

European Rotors Rotorcraft and VTOL Symposium 2021

Leonardo Helicopter Division

The Present, The Impending Challenges, and The outlooks for the future

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Leonardo Helicopter Head of Airworthiness

November 16th 2021





Agenda

- > The recent past & present
- > The impending challenges
- > The outlook for the future



MARKET

- OFFSHORE

GLOBAL IOGP FLEET

AVERAGE **-32%** FOR THE IOGP GLOBAL FLEET IN 2020 VS 2019
NUMBER OF PAX COLLAPSED BY **38%**.

AWFAMILY FLEET

-10% FH LOGGED IN 2020 FOR THE AWFAMILY FLEET.

POSITIVE TREND FOR **AW189** & **AW169** VS 2019 DUE TO INCREASED UTILIZATION AND FLEET EXPANSION.

TRAFFIC RECOVERY

BACK TO 2019 LEVELS
FORESEEN BY **END OF 2022**.

SARS CoV-2 EMERGENCY

LEONARDO HELICOPTERS SUPPORTED CUSTOMERS DURING THE SARS COV-2 EMERGENCY.

WE WANT TO THANK YOU ALL THE STAKEHOLDERS DURING THE EMERGENCY TO KEEP THE HEMS AND SAR HELICOPTER **FULLY OPERATIVE**.

- HEMS & SAR

- LAW ENFOR. & MILITARY

LH PRESENCE **INCREASED** IN DOMESTIC AND INTERNATIONAL MARKET.



CUSTOMERS SUPPORT & TRAINING

- CS&T

NEW TRAINING ACADEMY SITE ESTABLISHED IN US

ON-LINE TRAINING FOR CREW AND MAINTAINERS HAVE BEEN EMPOWERED

RDSG 2.0



&



HELILINK 2.0



DESIGN SOLUTIONS AND OUR PORTFOLIO

LEONARDO HELICOPTERS HAS BEEN FOCUSED ON ITS OWN MAIN **PILLARS** TO DELIVER DESIGN SOLUTIONS:

1

**Continued
Vertical Flight System Integration**

2

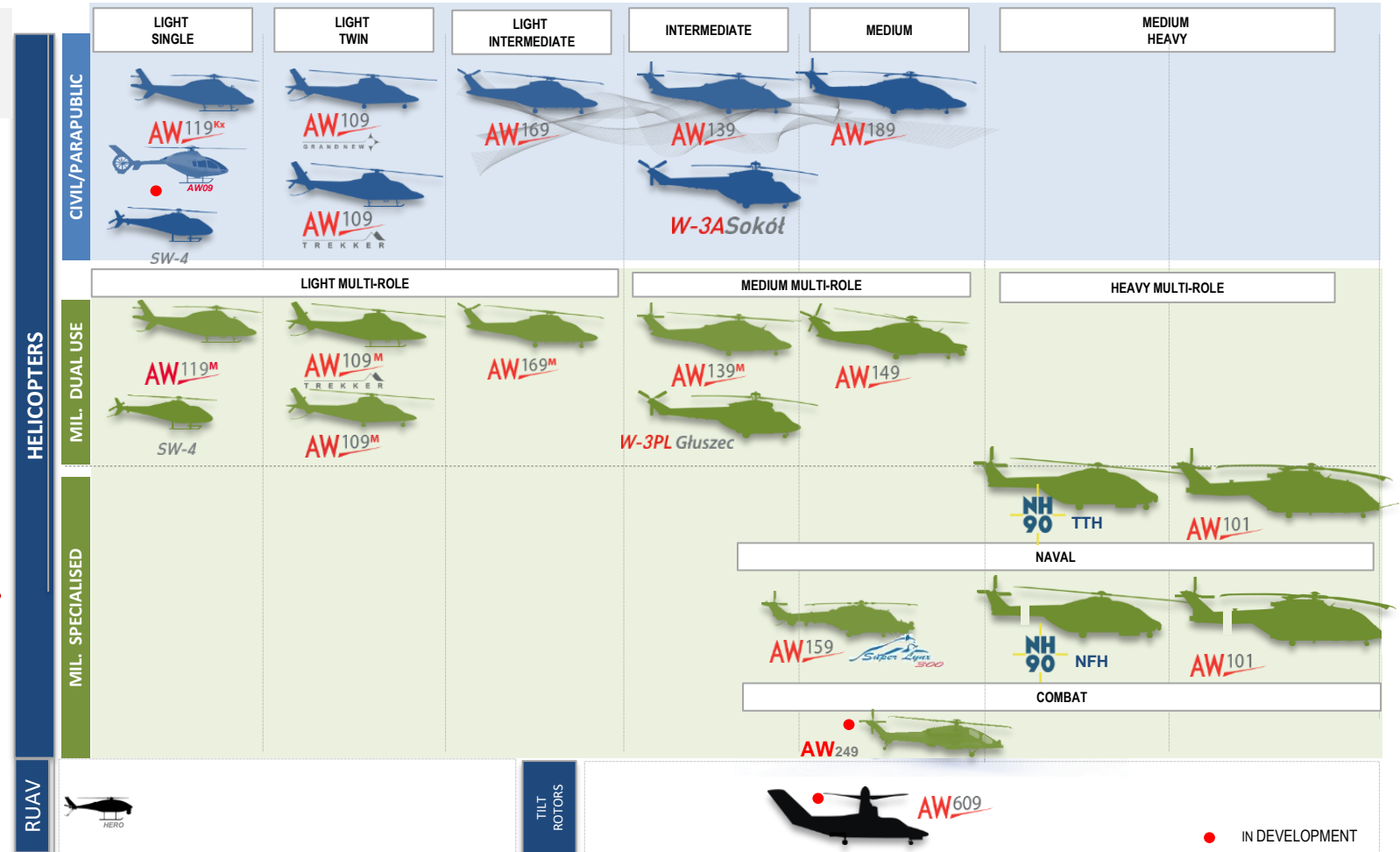
**Invest in
Key Systems and New Technologies**

3

**Implement
Safety features and Processes**

4

**Develop
Sustainable Business Model**





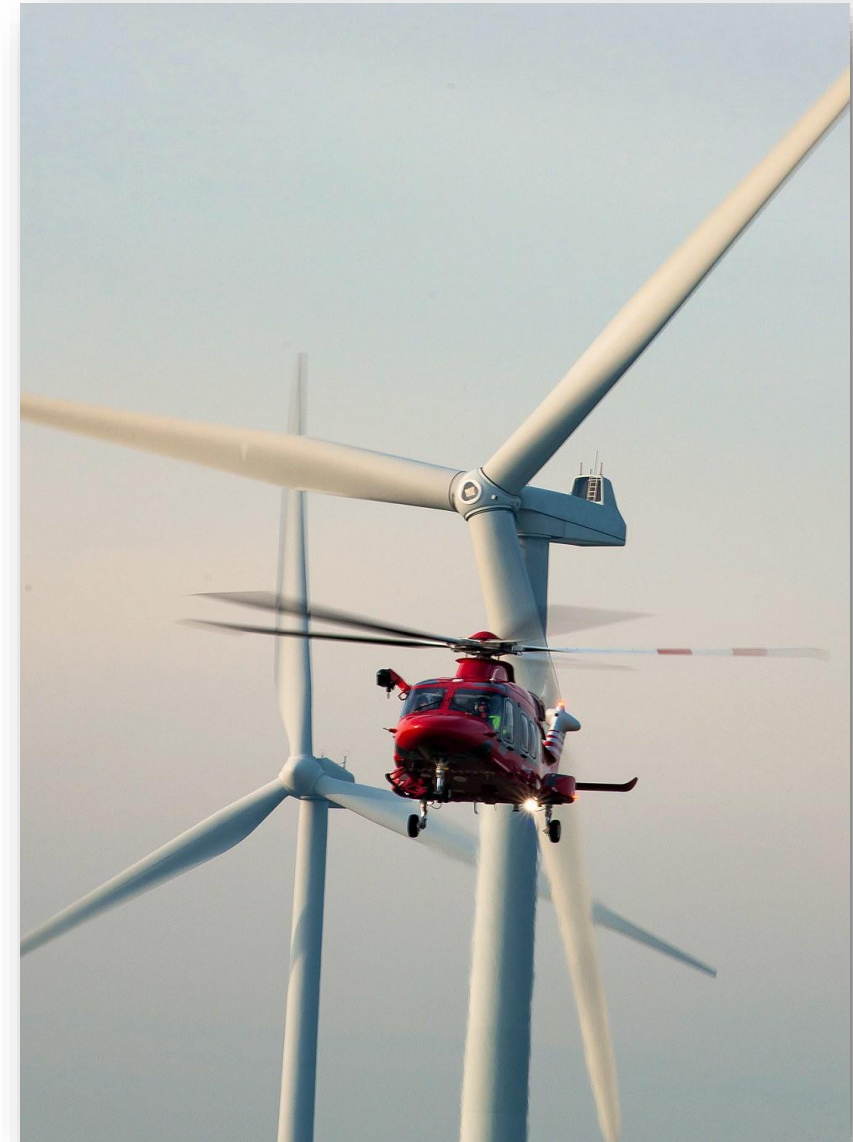
Agenda

- > The recent past & present
- > The impelling challenges
- > The outlook for the future

THE IMPENDING CHALLENGES

IN THE LAST TWO YEARS THE FOLLOWING STREAMS ARE THE **MAIN CHALLENGES** TO PURSUE FOR A SOLID BUSINESS SAFETY DEVELOPMENT:

- DEDICATED PLAN FOR SAFETY
- SAFETY SYSTEM GOVERNANCE IMPLEMENTATION
- NEXT COMING CERTIFICATIONS & NEW PRODUCTS
- OTHER FEATURES TO COME



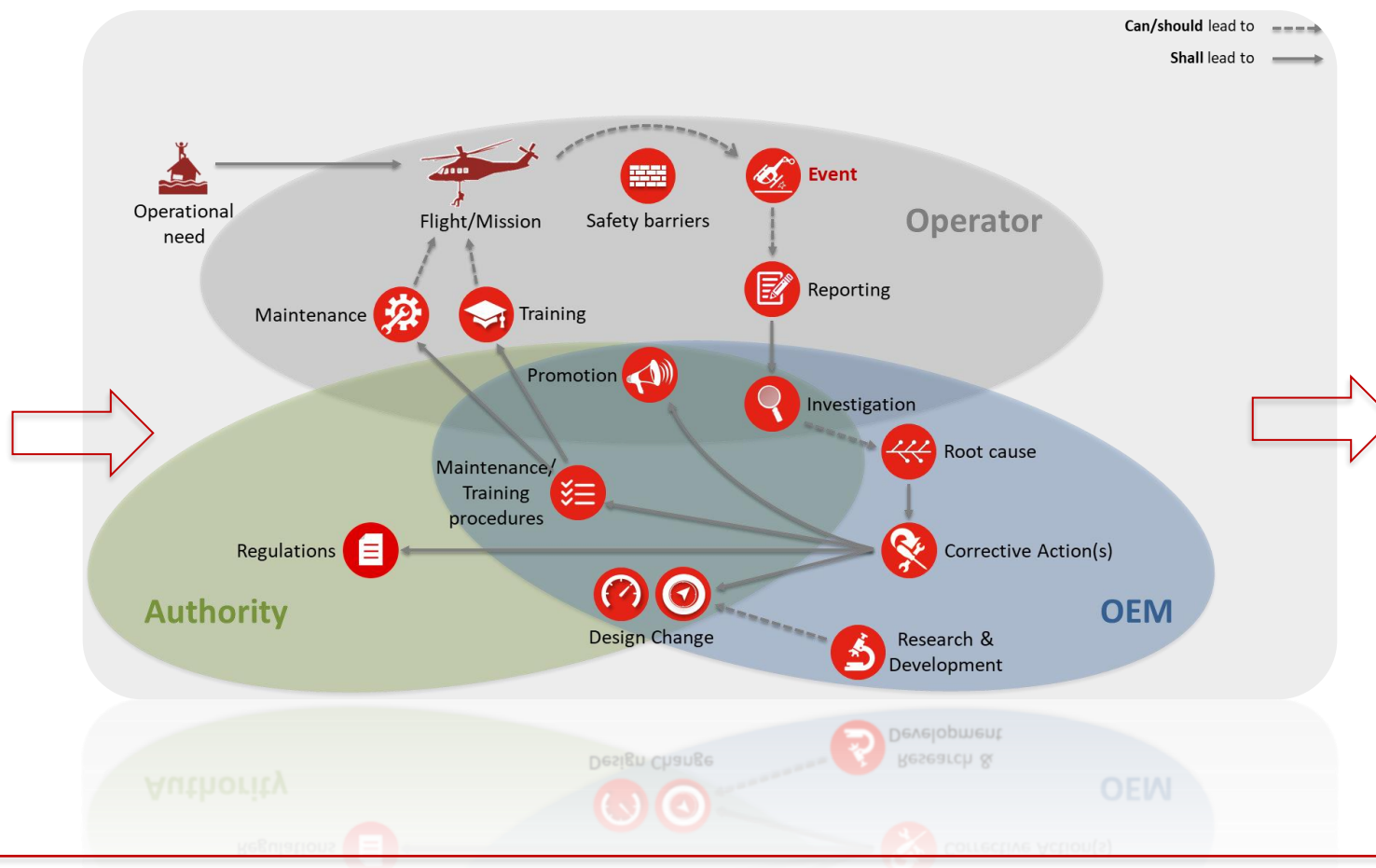
DEDICATED PLAN FOR SAFETY

LH STARTED IN 2019

EASA
INPUT

OPERATIVE
ENVIRONMENT
ANALYSIS

LH
COMMITMENT



SAFETY SYSTEM GOVERNANCE

LH STARTED IN 2019

SSG

SINCE 2020 **SAFETY SYSTEM GOVERNANCE** (SSG) ENSURES AN INTEGRATED APPROACH TO SAFETY MANAGEMENT FOR SAFETY ANALYSES AND RISK-BASED DECISION MAKING BETWEEN DEPARTMENTS (LOCAL SMS)

LOCAL SMS

OPERATIONAL STRUCTURE OF **LOCAL SMS** FOR EACH APPROVED COMPANY LEVEL CERTIFICATION (I.E. **PO**, **DO**, **MO**, **TO**) FOR SMS IMPLEMENTATION, WITH THE IDENTIFICATION OF THE KEY MANAGERS.

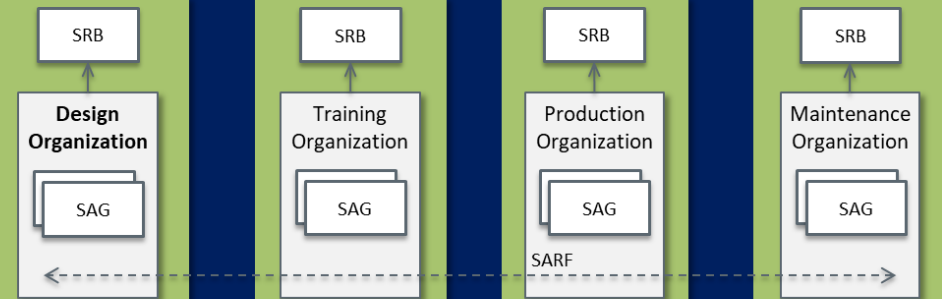
LDO – Leonardo

LHD – Leonardo Helicopters Division

SSG – Safety System Governance



Local-SMS (Departments)



SAFETY SYSTEM GOVERNANCE

LH STARTED IN 2019

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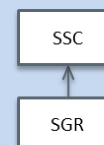
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LDO – Leonardo

LHD – Leonardo Helicopters Division

SSG – Safety System Governance

Local-SMS
(Departments)

SRB

Design
Organization

SAG

SRB

Training
Organization

SAG

SRB

Production
Organization

SAG

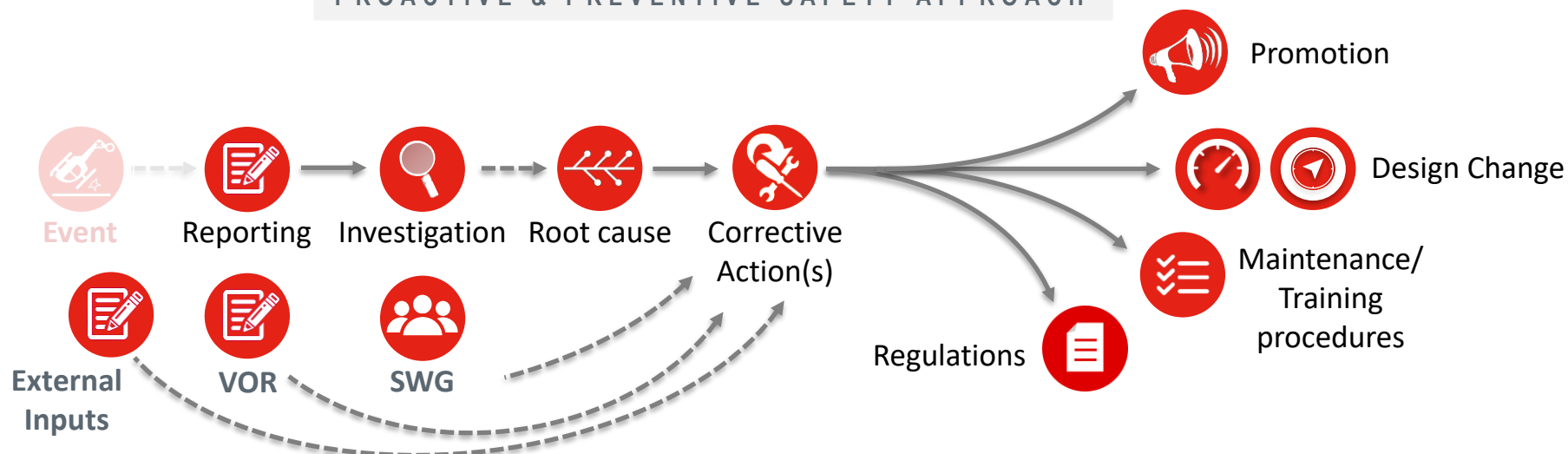
SARF

SRB

Maintenance
Organization

SAG

PROACTIVE & PREVENTIVE SAFETY APPROACH



SOME ACHIEVEMENTS

ACTIONS
SAFETY PROMOTION

COMMUNICATION

TRAINING



Today

ID	Contents	2020				2021				2022			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q2	Q3	Q4	
1	Promotional Videos ✓						LOC-I Maint.						COMMUNICATION
2	Re-vitalize Safety website ✓						LIVE						TRAINING
3	Safety Information Documents ✓				Hoist		Bird Strike		Crash Cards		Pax Brief. Cards		
4	E-Learning video briefing ✓			139	189				109		169		
5	Enhanced Training Devices (ETD) ✓						EASA Pres.		EASA FollowUp				
6	Critical Failures / Upset Prevention Recovering ✓								FFS Valid				
7	CFIT Training / Webinars ✓				Brazil Mexico		Chili		Malaysia		Africa		

ACTIONS
TECHNICAL IMPROVEMENTSnext
step

KIT/TC

STC



Today

ID	Platform	Contents	2020				2021				2022			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	AW119	Crashworthy Fuel System ✓						FAA			EASA			
2	MkII	Crashworthy Seats ✓						EASA						
3	A109/ AW119	Flight Recorders * (including CVFDR)									EASA			
4	AW139	Synthetic Vision System (SVS) ✓					EASA							
5	AW169/ AW189	HUMS 2.0: real time data transmission/download									EASA			
6	AW1_9	CNSAS Maps												EASA
7	AW169	Obstacle Detection & Warning – OPLS											EASA	
8	AW1x9	Obstacle Detection & Warning – Enhanced Sensing						CWO			proto flight			
9	AW1x9	Infrared Stress Monitoring System (ISMS)						proto flight						
10	AW1x9	Automatic Flight Conditions Recognition									AW169 /189			AW101
11	AW1x9	Ageing – Corrosion & fatigue strength of metallic components												Corrosion
12	AW1x9	Full damage tolerance of helicopter gearboxes									fatigue test		pitting test	

RESEARCH

NEXT COMING CERTIFICATIONS & NEW PRODUCTS

LEGACY

AW169



- AFCS IMPROVEMENTS (W/ SW PHASE 6)
- OVERALL ENHANCED PERFORMANCE (W/ SW PHASE 7)
- FMS IMPROVEMENTS (W/ SW PHASE 8)
- PRODUCT IMPROVEMENTS
(PEDAL ASSY, ENGINE GRIDS, ENHANCED AHRS)
- ADDITIONAL FEATURES
(SKIDS, OPLS, SAR CONFIG)

AW189 – AW139 – AW109



AW189

- DTD SW DATA TRANSMISSION SYSTEM WITH CYBER SECURITY COMPLIANCE
- AW189K PERFORMANCE ENHANCED

AW139

- PRODUCT IMPROVEMENTS
(SVS, OIL RIG APPROACH, HTAWS OFFSHORE MODE, NEW EMERGENCY EXIT SYSTEM)
- CERTIFIED IN ACCORDANCE TO LATEST ICAO NOISE REQUIREMENTS (Ref. Annex 16)

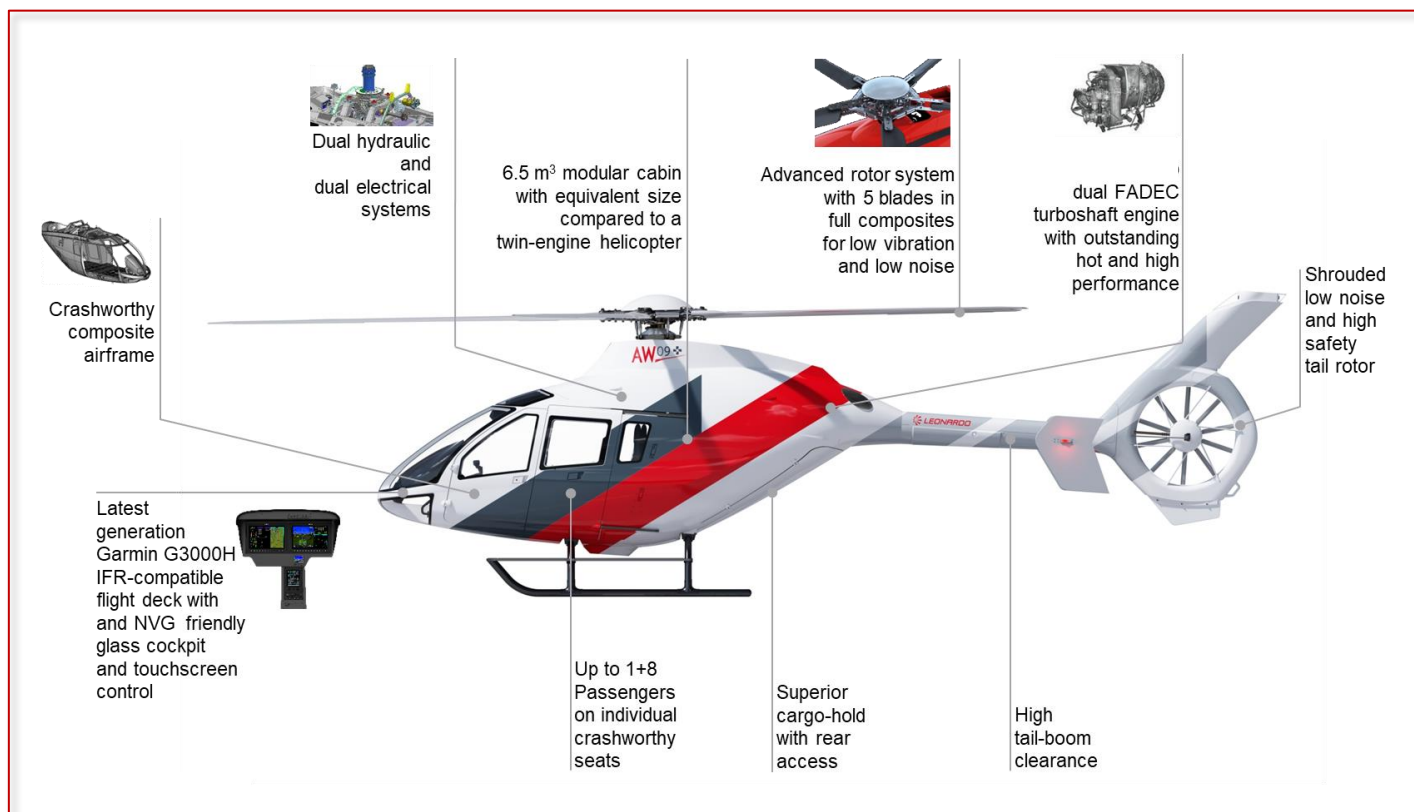
AW109

- PRODUCT IMPROVEMENTS
(CRASHWORTHY SEAT, LIGHT FDR)
- PERFORMANCE ENHANCEMENT
(4 AXIS AUTOPILOT)

NEXT COMING CERTIFICATIONS & NEW PRODUCTS

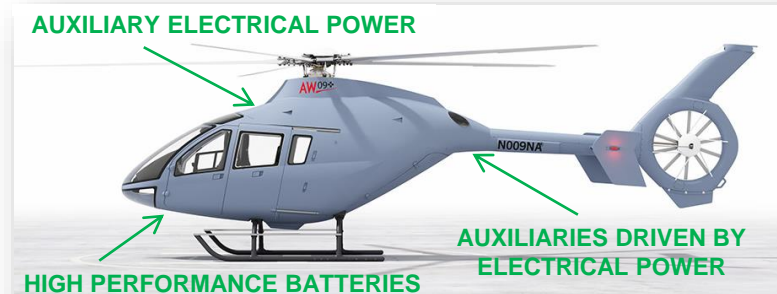
AW09

NEW GENERATION OF SINGLE ENGINE HELICOPTER



- THE REQUIREMENT TO GET A NEW TYPE CERTIFICATE ACCORDING TO THE **LATEST CS.27 ADMT**, ALLOWS THE OPPORTUNITY TO INTRODUCE OUTSTANDING **SAFETY FEATURES** IN THIS CLASS.

- FUTURE OPPORTUNITIES FOR **HYBRID CONFIGURATION** APPLICATIONS.



NEXT COMING CERTIFICATIONS & NEW PRODUCTS



AW609



- BY END OF 2021 **4 AIRCRAFT** WILL BE ENROLLED FOR FLIGHT TEST ACTIVITIES IN THE “**SHOWING COMPLIANCE**” FINAL STAGE.
- LARGE COLLABORATION WITH FAA AND EASA TO FINALIZE THE CERT. BASE IN 2020-2021.
- AW609 FLEW IN DUBAI AIRSHOW DEMONSTRATING **THE STEP CHANGE** FORESEEN FOR THIS CATEGORY OF POWERLIFT AIRCRAFT.



AWHERO

SW - 4



- AWHEREO OBTAINED THE FIRST **MTC** IN OCT. 2021.
- THE COOPERATION WITH EASA TO EXPLORE THE ROADMAP TO CIVIL CERTIFY THE PRODUCT SHALL BE ENVISAGED TO CONSOLIDATE THE **SAFETY FEATURES** NECESSARY IN **CIVIL OPERATIONAL ENVIRONMENT**.
- SW -4 RUAS SOLO COMPLETED SUCCESSFULLY ALL CAPABILITES CONCEPT DEMOSTRATION.



OTHER FEATURES TO COME

ACHIEVEMENTS

Support Sustainable Aviation Fuel

ON ALL LEGACY PRODUCTS LEONARDO COMPLETED THE ASSESSMENT FOR USING **SAF** IN ACCORDANCE TO **ASTM DT566**, PROVIDED THAT ARE REIDENTIFIED AS **D1655 FUEL**.

Promote Performance Base Navigation in Europe and worldwide

LEONARDO IS PROMOTING THE **DISSEMINATION OF PBN ROUTES** IN EUROPE AND WORLDWIDE TO ENABLE SAFER FLIGHT OPS.

ON GOING ACTIVITIES

Single Engine IFR capability

LEONARDO IS IN FAVOUR TO APPROVE SUCH OF CHANGE TO EVALUATE THE **ADDITIONAL SAFETY FEATURES**.

Human Hazard Assessment

MINDSET ENDORSED IN THE **NEW PRODUCT CHANGES AND NEW PROJECTS**.

Helicopter FIVE STAR

LEONARDO HELICOPTERS IS COMPLETELY **COMMITTED** TO SUPPORT FIVE STAR PROJECT.

DIGITAL TRANSFORMATION OPPORTUNITIES

Continuous Airworthiness

Develop Predictive Maintenance solutions

LEONARDO IS EXPLORING THE OPPORTUNITIES TO LEVERAGE TO **DIGITAL TRASFORMATION** IN ORDER TO OFFER A BETTER SERVICE.

Environment impact mitigation

LEONARDO HELICOPTERS DIVISION

TECHNICAL INFORMATION LETTER

TIL N° T-GEN-21-005
DATE: September 21, 2021
REV.: /

To: Leonardo Helicopters products Owners / Operators

SUBJECT: Environment impact mitigation

Helicopters Affected: AW139, AW169, AW189, AW149, A109S, AW109SP, AW119MkII, A109A/II, A109C, A109K2, A109E, A119

Dear Customer,

With this information letter, Leonardo Helicopters (LH) would like to share relevant updates and results regarding the environment impact mitigation.

Within the Leonardo Sustainability Plan's framework, LH is strongly active with several R&D programs and new technologies certifications in order to reduce Product's noise level and Greenhouse Gas (GHG) emissions, in accordance with the new ICAO standards and International Sustainability Policies.

Helicopter's usage is foreseen to increase in the next years, thus the rotorcraft contribution to the environmental goals would become more significant in next decade and dedicated initiatives are constantly deployed by LH to keep related emissions as low as possible.

Within this context, LH is pleased to announce the following important achievements:

- Usage of engine jet fuel made from the Synthetic Blending Components (also called Sustainable Aviation Fuel - SAF), that meet the current ASTM International Standard D7566 requirements, does not have any operational limitations and performance degradation on all the AW legacy products (AW109/119 family, AW139, AW169 and AW189/149), provided they are re-identified as D1655 fuel.
- AW139 has been recently certified compliant to latest ICAO Noise Requirements (ref. Annex 16, Volume 1, Chapter 8, Sect. 8.4.2 - FAA Stage 3 Noise compliance). This approval does not require any modification to the in service fleet, confirming the excellent AW139's design that fulfil the new requirements by keeping this helicopter model also aligned with the green roadmap set up for the helicopter market.

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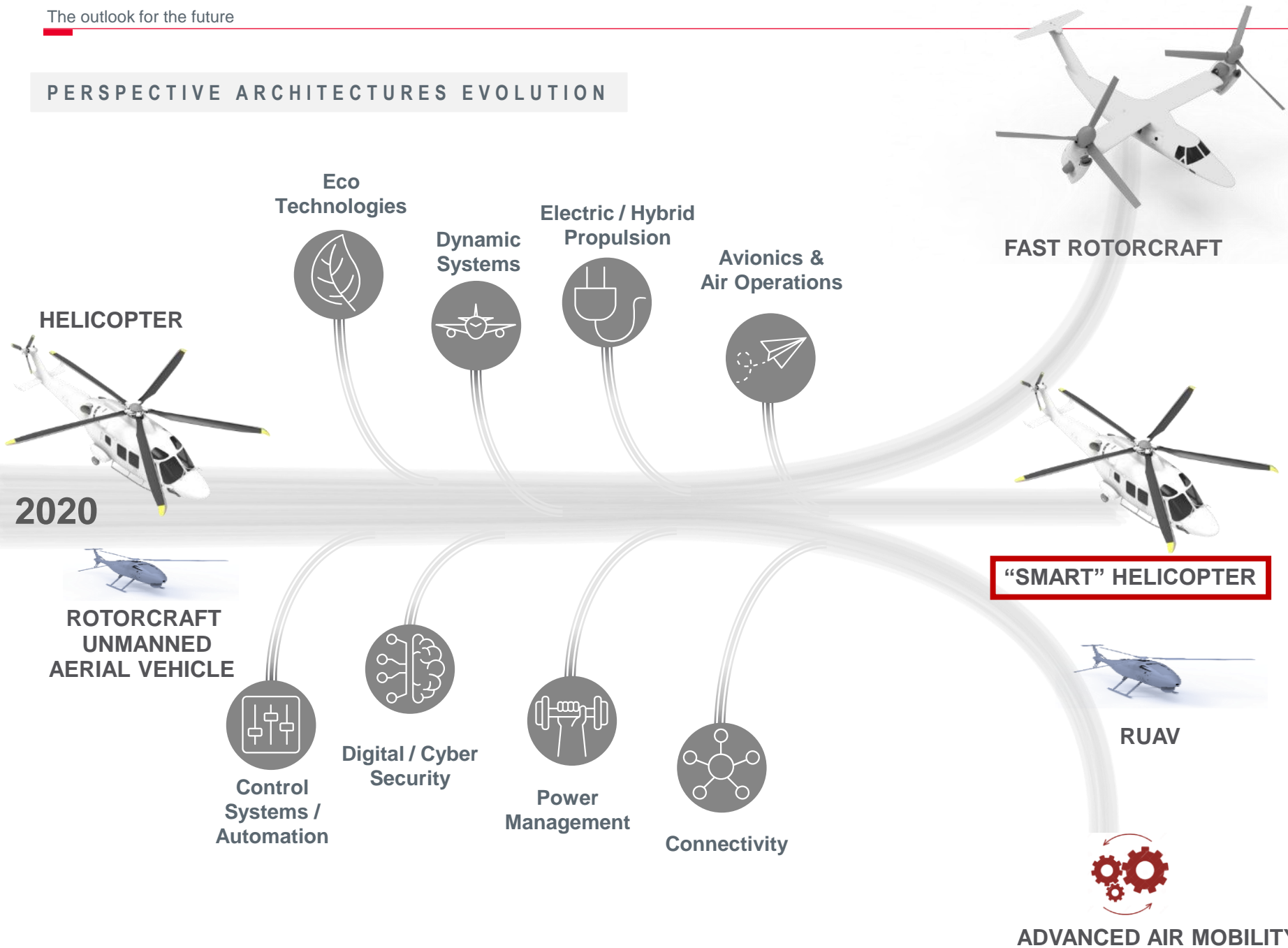


Agenda

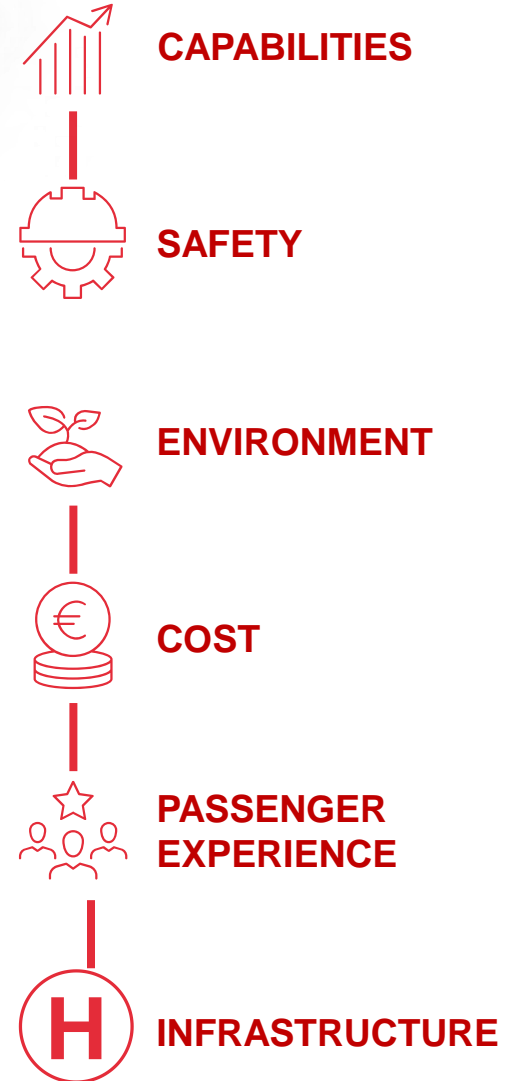
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PERSPECTIVE ARCHITECTURES EVOLUTION

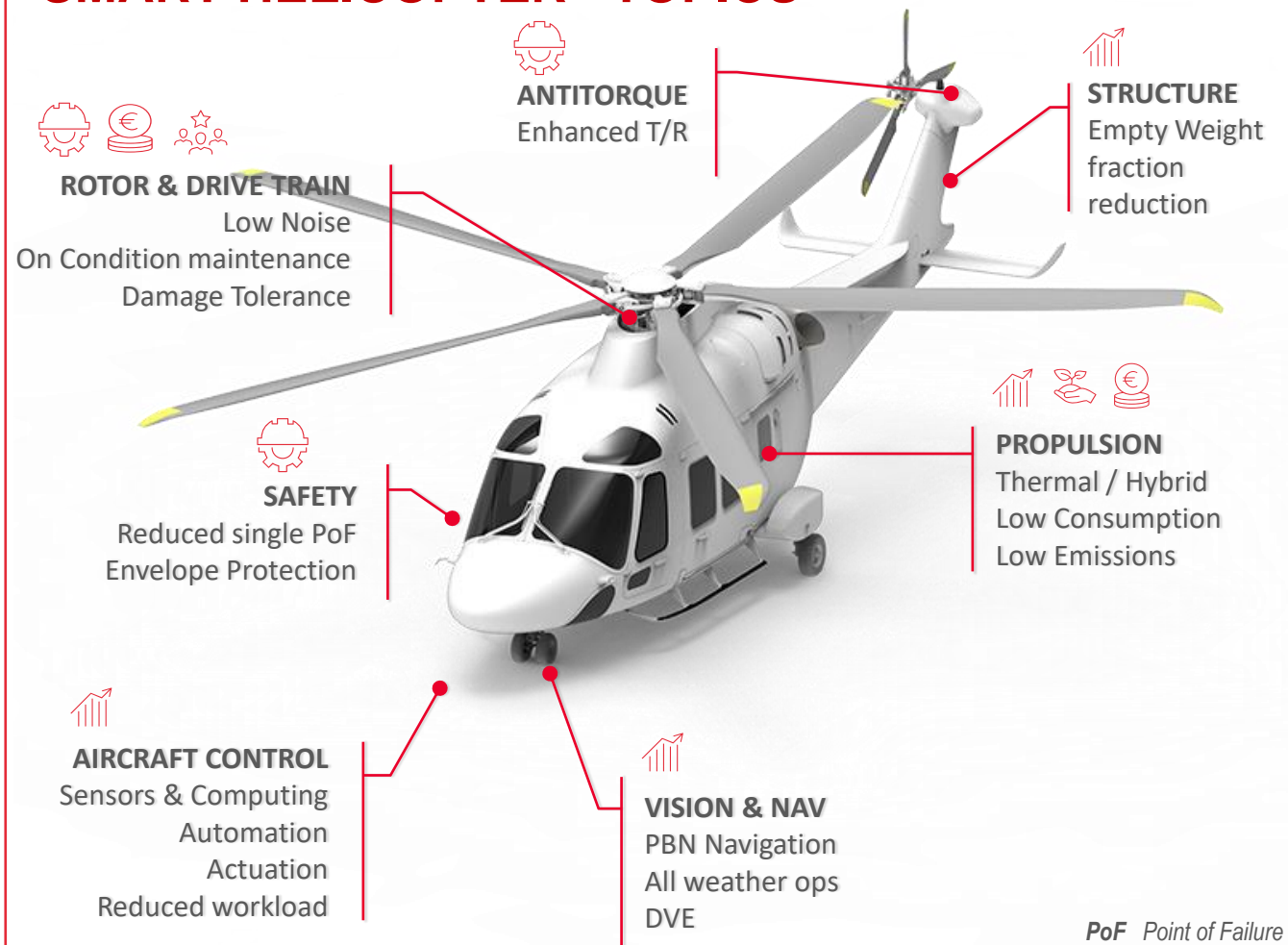


CUSTOMERS EXPECTATIONS





«SMART HELICOPTER» TOPICS



ENABLING TECHNOLOGIES

PROPULSION	Thermal with power management, Hybrid
CONTROL AUTOMATION	Computing, Sensors, Actuation, SW
AVIONICS	Communications / Navigation / Data-Link, Sense & Avoid, SW
DIGITALS	Cyber, Usage, Maintenance, SW
INTEGRATION	Modelling, Simulation, Testing
PRODUCTION	Adv. Materials, Low Cost Processes
TRAINING	Physical, Simulation
SUPPORT	Diagnostics/Prognostic, usage and monitoring data sharing, on condition

OTHER ENABLERS



CAPABILITIES



SAFETY



ENVIRONMENT



COST



PASSENGER EXPERIENCE



INFRASTRUCTURE



CONCLUSION

THE RECENT PAST ALLOWED TO FACE NEW CHALLENGES WITH A **DIFFERENT APPROACH**. LEONARDO HELICOPTERS IS COMMITTED TO PROVIDE THE BEST VERTICAL LIFT SOLUTIONS TO THE MARKET.

THE CURRENT MOMENTUM IS BRINGING A GREAT **OPPORTUNITY** TO REDEFINE A PERIMETER FOR SAFE APPROACHES ON **DESIGN CHOICES, CERTIFICATIONS AND IN SERVICE OPERATIONS**.

SUCCESS IS ACHIEVED THROUGH **SYNERGY** BETWEEN ALL THE STAKEHOLDERS SUCH AS **AVIATION AUTHORITIES, OEMS AND CUSTOMERS**.

SAFETY IS THE FIRST COMMITMENT FOR LEONARDO HELICOPTERS.





Contacts

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HELICOPTERS DIVISION



THANK YOU
FOR YOUR ATTENTION

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