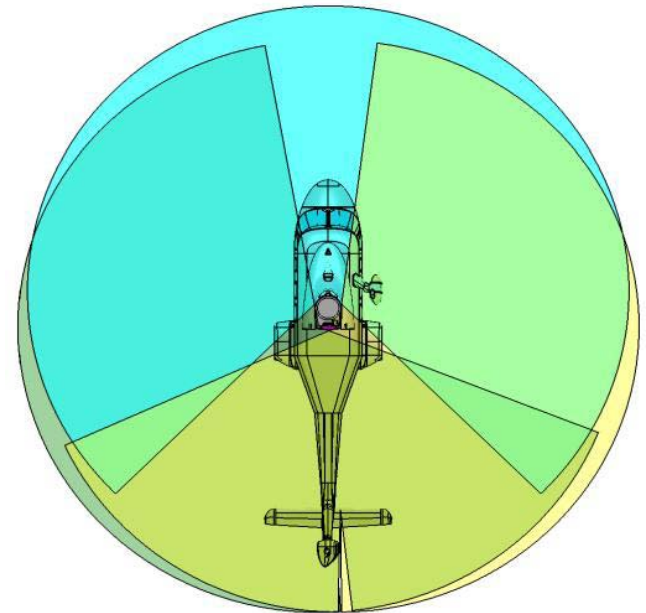
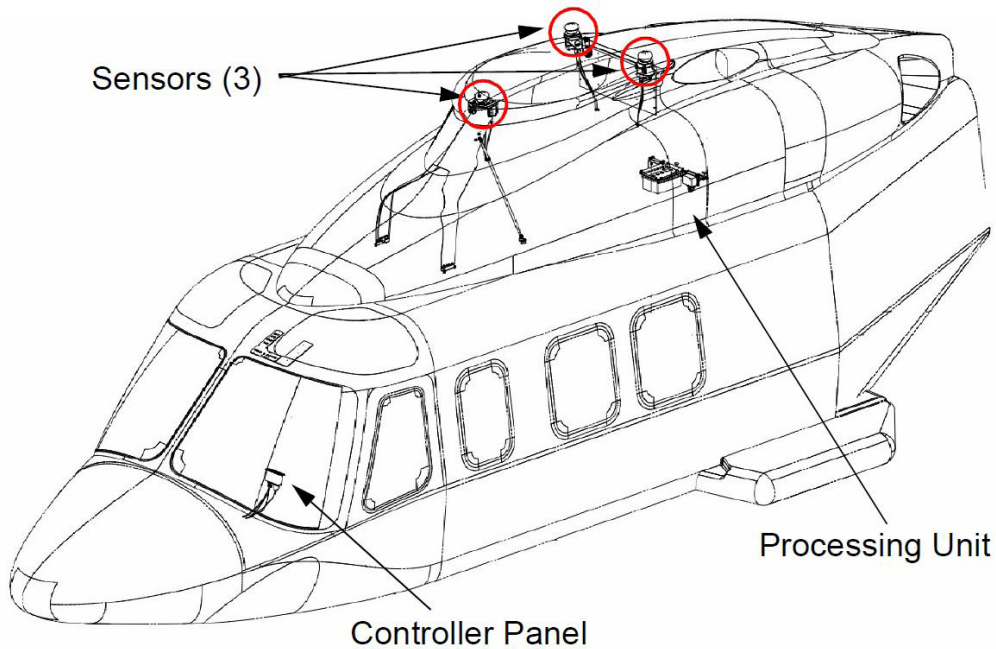
D0	0m
D1	[2;8]m
D2	D1+5m
D3	D2+2m
D4	15m
f0	0Hz
f1	2Hz
f2	4Hz





SYSTEM INSTALLATION

Obstacles are detected 360° and up to 25 m by digital processing of overlapped laser beams (minimum distance voting applies).

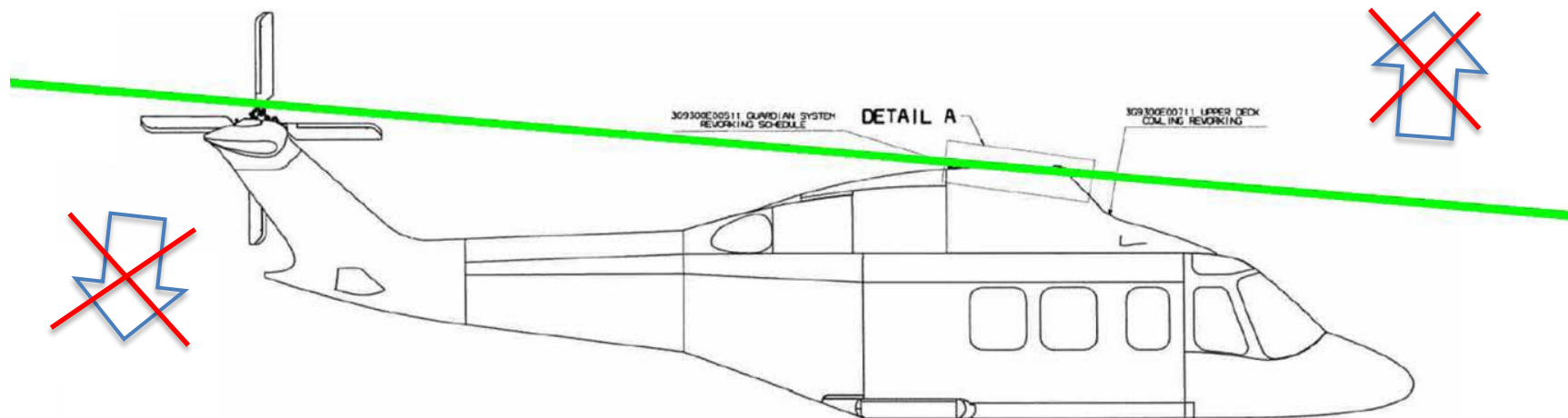




SYSTEM FOV

CAUTION

OPLS indicates the obstacles in the plane of the LIDAR sensors. **No information above or below this plane is measured.**





System Performance

Ground Testing



Different target obstacles were successfully detected with a high level of accuracy.





System Performance

Flight Testing





SYSTEM CERTIFICATION

The OPLS has now been certified by EASA as an option for AW139.

The system will also be made available for additional platforms including the AW169, AW189 and AW101 helicopters.





THANK YOU FOR YOUR ATTENTION

