CONAER 2019
Leonardo for HEMS and the Italian experience

CONAER 2019
Curitiba – October 24° 2019

Leonardo Helicopters

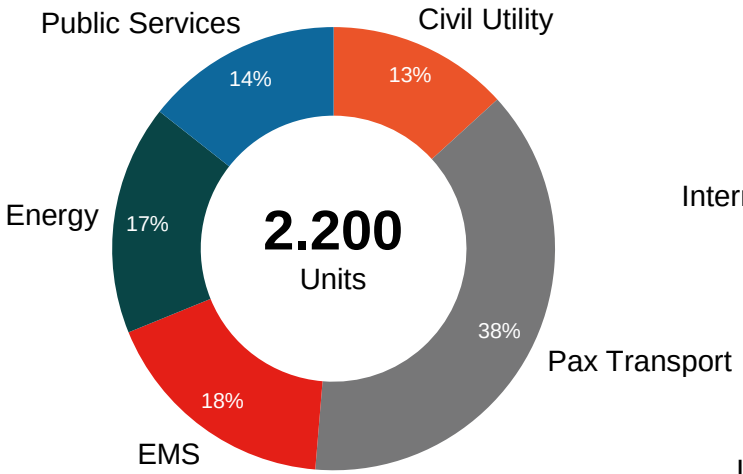
within Leonardo Group

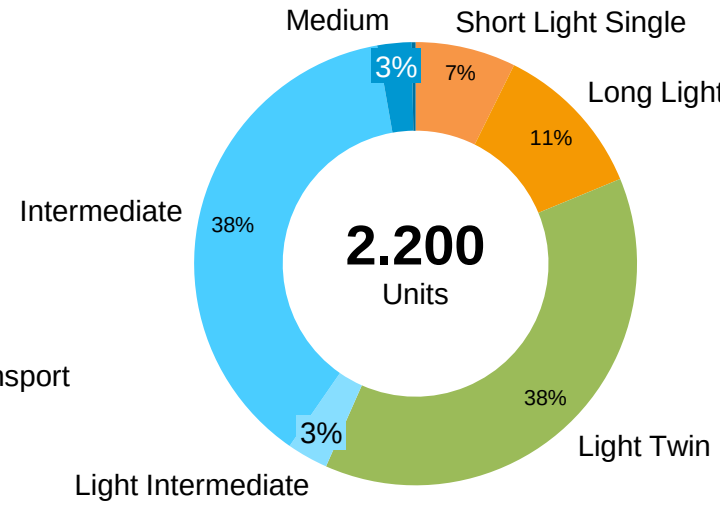
KEY FIGURES I 2018 overview

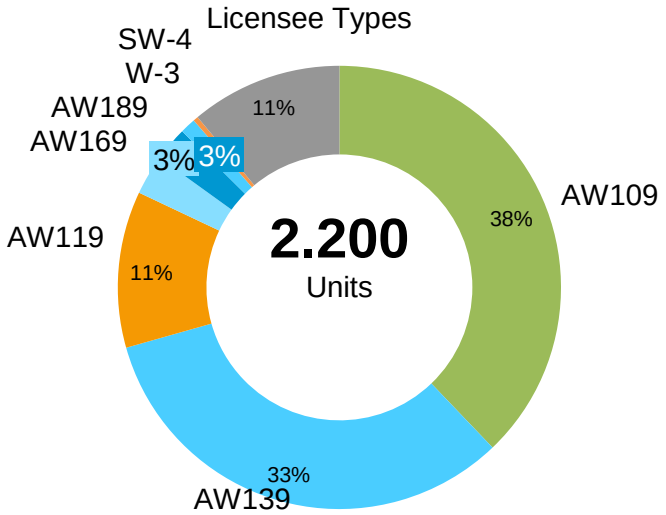
	REVENUES	ORDERS	PEOPLE
			
LEONARDO	**12,2B**	**15,1B**	**46,462**
LEONARDO HELICOPTERS	**3,8B**	**6,2B**	**11,596**
	31%	**41%**	**25%**

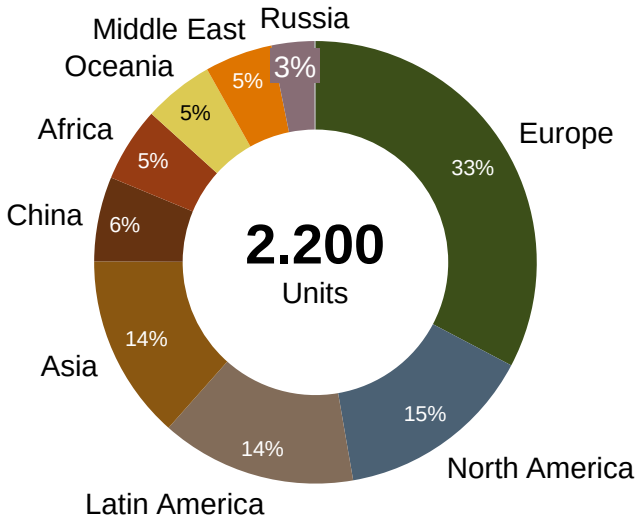
MISSIONS I The right product to perform any mission

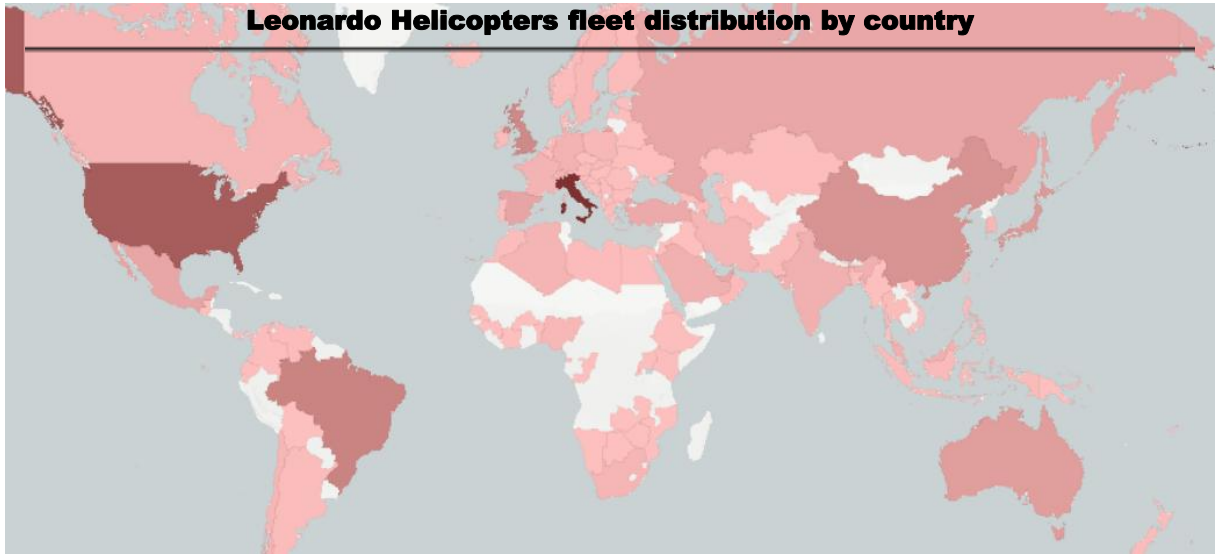
Leonardo Helicopters Current Civil Turbine Helicopter Fleet





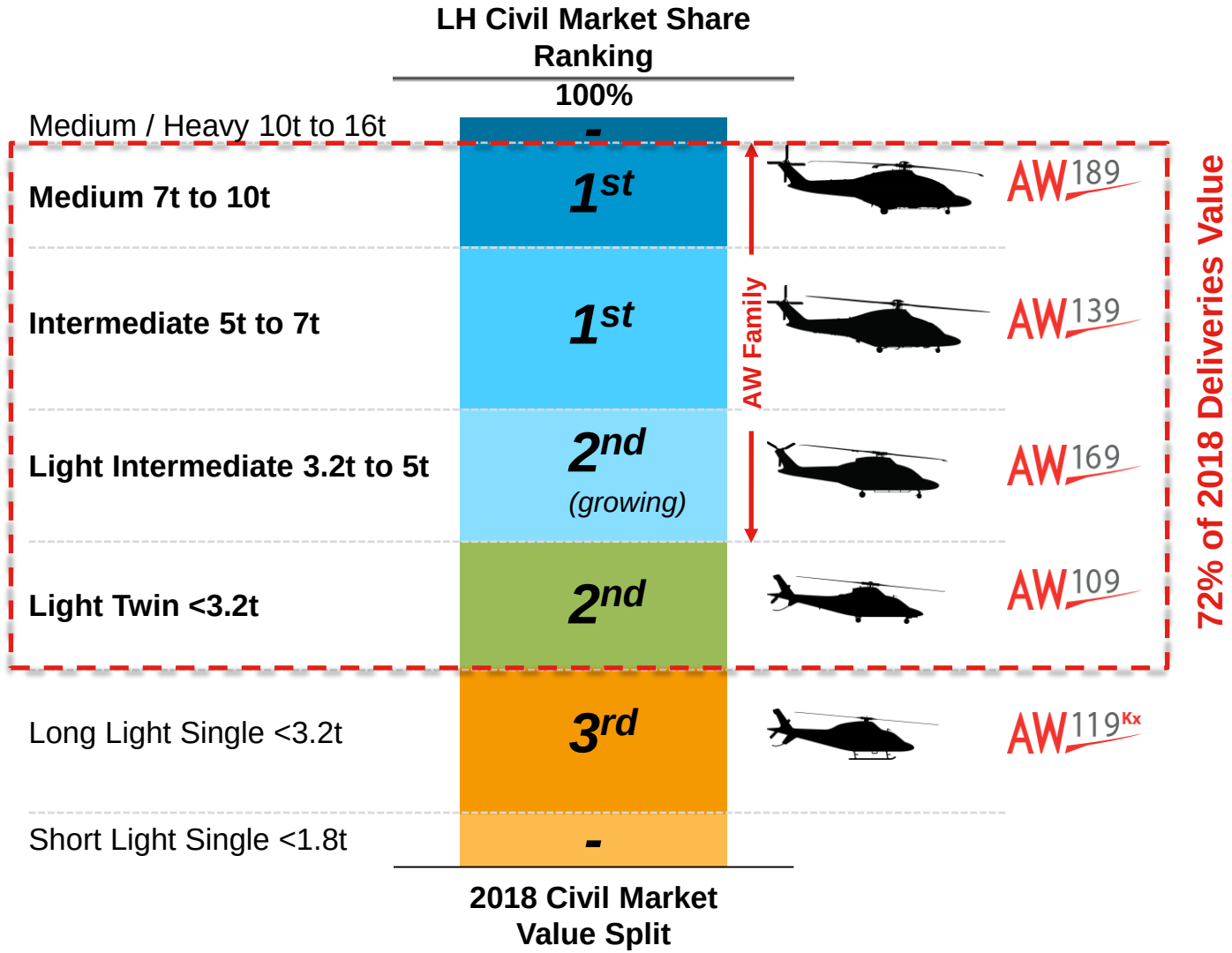






Source: Leonardo Helicopters in service active turbine fleet as of April 2019.
Pax Transport includes Corporate/Private and Air Taxi/Charter;
Public Services include Law Enforcement and SAR.

Leonardo first civil OEM in 2018 for Value



- Leonardo first civil OEM in 2018 for value of deliveries
- Civil Market share increase in 2018 to ~40% (was below 35%)
- Clear leadership in the 3,2-10 tons range across all roles
- Leader in the VIP multiengine market, with a share higher than 40% in the last 10 years
- Focused presence in light classes, especially for Utility, EMS and VIP roles

Source: Internal analysis on Leonardo Helicopters reference civil market (based on deliveries evaluated at standard prices); 2019 economic conditions.

HEMS / SAR

Helicopter Emergency Medical Services
/
Search And Rescue

HEMS: what it is about?
This term refers to the medical professionals who respond to emergency calls and treat and transport people by helicopter in crisis health situations

HEMS (Helicopter Emergency Medical Services) is the most rapid and effective service conceived to:

- protect and serve the population, being able to overcome any traffic and speed limitations
- bring the patient in the shortest time not to the nearest hospital but **to the most suitable one**.

The EMS symbol, the Star of Life, highlights the 6 main aspects of emergency service that are key to guarantee a real and effective public utility service:

1. Early detection
2. Early reporting
3. Early response
4. On-scene care
5. **In-transit care**
6. Transfer to definite care

Faster intervention with immediate and continuous care

↓

Better recovery by means of accurate care in the right medical facility

↓

Reduction of permanence in the hospital

↓

Faster return to **normal life and productivity**

↓

Cost-reduction for the healthcare system

MISSIONS HEMS / Leonardo Helicopters

Leonardo Helicopters is fully committed to EMS and SAR:

- **seven new helicopters** certified in EMS version in the last decade.
- Tilt rotor under certification process.

2007
AW119Ke

2013
AW119Kx

2015
AW169

2017
AW109 Trekker

Type Certificate

2003
AW139

2009
AW109 GranNew

2014
AW189

2020
AW609

AW119Kx

Fast and Flexible

- 2.8 - ton class
- More Room Than Any Other Light Single Turbine Helicopter
- 1 patient + 4 attendants
- 2 patients + 2 attendants

} **Like a twin-engine h/c**

- Advanced avionics
- Unrivalled performance
- Wide and spacious cabin
- System redundances

AW119Kx

Fast and Flexible

- 1 or 2 longitudinal litters with no intrusion into the cockpit
- 2 attendants + 2 patients as the larger twin engine h/c
- Access to fully body patient

AW109 GRAND NEW

See Further. Go Anywhere

- 3.2 - ton class
- Outstanding performance
- Advanced navigation
- Cabin comfort
- Power and controllability

AW109 GRAND NEW

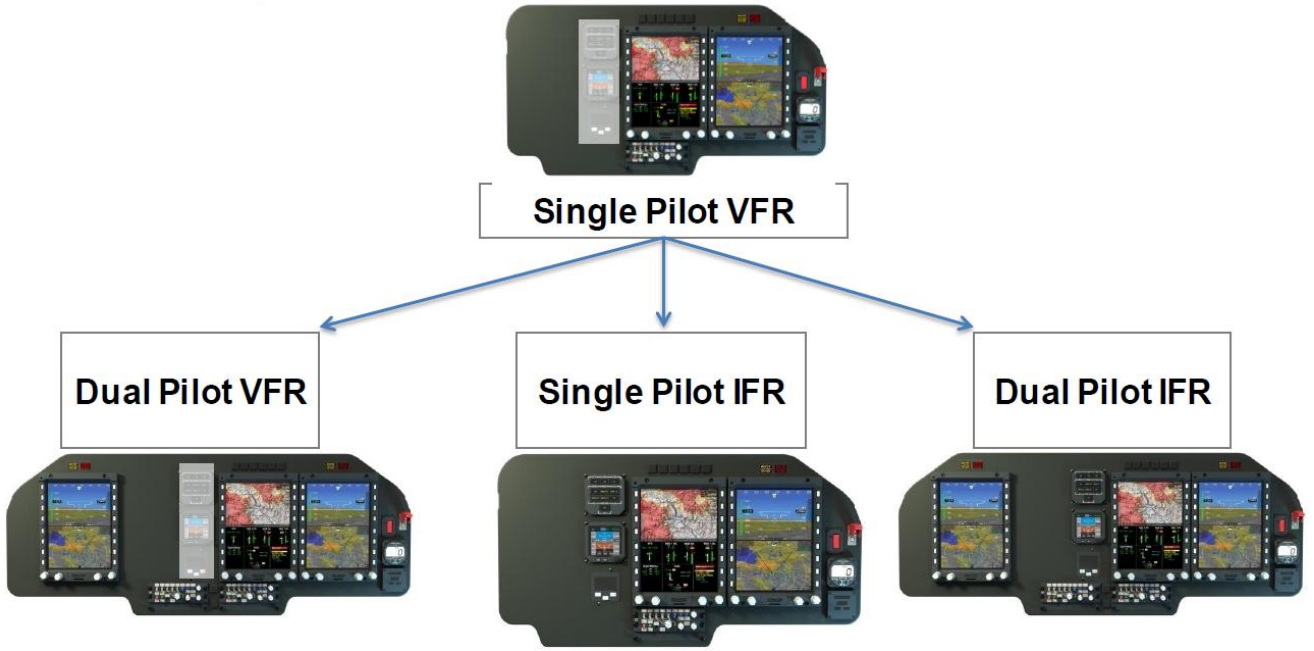
See Further. Go Anywhere

- 1 patient + 4 attendants
- 2 patients + 2 attendants

AW109 TREKKER

Rugged and Reliable

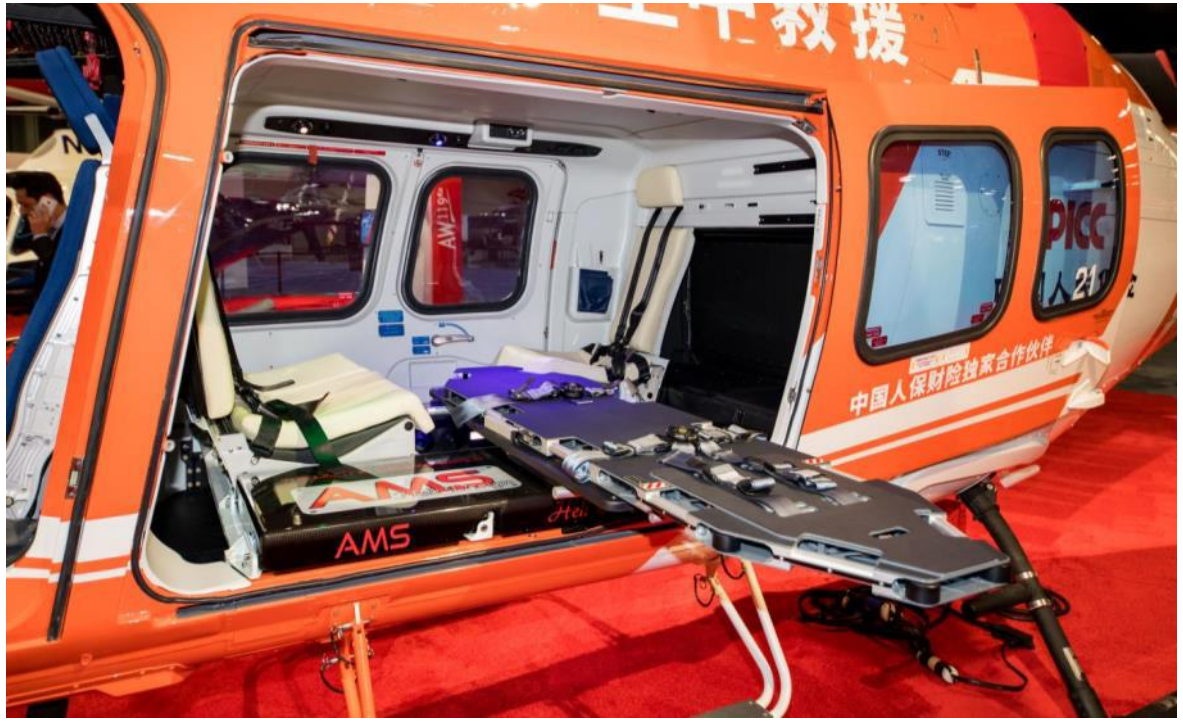
- 3.2 - ton class
- Robust skid landing gear
- A comprehensive range of mission equipment
- High performance in the most demanding operating con
- Controllability and manoeuvrability



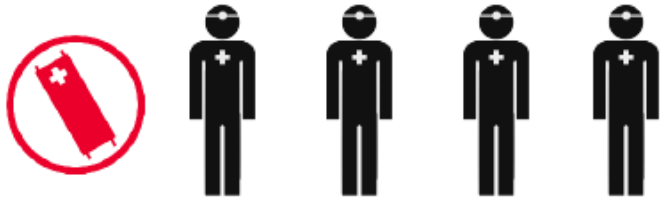
- Embedded features:
  - Synthetic Vision System (SVS)
  - Highway In The Sky (HITS)
  - Helicopter Terrain Awareness and Warning System (HTAWS)
  - Flight Management System (FMS)

AW109 TREKKER

Rugged and Reliable



Easy & effortless transition of the patient to the final locked position inside the helicopter



Unique cabin layout with up to 4 seats for HEMS crew

AW169

Next Generation Versatility

- 4.5 - ton class
- MTOW 4.6 / 4.8 tons
- 2 pilots / up to 10 passengers

- Unrivalled flexibility and uncompromised safety
- Latest-generation avionic suite (open)
- APU mode

AW169

Next Generation Versatility

- Largest cabin in its class
- Designed around the patient needs
- Full body patient access
- Longitudinal layout
- Transversal layout with one or two stretchers

AW139

Simply No Rivals

- 7.0 - ton class
- MTOW 6.4 / 7 tons
- Highest power to ratio in its class
- Widest cabin and baggage volume in its class
- 2 pilots / up to 15 passengers

- Full integrated Honeywell avionic system
- Excellent internal visibility
- Liquid crystal cockpit
- Ergonomic cockpit easy to use
- Full redundancy in all the function

AW139

Simply No Rivals

Cabin **flexibility**

Different type of **stretchers**

Whole patient's **body**

accessibility

Different type of

electromedicals

Crashworthy seats

Cabin **brightness**

AW189

Latest Generation Performance

- 8 - ton class
- MTOW 8.3 / 8.6 tons
- Certified for Full SAR Maritime
- 2 pilots / up to 19 passengers

- A real “All Weather” Helicopter thanks to the latest avionics technology and an impressive number of safety and navigation equipment.
- 50 min main gear box dry run capability
- Larger cabin space and baggage compartment accessibility
- Cabin safety up to sea state 6 (demonstraded and approved

AW189

Latest Generation Performance

AW609

The Game changer - Faster, Further, Higher – A New Way to Fly

- 8.0 - ton class
- First commercial TiltRotor
- 1 litter and up to 6 medical attendants
- 2 litters and up to 3 medical attendant
- All-weather capability
- Fly-by-wire and fully digital cockpit
- High Speed – about 500 km/h cruise speed
- Long Range – up to 1850 km

AW609

The Game changer - Faster, Further, Higher – A New Way to Fly

Conceptual Layouts

Air Ambulance - Single stretcher

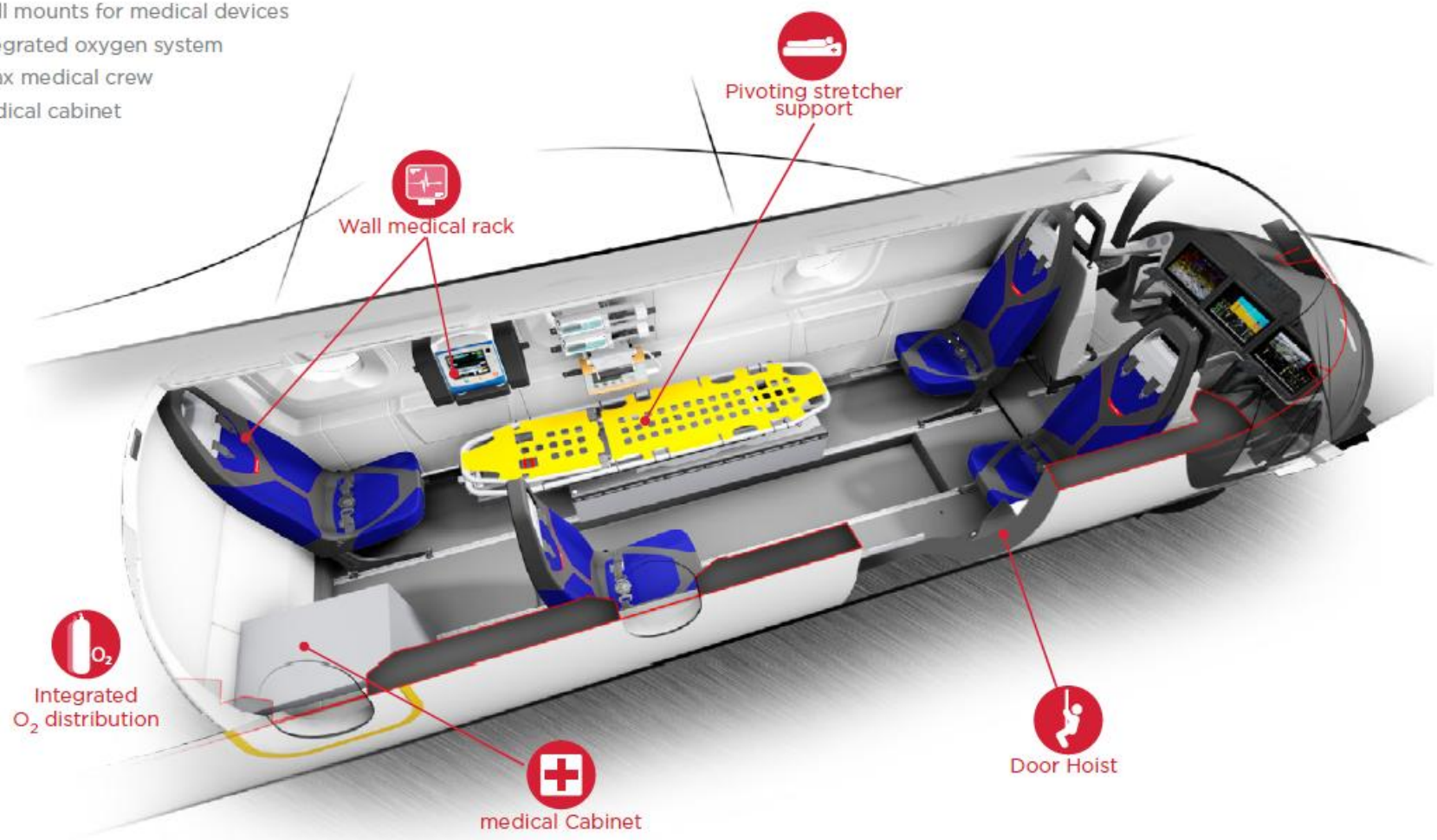
Singlestretcher support with pivoting loading platform

Wall mounts for medical devices

Integrated oxygen system

4pax medical crew

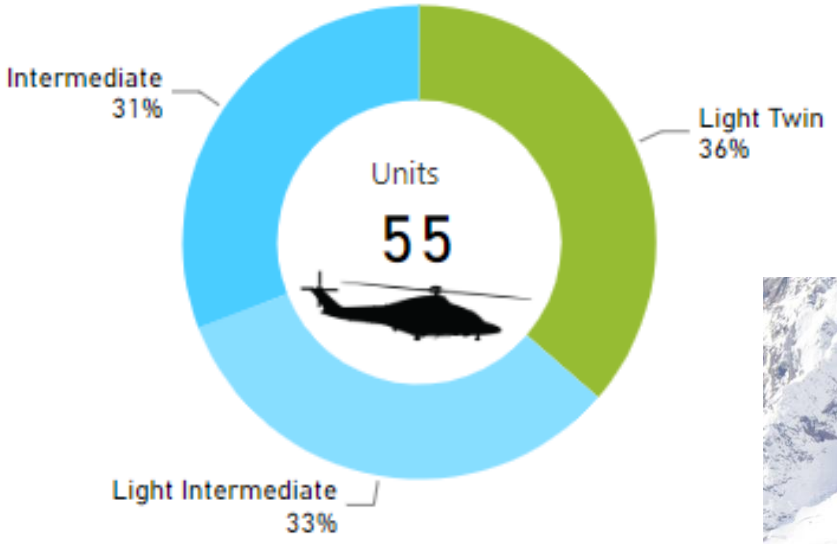
Medical cabinet



Emergency Helicopter Air Services in Italy

- 20 Regions
- 55 Helicopters
- 53 HEMS Bases
  - 17 operating H24
  - 36 operating day only

HEMS = Twin Engines



HEMS Organization

Currently, healthcare emergency services in Italy are **organized on a regional, or provincial basis** and are included in the context of the 118 service - Health emergency

Most health care emergency services are carried out by **private aerial work companies** that own TPP (public passenger transport, according to the ENAC regulation) **through a contract by the National Health Service**.

AIRGREEN TRASPORTI CON ELICOTTERI

Elitaliana

babcock

Alidaunia

elilombarda s.r.l.

THE NUE 112 SERVICE

Single European Emergency Number 112

- Emergency service model already adopted in several European countries.
- All emergency phone calls flow into a single Operations Center (Call Center NUE 112)
- The Call Center operators, after having identified the requirement, redirect the calls to the competent body for the management of the emergency event:
  - Arma dei Carabinieri (112)
  - State Police (113)
  - Fire Brigade (115)
  - **Health Emergency (118)**

The Missions (1/2)

Primary Missions:
the helicopter is sent directly to the scene of the accident or illness, possibly simultaneously with other means or rescue teams, even in inaccessible environments where the winch is used to reach the patient, as it is not possible to carry out a landing.

The Missions (2/2)

Secondary Missions:
the helicopter is used for the transport of a critical patient from one hospital to another, typically to a hospital center equipped with specialist facilities absent in the sending center and for organ transportation.

HEMS Rescue Team

COLLABORATION

Most of the time, depending about mission, the Rescue Team is composed by:

- Flight Crew (Pilot and Co-pilot/flight technician)
- a doctor, in most cases an anesthesiologist-resuscitator;
- a nurse, preferably with a specialization in critical area, intensive care or first aid:
- a helicopter rescue technician, from the CNSAS (National Alpine and Speleological Rescue Corps), qualified to rescue in hostile or inaccessible environments and responsible for the safety of the healthcare team.

What about future of HEMS in Italy

What about the Future of HEMS (1/5)

SIAARTI

PRO VITA CONTRA DOLOREM SEMPER

Italian Society of Anesthesia Analgesia Resuscitation and Intensive Care

SIAARTI AND HEMS GUIDELINES

Flying Intensive Care Project

Over the last year, SIAARTI has undertaken a path of great commitment in the helicopter rescue sector.

The anesthesiologists and resuscitators are the Medical Crew's team-leaders on board helicopters employed in rescue activities in Italy. The specific training course of the anesthesiologist-resuscitator also includes the area of emergency.

SIAARTI shares, in particular, the definition of the Critical Emergency Medicine - CREM, which identifies in the anesthesiologist-resuscitator "the medical figure with the appropriate skills" able to manage the treatment of acute and critical patients, both in hospital and on the territory. Emergency activity is a natural extension of the ability to treat complex patients in intensive care.

The model that SIAARTI adopts for the helicopter emergency service is that of a flying intensive care unit (or "a flying hospital"), in the sense of ensuring the possibility of treating the most critical patients on the spot and during transport to the suitable hospital destination, with the possibility of ensuring the monitoring and interventions necessary to stabilize the patient in-flight, as well as on the road. Such model allows the anticipation of treatment before arrival at the hospital, offering the standards of an intensive care unit, enabling life-saving interventions (e.g. in-flight intubation and/or defibrillation without landing). It also performs an ultrasound scan, making it easier to choose the best Hospital pathway/ward, once landed (e.g. direct access to the operating room in the event of an unstable trauma with abdominal effusion).

The helicopter of the future should guarantee the necessary space to access the patient from both sides, the possibility of allocating Critical Patient First Treatment Medical station, the possibility of sending all available clinical parameters and images during flight in order to allow a real time monitoring thus helping the hospital team that will take care of the patientfor the team that will take care of the patient.

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What about the Future of HEMS (2/5)

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What about the Future of HEMS (3/5)

The helicopter of the future should guarantee the necessary space to access the patient from both sides

What about the Future of HEMS (4/5)

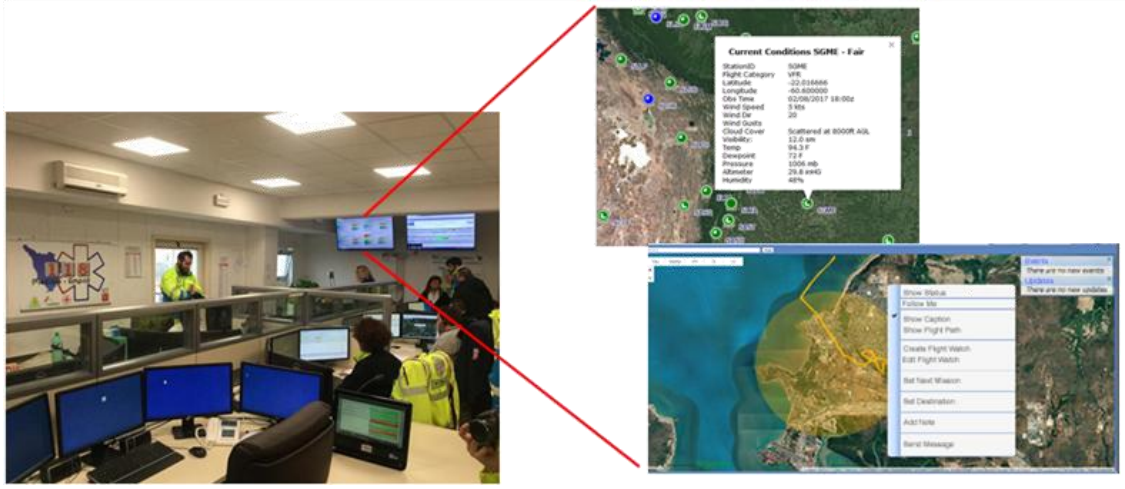
The helicopter of the future should guarantee the possibility of allocating Critical Patient First Treatment Medical station

What about the Future of HEMS (5/5)

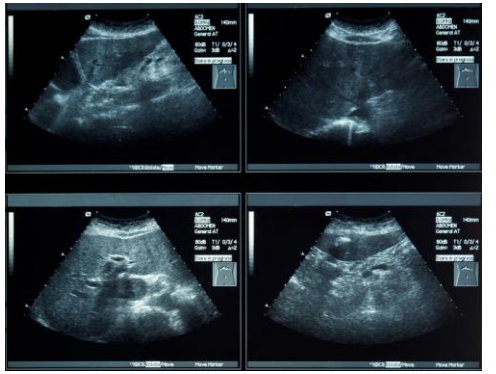
The helicopter of the future should guarantee the possibility of sending all available clinical parameters and images during flight

Continuous monitoring of patient parameters

Continuous communication with Operative base/Hospital and transfer of patient data including ECG, images, parameters...



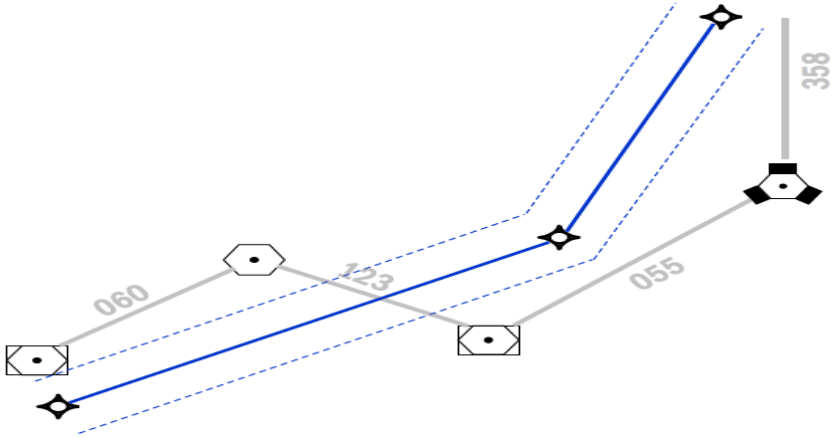
Telemedicine



Safety in Italian HEMS

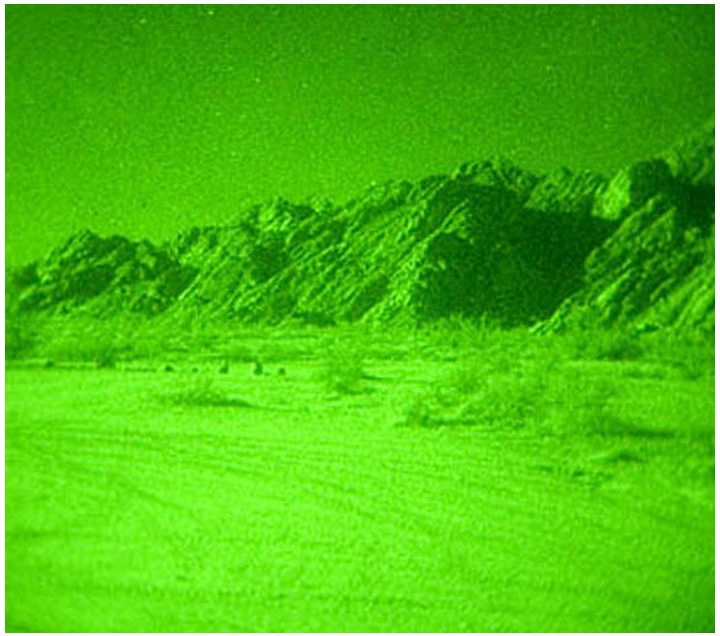
SAFETY in Italian HEMS – PBN Routes (1/5)

from → a conventional radio-navigation based on fixed points identified on the ground → to **Performance Based Navigation (PBN)** with a Flight Management System based on points and corridors defined in space followed by the helicopter with the aid of GPS



SAFETY in Italian HEMS – Night Vision Goggles (2/5)

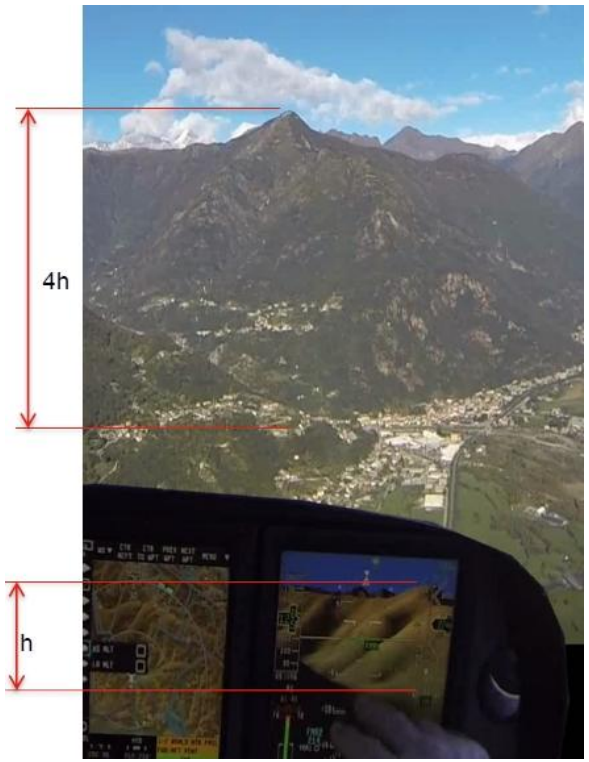
Night Vision Goggles (NVG) amplify light signals even in low light conditions, restoring a monochrome image.

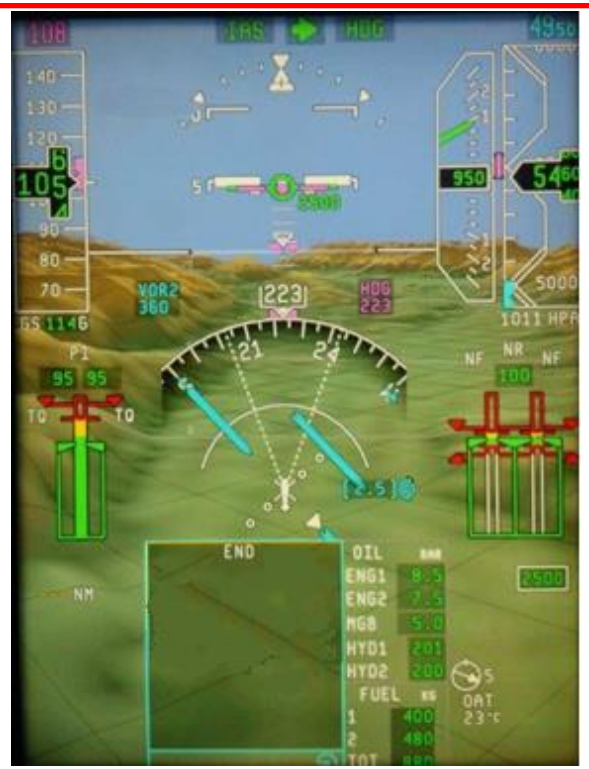


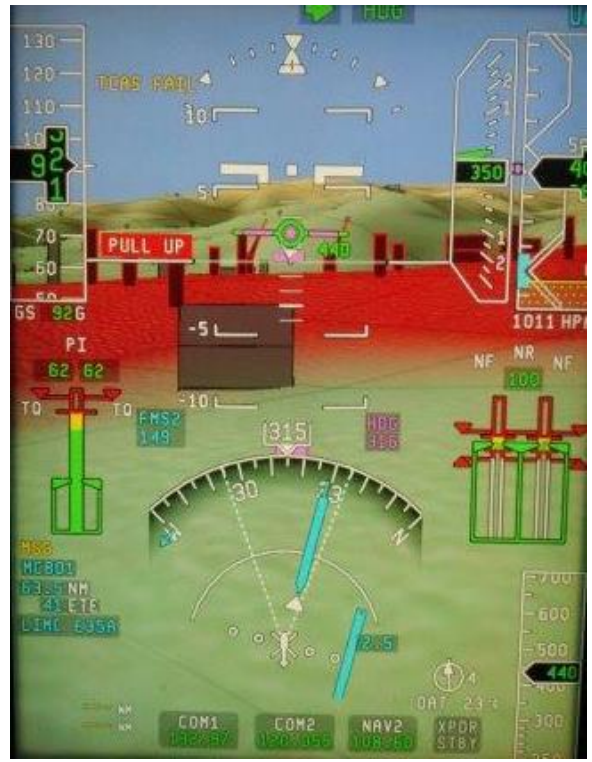
SAFETY in Italian HEMS – SVS (3/5)

The **Synthetic Vision System (SVS)** is a three-dimensional representation of the external scene on the main display based on terrain databases, obstacles and navigation objects

- the representation of the external scene conforms to reality
- the overlay of the flight symbology to the representation of the terrain provides the pilot with a better awareness of the flight scenario (**Situation Awareness**)



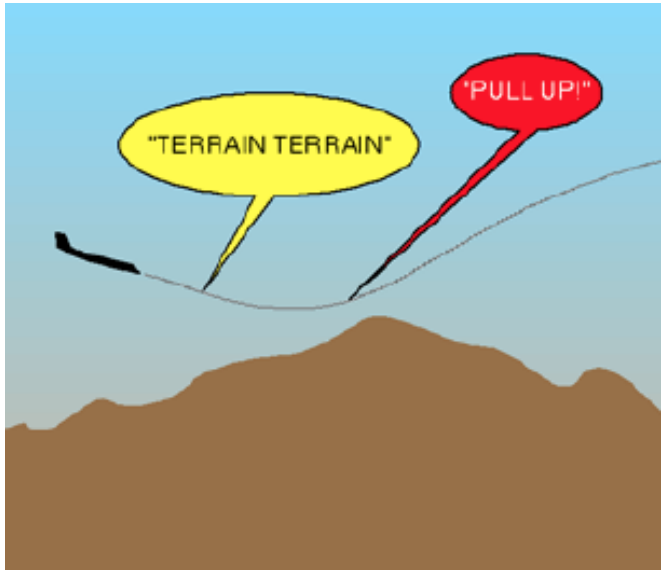


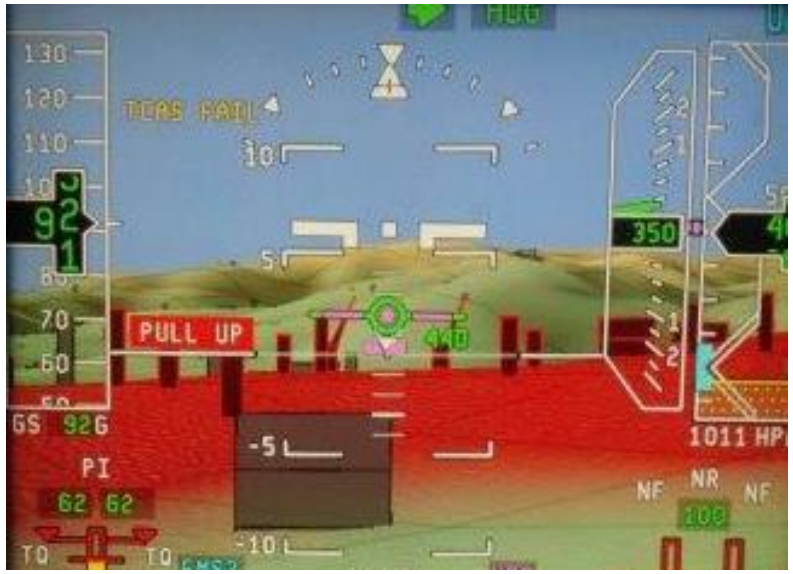


SAFETY in Italian HEMS – HTAWS (4/5)

The **Helicopter Terrain Awareness and Warning System (HTAWS)**:

- combines information from the speed, altitude, ground clearance sensors and provides alarms on the display and in headphones to the pilot
- receives the GPS position of the aircraft and correlates the current trajectory warning the pilot with visual and sound alarm in case of potential impact within a certain time sufficient to allow a corrective maneuver

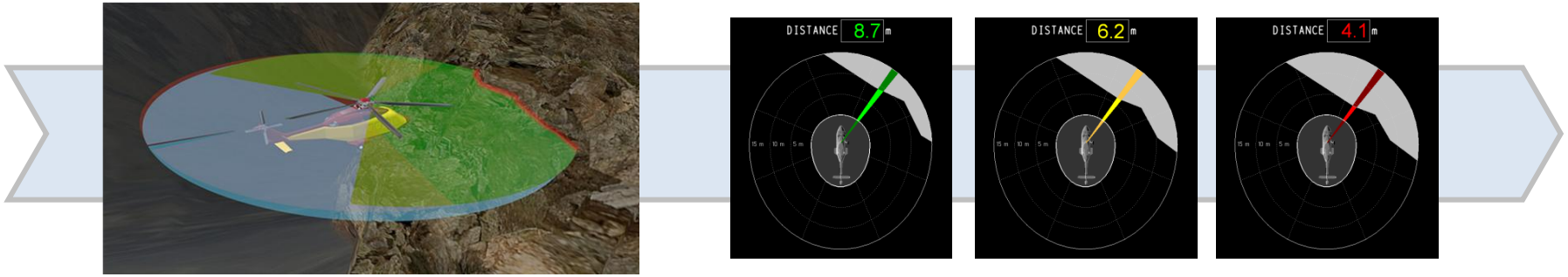




SAFETY in Italian HEMS – OPLS (5/5)

OPLS (Optical Proximity LiDAR System)

- Support for hovering operations near obstacles
- Inform the pilot of the distance from the nearest obstacle with notification on the displays and audio feedback



PARETI

ALBERI

STRUTTURE


VH-ZXC
THANK YOU
STAY SAFE
THANK You!
STAY SAFE!!
THANK YOU
STAY SAFE
STAY SAFE

THANK **YOU**
FOR YOUR ATTENTION

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