



# *Risk Management in Airbus Helicopters Flight Test Operations* *EASA Rotorcraft Symposium*

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# Safety starts from the Top: Airbus Helicopters' Chief Priority

**“The only  
acceptable  
objective  
is ZERO  
accidents.”**

**Guillaume Faury**



© Lorette Fabre



# Aviation Safety: Airbus Helicopters' chief priority

**Supporting flight safety for the thousands of women & men around the world who are flying in our aircraft every day.**

## **Safety by**

- **Design**
- **Maintenance**
- **Training & support to flight operations**
- **Aviation Safety Management System (SMS)**
- **Cooperation**



# Top Level - Enterprise Risk Management

Risk Probability	Risk Severity				
	Catastrophic A	Critical B	Moderate C	Minor D	Negligible E
5 - Frequent	5A	5B	5C	5D	5E
4 - Likely	4A	4B	4C	4D	4E
3 - Occasional	3A	3B	3C	3D	3E
2 - Seldom	2A	2B	2C	2D	2E
1 - Improbable	1A	1B	1C	1D	1E

**Aviation SMS**

Corporate Level

\*Enterprise Risk Mgmt

Organisation Level

Technical Risks

Operational Risks

**ERM**

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Top Risks

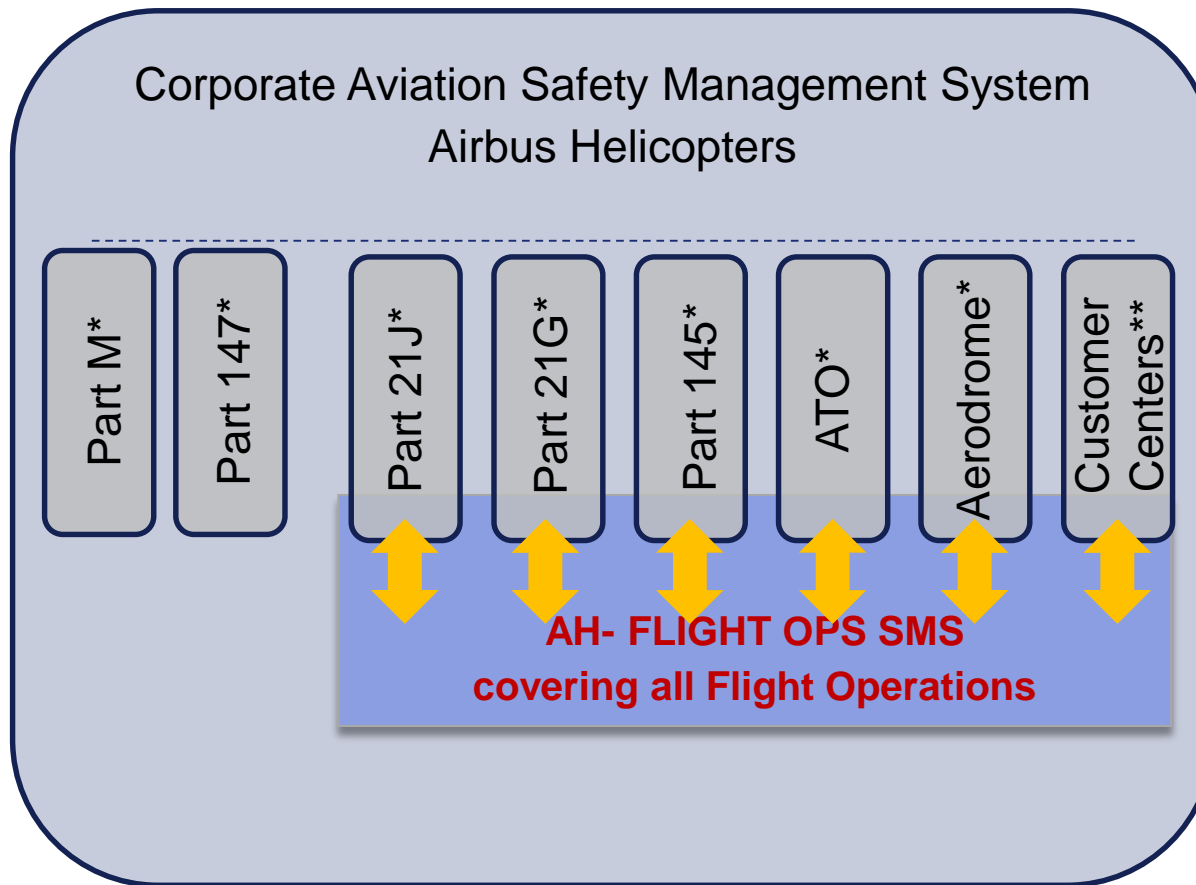
Top Risks

Enterprise Risk Mgmt (ERM): Top risks for Aviation Safety

Operational Risk Mgmt: developed within the Aviation SMS

Technical Risk Mgmt: stable, mature risk management (Continued Airworthiness,...)

# The Basics – Airbus Helicopters groupwide SMS System



AH groupwide standard for Aviation SMS

Compliance with and beyond authority

requirements



Responsibility for performing  
flight operations

\* EASA regulation level  
\*\* National regulation level

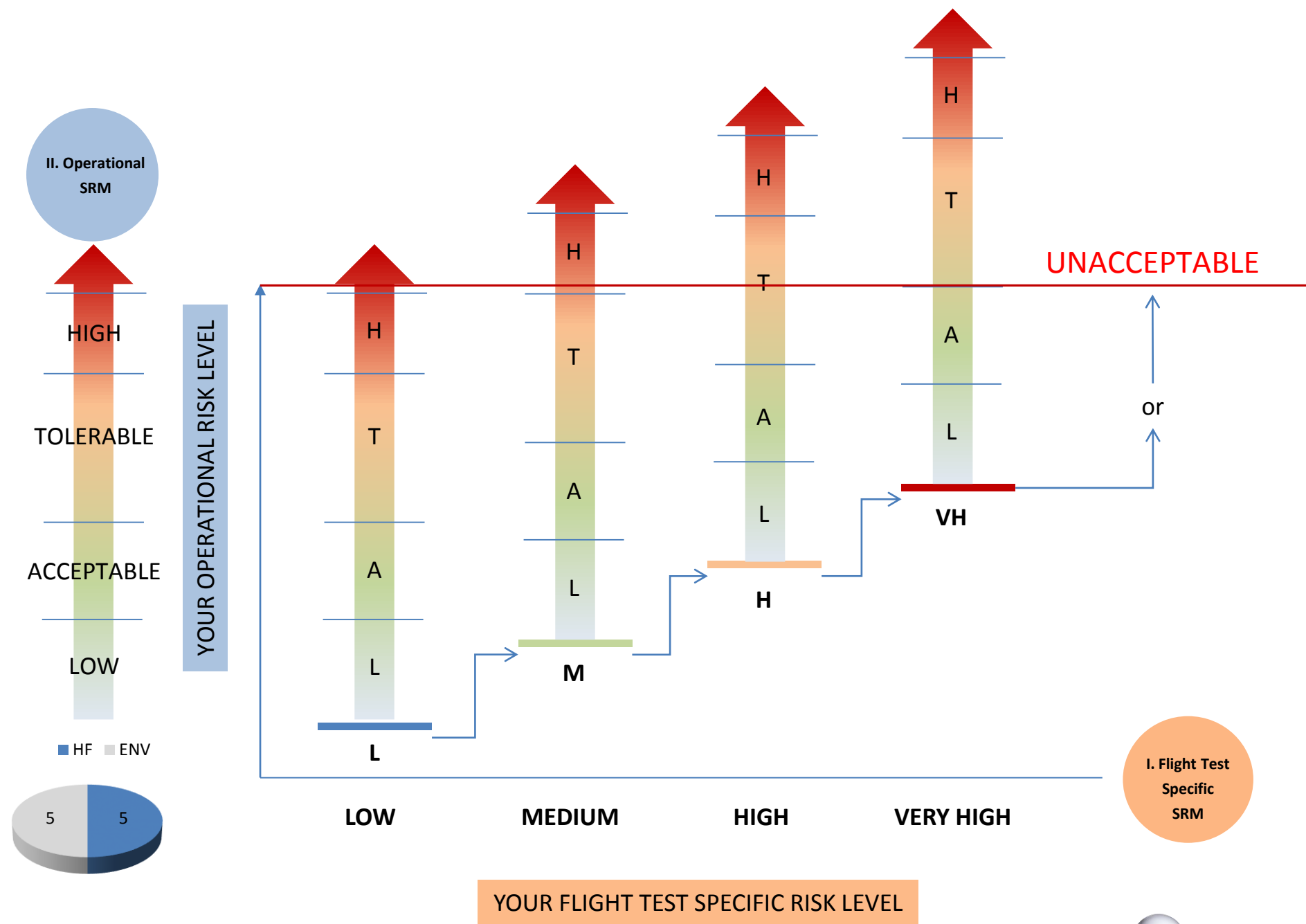
# How to manage risks in a high risk operation?

## New Approach for Risk Management in Flight Test Operations

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# Flight Test – Adapted PRE-FLIGHT RISK ASSESSMENT MATRIX

EAS / M. KLEIN / Risk Management and Safety Assurance in AH Flight Test Operations / 1.v.0 / 23/11/2016 © Airbus Helicopters rights reserved



# FLIGHT TEST - PRE-FLIGHT RISK ASSESSMENT MATRIX

– proactive

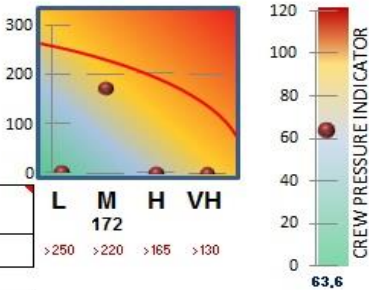
AIRBUS HELICOPTERS - FLIGHT TEST

PRE-FLIGHT RISK ASSESSMENT

Flight Test Risk	1	LOW	X	MEDIUM M	HIGH	VERY HIGH	M
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Flight N° or S/N	08/12/2015			
	DATE	Flight Crew Signature	CTP Signature	

NAME: \_\_\_\_\_





# ETX – New PRE-FLIGHT RISK ASSESSMENT MATRIX – Proactive Mitigation Process



## ETX – Flight Test Risk Classification

AIRBUS HELICOPTERS Flight & Engineering Test Center		Flight Test Risk Typology AH-ETX Marignane	
1	H/V Diagram	HIGH to VERY HIGH	<p>Estimate boundaries using design office modelisation or through previous similar aircraft results if possible. Limiting factors/parameters to be defined prior to the tests.</p> <p>Approach theoretical boundaries incrementally.</p> <p>Real time monitoring of parameters.</p> <p>VERY HIGH : 1<sup>st</sup> time at low middle and high altitude for a given max weight, and at altitude of max power deficit. Or reduction of H/V diagram compared to previously demonstrated one.</p> <p>HIGH – other cases (in particular if reduce weight does</p>
AIRBUS HELICOPTERS Flight & Engineering Test Center		Flight Test Risk Typology AH-ETX Marignane	
2	One Engine failure on take-off path (multi engine)/ Cat A helipad	High/HIGH to VERY HIGH	<p>Estimate boundaries modelisation or the aircraft results if possible. Limiting factors/parameters to be defined prior to the tests.</p> <p>Incremental approach</p> <p>Dedicated zone / ex with no other constraints</p> <p>Real time monitoring of parameters</p> <p>Rescue services briefed</p> <p>Don't repeat the critical test if not successfully completed</p> <p>Envelope initially open in AEO</p> <p>Fly the flight path initially on ground: first in AEO and subsequently in simulated OEI</p> <p>Test point performed with:</p> <ul style="list-style-type: none"> <li>- build up weights (starting with elevated helipad weight)</li> <li>- moderate front wind (20kts to 30 kts oriented ship centerline)</li> <li>- deck motion reduced to minimum (heave must be considered)</li> <li>- clear deck</li> <li>- Rescue service briefed and on standby</li> </ul> <p>VERY HIGH : whenever approaching MTOW with significant deck motion (R&gt;3 and/or P&gt;1) and/or strong wind (&gt;35kts)</p>
5	OEI ship deck landing	HIGH to VERY HIGH	
6	Engine failure during shipdeck T/O or landing	Unacceptable	
AIRBUS HELICOPTERS Flight & Engineering Test Center		Flight Test Risk Typology AH-ETX Marignane	
7	Full autorotation for multi-engines at MTOW	UNACCEPTABLE	
8	One Engine failure while in OEI training mode at T/O and landing at training MTOW	UNACCEPTABLE	
9	Transition from VNE power on to VNE power off with real engine reduction.	HIGH to VERY HIGH	<p>Test flight method:</p> <ul style="list-style-type: none"> <li>- Power ON: AEO or OEI</li> <li>- ENG reduction tool to 1 representative</li> <li>- Recover maneuvers step</li> </ul> <p>Consider parachute if test point perform at altitude high enough</p> <p>Dedicated control / zone.</p>
AIRBUS HELICOPTERS Flight & Engineering Test Center		Flight Test Risk Typology AH-ETX Marignane	
10	Tethered Hover	HIGH	<p>If possible Telemetry and/or on board real time monitoring.</p> <p>Off line simulation to be used prior to the test if possible and validate.</p> <p>High to Medium.</p> <p>Full team briefing (including ground crew).</p> <p>Ground crew – Left/Right, Front/Aft and supervisor.</p> <p>Sling load camera if possible or on board monitoring of sling angle by a crew member</p> <p>Practice procedures.</p> <p>Communication means with ground crew</p> <p>Rescue services briefed and on standby.</p>
11	Moving Deck landings and T/O	MEDIUM to HIGH	<p>Simulations for deck sliding limits, ship pitch/roll limits, SHOL boundaries.</p> <p>Full team briefing (including ground crew).</p> <p>Minimum personnel on deck.</p> <p>Incremental approach to test points.</p> <p>Real time monitoring of parameters / telemetry.</p> <p>Rescue services briefed and on standby.</p> <p>HIGH : First deck landing for aircraft type at a given MTOW or for significant ship movement increase compared to previously demonstrated domain or significant increase of wind value</p> <p>MEDIUM : other cases</p>

# ETX – New PRE-FLIGHT RISK ASSESSMENT MATRIX – Proactive Mitigation Process

## AIRBUS HELICOPTERS - ETX FLIGHT TEST

## PRE-FLIGHT RISK ASSESSMENT MATRIX

Flight Test Risk	1		LOW		MEDIUM		HIGH	X	VERY HIGH VH	VH
Task Knowledge	1 HF		Expert	X	Familiar 15		Unfamiliar		First Time	15
Stress Factor	1 HF		Low		Medium	X	High 35		Extreme	35 Attention
Crew Composition	1 HF		Dedicated	X	Usual 15		Unusual		First Time	15
Altitude Profile	1 ENV		Medium >500 ft		High /Oxygen-Flight	X	Low 250-499ft 25		Terrain Flight <250ft	25
Day/Night	1 ENV	X	Day 0		Night unaided		Night NVG		Night FLIR	0
Weather	1 ENV		Not a factor		To be monitored	X	Impact on test/flight 20		Marginal	20
Crew Fatigue Status	1 HF		Excellent	X	Normal 10		Still Acceptable		Fatigue	10
Operating Area	1 ENV		Dedicated	X	Usual 10		Unusual		Unknown	10
Other POB	1 HF	X	None 0		Technicians/Observers		Passengers		VIP	0
Flight Monitoring	1 ENV	X	Real Time 0		Dedicated ATC		Controlled Airspace		Uncontrolled	0
	11	3		4		3 Caution !		1		TOTAL 130

Complete

Operational Risks



# Thank You

