EASA
European Aviation Safety Agency

Less human involvement, bringing more safety?

Moderator

Panellist

George Rebender

Hugues Meunier

Philip Adrian

Panel 3

Marc Parisis

Wilhelm Wesendorfer

Your safety is our mission.

An agency of the European Union

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European Aviation Safety Agency

Less Human involvement bringing more safety?

Georges Rebender
Aircrew Medical Head of Department

Your safety is our mission.

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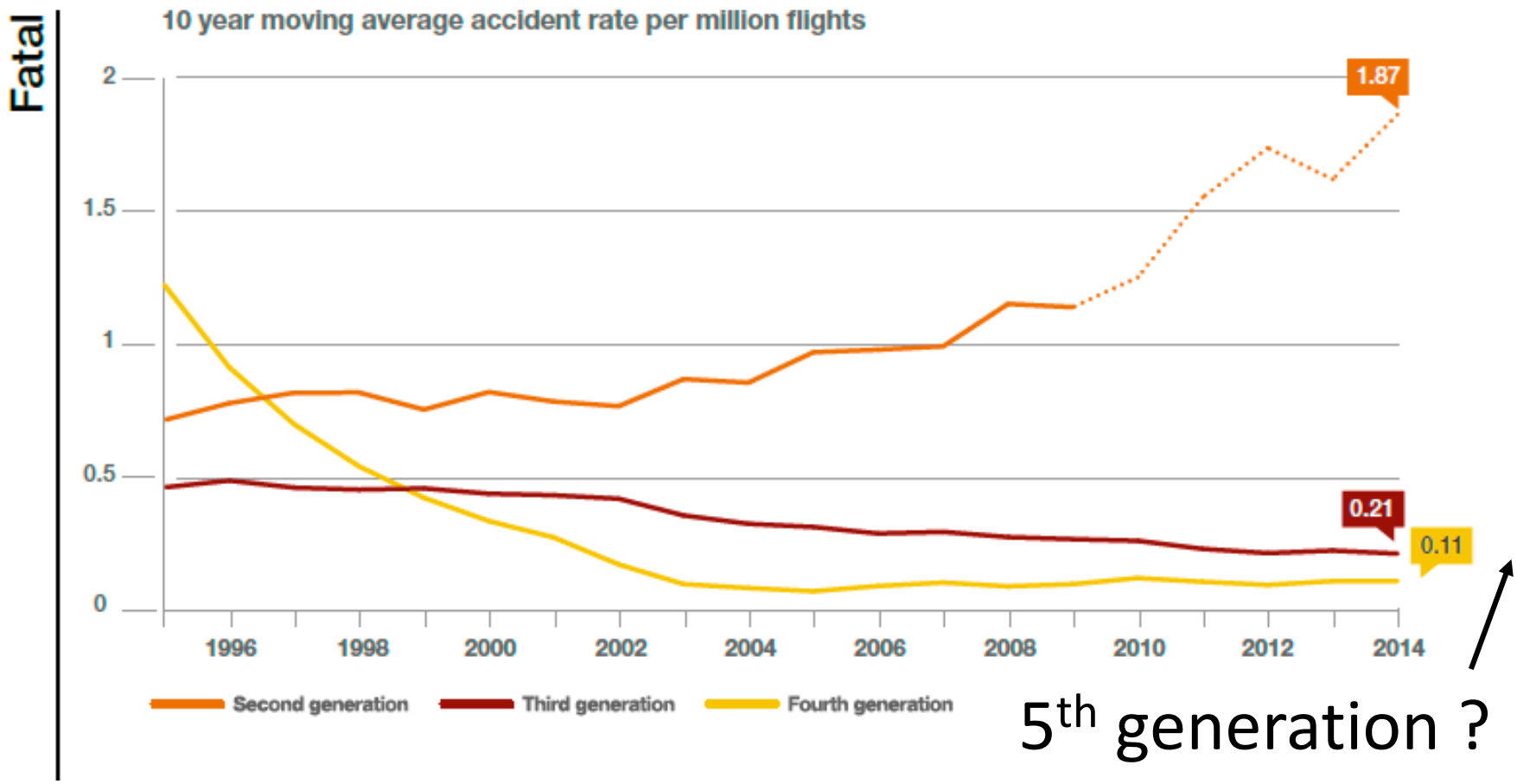
The Safety benefit of automation



5th generation ?

Source: Airbus Commercial Aviation Accidents 1958 – 2014 / Statistical Analysis

Accidents / serious incidents linked to precision approaches*

*CAT, MTOW >= 27t, since 1980

Row	ADRM: Aerodrome	ARC: Abnormal runway contact	ATM: ATM/CNS	CFIT: Controlled flight into or toward terrain	LOC-G: Loss of control - ground	LOC-I: Loss of control - inflight	RE: Runway excursion	SCF-NP: System/component failure or malfunction [non-powerplant]	USOS: Undershoot/overshoot	WSTRW: Windshear or thunderstorm.
CAT I	3	17	8	8	2	2	15	5	1	1
CAT II	1	1		1			1		1	
CAT III A								1		
CAT III B			1					1		
CAT III C	1	1	1				1			

New challenges due to automation

EASA SIB related to aircrew and automation

2016-02	Use of Erroneous Parameters at Take-off
2015-17R1	Unreliable Airspeed Indication at High Altitude/ Manual Handling at High Altitude
2014-07R1	Unexpected Autopilot Behaviour on Instrument Landing System (ILS) Approach
2010-33R1	Automation Policy - Mode Awareness and Energy State Management
2014-17	Aeroplane Mode Awareness During Final Approach
2010-18	Go-Around Callout and Immediate Response

Additional related facts

- Basic elements :Fly- Navigate - Communicate
- Long haul flight, Dubai Seattle:
- 1 pilot only over 4 will manually fly the plane, and this for 1 minute (if autoland used)

EASA Annual Safety Conference 2016

New Technologies and New Business Models

Bratislava - 25 & 26 October 2016

Panel 3 : Autonomous vehicles and AI
Less human involvement, bringing more safety?

Towards 2050 avionics :
Evolutions in Human-Machine Interactions

Hugues MEUNIER
Regulation & Standardization Director

THALES

An autonomous aircraft: myth or reality?

The technology exists…

A demonstrated capability…

Potentially transposable to commercial aviation…

Automation foreseeable : and what about safety ?

An autonomous aircraft: myth or reality?

An <u>autonomous</u> aircraft must be able to:

- Deal with whatever situation it encounters…
- throughout the 30 years of its service life…
- completely on its own

Automated driving cars are experiencing their first accidents

The environment will always be unpredictable.
A human pilot will be needed on board for the foreseeable future

Humans and automated systems working together

Automated systems are becoming ever more complex

- Increase in air traffic volumes
- Greater focus on competitiveness
- More stringent environmental standards
- Growing system complexity
- Increased connectivity

How do we manage effective cohabitation between humans and advanced automation?

Towards 2050 Avionics:
Evolutions in human-machine interactions and avionics architectures

“Avionics 2020 next cockpit generation” and “Integrated HSI”
“New Head Worn Display” and
“Fly by trajectory” concept

Examples of avionics system evolutions:

- More automated
- Simpler to operate
- More robust safeguards

Based on:

- New human-machine interactions
- Improved system architectures

Avionics 2020 – Next Cockpit Generation

Ergonomic and user-friendly cockpit

“Integrated HSI”

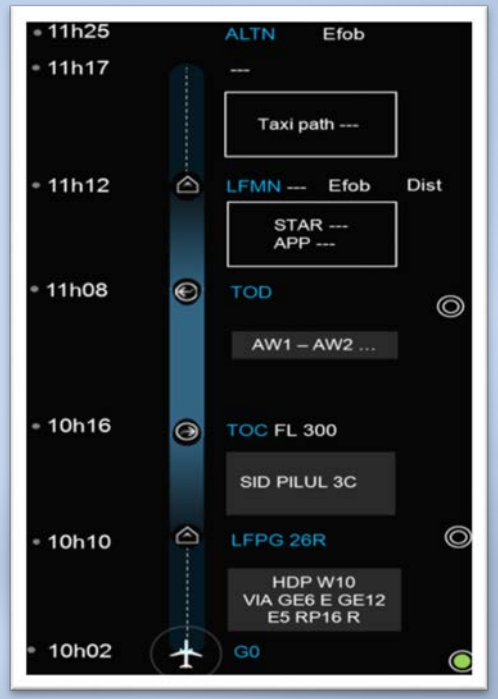
Today:
Organised by function

by

Tomorrow:
Organised by interactive object

Timeline: the flight log

Mission view

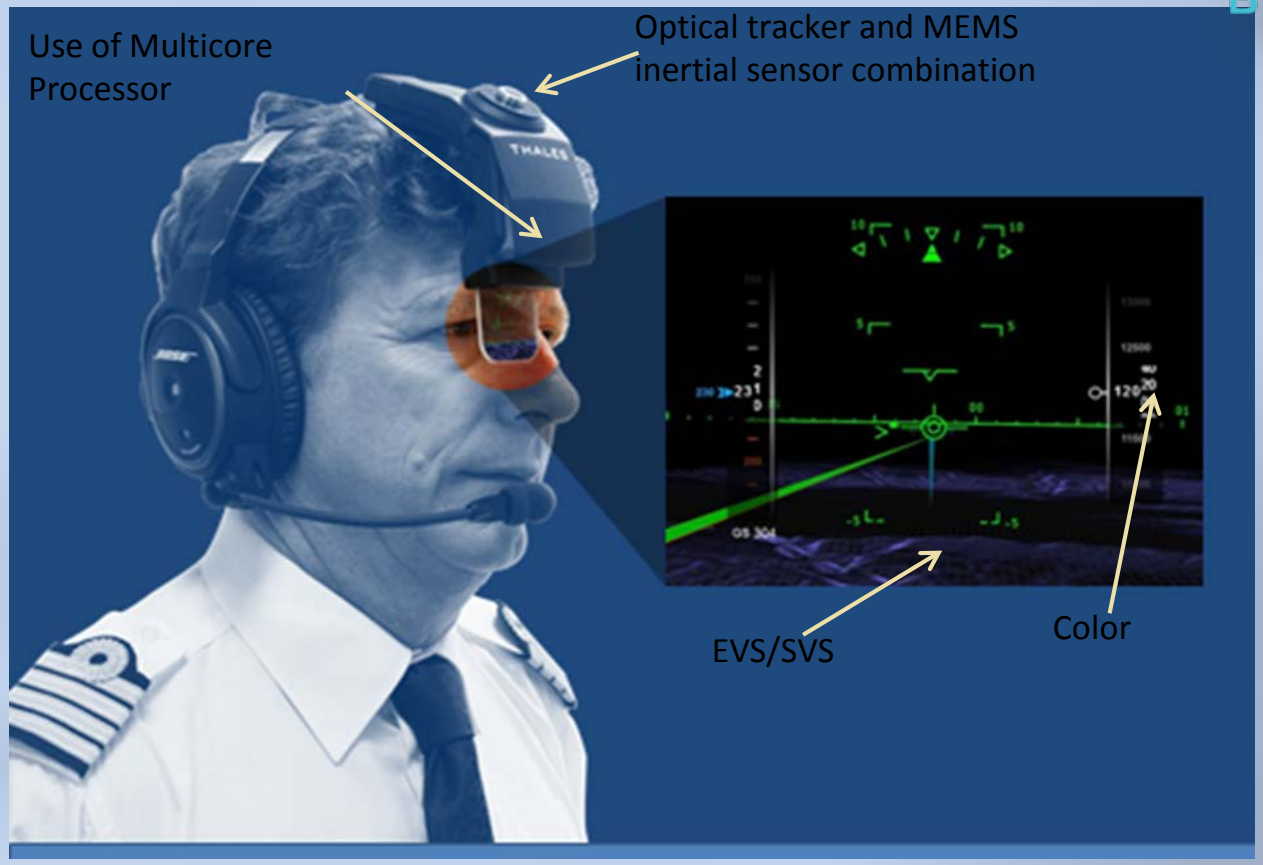


Summary leg view

Detailed leg view

New Head Worn Display

TOPMAX
BY THALES



New way for pilots to safely fly and efficiently manage the mission:

- HUD symbology like +
- 360° situational awareness
- Off-axis symbology
- Synthetic Vision System (SVS)
- 3D Flight Plan
- Reduction of T/O & Landing Minima

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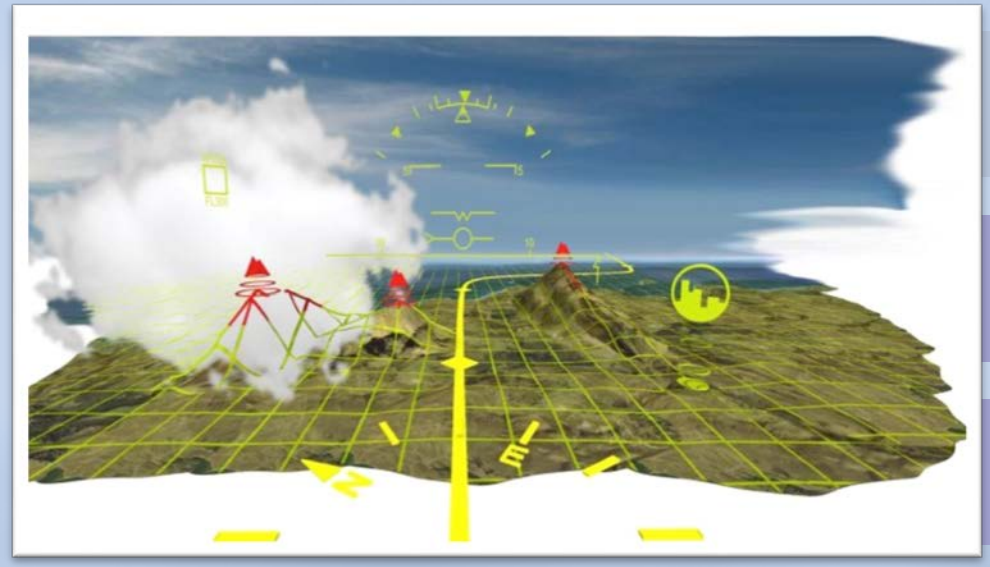
“Fly by trajectory”: an innovative concept



Permanent trajectory computing and display

New protection functions

“Fly by trajectory”

Enable pilots to manage the aircraft's future trajectory more directly

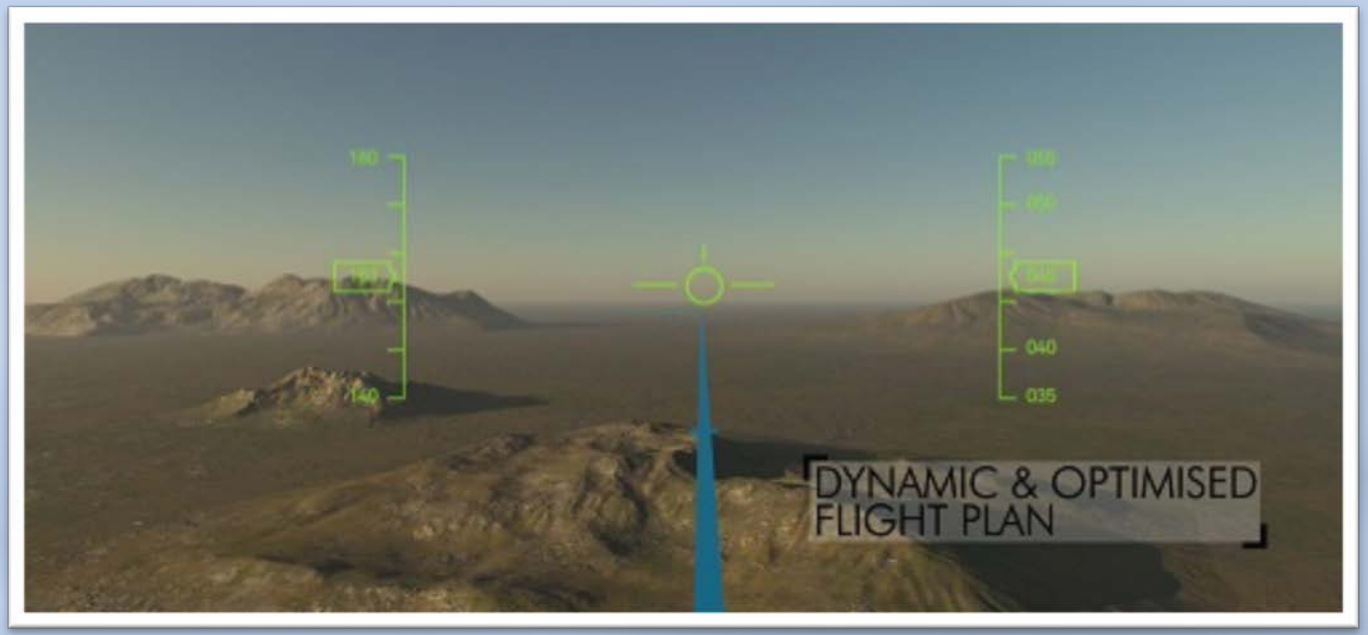
“Fly by trajectory”: an innovative concept

- Video 1: Short/medium-term applications

“Fly by trajectory”: for easier and more efficient flight management

“Fly by trajectory”: an innovative concept

- Video 2: Medium/long-term applications



“Fly by trajectory”: permanent flight path management for a connected and continuously protected flight

How to ensure a successful safe introduction?

- Upstream dialogue to ensure between Industry and Authorities
- Industry to familiarize AA on new technology or innovation with demonstrations : mock-up, simulation, evaluation, testing results, …
- AA/Industry Confidence Building towards Safety
- Be global in covering at same time Certification, Flight Standards, Training, Manufacturing - Strong Coordination needed
- AA challenging and helping the manufacturer towards safety
- Availability of Engaged Experts
- Industry to be pro-active (standardization, rulemaking proposal)
- Ensure progressive and consistent certification approach based on experience (to not kill innovation)

Improving pilot efficiency while enhancing safety

Design Innovative Systems that :

Put humans at the centre of the decision process

Don’t use human resources for tasks a machine can do

Limit the impact of inevitable human shortcomings:

- Make systems easier to use
- Offer more robust safeguards, even if flight crew are incapacitated

Capt. Marc Parisis

Vice-President Flight Operations & Chief Pilot, Customer Services, Airbus

Capt. Philip Adrian

Chief Pilot Regulatory Strategy, Boeing

08:14
RTC
Frieda Heinz
'Crashproof' Motorrad

Would you take that flight?

Wilhelm Wesendorfer
Also: @eu_cockpit

ECA Piloting Safety
European Cockpit Association

2015-2016 – SAFEST two years in aviation

since the beginning of commercial human flights

ECA

Piloting Safety

Is this because of well-trained pilots ...or despite pilots in the cockpit???

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High safety standards

Result of technical evolution or improved pilot training standards?

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Aviation – one of the fastest growing businesses of the world!

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Human Factors still a contributing factor

But NO statistics on incidents & accidents <u>avoided</u>

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Autopilot for routine tasks

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NO computer could be creative enough

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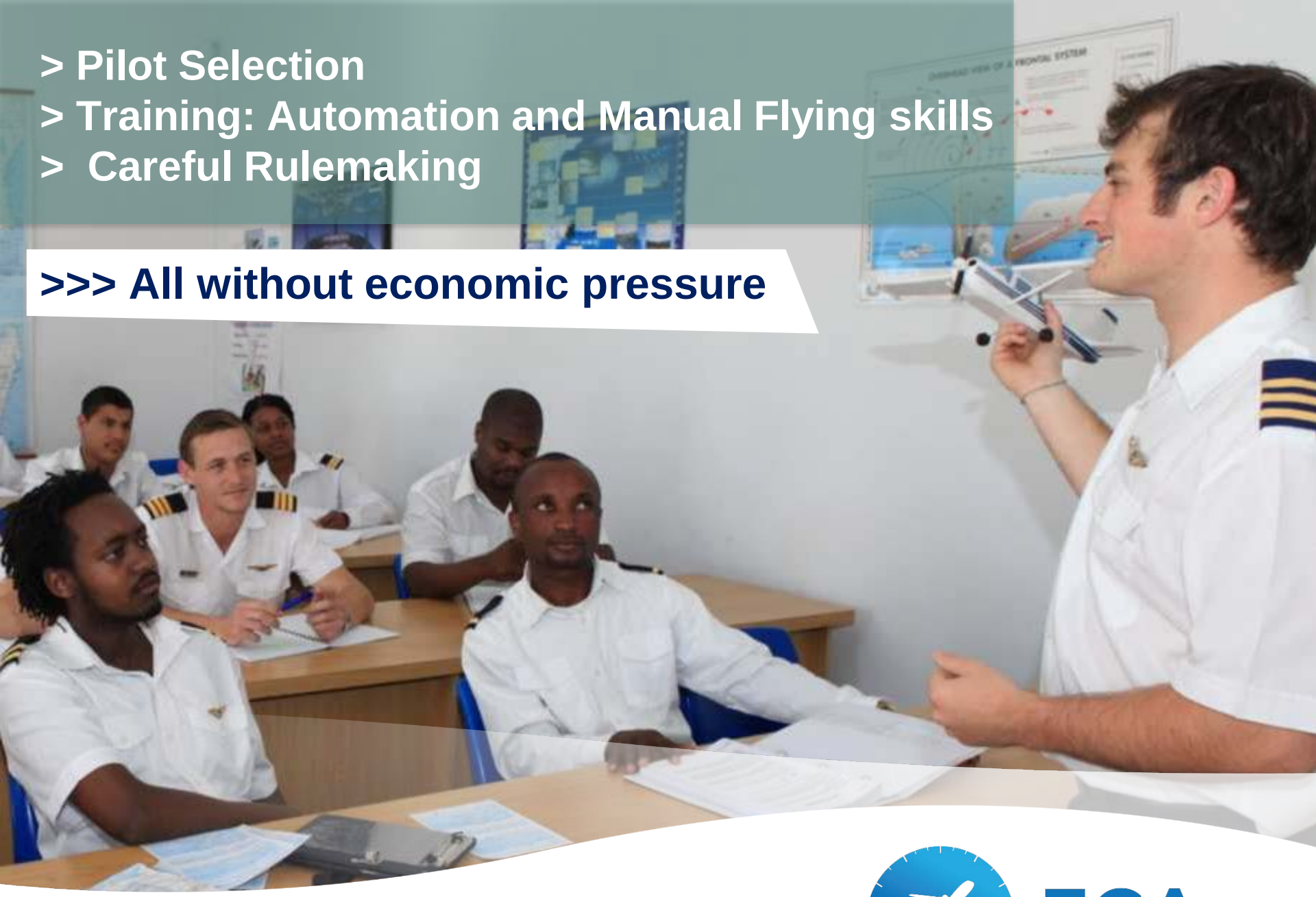

> Pilot Selection
> Training: Automation and Manual Flying skills
> Careful Rulemaking

>>> All without economic pressure

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Thank you!

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Questions?

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