BOEING

Collins Aerospace

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety togethe

The Inaugural African Aviation Safety & Operations Summit

"Championing Africa aviation safety together"


BRONZE SPONSOR
LEONARDO
75
FLIGHT
SAFETY

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Opening Ceremony

BOEING

Collins Aerospace

Presentation 1

Safety Report of RASG AFI, Safety Performance and Sustainability for Africa

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Presenter: Mr. Eyob Estifanos - Associate Regional Programme Officer, Comprehensive Regional Implementation Plan for Aviation Safety in Africa (AFI Plan) ICAO ESAF Office

ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

Safety Performance and Sustainability for Africa

Inaugural African Safety & Operations Summit
Addis Ababa – Ethiopia 15 May 2024

Eyob Estifanos
Associate Regional Programme Officer – AFI

BACKGROUND AND CONTEXT

- RASG-AFI
  - RASG-AFI is the main driver of the planning and implementation of Safety Enhancement Initiatives (SEIs) in the region. It is composed of States, regional entities and aviation industry, among others
  - Mandated developing and implement a work programme that supports a regional performance framework for the management of safety on the basis of the Global Aviation Safety Plan (GASP) and the Global Aviation Safety Roadmap (GASR); and
  - Using the GASP and GASR:
    - to build on the work done by States, existing sub-regional organizations and programmes such as Regional Safety Oversight Organizations (RSOOs), Regional Accident and Incident Investigation Organizations (RAIOs) the Cooperative Development of Operational Safety and Continuing Airworthiness Programmes (COSCAPs) and industry,
    - to support the establishment and operation of a performance-based safety system for the region.
- AFI Plan
  - The Comprehensive Regional Implementation Plan for Aviation Safety in Africa (AFI Plan) was adopted by the 36th ICAO Assembly (Assembly Resolution A36-1);
  - Evaluated 2015 and 2022 -confirm its continued relevance of the programme to the region.
  - The ICAO council presented a paper A41-WP/103 to the Assembly on the implementation of the AFI Plan.
  - The continuation of the AFI Plan endorsed as a key framework for addressing safety related deficiencies in Africa, as well as its further extension from 2025 to 2030.

ICAO

Safety Support Teams (SSTs) and Regional Office Safety Team (ROST)

- SSO (State Safety Oversight System)
- SSP (State Safety Programme)
- ANS (Air Navigation and Airport Infrastructure and
- OSI (Operational Safety Issues)-previously designated as Emerging Safety Issues SST and addressing Global High-Risk Categories of occurrences (G-HRCs):
  - Runway Safety (Excursion and Incursion)
  - Controlled Flights into Terrain (CFIT)
  - Loss of Control In-flight (LOC-I)
  - Mid-Air Collision (AIRPROX)

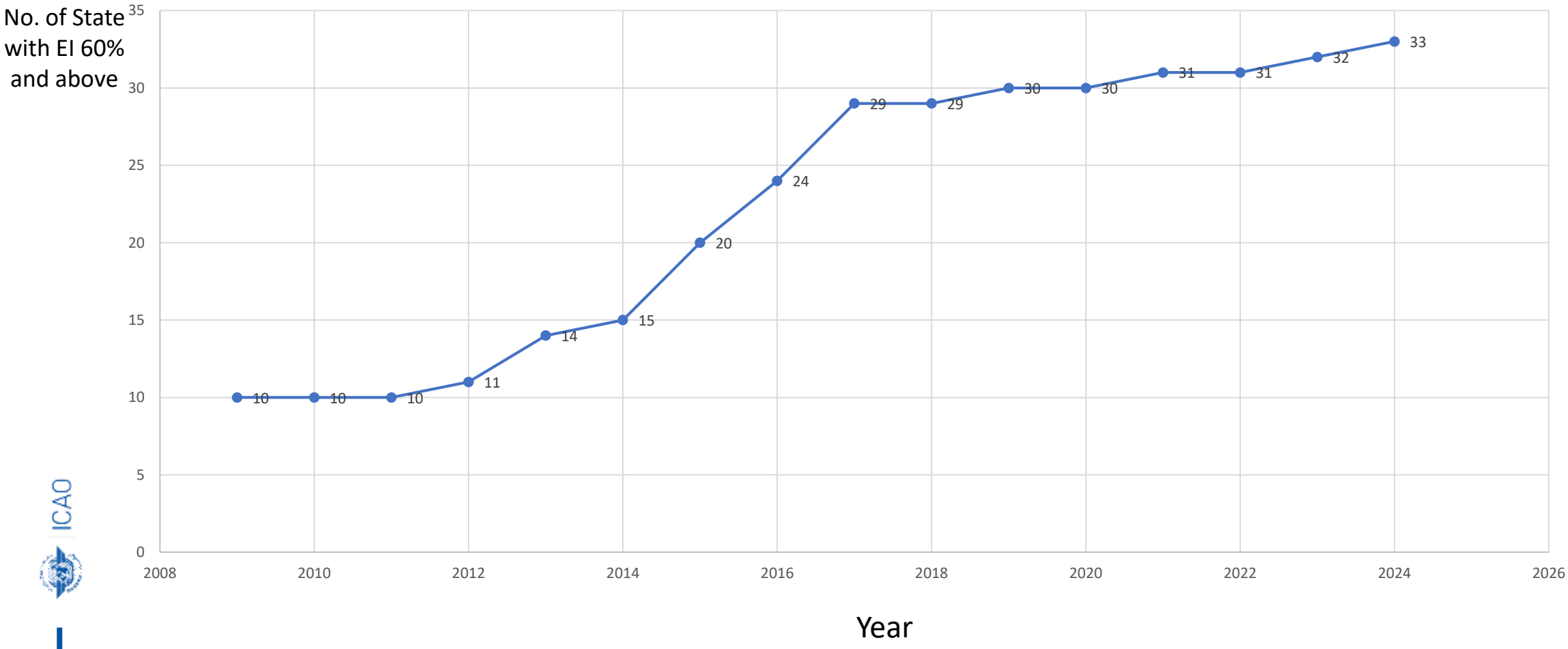
ICAO

Aviation Safety Key Focus areas in Africa

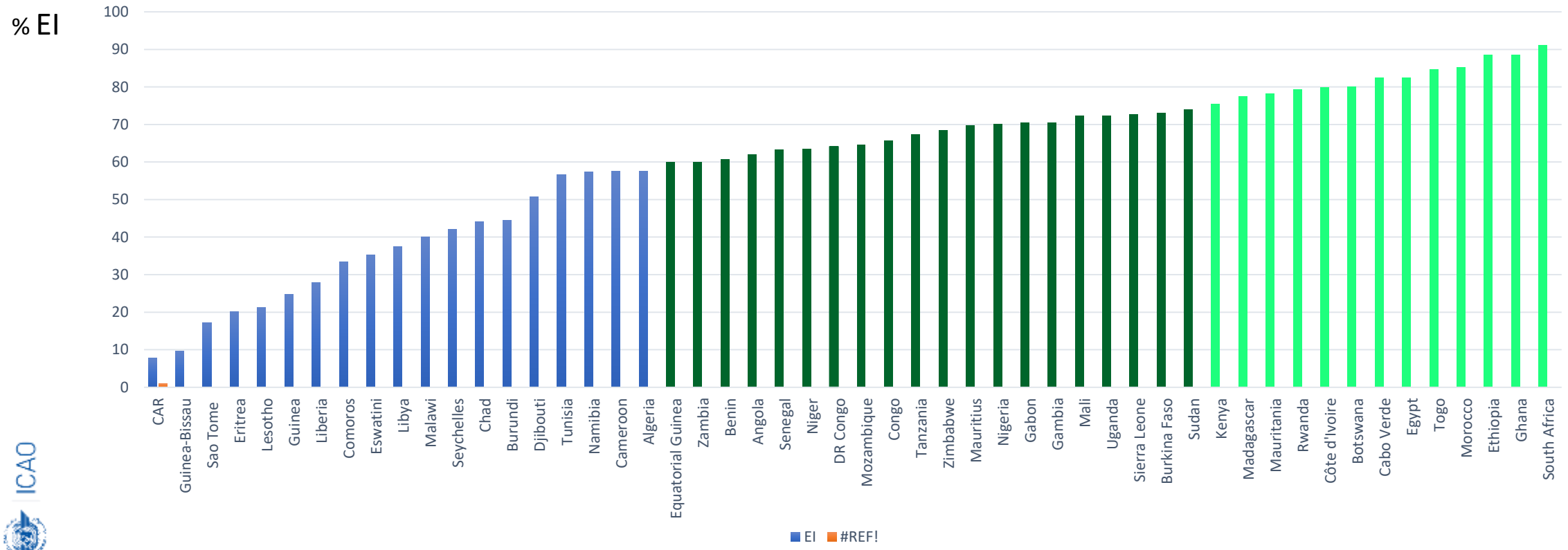
- Enabling States to establish and maintain a sustainable safety oversight system;
- Enhance the aviation professional capacity of states

- Assisting States to resolve identified deficiencies within a reasonable time;
- Enhancing aviation safety culture of African aviation service providers;
- Reduce aviation Safety risks in the AFI Region and
- Assist states in development of Infrastructure Gap Analysis and Planning

Safety Oversight Effective Implementation in African States
Implementation of Abuja Aviation safety Targets, 2008-24



Safety Oversight Effective Implementation in African States
Implementation of Abuja Aviation safety Targets, May 2024

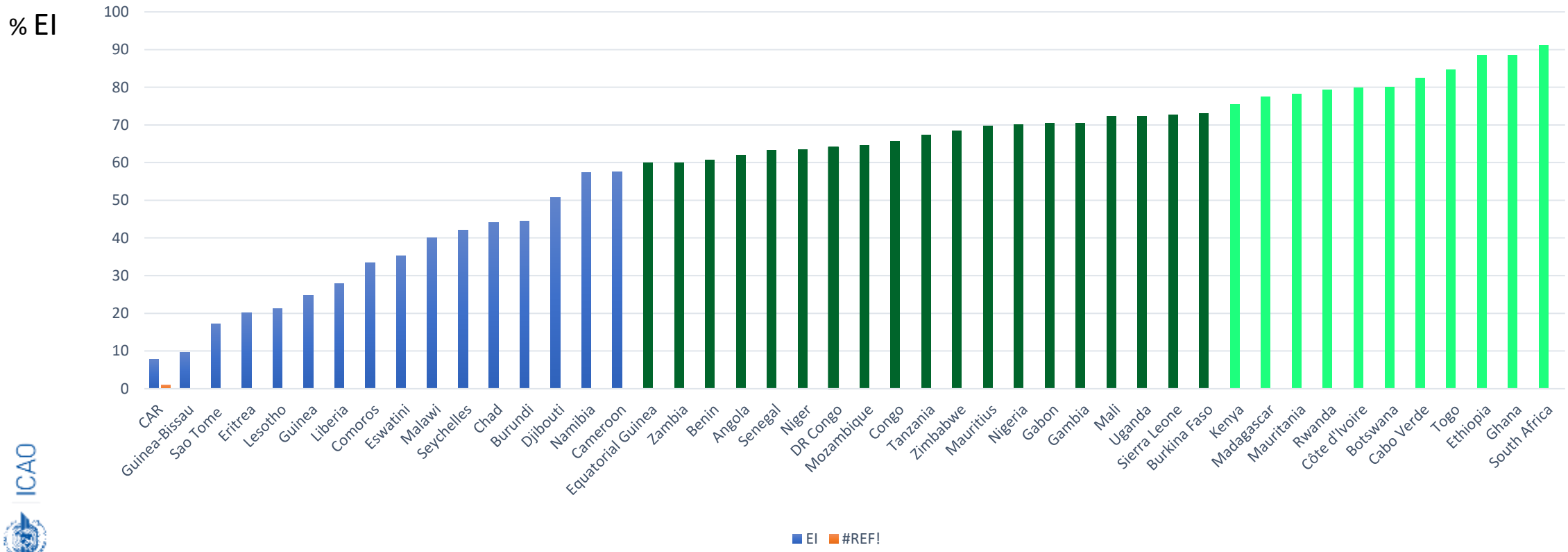


19 States EI<60%

60% < 20States <75%

13 States >75%

Safety Oversight Effective Implementation in AFI States
Implementation of Abuja Aviation safety Targets, May 2024

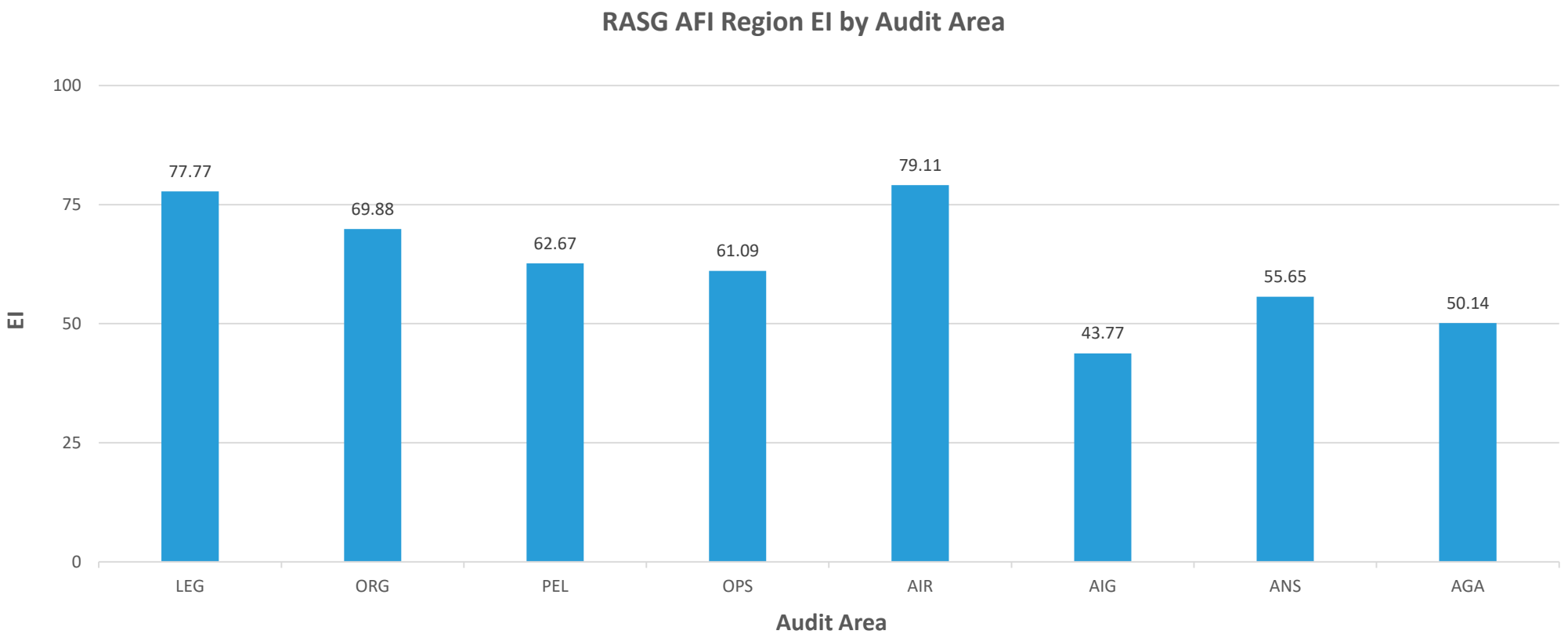


16 States EI<60%

60% < 19States <75%

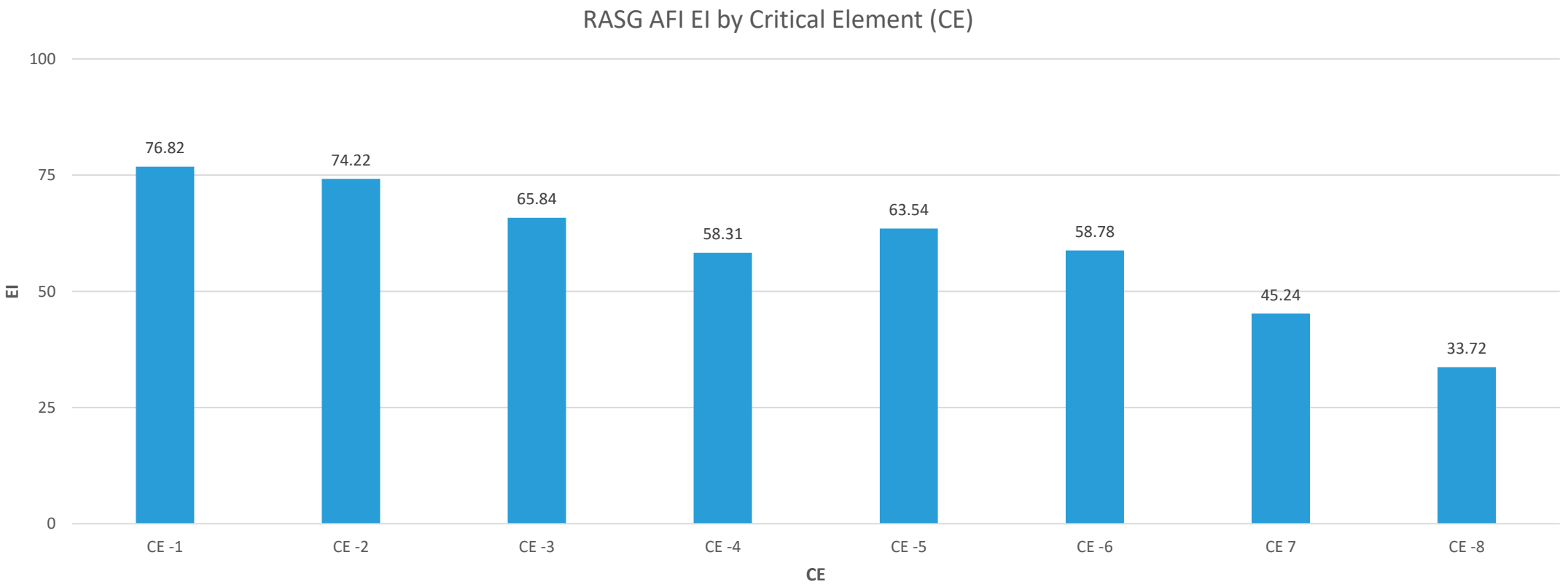
11 States >75%

RASG –AFI USOAP Audit Result – by Audit Area



Two audit areas(LEG & AIR) are above the GASP Targets of 75% EI

RASG –AFI USOAP Audit Result – by Critical Elements



Only One Critical Element (CE -1) above the GASP Targets of 75% EI

Progress in the attainment of the Safety Targets – Resolution of SSCs in Africa

July'12
(Total no. of SSCs)

20 SSCs in
13 States

Resolved so far
May 2022

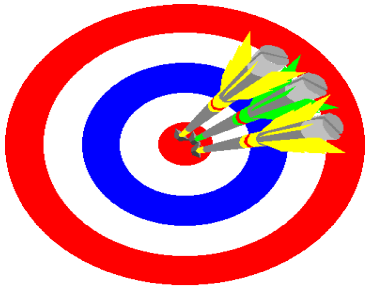
20 SSCs in
13 States

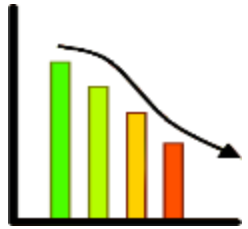
Existing
September May 2024

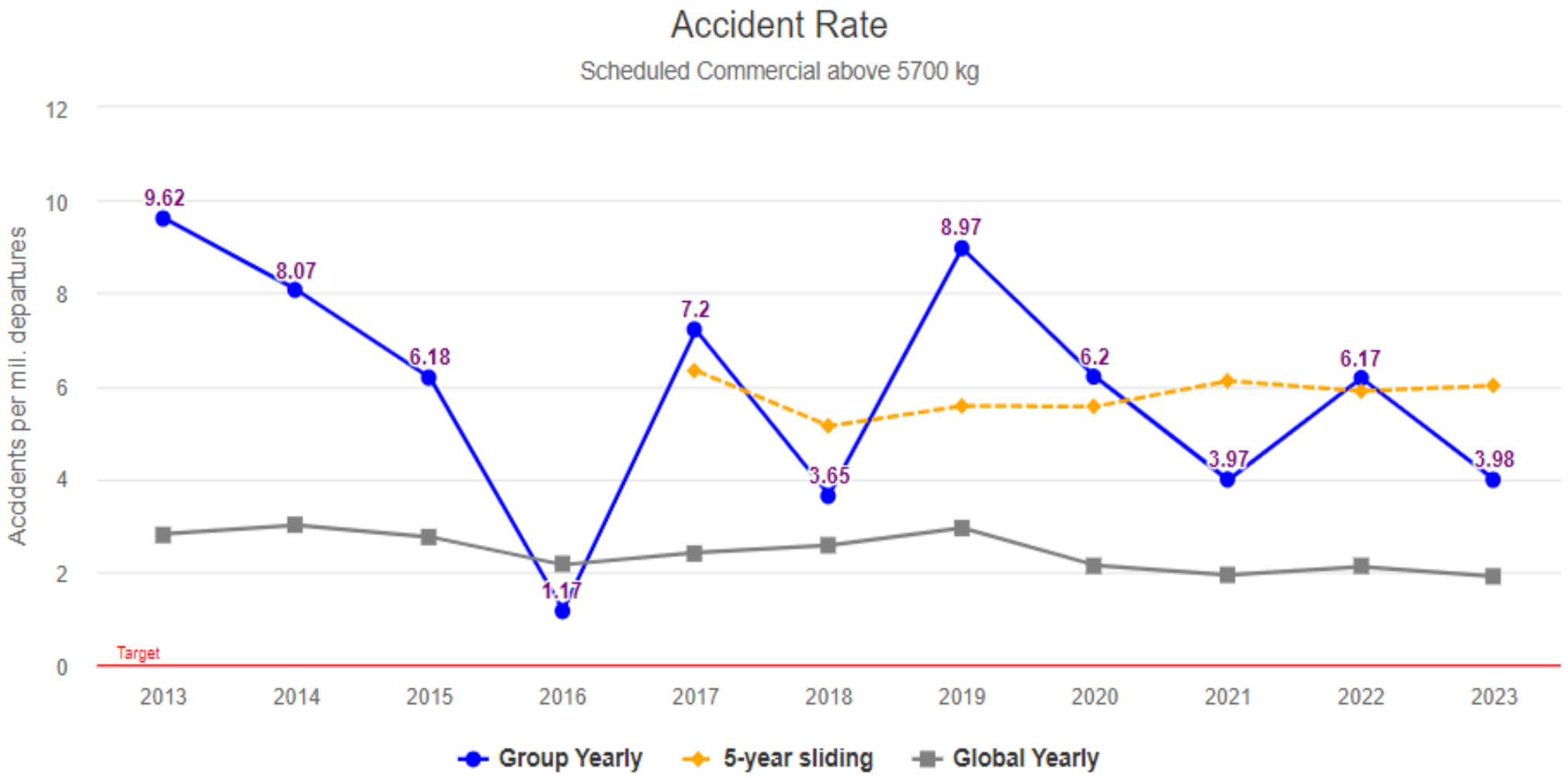
5 SSC in
3 State

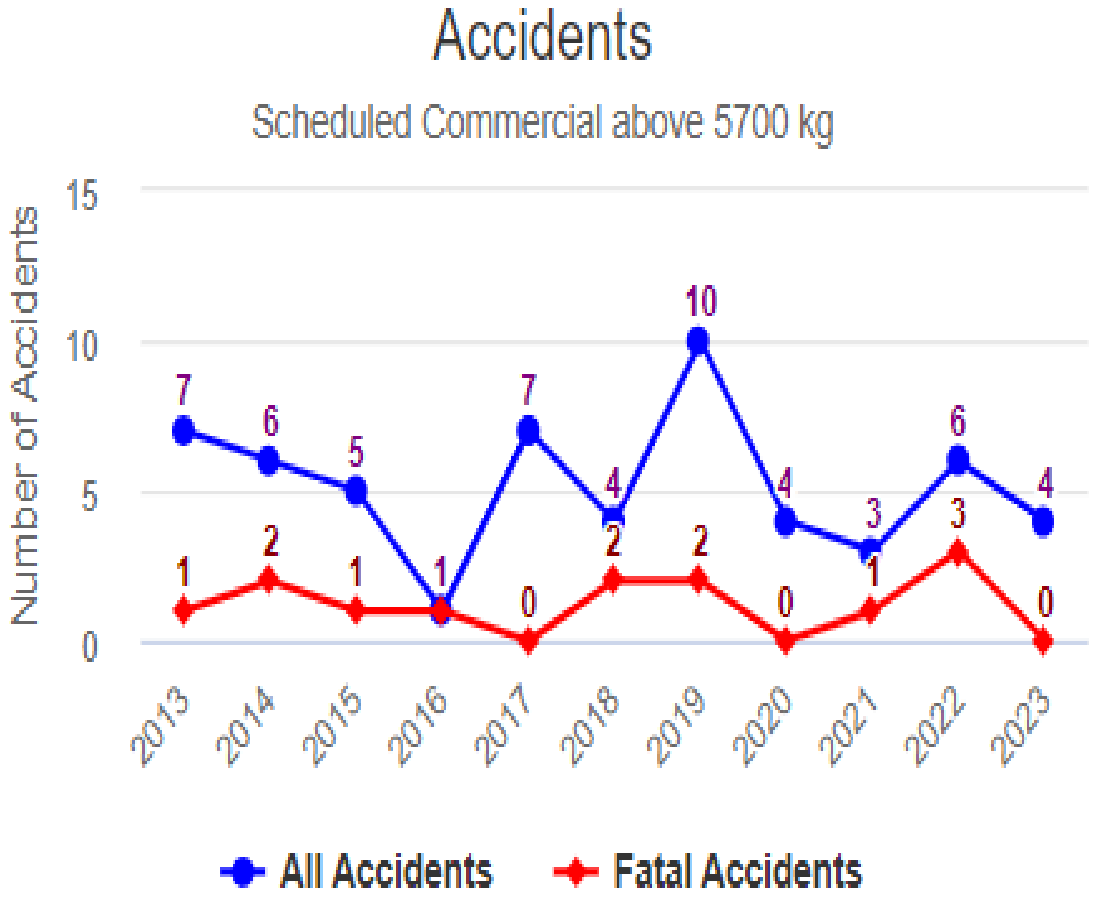
Target
31 Dec 2024

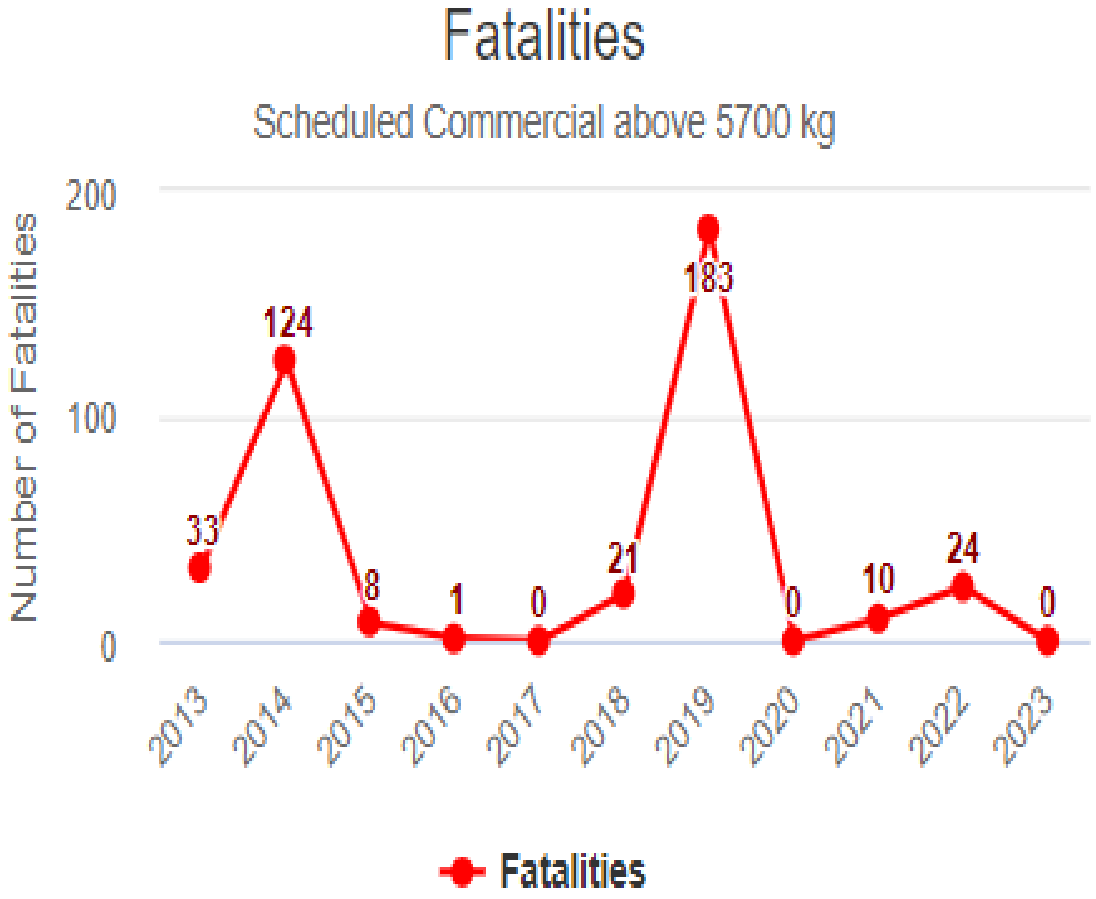
- ZERO -






Accident Rate
Scheduled Commercial above 5700 kg
Accidents per mil. departures
12
10
8
6
4
2
0
9.62
8.07
6.18
1.17
7.2
3.65
8.97
6.2
3.97
6.17
3.98
Target
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Group Yearly
5-year sliding
Global Yearly


Accidents
Scheduled Commercial above 5700 kg
Number of Accidents
15
10
5
0
7
6
5
1
7
4
10
4
3
6
4
1
2
1
1
0
2
2
0
1
3
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
All Accidents
Fatal Accidents


Fatalities
Scheduled Commercial above 5700 kg
Number of Fatalities
200
100
0
33
124
8
1
0
21
183
0
10
24
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Fatalities

RASG –AFI Accident Statistics

- RASG-AFI had 3 fatal accidents on scheduled commercial flights with aircraft over 5.7t in 2022 declined to None in 2023 with no fatalities.
- RASG-AFI has an accident rate of 6.17 accidents per million departures in 2022 which decline to 3.98 in 2023 trending down.
- The current 5-year sliding average accident rate for RASG-AFI is 5.89 .
- To be in line with the global accident rate and taking into account the traffic volume of RASG-AFI, the yearly accident rate for RASG-AFI should be between 0.22 and 4.
- The accident rate for RASG-AFI in 2022 was 6.17 and it declined to 3.98 in 2023 which is with in the boundary of the global rate.

Key Priorities, Projects and Studies

- Aerodrome Certification
- African ANSP Peer Review Programme
- State Safety Programme (SSP) Implementation
- Establishment of Fundamentals of Safety Oversight (FSO)
- Aeronautical Information Management (AIM)
- Infrastructure Gap Analysis Study 2019 and 2023
- RSOO Strategy and Roadmap
- Aviation Professional Capacity Building Study

Key Focus Areas and Challenges

Focus areas

- Enabling States to establish and maintain a sustainable safety oversight system;
- Assisting States to resolve identified deficiencies within a reasonable time;
- Enhance the aviation professional capacity of states
- Enhancing aviation safety culture of African aviation service providers
- Aviation infrastructure analysis and planning; and
- RSOOs sustainability and capacity strengthening.

Challenges

- Availability of sufficient funding
- Implementation capacity (Need to rethink the implementation support activity taking into consideration best practices)

Thank You!

QUESTIONS?

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12TH AVIATION STAKEHOLDERS CONVENTION
12 - 14 MAY 2024 | ADDIS ABABA, ETHIOPIA

Theme: Beyond Connecting Africa: Aviation

COFFE E BREAK

10.10-10.40hrs

Presentation 2

Championing Better and safer Skies for Africa - Global perspective

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Presenter: Dr. Hassan Shahidi, President & CEO - Flight Safety Foundation

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety together

Global Perspective

Hassan Shahidi
President and CEO
Flight Safety Foundation

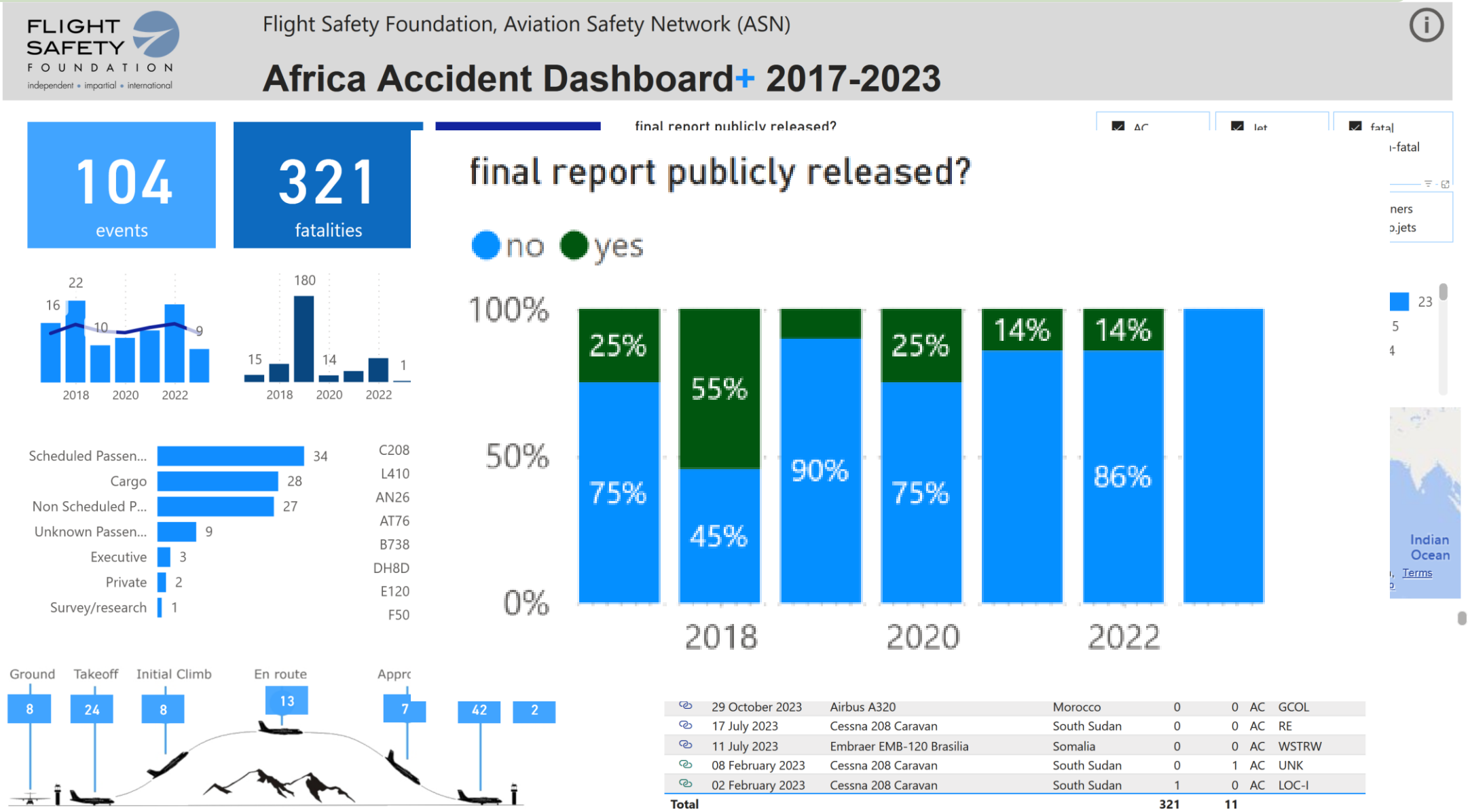
Global Accident Statistics
ICAO region based on State of Occurrence in 2022

ICAO Region	Estimated departures	Number of accidents	Accident rate (per million departures)	Fatal accidents	Fatalities
APAC	9 445 233	15	1.59	2	133
ESAF	710 630	4	5.63	1	19
EUR/NAT	7 838 023	8	1.02	-	-
MID	1 163 085	2	1.72	-	-
NACC	10 100 395	28	2.77	1	1
SAM	1 687 796	5	2.96	1	2
WACAF	261 169	2	7.66	2	5
World	31 206 331	64	2.05	7	160

ICAO High Risk Categories
2023-2025 Global Aviation Safety Plan (GASP)

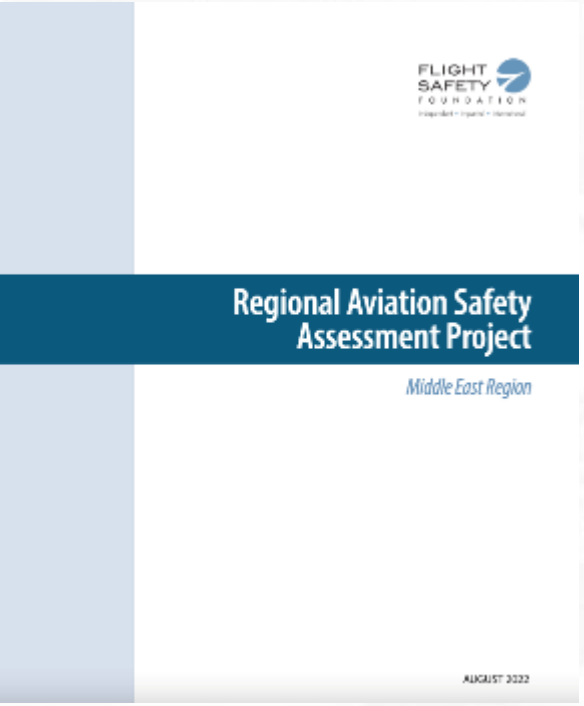
- Controlled flight into terrain (CFIT)
- Loss of control in-flight (LOC-I)
- Mid-air collision (MAC)
- Runway excursion (RE)
- Runway incursion (RI)

Flight Safety Foundation
Africa Aviation Safety Dashboard

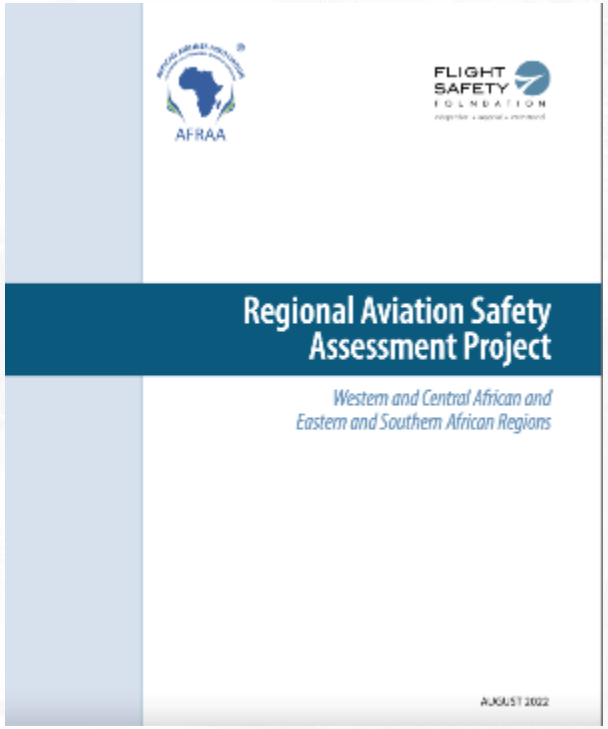


29 October 2023	Airbus A320	Morocco	0	0	AC	GCOL
17 July 2023	Cessna 208 Caravan	South Sudan	0	0	AC	RE
11 July 2023	Embraer EMB-120 Brasilia	Somalia	0	0	AC	WSTRW
08 February 2023	Cessna 208 Caravan	South Sudan	0	1	AC	UNK
02 February 2023	Cessna 208 Caravan	South Sudan	1	0	AC	LOC-I
Total			**321**	**11**		

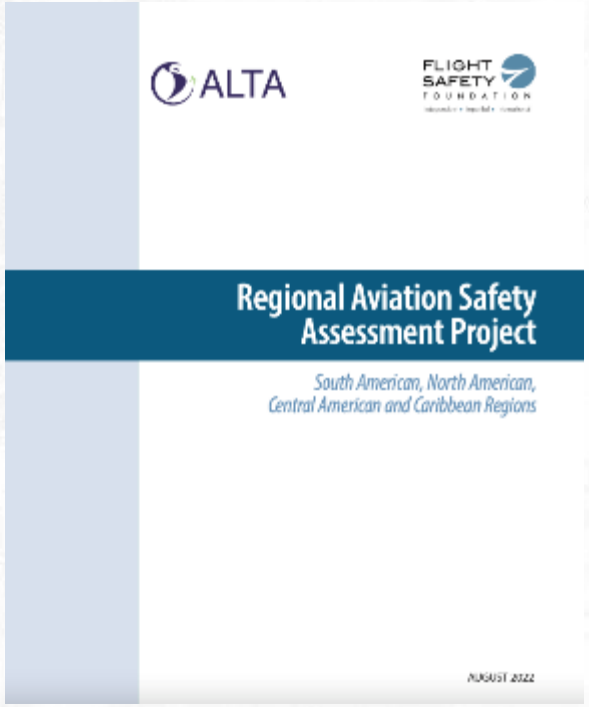
Foundation's Global Safety Assessment



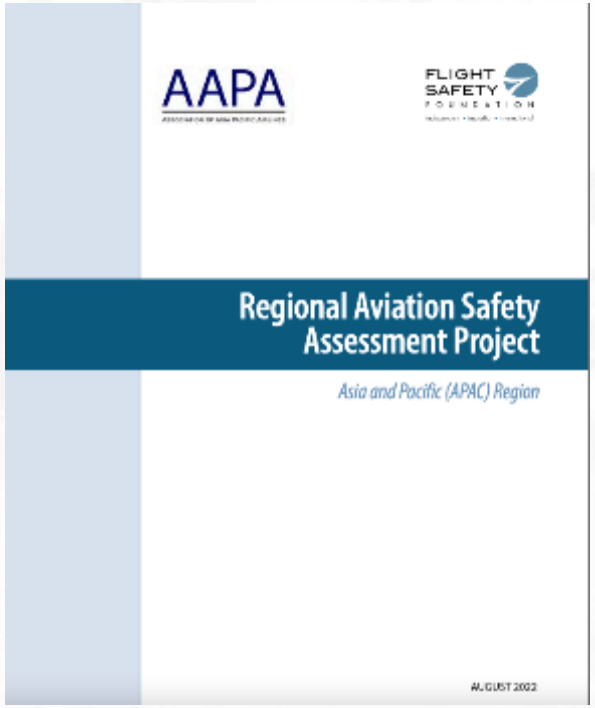
Middle East



Africa

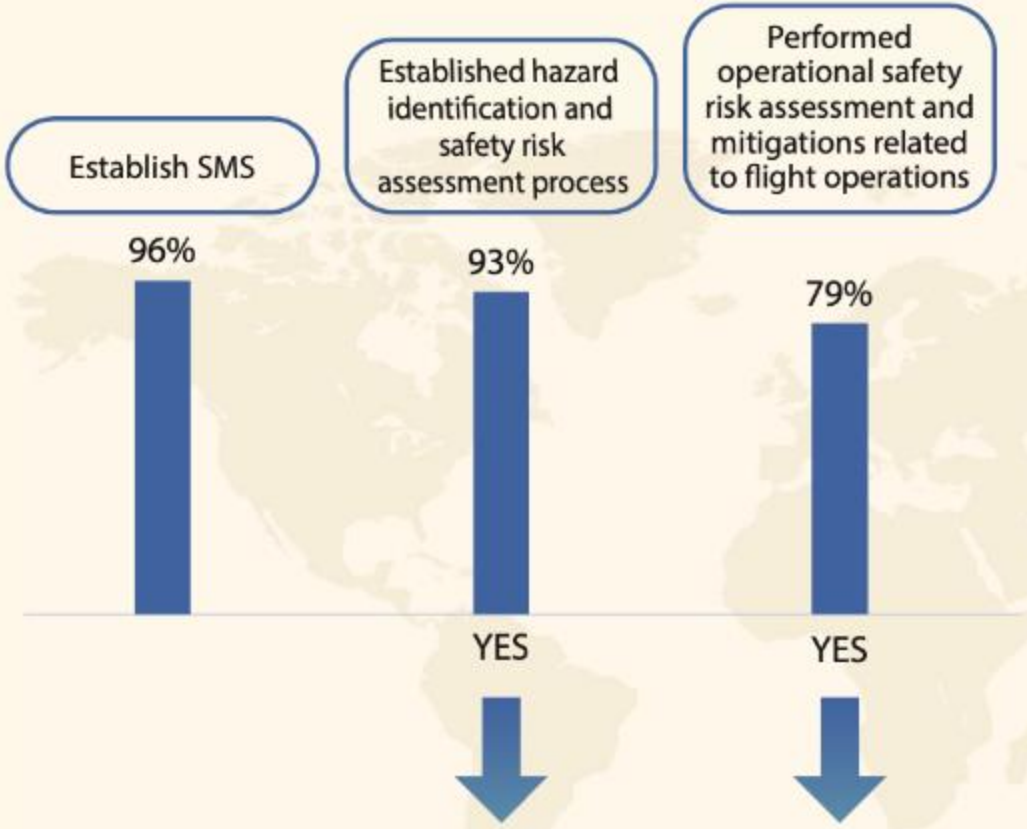


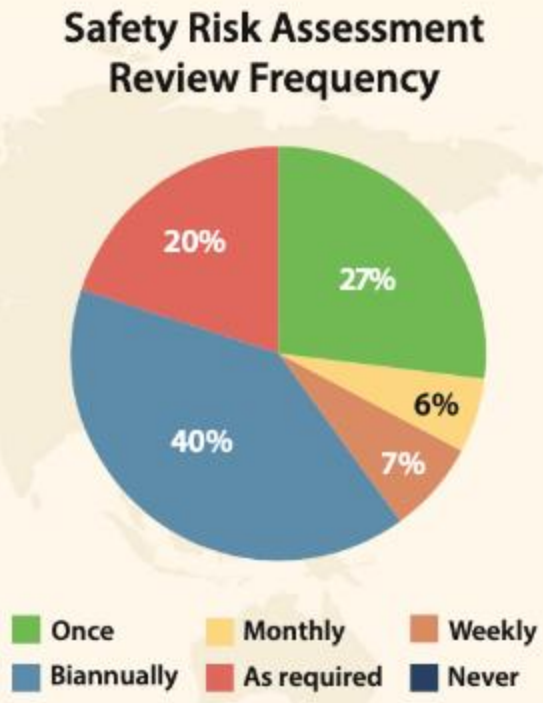
Latin America



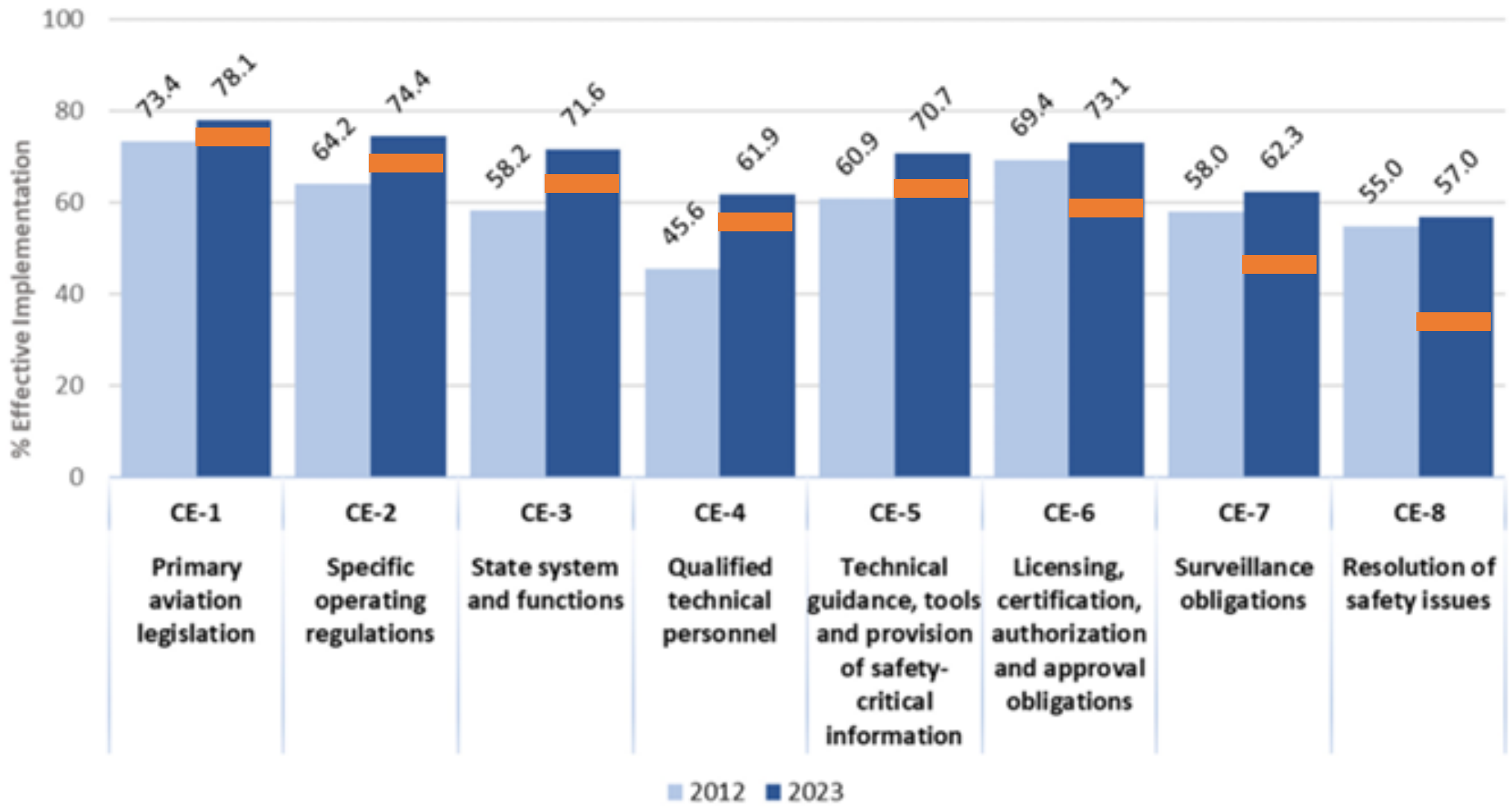
Asia Pacific

Africa Results: SMS and Risk Assessment

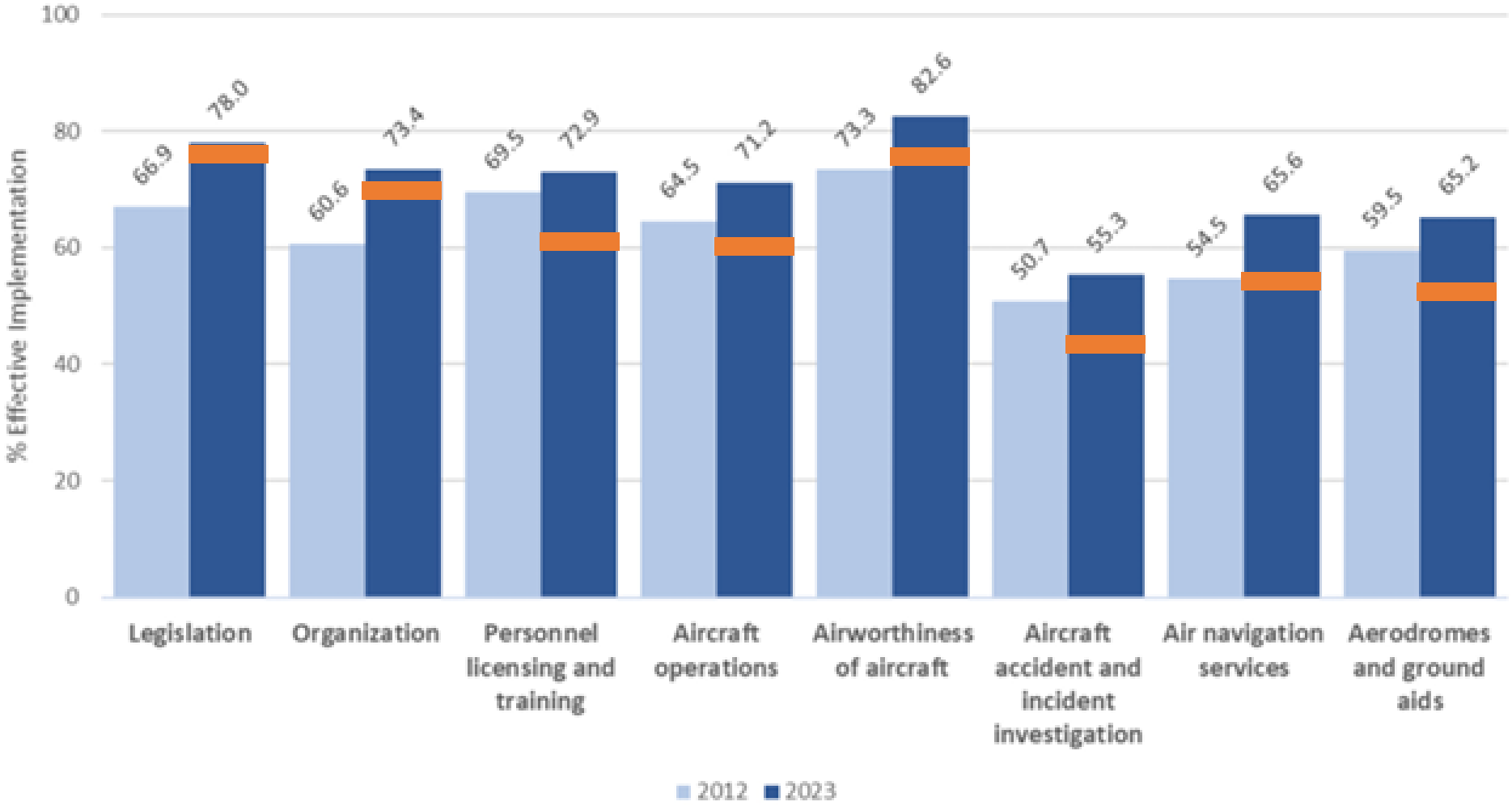




Global level of Effective Implementation
Comparison 2012 and 2023 by Critical Element



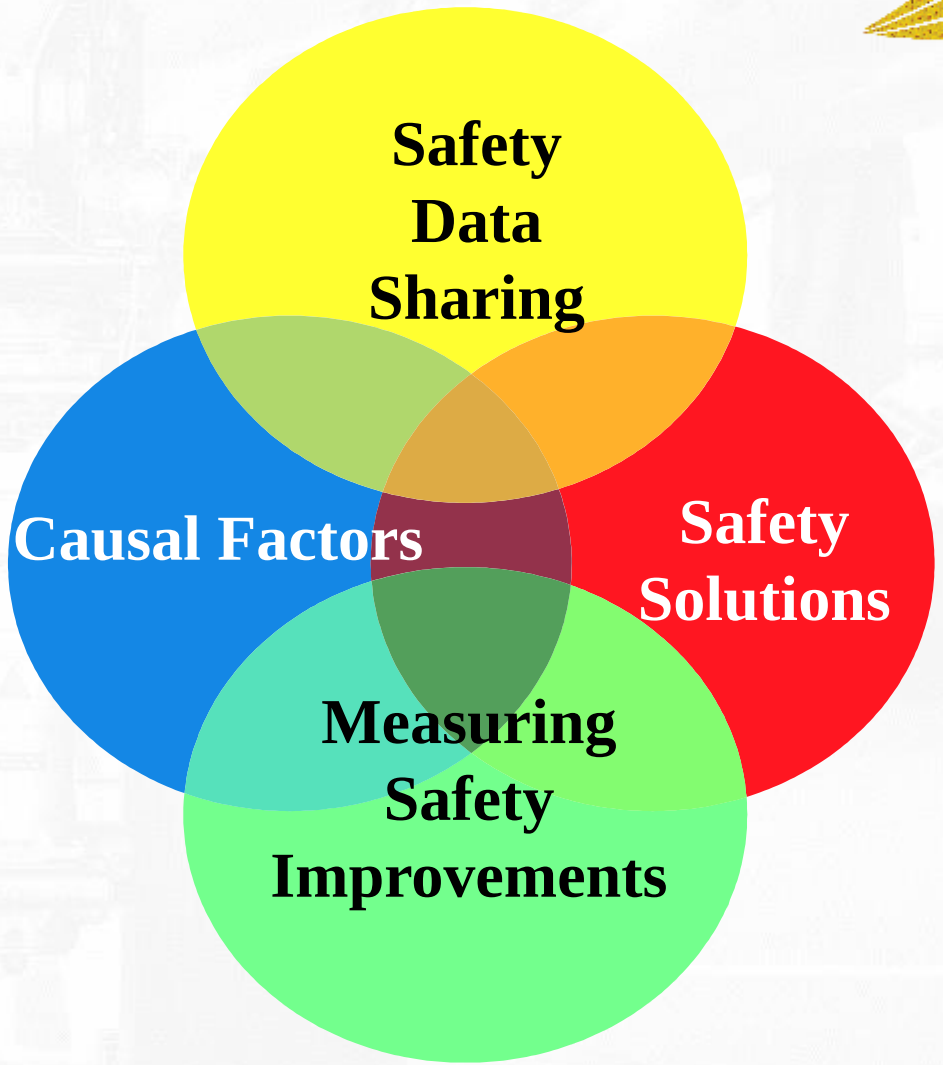
Global level of Effective Implementation
Comparison 2012 and 2023 by Audit Area



The absence of accidents is not evidence for presence of safety

Towards a Proactive Safety Management System

- Sharing Safety Data
  - Voluntary and non-punitive
- Determining risks and causal factors
  - Focus on precursors
  - Data driven and analytical
- Implementing Safety Solutions
  - Through collaborative and adoption of solutions and best practices
- Measuring safety improvements



Concluding Thoughts

- We are in the midst of the safest period in aviation history
- The challenge is to improve the safety record even further
- Forensic and reactive approach are not sufficient
- Proactive, prognostic and preventive approach to managing risk through the implementation of SMS is imperative

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety together

Thank You

Presentation 2

Championing Better and safer Skies for Africa – African perspective

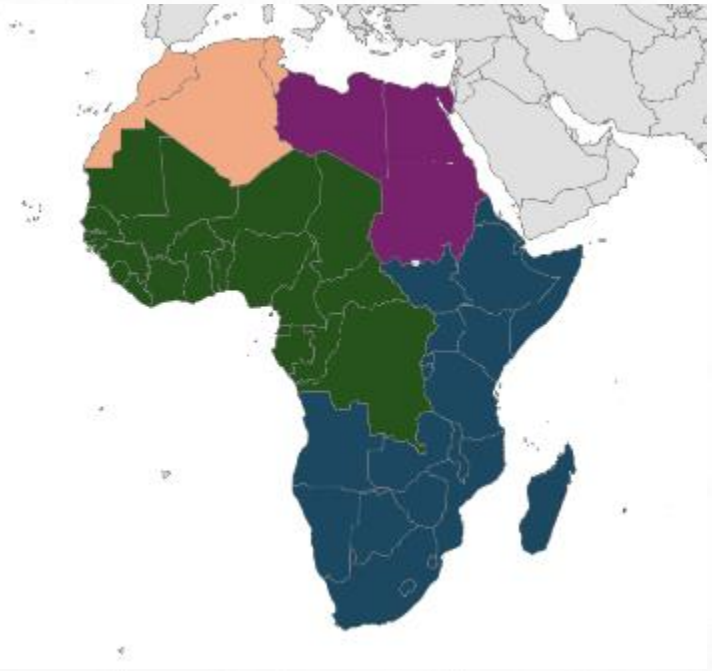
THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Presenter: Mr. Abdérahmane Berthé, Secretary General - AFRAA

TABLE OF CONTENT

I. Global Accident Rate vs. Africa Accident Rate 1 2022

AFRICA ICAO ZONES



- WACAF: 24 Countries
- ESAF: 24 Countries
- MIDDLE EAST** : Egypt, Lybia, Sudan
- EUROPE* : Algeria, Maroc, Tunisie

Sub-Region	Departures	Number of Accidents	Accident Rate (per million departures)	Fatal Accidents	Number of Fatalities
RASG-AFI	0.97 M	6	7.01	3	24
RASG-EUR*	0.34 M	0	0	0	0
RASG-MID**	0.28 M	0	0	0	0
WORLD	30.79 M	66	2.16	6	160

The accident rate in the RASG-AFI Region escalated from 1.53 to 7.01 per million departures between 2021 and 2022, while the total number of accidents rose from 1 to 6 in the same period.

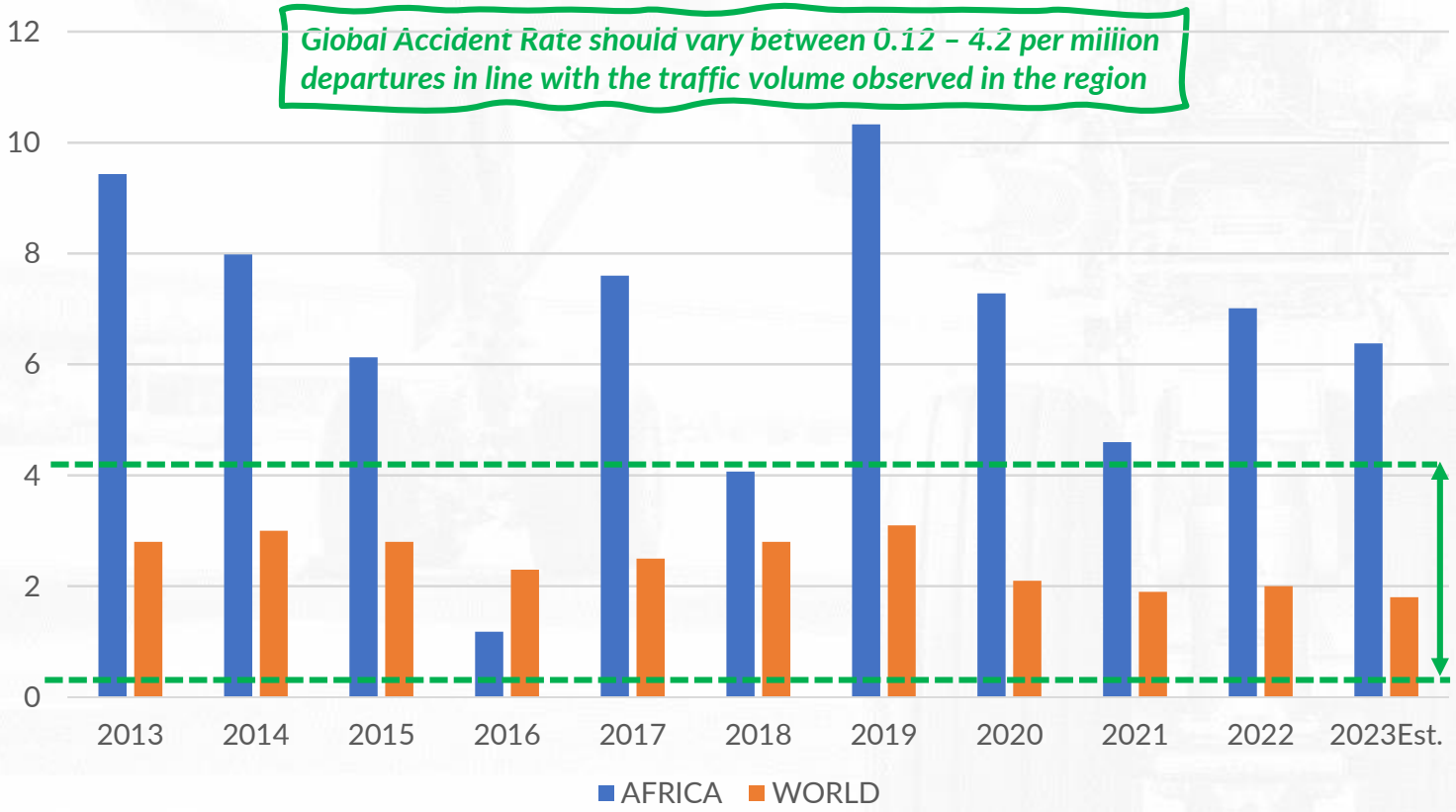
The RASG-AFI Region experienced a positive trend in traffic volume, with departures rising from 652 thousand in 2021 to 970 thousand in 2022, indicating a continued recovery in aviation from the adverse effects of the COVID-19 pandemic.

I. Global Accident Rate vs. Africa Accident Rate

2

2022
2023

Scheduled commercial flights on Aeroplanes above 5,700 Kg



Source: RASG AFI annual safety report 2022 – ICAO iSTARS, IATA, Africa News 2023

NUMBER OF ACCIDENT	YEAR
7.01/million departure	2022
6.38 per million departure	2023

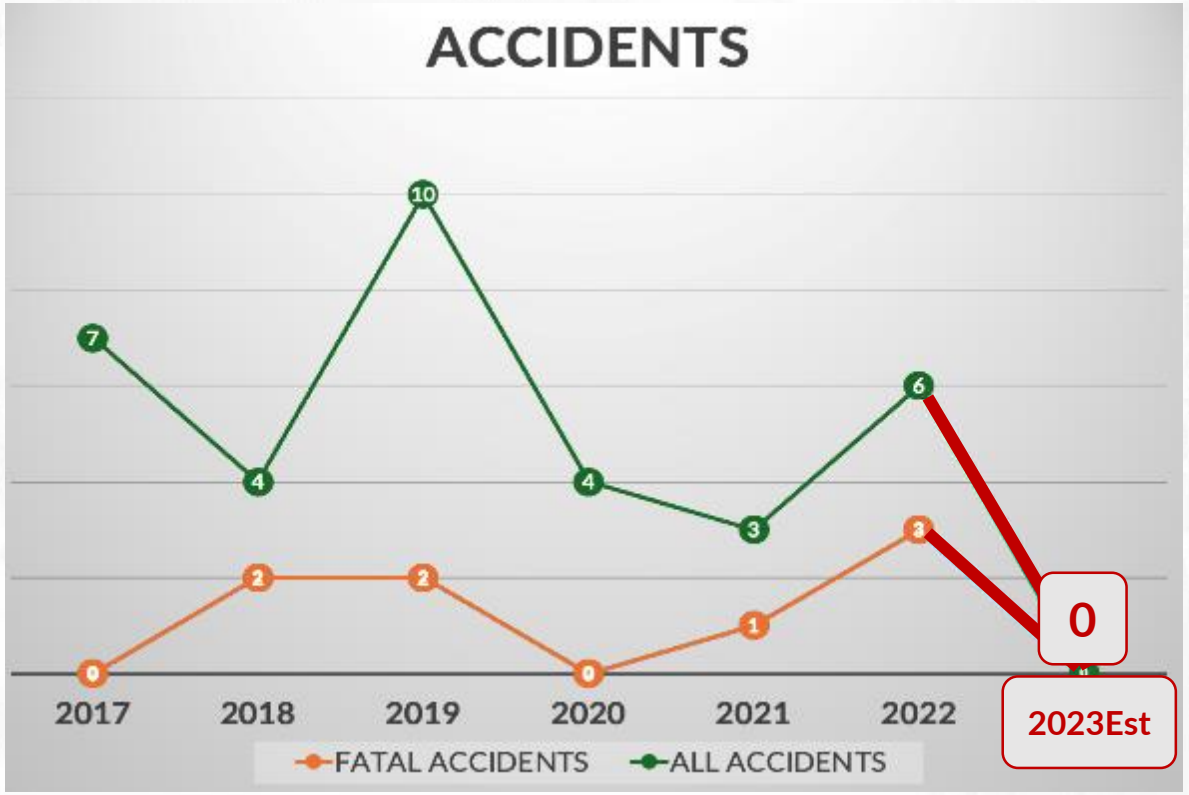
Source: RASG AFI annual safety report 2022 – ICAO iSTARS; IATA, Africa News 2023

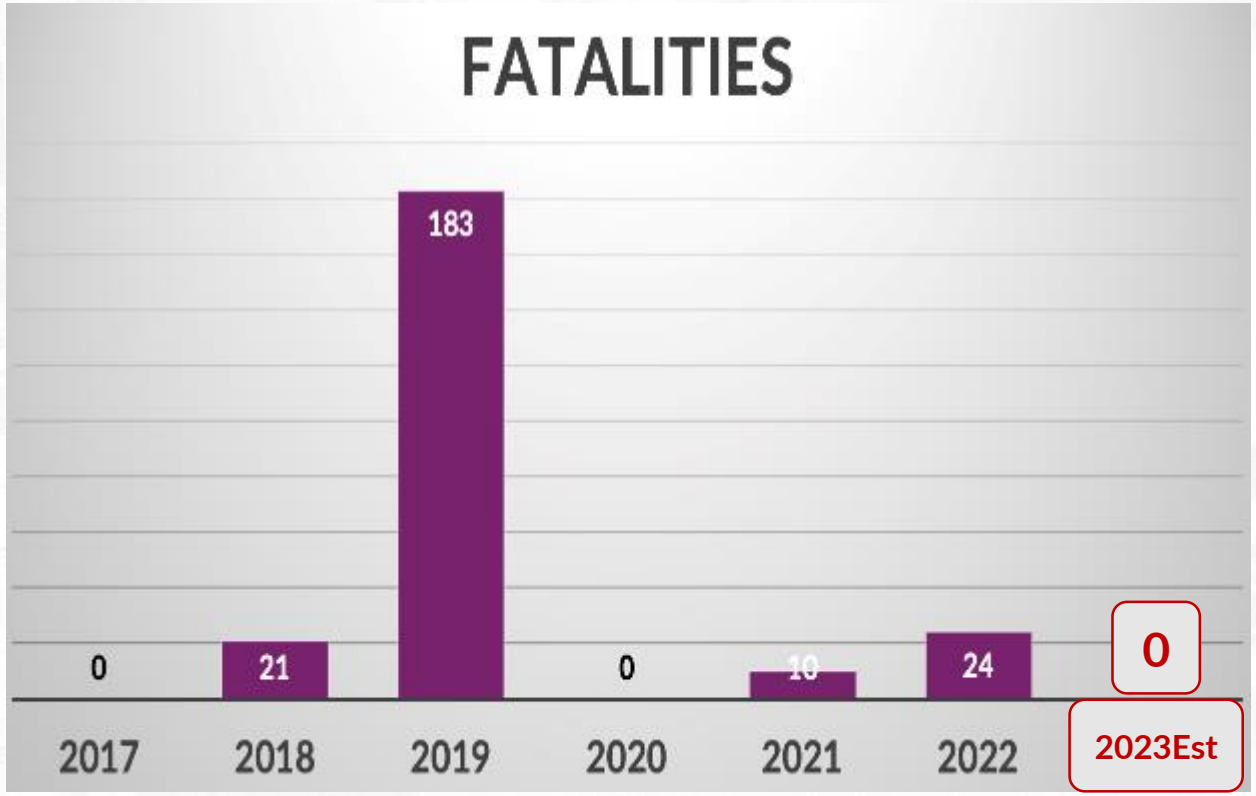
- In 2023 the Africa accident rate was 6.38 per million departures

- Above the global yearly rate (2.16/million departures)
- 5-year sliding average: 6.73/million departures

II. RASG-AFI Accident & Fatalities Rate

2022
2023





Source: RASG AFI annual safety report 2022 – ICAO iSTARS, IATA, Africa News

Jet operations saw no hull losses or fatalities. 2023 also saw the lowest fatality risk and 'all accident' rate on record

III. ICAO High Risk Categories AFRICA

2022
2023

- **Controlled flight into terrain (CFIT)**
  - *[Main Source of Fatal Accident]*

  → Only one CFIT accident reported between 2015 and 2020 and zero after.

- **Loss of control in-flight (LOC-I)**
  - *[Main Source of Fatal Accident]*

  → Since 2015, Two events in 2019, three in 2021 and one in 2022

- **Mid-air collision (MAC)**

  → MAC are really rare, with RVSM implementation, the MAC risks are mitigated thanks to the air traffic incidences

- **Runway excursion (RE)**

  → RE are the most predominent High-Risk Category of Occurrence and continues to be the main priority for Safety Enhancement Initiatives

- **Runway Incursion (RI)**

  → Less frequent than RE but still has to be subject of safety enhancement initiatives

III. ICAO High Risk Categories AFRICA

2024

RUNWAY EXCURSION

08 OCCURRENCES ALREADY FOR THE FIRST 05 MONTHS

- Malakal International Airport, Juba
- Boeing 727-200
- Too low approach
- 1 injury reported

- Pemba international Airport
- Embraer 135
- Heavy rain, wet runway
- No injury reported

- Alula Aba Nega Airport (MQX)
- Bombardier DHC-8-402Q
- Flat tyre
- No injury reported

- Elbarde Airport
- Fokker 50
- Failed Go-Around
- No injury reported

- Lagos International Airport
- MD 82
- Wet runway
- No injury reported

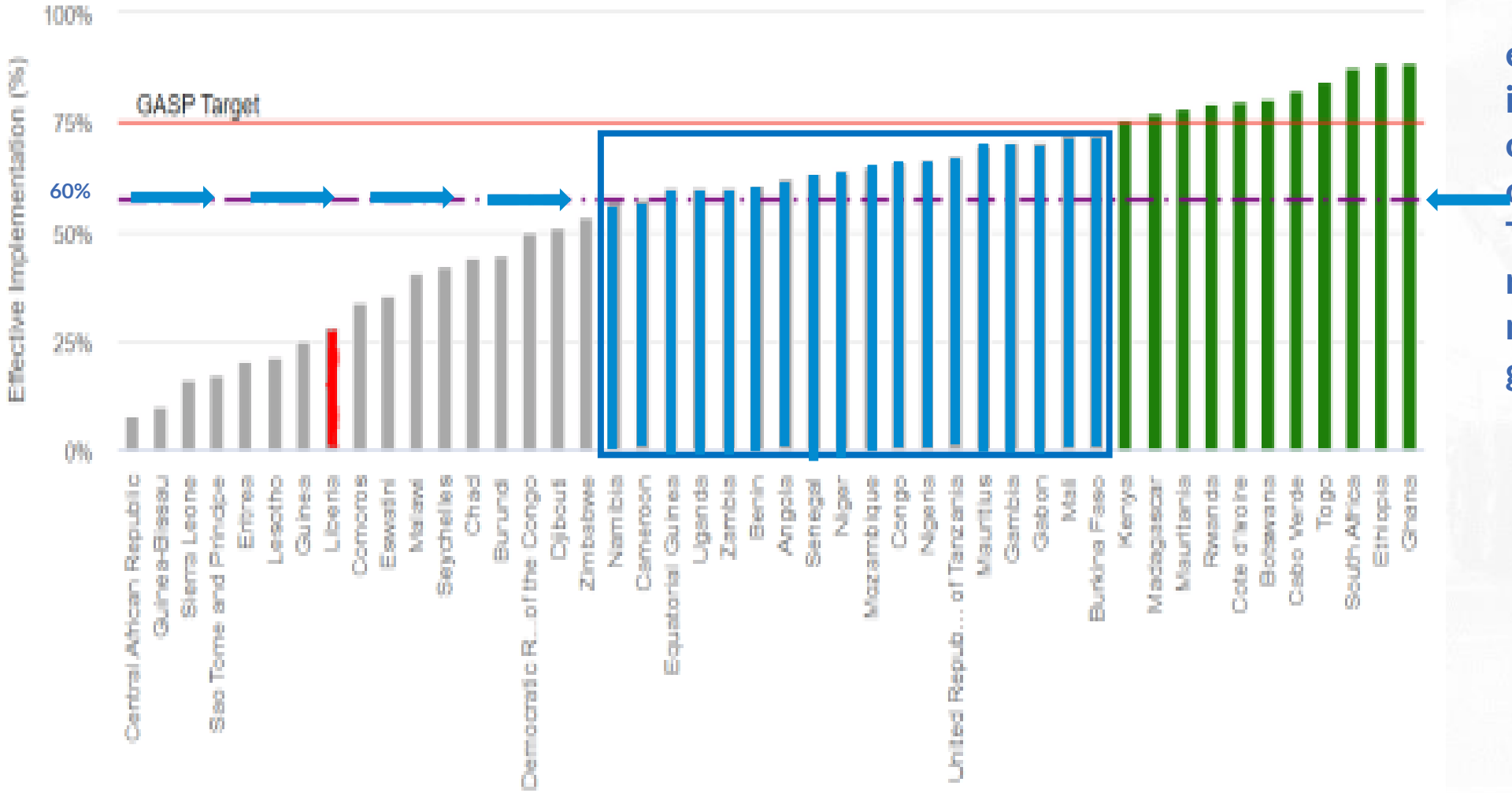
- Ndjili International Airport
- Boeing 737
- Lelft Engine failed on descent
- No injury reported

- Lagos International Airport
- ERJ-145LR
- Wet runway
- No injury reported

- Dakar International Airport
- Boeing 737-300
- Aborted takeoff
- Some injuries reported

IV. Africa - Effective Implementation [ASTs]

2023



Source: ICAO iSTARS

The progress and effectiveness of States in achieving the objectives and priorities of the Abuja Safety Targets (ASTs) and the revised ASTs are measured on an on-going basis.

- 13 States attained EI (Eff. Impl.) ≥75%
- 20 States attained EI (Eff. Impl.) 60%≤EI ≤75%
- 19 States not attained EI (Eff. Impl.) < 60%.

V. Recommendations

1. Cooperative/collaborative approach in safety improvement in Africa to deal with operational safety issues including ICAO high risk categories
2. Operational compliance of African carriers with international standards [IOSA, ISSA, ISAGO]
3. Data-driven safety management – Investigate all accidents and serious incidents in Africa
4. Air Navigation Infrastructure Safety & Airports Infrastructure safety
5. Safety Management System effective implementation

VI. Conclusion

DASHBORD

Africa Air Traffic around 4-5% of global air traffic by 2030 – *World Bank*

- 2,3% Fleet growth rate per year
- 1555 A/C in 2042, including 1025 new deliveries

ICAO's Aspirational safety goal Zero Fatalities by 2030 and beyond

Abuja Safety Targets Achievement

Adoption of Safety oriented approach

The safety performance of the African aviation industry is still behind that of the rest of the world, as you have seen in the previous slides.

Nevertheless, the demand for air transport is on the rise each year, leading us to record more flights.

Safety is the most critical concern for the African aviation industry. AFRAA and FSF are striving to express a cooperative/collaborative approach, with efforts focused on implementing globally accepted standards and best practices.

Together we will be able to address the following:

- Enhancing safety trends by mitigating high-category risks and beyond.
- Fulfilling the Abuja Safety Targets across all domains.

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety together

Thank You

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Panel Discussion

How do we address the underlying factors behind the safety trends in Africa?

Presentation: Mr. Henry Gourdji, Director of Safety Strategy and Policy - Flight Safety Foundation

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety together

Accidents and the Current Risk Picture

Henry Gourdji, MSC, CD

Director, Safety &Strategy

Flight Safety Foundation

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

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FLIGHT SAFETY

Theme: Championing Africa aviation safety together

Accidents and the Current Risk Picture

Henry Gourdji, MSC, CD

Director, Safety &Strategy

Flight Safety Foundation

FLIGHT SAFETY FOUNDATION
independent • impartial • international

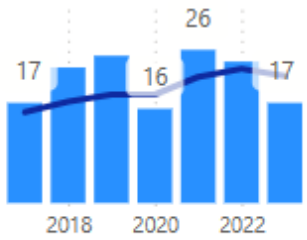
Flight Safety Foundation, Aviation Safety Network (ASN)

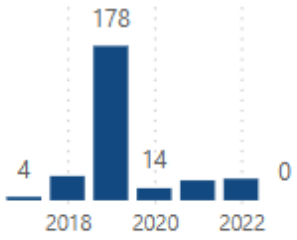
Africa Accident Dashboard+ 2017-2023

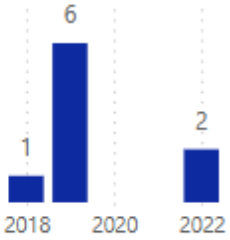
148 events

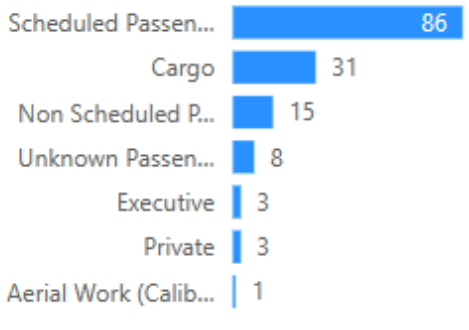
272 fatalities

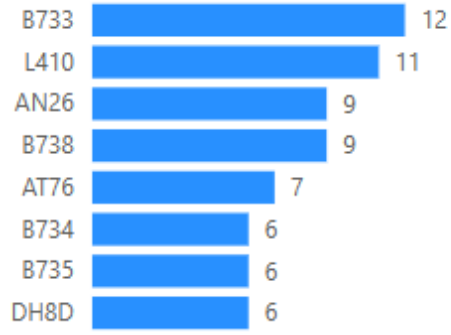
9 ground fatalities

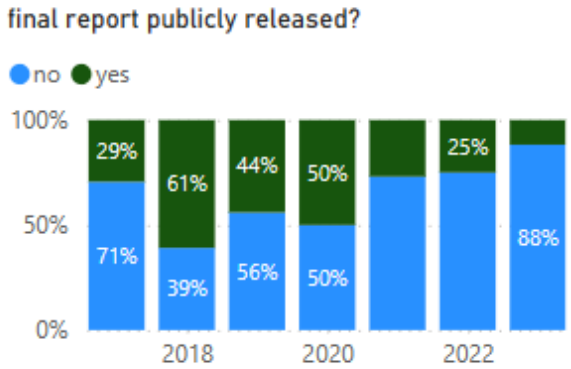


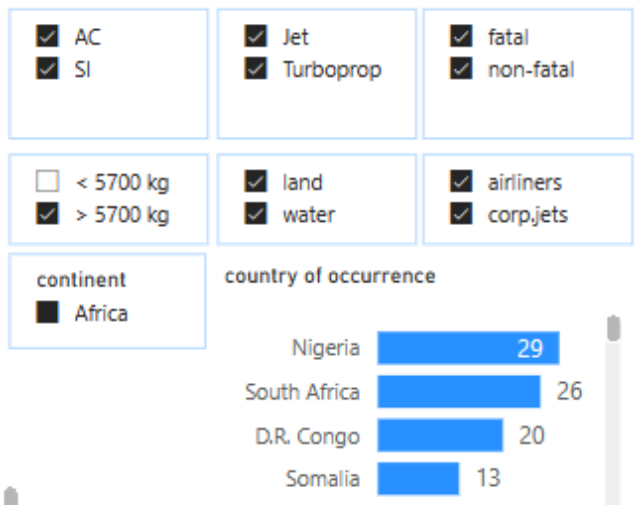




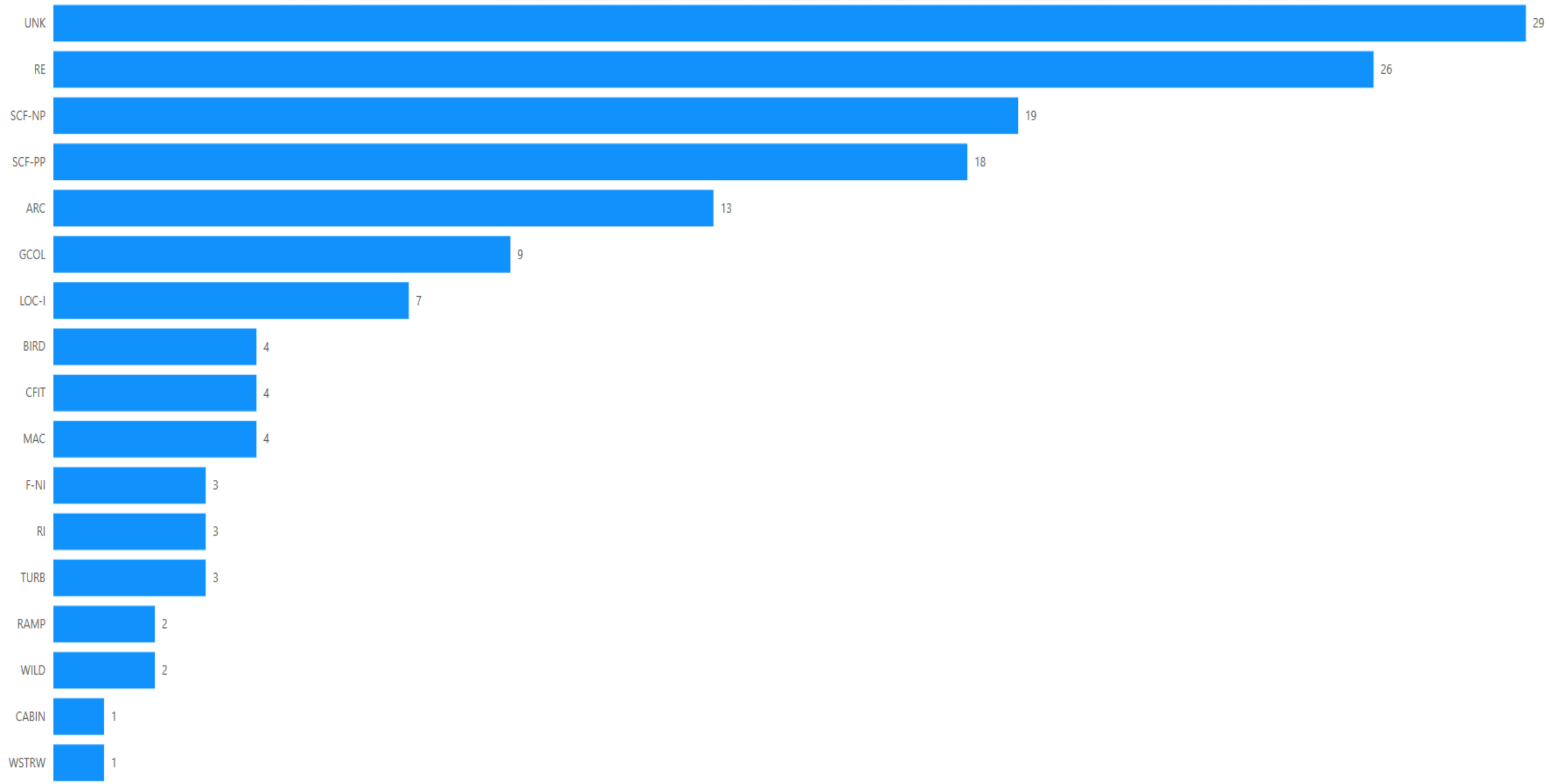






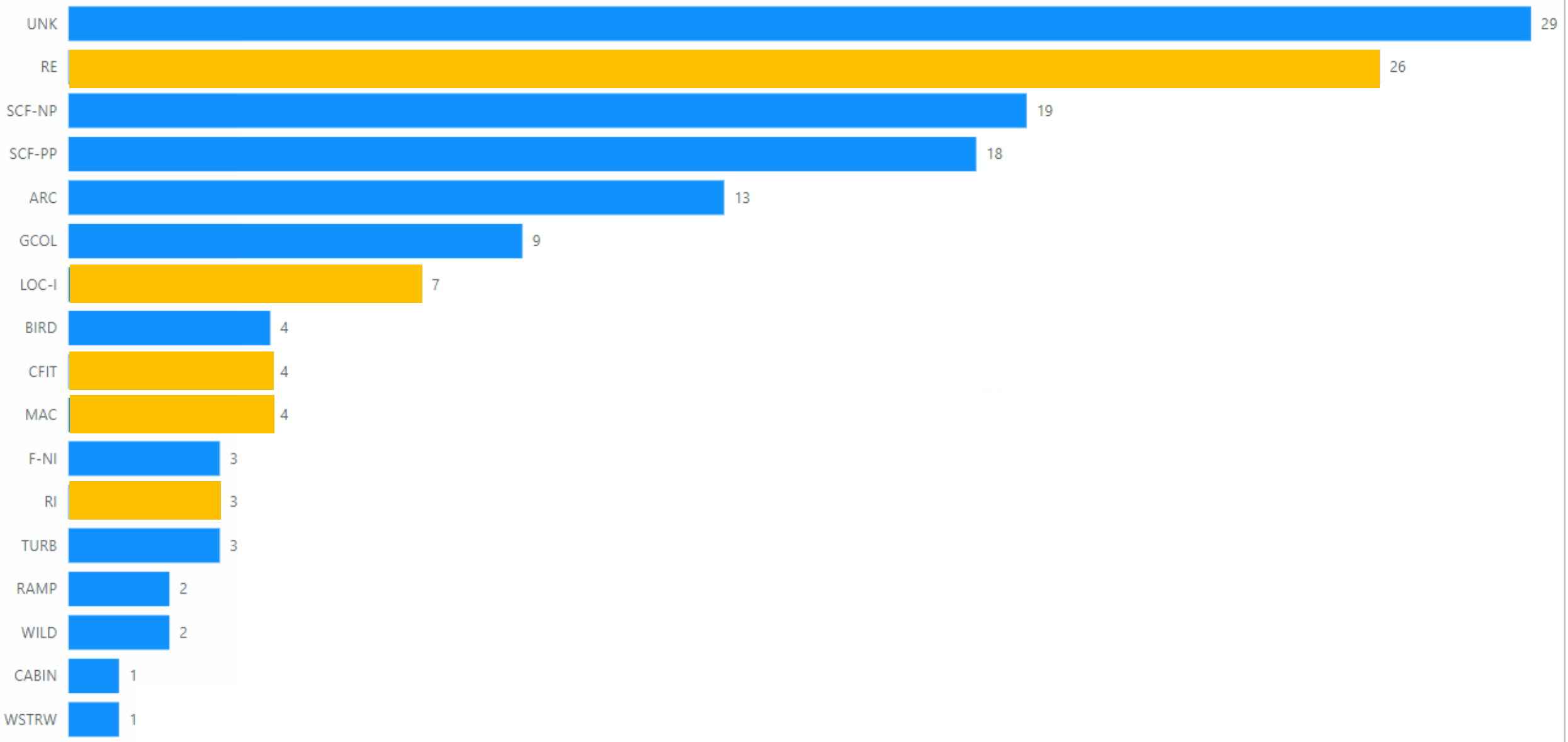


url	date	type	country	fatalities	grd fatal	cat	ICAO_category
	Monday, January 02, 2017	Let L-410	D.R. Congo	0	0	AC	RE
	Friday, January 20, 2017	Airbus A320	Seychelles	0	0	SI	MAC
	Sunday, February 05, 2017	ATR 72	Algeria	0	0	SI	UNK
	Monday, March 13, 2017	Boeing 737-800	South Africa	0	0	SI	MAC
	Saturday, March 18, 2017	de Havilland Canada DHC-8-400	Nigeria	0	0	SI	F-NI
	Monday, March 20, 2017	Antonov An-26	South Sudan	0	0	AC	UNK
	Saturday, April 01, 2017	Let L-410	South Sudan	0	0	AC	RE
	Sunday, April 30, 2017	Boeing 737-700	Angola	0	0	AC	SCF-NP


UNK
29
RE
26
SCF-NP
19
SCF-PP
18
ARC
13
GCOL
9
LOC-I
7
BIRD
4
CFIT
4
MAC
4
F-NI
3
RI
3
TURB
3
RAMP
2
WILD
2
CABIN
1
WSTRW
1

Back to report

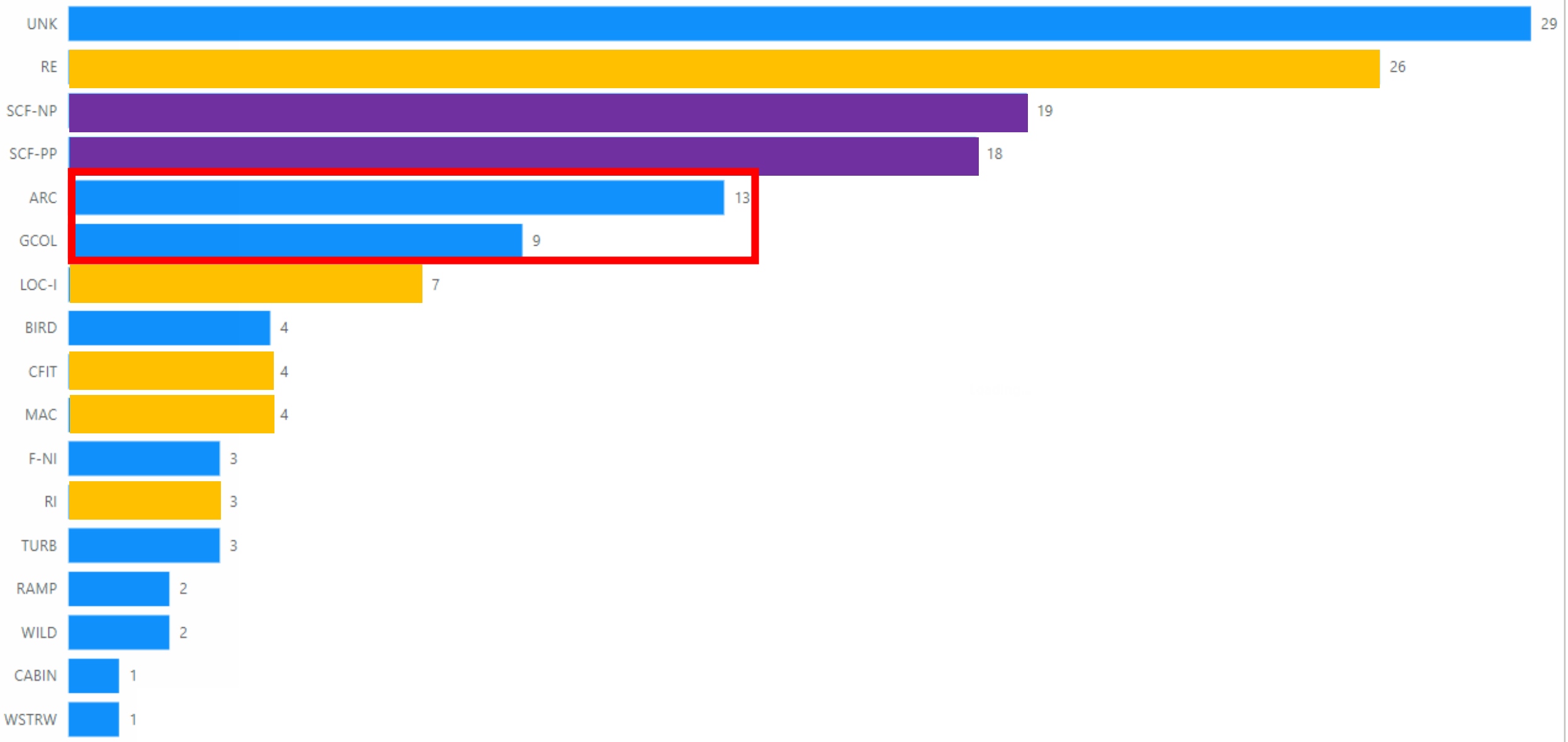
ICAO OCCURRENCE CATEGORY



Filters

Back to report

ICAO OCCURRENCE CATEGORY



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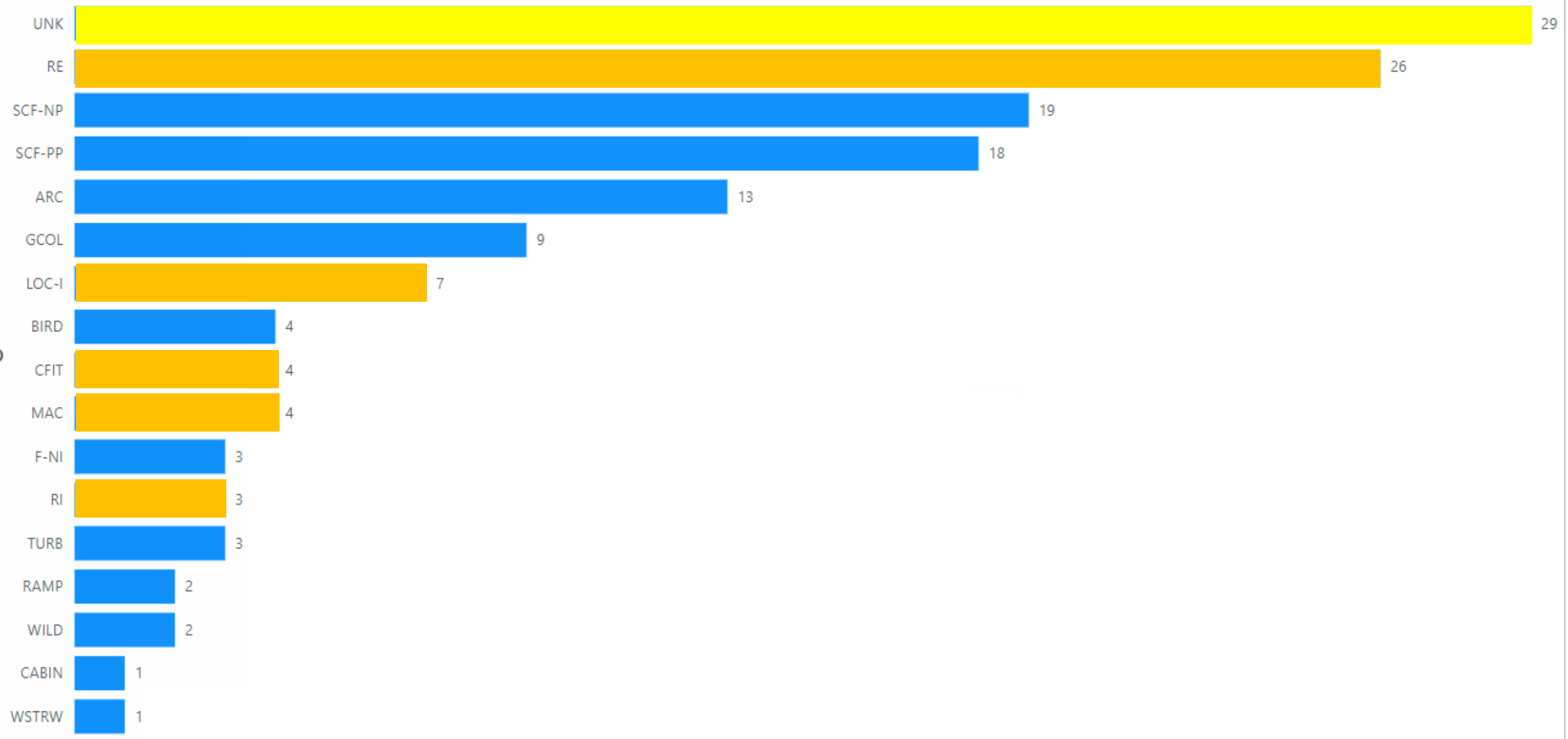
ICAO OCCURRENCE CATEGORY



Filters

FLIGHT SAFETY FOUNDATION
independent • impartial • international

Flight Safety Foundation, Aviation Safety Network (ASN)

Africa Accident Dashboard+ 2017-2023

148 events

272 fatali

9

final report publicly released?

AC
SI

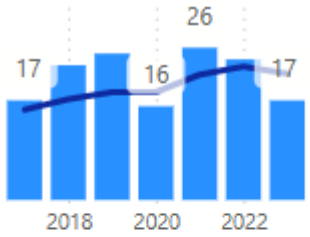
Jet
Turboprop

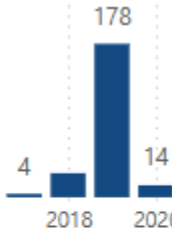
fatal
non-fatal

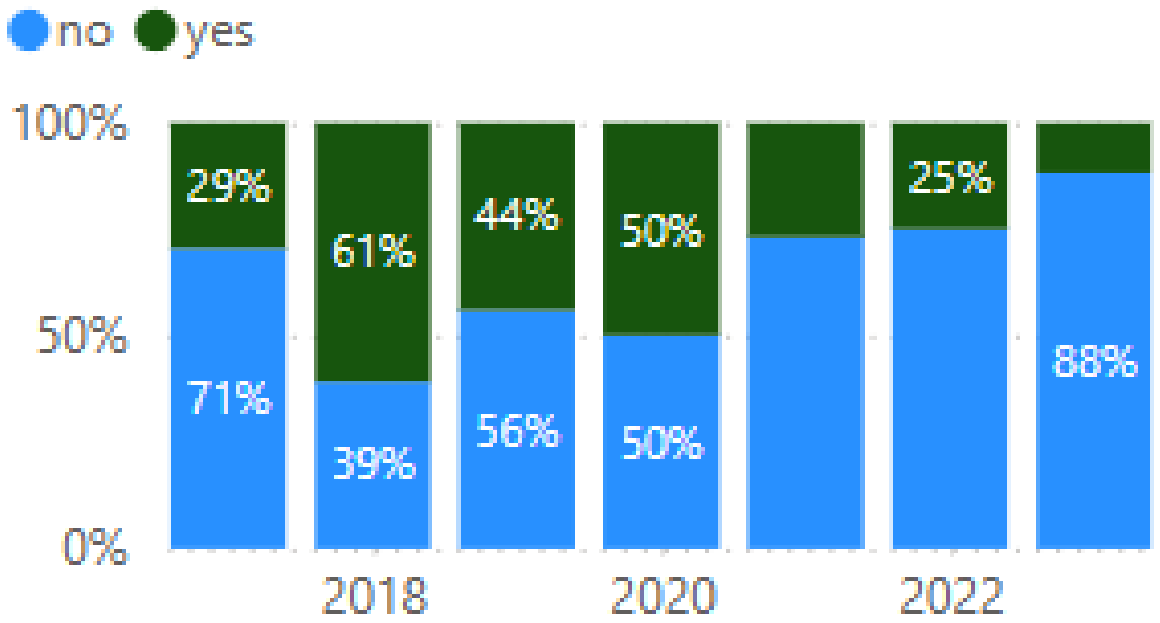
< 5700 kg

land
water

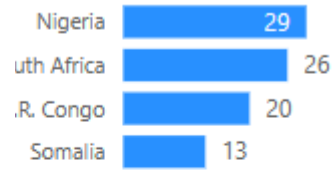
airliners
corp.jets

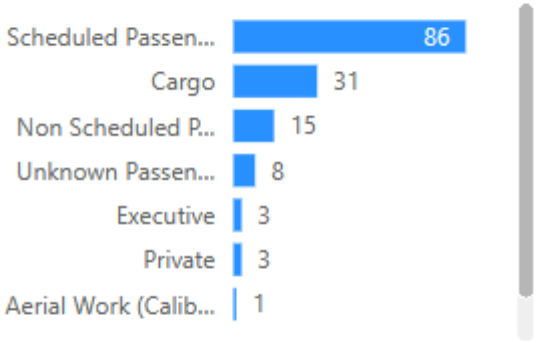






try of occurrence





					fatal	cat	ICAO_category
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	Sunday, April 30, 2017	Boeing 737-700	Angola	0	0	AC	UNK
					0	AC	RE
Total				**272**	**9**		

Africa Accident Dashboard 2017 -2023

Access to the ASN Dashboard is located at:
https://flightsafety.org/toolkits-resources/aviation-safety-network/

Panel Discussion

How do we address the underlying factors behind the safety trends in Africa?

Panelists:

- Mr. Jehad Faqir – AME Head of Regional Safety, IATA
- Mr. Eyob Estifanos, Associate Regional Programme Officer, ICAO ESAF Office
- Ms. Hellen Ndichu, Director Safety - RwandAir
- Mr. Kayode Ariwodola - Director, Global Safety and Regulatory Affairs – Middle East & Africa Dubai Office, Boeing
- Mr. Alberto Grande, Operations Safety Enhancement Director Aviation Safety - Airbus

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

Theme: Championing Africa aviation safety together

Thank you

Panel Discussion

How do we address the underlying factors behind the safety trends in Africa?

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Panelists

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Ms. Hellen Ndichu, Director Safety - RwandAir

Mr. Kayode Ariwodola - Director, Global Safety and Regulatory Affairs – Middle East & Africa Dubai Office, Boeing

Mr. James Danga, Safety Expert - AFCAC

Mr. Alberto Grande, Operations Safety Enhancement Director - Airbus

Moderator: Capt. Irene Koki Mutungi, Board Member - Flight Safety Foundation

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Presentation 3

Runway Safety – African Perspective by Aviation Safety Alliance for Africa (ASAA)

Presenter: Capt. Gilbert Kibe, Member - Aviation Safety Alliance for Africa (ASAA)

ASAA

WHO IS ASAA?

- The Aviation Safety Alliance for Africa (ASAA) is a nonprofit, non-political independent industry body. It is an initiative of African aviation experts who are passionate about safety in Africa.
- ASAA is a platform to advance the cause of safety in Africa at the operational level, complementing the work of ICAO, AFCAC, and the efforts of other organizations.

Function:

- ASAA functions as an independent, impartial, and international catalyst for changing attitudes to produce safety, aiming to strengthen the work of other bodies and not to compete with them.

Current activities:

- The alliance works predominantly through online events for aviation professionals as well as future aviation professionals.

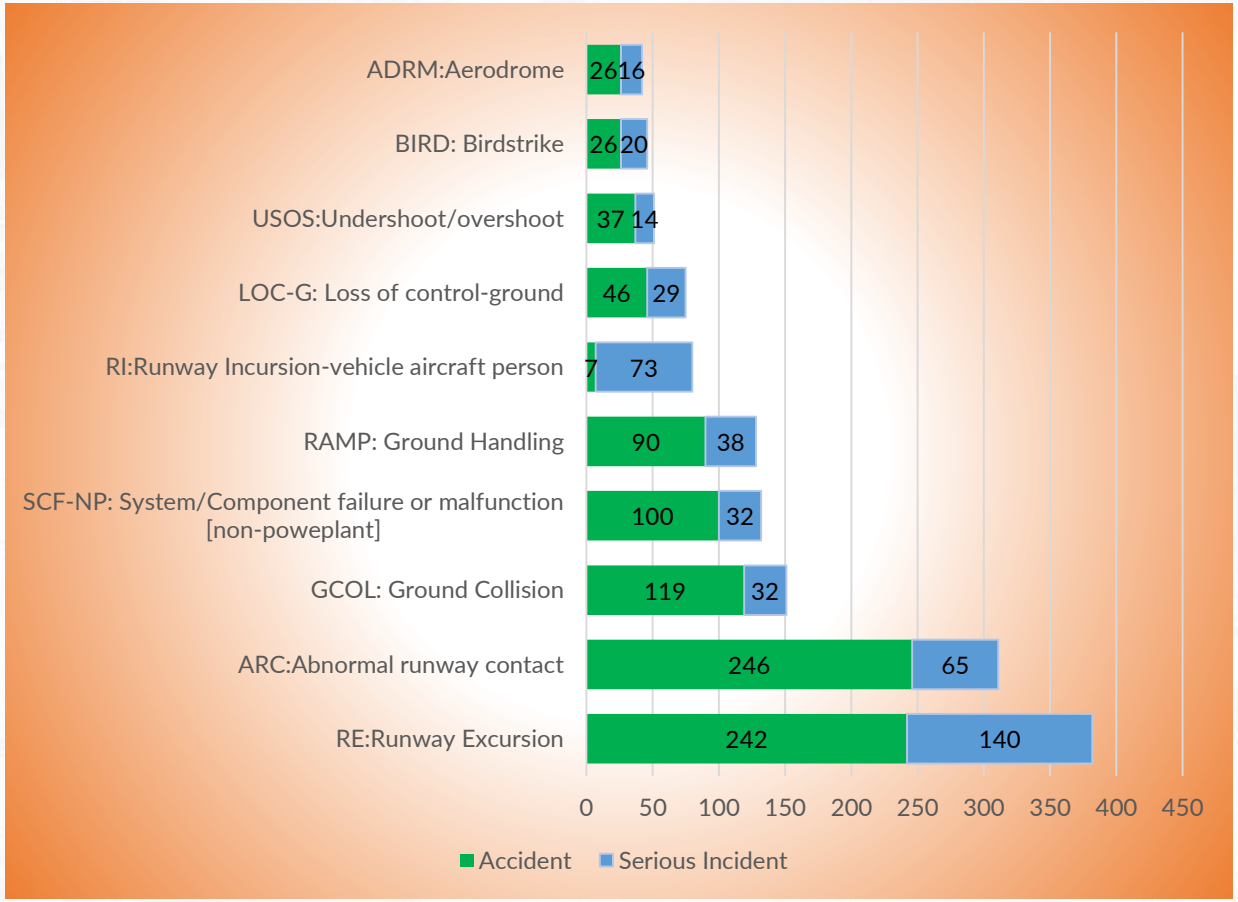
RUNWAY SAFETY AND RUNWAY EXCURSIONS/INCURSIONS

- The ICAO Global Aviation Safety Plan (GASP) identifies runway safety as a global priority. Runway Safety Action Plan Working Group (RSAP-WG) identified Runway excursions and incursions as the high risk category.

- A runway excursion is defined as an incident where an aircraft makes an inappropriate exit from the runway and cannot stop before reaching the end of the runway, including runway overruns.

- A runway incursion is defined as any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.

- Runway excursions are among the most frequent landing occurrences, with causal factors identified as human error, bad weather, or aircraft defect. Records show high fatalities involved runway excursions.



RUNWAY EXCURSIONS- Mitigation and prevention

❖ **Mitigation measures to prevent and address runway excursion causal factors and related injuries are critical to minimize the amount of damage or injury through aviation safety regulators and other actions that will allow adequate aircraft stoppage.**

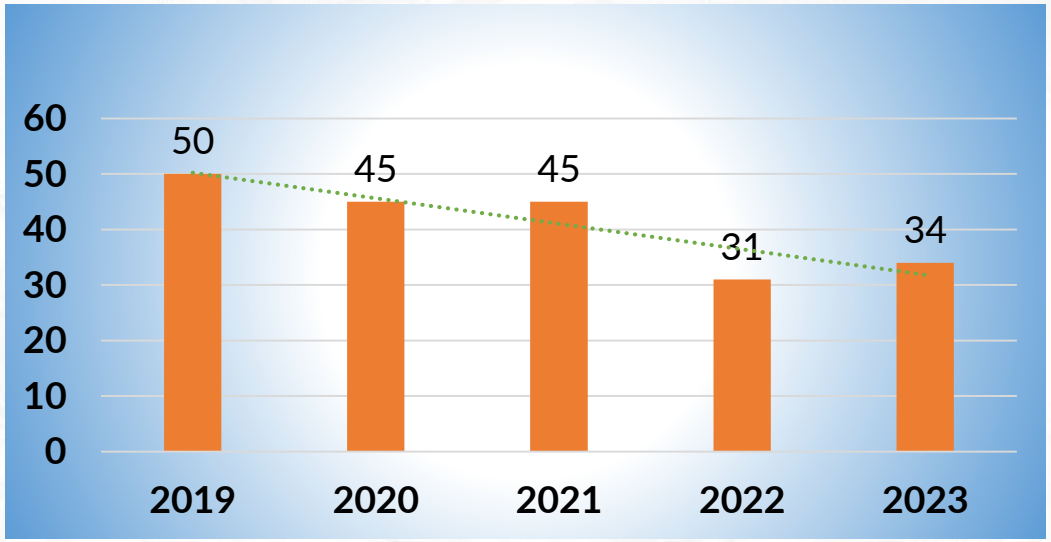
❖ **The actions that can be taken to prevent or minimize runway excursion include, among others:**

- **Runway widening and extension (the jet engine and required landing space evolution prompted extending runways landing distance, building new airports),**
- **Developing an engineered materials arrestor system (EMAS), a high-energy absorbing material installed on the surface, to absorb energy and slow the plane and event overrun.**
- **Developing flight systems technology to proactively detect and prevent Runway Overruns, increase pilots' situational awareness, and enhance automation during landings.**
- **Runway condition assessment**
- **The Takeoff and Landing Performance Assessment (TALPA) is used to report runway takeoff and landing conditions to airport operators.**
- **Deployment of systems and tools anchored on technological advancement.**

AFRICA REGION OVERVIEW

As of 2023;

- **The Eastern African and Southern Africa Region has an accident rate of 3.85 accidents per million departures in 2023**
- **The Region has an average of 770,000 movements annually**
- **A case study of 5 states in the Region -The average Runway excursion is over 40 annually**



Source: ICAO iSTARS

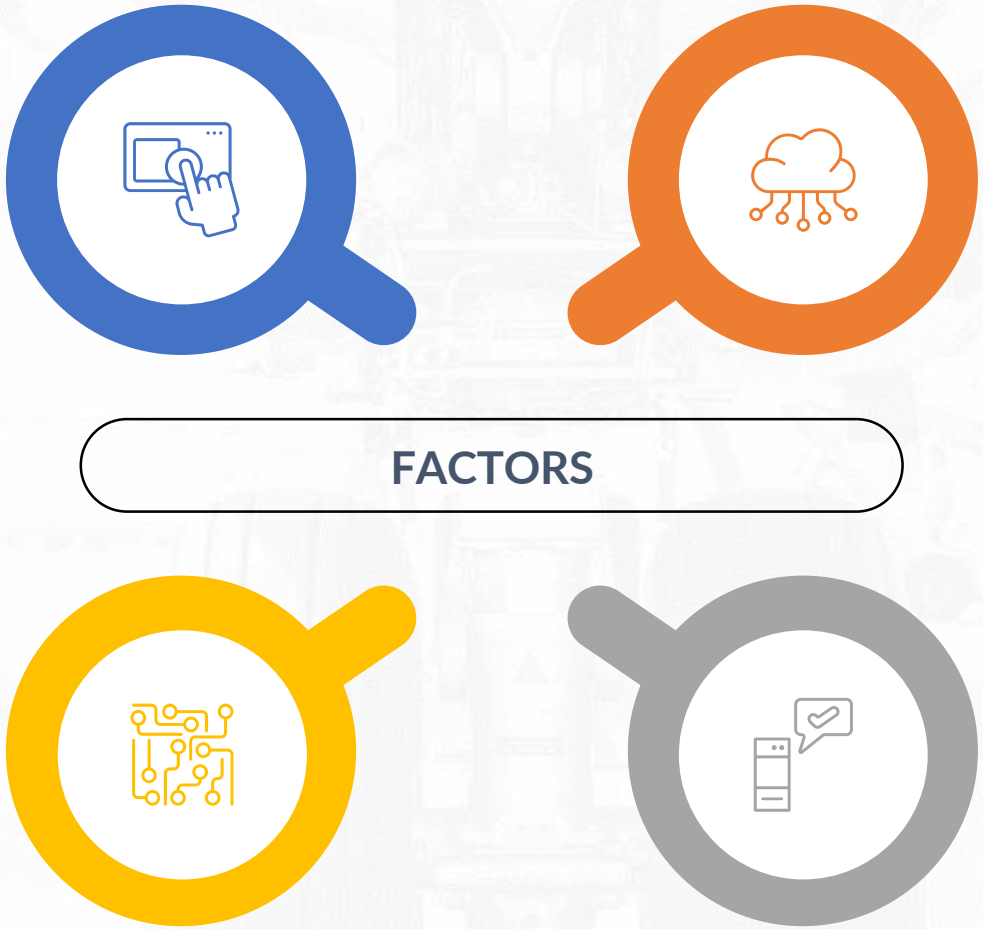
Top Contributing Factors

Latent Conditions

- Inadequate/ineffective Standard Operating Procedures
- Inadequate or ineffective training of flight crews
- Inadequate Regulatory oversight
- Ineffective safety management.

Mismanaged threat

- Meteorological conditions
- Deficient Airport Facilities



FACTORS

Human Error

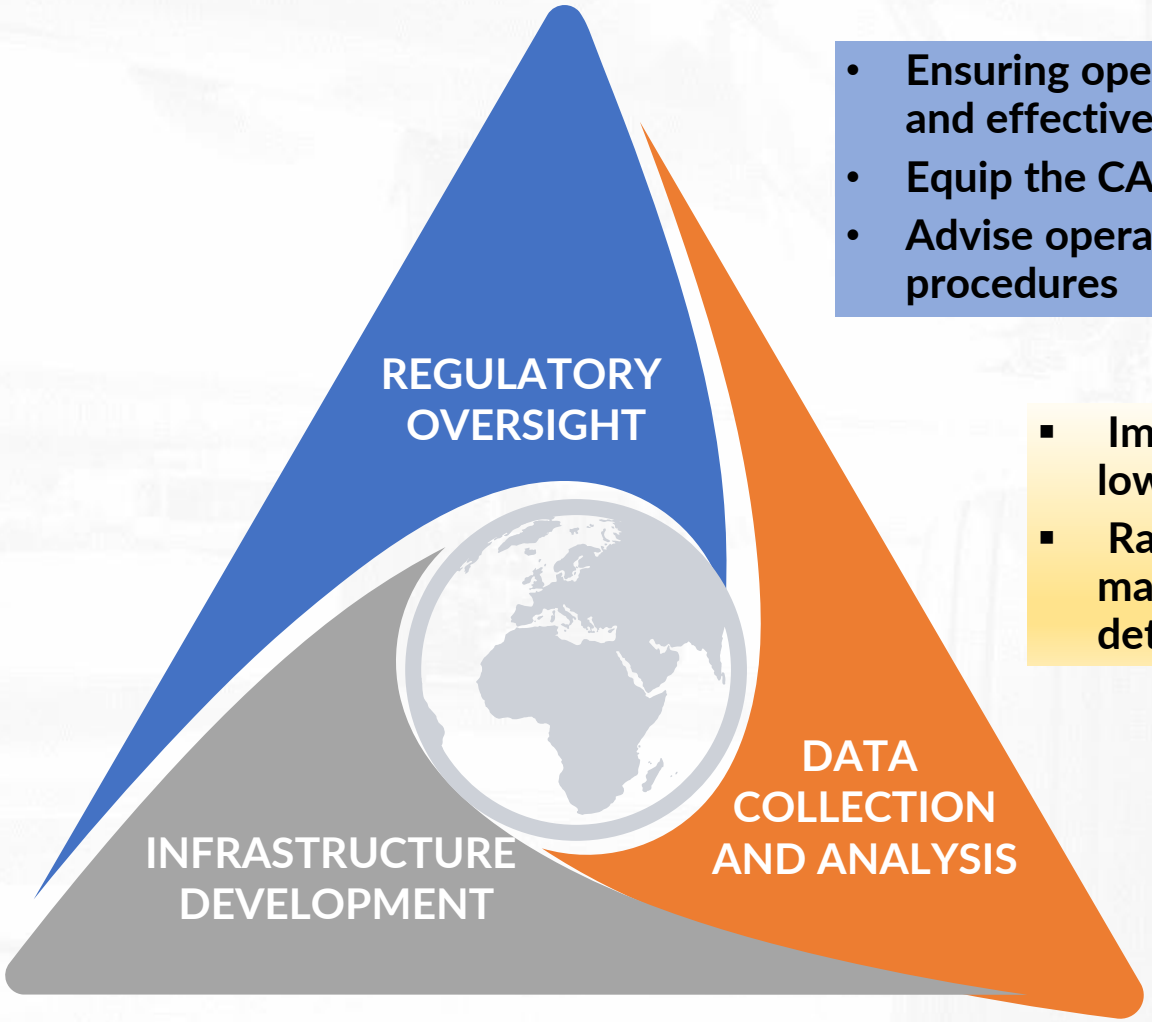
- Failure to abandon unstable approach
- Deficient flying skills
- Failure to adhere to Standard Operating Procedures (SOP)

Undesired Aircraft Condition

- Unstable Approach Condition
- Landing Deviations

Source:
-Runway Safety Programme – Global Runway Safety Action Plan Second Edition, February 2024
- Data of the 5 case study States

RECOMMENDATIONS



REGULATORY OVERSIGHT

- Ensuring operators are well trained, with approved SOPs being implemented, and effective SMS.
- Equip the CAAs with qualified oversight personnel.
- Advise operators on appropriate designs and development /compliance with procedures

DATA COLLECTION AND ANALYSIS

- Improving the Data collection network to secure data (currently at a low level), which is key and is both mandatory and voluntary.
- Raise awareness of the need and benefits of reporting (both mandatory and voluntary) and data analysis to improve decision and determining of incidents root causes.

INFRASTRUCTURE DEVELOPMENT

- It is critical to ensure accurate information is available on adverse weather that can affect airport operations and function, runway adequacy, serviceability, and availability of ATM infrastructure, etc.
- Installation and utilisation of suitable, protected and updated ICT systems, software and architecture.

Climate change effects on runway incursion

The challenges of runway incursions are persistent and affect aircraft operators, ANSPS, aerodrome operators, etc.; improving and preventing occurrences is critical.

Key changes and emerging issues that potentially elevate runway incursion should be considered as we transition into the Short and long-term future. These include the evolution of ATM systems, the effects of climate change, and the impact of ICT innovation, notably AI, cyber security, and automated/flexible airport operations control.

The post-COVID-19 pandemic and unprecedented geopolitical issues have not only impacted but also caused a severe drain on resources. These resources are now desperately needed for recovery and infrastructure development, underscoring the immediate need for action.

Environment issues such as high CO2 emissions and other climate change factors are some of the major factors to be addressed.

** Climate change poses challenges and threats to vital, expensive, and essential airport facilities and infrastructure. Extreme weather conditions, such as heat waves, floods, and high winds, can result in unacceptable meteorological and ground infrastructure conditions that support safe operations.

***An effective strategic approach, action plans, and programs must be implemented by the identified risks/threats, qualified/skilled personnel, appropriate resources, improved collaboration and compliance with regulatory requirements.

Adapting processes to mitigate the effects of climate change is a feasible option and approach that will focus on infrastructure design, operational efficiency, strengthening infrastructure and operational processes, embracing technological development and innovation and establishing robust governance/management systems.

WHILE OPERATORS HAVE MADE STRIDES IN IMPROVING OPERATIONAL RUNWAY SAFETY, THE SPIRIT OF CONTINUOUS IMPROVEMENT AND COMPLIANCE WITH REQUIREMENTS/PROCEDURES MUST PREVAIL.

Technological/AI effects on runway incursion

- The deployment of technology and related systems, such as GPS, moving maps, visual aids, Artificial intelligence, and cyber security protection systems, to mitigate situational awareness deficiencies is fundamental to improving the prevention of runway incursions in the future.

  The continuous advancement of AI is set to revolutionise how we assess, predict, and advance mitigation measures. This will significantly enhance our ability to avert and prevent runway incursions, marking a new era in aviation safety.

  Integration of technological structures and aerodrome, ATM, ground control, flight crew, and processes using advanced systems will ease the operation, surveillance and occurrence of runway incursion.

THE ADOPTION OF AI AND GENERATIVE AI TECHNOLOGIES AS A MEANS OF PREDICTING, PREVENTING AND DETECTING RUNWAY INCURSION HAS CONSIDERABLE BENEFITS THAT ARE BEING TREMENDOUSLY IMPROVED INNOVATION.

** As we move into the future, AI and generative AI will not only carry significant benefits but also harbour increased risks, including runway safety and incursion

AI and Generative AI present the challenge of unpredictability, with the potential to produce technological surprises that were not anticipated.

Inadequate resources will deny commensurate advancement of technical systems in Africa similar to those in other regions. The aggregate risk is probable with the embracement of Generative AI.

Not only are African countries ill-prepared to mitigate the risks of runway incursion, but the situation might also be aggravated by the deployment of Generative AI due to the poor training, regulatory compliant and appropriate infrastructure and facility support required for future systems and operations.

PROACTIVE ACTION MUST BE TAKEN TO PURPOSELY INVEST IN AI AND GENERATIVE AI AND UNDERSTAND ITS IMPACT ON AVIATION.

ASAA is open to working with stakeholders in addressing the challenges.

For collaboration or inquiries:

asaforafrica@gmail.com

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety together

THE AVIATION SAFETY ALLIANCE FOR AFRICA

CHANGING ATTITUDES • PRODUCING SAFETY

Thank You

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Presentation 4

Safety culture, leadership, and addressing human factors for safety enhancement

Presenter: Mr. Jehad Faqir – AME Head of Regional Safety, IATA

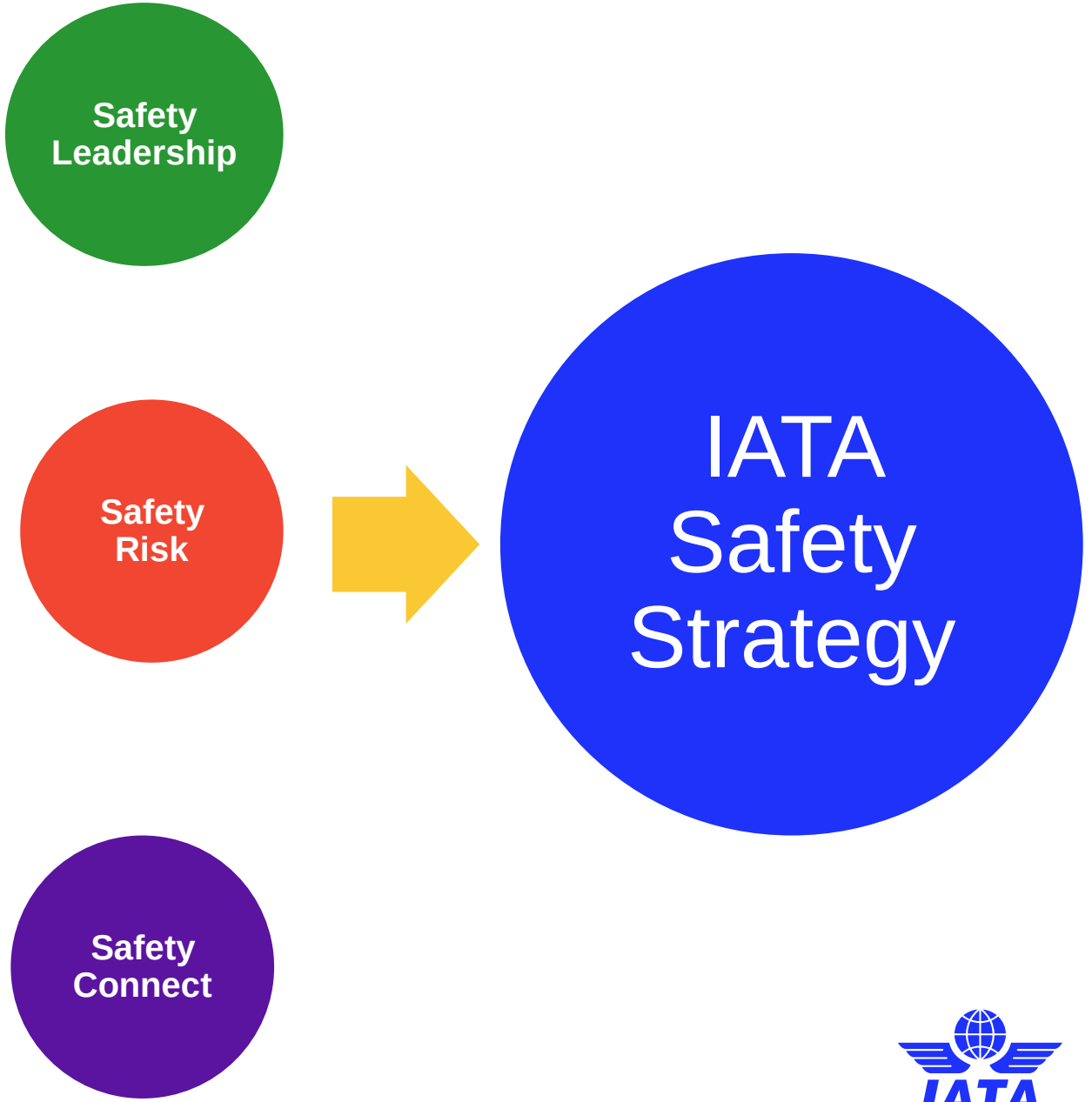
Safety Leadership

Jehad Faqir -Head Regional Safety
Africa & Middle East

Supporting a safety leadership mindset, amongst industry executives, to evoke a positive safety culture across aviation

A repository of hazards and risks to enhance collective knowledge and identify safety initiatives to meet industry needs

A connected community to support continuous improvement in aviation safety



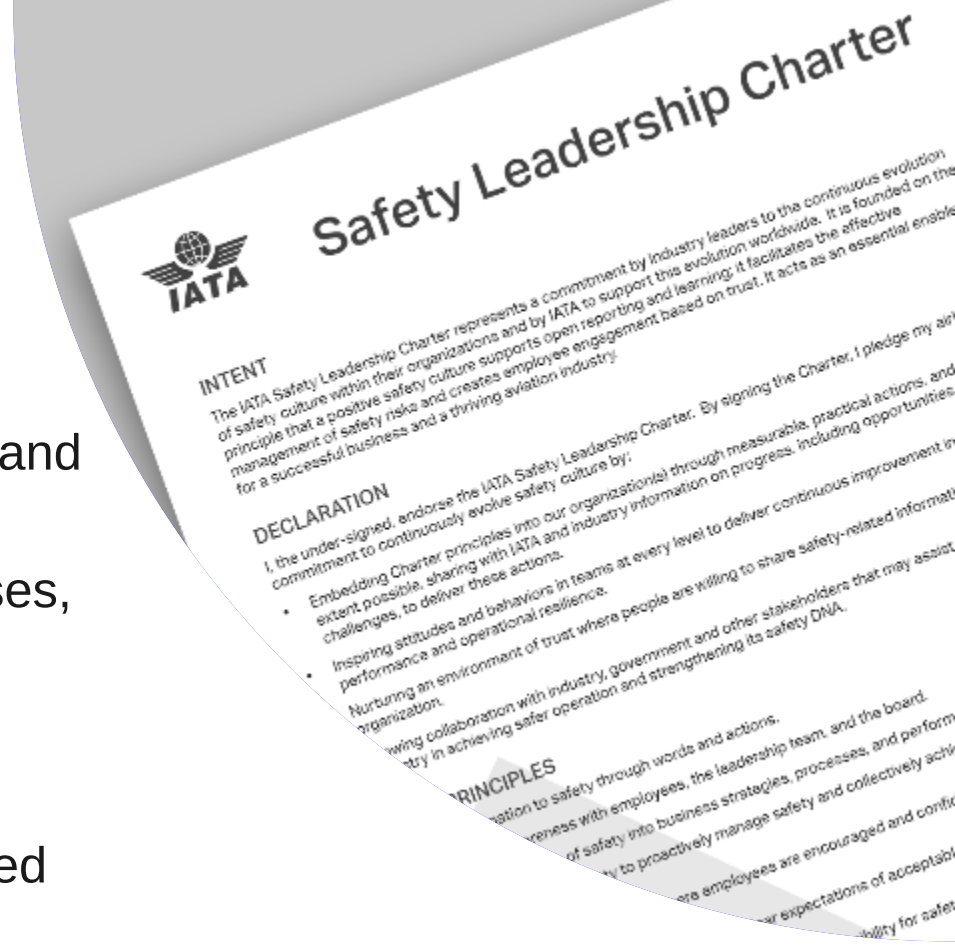
Safety Leadership – why?

Robust Safety Culture for a resilient & efficient business

Safety Leadership Charter

Guiding Principles

1. Lead obligation to safety **through words and actions**.
2. Foster safety awareness with employees, the leadership team, and the board.
3. Guide the integration of safety into business strategies, processes, and performance measures.
4. Create the internal capacity to proactively manage safety and collectively achieve organizational safety goals.
5. Create an atmosphere of trust, where employees are encouraged and confident to report safety-related information.
6. Establish a working environment in which clear expectations of acceptable and unacceptable behaviors are communicated and understood.
7. Create an environment where all employees feel responsibility for safety.
8. Regularly assess and improve organizational Safety Culture.



Safety Leadership – 2024

Commitment from the top

Pledge

- Charter signature by CEOs

1 Sign the Charter

Practical application

Act & Learn

- Implement initiatives
- Identify lessons-learned

2 Demonstrate Commitment

Engagement & promotion

Share

- Engage with IATA and industry

  Examples of initiatives from signatories, WSOC, SIRM, SIH, Safety Connect

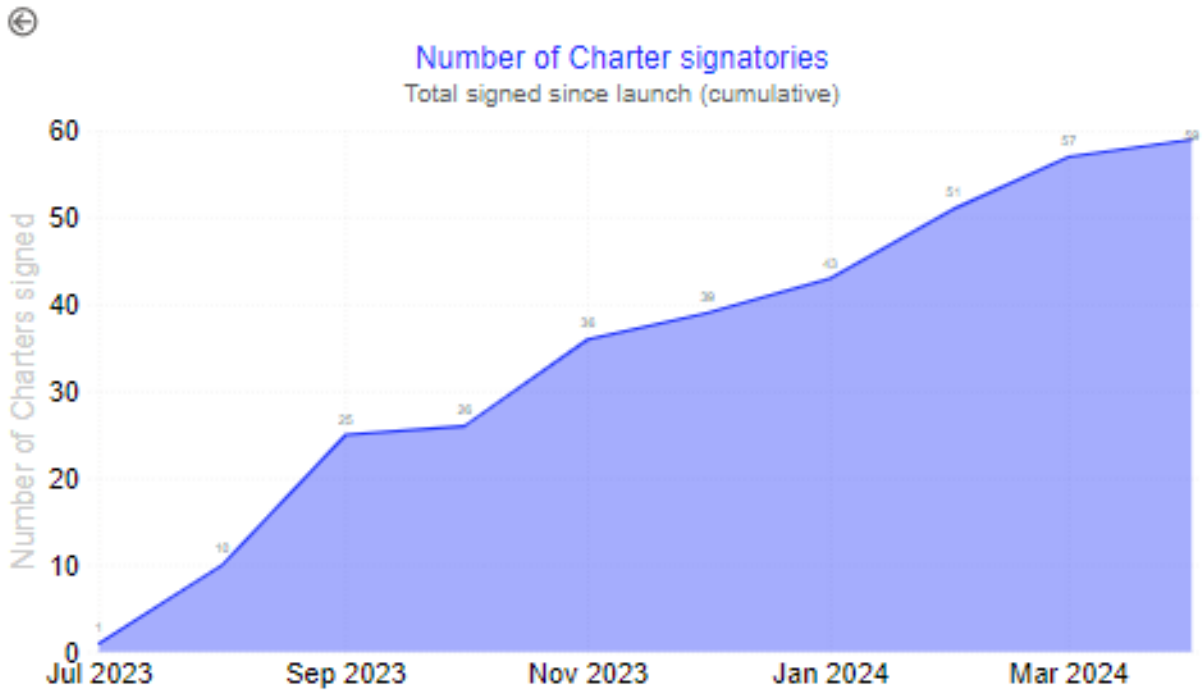
3 Share with Industry

Safety Leadership Charter

1 Sign the Charter

Since the launch of the Safety Leadership Charter in **September 2022**, the number of its signatories has evolved significantly, reaching 61 airlines globally*.

* As at April 10, 2024



Safety Leadership Charter - signatories

Commitment from the top

1 Sign the Charter

61

airlines

as at April 10

Charter signatories

1 Sign the Charter

Signatories - AFI & MENA region:

Air Arabia
Emirates
Ethiopian Airlines
Flynas
Gulf Air
Jazeera Airways
Oman Air
Qatar Airways
Royal Air Maroc
Royal Jordanian Airlines
RwandAir
TunisAir
Salam Air
South African Airlines
Congo Airways

Demonstrating Charter principles

Practical application

Sharing safety knowledge and best practices is critical for the industry to learn and improve.

https://www.iata.org/sl-examples

2 Demonstrate Commitment

3 Share with Industry

Where to find the information?

Safety Leadership

Accident investigations have identified that a positive safety culture is a critical factor in the prevention of accidents and incidents. It is also recognized that enabling a strong organizational safety culture requires continual application of all employees at every level, but especially commitment from top executives, as leadership thoughts and actions cascade down the organization and impact the actions of all employees.

This is why providing greater visibility to the importance of Safety Leadership and Safety Culture in a safety-critical industry, such as aviation, is a priority and part of the IATA 3-pillar safety strategy.

To raise awareness on these important topics, IATA initiated the development the IATA Safety Leadership Charter. IATA's "Safety Talks" initiative was launched to bring the Safety Leadership Charter to life.

Through these activities, IATA aims to promote learning, understanding and continuous improvement of organizational culture – practices and behaviours – that support the effective management of safety risks within the aviation ecosystem.

On September 19, 2023, at the IATA World Safety and Operations Conference in Hanoi, IATA announced the launch of the IATA Safety Leadership Charter and its first signatories.

The IATA Safety Leadership Charter represents a commitment by industry leaders to the continuous evolution of safety culture within their organizations and by IATA to support this evolution worldwide. It is founded on the principle that a positive safety culture supports open reporting and a learning culture; it facilitates the effective management of safety risks and creates employee engagement based on trust. It acts as an essential enabler for a successful business and a thriving aviation industry.

Share your initiative

Demonstrating their leadership and commitment to the Charter Declaration, signatory airlines are sharing with IATA practical actions and initiatives that uphold Charter principles in their organizations.

INITIATIVES FROM SIGNATORY AIRLINES

Collaboration and safety information-sharing is critical for the industry to learn and improve. We invite you to share examples – action, projects and initiatives – of how Safety Leadership Charter Guiding Principles are helping your organization enhance its Safety Culture.

SHARE YOUR INITIATIVE

SAFETY LEADERSHIP CHARTER | CHARTER SIGNATORIES | SAFETY TALKS | SAFETY CULTURE | RESOURCES

IATA public site resources

SAFETY LEADERSHIP CHARTER | CHARTER SIGNATORIES | SAFETY TALKS | SAFETY CULTURE | RESOURCES

Resources

Safety is not just a goal, it's a mindset. Leaders and safety champions at every level have the power and responsibility to shape the safety culture of their organizations by modeling and reinforcing safe practices and values. We hope that these resources will inspire you to take action and make a positive difference in your organizations.

Sir Charles Haddon-Cave's keynote speech "Safety is Everyone's Job"

Industry Publications

- Safety Leadership, Information Paper – IATA and Flight Safety Foundation (pdf)
- Creating a Positive Safety Culture, White Paper - IATA
- Five steps to developing your positive safety culture - IATA
- Safety Culture Definition and Enhancement process – CANSO
- Just Culture Toolbox - ATM Partners for Just Culture
- Improving Just Culture, Working Paper – CANSO
- Safety Culture discussion cards - Eurocontrol
- Learning from All Operations - concept notes and case studies - Flight Safety Foundation

Awareness & promotion

Some of the Challenges

- **Safety Culture**: outsourced services
- **Safety Culture**: assessment and performance indicators
- **Safety Culture**: alignment between airlines and regulators
- **Just Culture**: interpretation across regions and successful implementation
- **Safety Reporting**: hazard reporting, voluntary reporting, 3rd party reporting

Practical application

I-ASC

Aviation Safety Culture Survey

Assess – Understand – Improve

iata.org/i-asc/

IATA

I-ASC - development

Developed in collaboration with Cranfield University, UK.
Operations is run in partnership with IPSOS.

Development

Operations

IATA Aviation Safety Culture survey : observations from 45+ studies

- Airline Groups
- Airlines
  - PAX
  - Cargo

- Airport
- Training Organization
- Ground Service Provider

- Europe
- North America
- Asia Pacific and North Asia
- LATAM

From 500  to 90,000 

Aviation Safety Culture (I-ASC)

I-ASC – methodology and survey report sample visuals

I-ASC methodology | Our survey evaluates safety driver performance using 60 statements in 9 safety culture drivers and explores their correlation with overall safety perceptions

I-ASC benchmarking | Benchmarking results from 2 surveys, organizations can create a baseline and track improvements in its safety culture, captured by various aspects of safety culture

I-ASC benchmarking | Our survey captures quantitative data on safety culture perceptions, segmented by organizational sections, to show the progress the airline has made

Performance by organizational sections*: comparison to organization's previous I-ASC survey results.

Illustrative

Total Agree (5-7)	Total - AVERAGE	ORGANIZATIONAL SECTION											
		ORG		DSP		MNT		GRH		CAB		CGO		FLT	
n=	10165	4071*	1549	107*	134	1174*	1826	1365*	2347	2619*	2084	377*	916	1402*	1309
Senior Management Commitment (SMC)	90%	88%	94%	68%	94%	86%	97%	81%	93%	76%	85%	86%	93%	77%	87%
Management Commitment (MAC)	90%	87%	93%	74%	94%	86%	91%	84%	93%	75%	86%	85%	92%	79%	88%
Learning Organization (LRN)	93%	88%	92%	78%	97%	86%	93%	85%	94%	83%	91%	90%	94%	82%	91%
Communications (COM)	92%	86%	92%	74%	93%	87%	92%	86%	94%	83%	90%	89%	94%	80%	90%
Employee Empowerment (EMP)	91%	87%	93%	74%	94%	86%	90%	85%	93%	83%	90%	86%	93%	81%	90%
Policies, Processes & Procedures (PPP)	94%	89%	94%	83%	97%	90%	94%	88%	95%	86%	92%	92%	95%	87%	93%
Just Culture (JUS)	89%	86%	93%	76%	94%	84%	88%	82%	90%	74%	84%	86%	92%	79%	88%
Safety Awareness (SAW)	94%	89%	93%	89%	96%	92%	95%	90%	94%	90%	93%	92%	95%	92%	94%
Reporting & Feedback (RFB)	90%	79%	87%	77%	93%	83%	91%	86%	92%	79%	89%	87%	92%	81%	91%

Notes: *Organizational sections As defined in the IOSA Standards Manual (ISM) Organization (ORG) | Operational Control and Flight Dispatch (DSP) | Aircraft Engineering and Maintenance (MNT) | Ground Handling Operations (GRH) | Cabin Operations (CAB) | Cargo (CGO) | Flight Operations (FLT)

I-ASC benchmarking | We provide benchmarking capability against other organizations that have deployed I-ASC survey. This allows organizations to better understand how the quantitative data from their individual survey compares to the average results of other organizations in the I-ASC pool.

Benchmarks are based on data collected from all I-ASC surveys conducted since 2016.

Illustrative

Total Agree (5-7)	Total - AVERAGE	HIERARCHY			ORGANIZATIONAL SECTION						
		ADMIN	FRONT LINE	MGMT	ORG	DSP	MNT	GRH	CAB	CGO	FLT
n=	10165	2043	7733	383	1549	134	1826	2347	2084	916	1309
Senior Management Commitment (SMC) - Average	5%	6%	4%	5%	9%	8%	8%	9%	-2%	7%	7%
Management Commitment (MAC) - Average	4%	5%	5%	5%	7%	7%	9%	8%	0%	5%	5%
Learning Organization (LRN) - Average	6%	5%	6%	4%	6%	8%	8%	7%	1%	7%	6%
Communications (COM) - Average	6%	8%	6%	4%	9%	7%	10%	8%	2%	8%	7%
Employee Empowerment (EMP) - Average	4%	5%	5%	2%	7%	8%	6%	8%	1%	6%	6%
Policies, Processes & Procedures (PPP) - Average	4%	4%	4%	3%	6%	6%	6%	5%	0%	4%	4%
Just Culture (JUS) - Average	4%	6%	4%	5%	7%	7%	4%	6%	-2%	4%	4%
Safety Awareness (SAW) - Average	4%	5%	3%	4%	6%	6%	5%	4%	2%	4%	3%
Reporting & Feedback (RFB) - Average	7%	7%	8%	4%	9%	10%	12%	8%	5%	8%	7%

Notes: *Organizational sections As defined in the IOSA Standards Manual (ISM) Organization (ORG) | Operational Control and Flight Dispatch (DSP) | Aircraft Engineering and Maintenance (MNT) | Ground Handling Operations (GRH) | Cabin Operations (CAB) | Cargo (CGO) | Flight Operations (FLT)

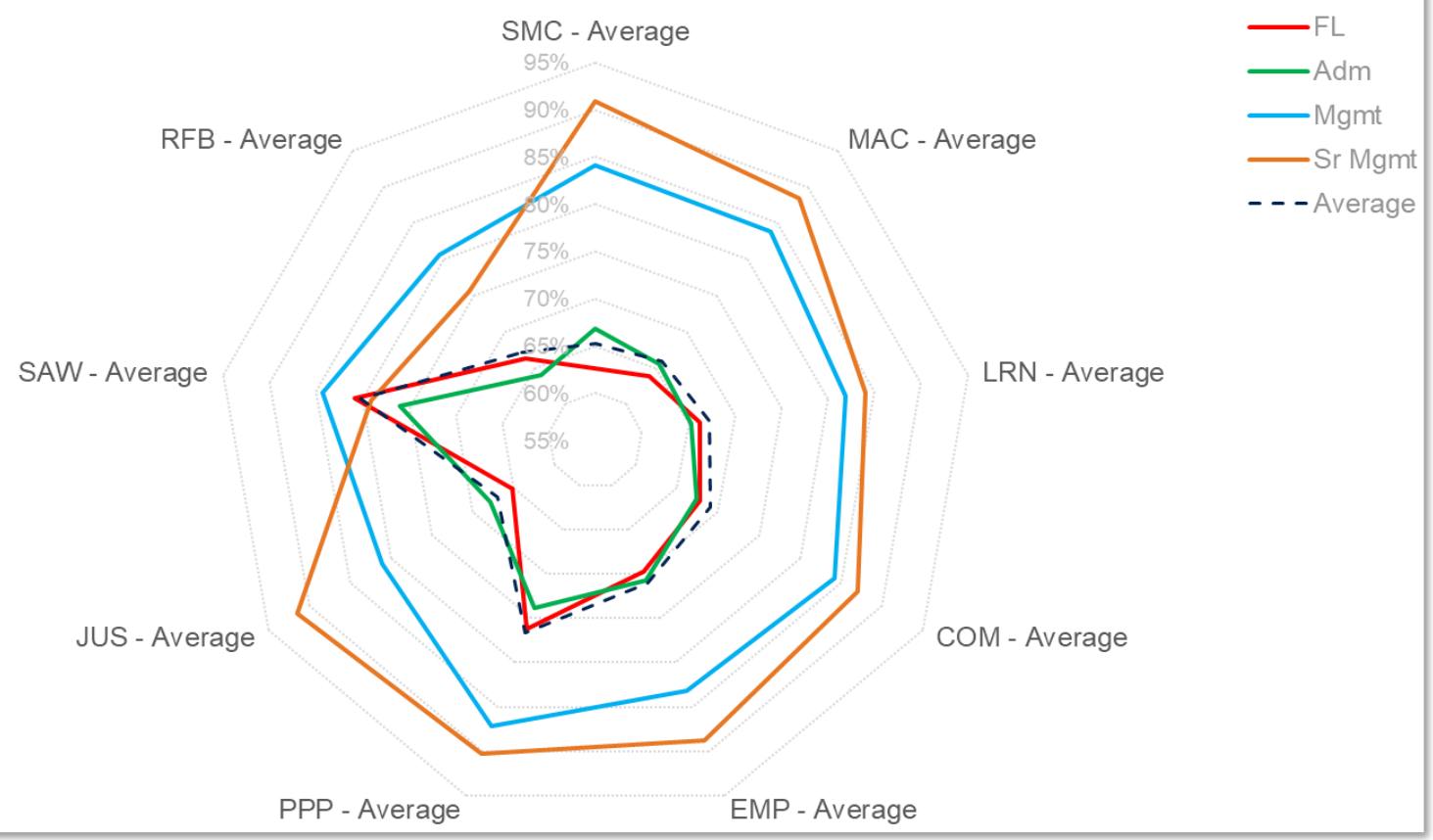
Overview by hierarchies

The highest scores are provided by Sr. Management, which has top scores across most areas, with the exception of RFB and SAW.

There is a gap in perceptions between Sr. Management / Management and the rest of the workforce.

Illustrative

PERFORMANCE BY HIERARCHY/ AREA



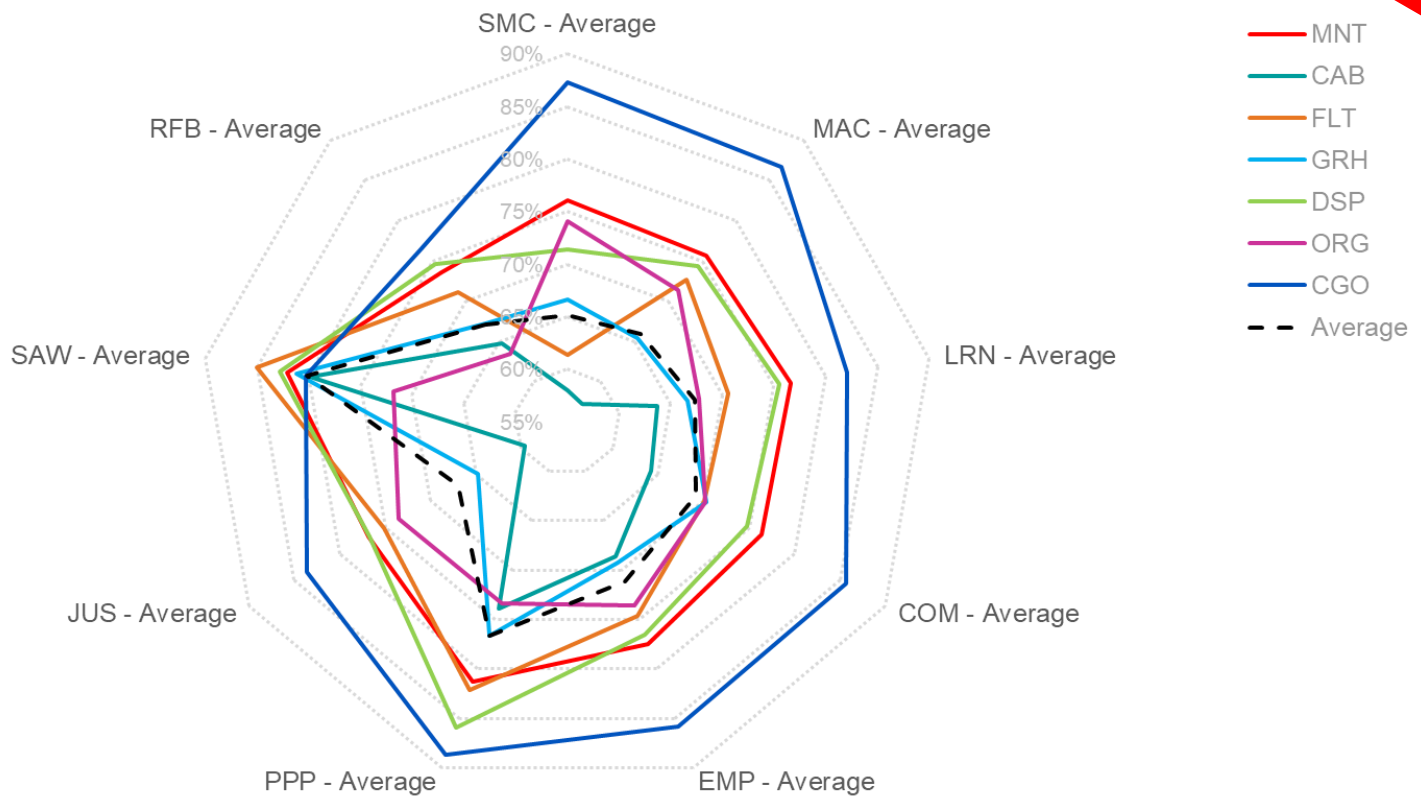
And IOSA Organizational Sections

*Organizational sections As defined in the IOSA Standards Manual (ISM) Organization **(ORG) |**Operational Control and Flight Dispatch(**DSP) |** Aircraft Engineering and Maintenance**(MNT)** Ground Handling Operations **(GRH) |** Cabin Operations **(CAB) |** Cargo (**CGO) |** Flight Operations **(FLT)**

There is also a wide variation in ratings by Organizational section, with Cargo being the highest, other areas providing lower scores, and Cabin Crew providing the lowest.

PERFORMANCE BY ORGANIZATION SECTION

Illustrative



What really matters

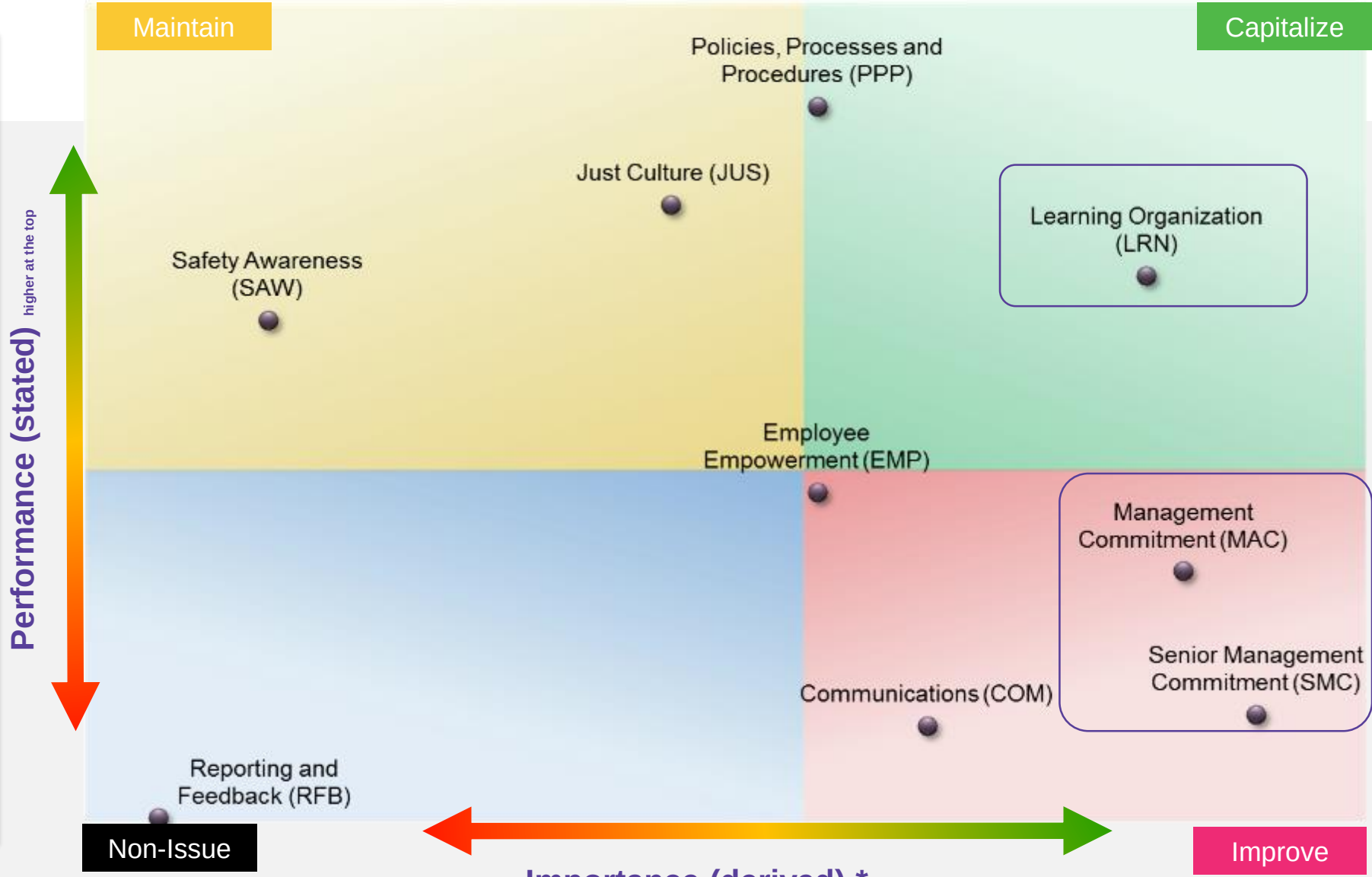
Areas of Improvement

A more vocal commitment from MGMT

This chart maps the **nine survey areas** based on their performance (Total Agree score) and their importance, derived from their relation to overall safety perceptions. This highlights that commitment from management and senior management matter the most, but are among the lowest-rated areas by employees (relative to other areas).

Learning Organization: Keep up the good work

Statements relating to lessons learned and continuous improvement were met with high scores by employees, and contribute strongly to the overall feeling of safety.



* Derived from correlation analysis performed on each statement. **See slide 6 for details**.

Thank you!

… to represent, lead and serve the airline industry.

IATA Human Factors

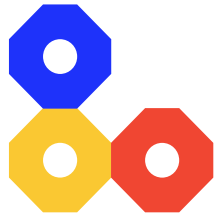
Human factors at a glance

All those conditions that influence a human being's ability to perform tasks and meet the requirements or expectations of a given job

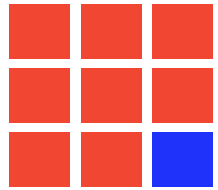
Individual Level

- Physiology
- Cognition

Social Level



Organisational Level

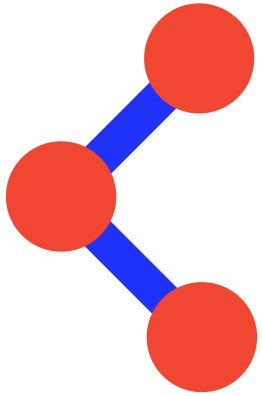


IATA Human Factors strategy

Focus on establishing **guidelines and best practices** to implement and enhance airlines' **Human Factors Programs** as an integrated part of their **Safety Management Systems**

Keywords

Networking

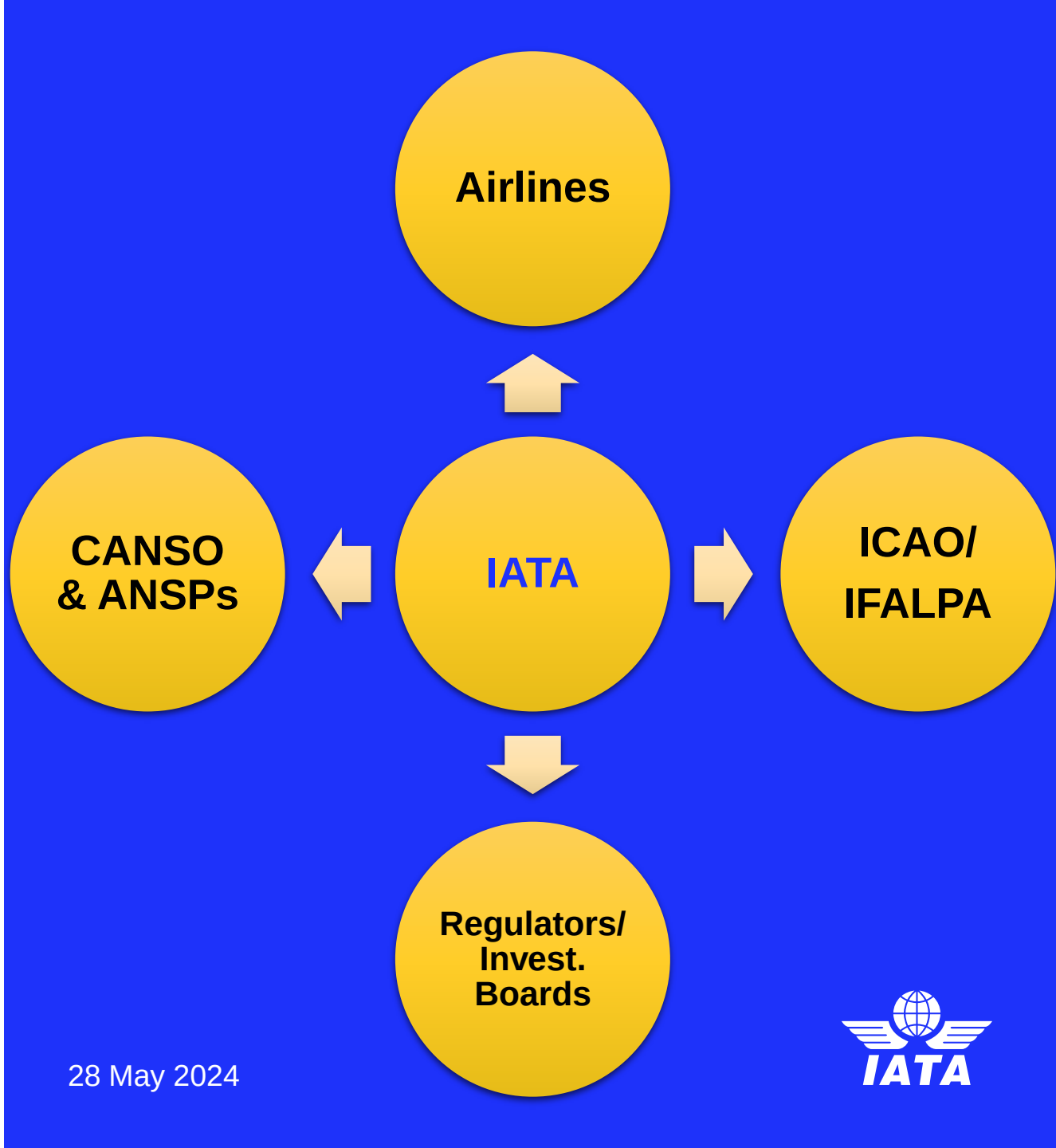


Connection

Best practices

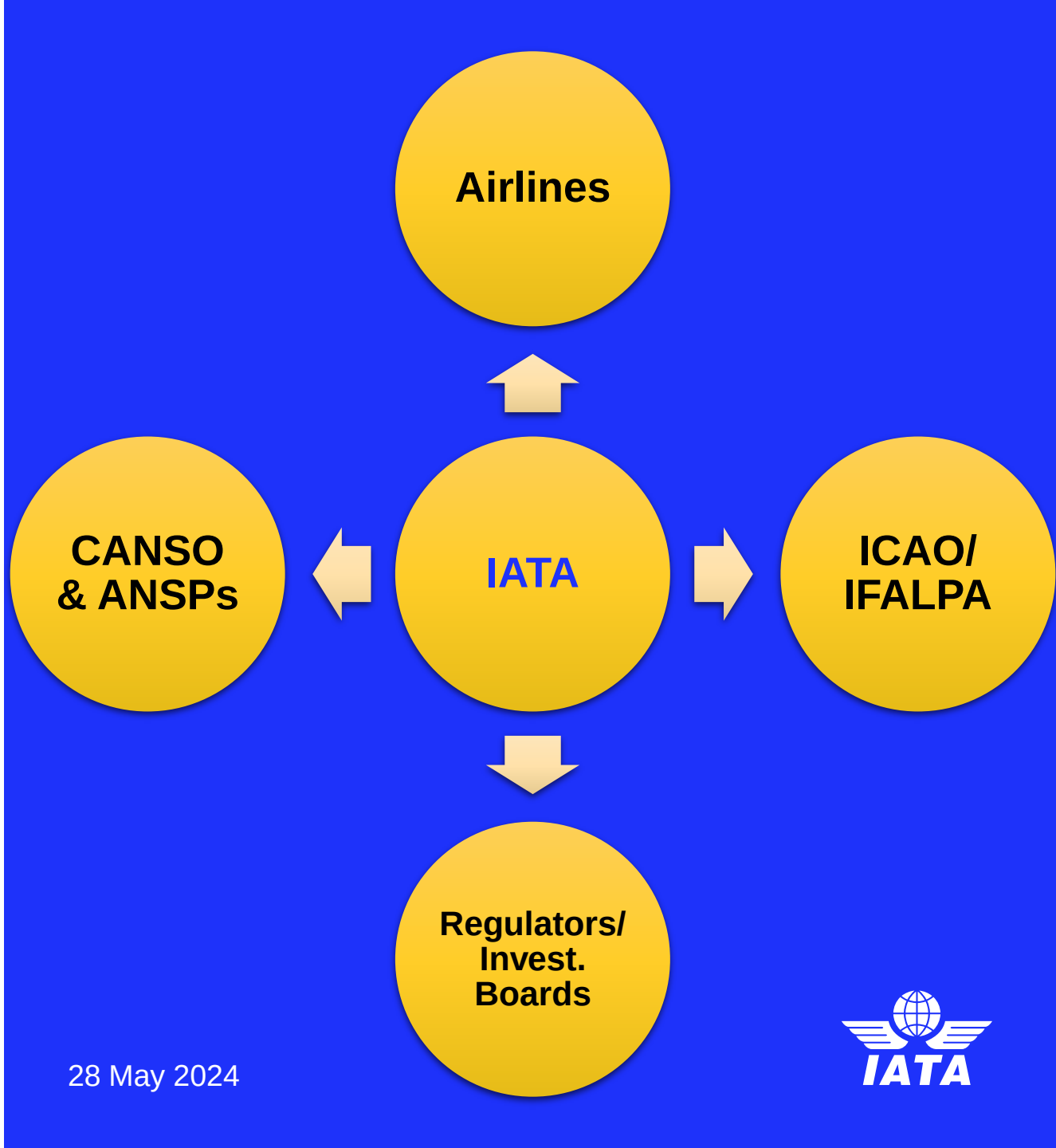
Networking

Building community with key industry stakeholders



Networking

- To validate and align **industry positions** on Human Factors
- **IATA representation** at relevant industry meetings
- To **support industry studies** related to HF into organizational and operational issues and to deliver safety initiatives



Connection

Safety Risk

Integration with the OSS Division

Added value and continuous improvement

Connection

Safety Risk

- **Integration into the processes** through HF analysis, content development and support:
  - ACTF Taxonomy
  - Annual Safety Report
  - Risk Assessments
  - Safety Group priorities
  - IOSA Program
  - HF and FRMS Trainings
  - Consulting projects,

Best Practices

Human Factors Program & Task Force

Development and implementation of an IATA Human Factors strategy, with associated initiatives that deliver tangible outcomes, in alignment with the IATA Safety Strategy to reduce the all-accident rate in aviation

Standards of Excellence

IATA Human Factors Manual

IATA Human Factors Guidelines for Service Providers

New cycle 2023 – 2025 workplan highlights

1. White Paper with the description of the industry status in Human Factors & Fatigue Management
    a. Survey of airlines regarding HF and FRMS implementation
    b. Study of Fatigue and Human Factors reports in IDX
2. Track regulatory changes, and their impact on HF & FM
3. IATA documentation update

World Safety and Operations Conference

Human Factors and Fatigue Management discussions into the WSOC agenda

- Human Factors in the Workshop - 30 SEP – To Be Confirmed
- Human Factors topic in Session 5 - 40 minutes - 2 OCT

Thank you!

… to represent, lead and serve the airline industry.

OEM's Perspective

The balance between automation and Safety in operations and maintenance – technological evolution of aircraft

Boeing Presentation: by Mr. Kayode Ariwodola - Director, Global Safety and Regulatory Affairs – Middle East & Africa Dubai Office

Automation for Safety improvement in Maintenance operations – sUAS for GVI

Kayode Ariwodola
Director – Global Safety & Regulatory Affairs
Africa & Middle East

AFRAA Safety Summit – Addis Abba, May 2024

We Will Never Be Done Improving

"*Everyone at Boeing will never forget the lives lost and where the company fell short in the tragic 737 MAX accidents. Based on key lessons learned, we implemented a series of meaningful changes to strengthen our safety practices and culture and bring lasting improvements to aerospace safety.*"

BOEING Contents Introduction Approach & Governance

Aerospace Safety and Quality

Safety is a fundamental value and our highest priority. We take seriously the responsibility to ensure those who fly on and service our products are safe.

Everyone at Boeing will never forget the lives lost and where the company fell short in the tragic 737 MAX accidents. Based on key lessons learned, we implemented a series of meaningful changes to strengthen our safety practices and culture and bring lasting improvements to aerospace safety.

These changes include uniting critical safety teams and functions under the leadership of Mike Delaney, our first-ever Chief Aerospace Safety Officer. Aligning these groups into a consolidated team helps drive safety across every aspect of our operations and helps enable end-to-end accountability throughout the safety ecosystem.

In 2020, Boeing began implementing its enterprise Safety Management System, or SMS. As an integrating framework for managing safety risks throughout the product and service life cycle, our SMS will incorporate data from employee reporting, production, compliance, quality and safety processes. This will provide line of sight to risks, incidents and identified hazards so we can proactively mitigate issues and continuously improve safety performance.

Ultimately, the intent of SMS is to bring the right data into the right forums with the right people to make data-driven, risk-based decisions that result in safer products. It is a journey of continuous improvement informed by existing data — including what is publicly available in Boeing's annual Statistical Summary of Commercial Jet Airplane Accidents report — and ongoing development of increasingly better safety analytics.

"From information gathered through risk assessment processes to the issues and ideas employees bring forward, our Safety Management System relies on data. We're taking an eyes-wide-open approach to how we use that data to continuously learn and improve — always with our sights set on safety."

Mike Delaney, Chief Aerospace Safety Officer and Senior Vice President, Global Aerospace Safety

Boeing is building first-time quality into everything we do. Pictured here is Christal Nesby and colleagues from P-8 Final Assembly working to take quality to the finish line.

Boeing is taking comprehensive action to continuously improve quality. Boeing employees from each of our businesses work together to drive improvements that will help us build first-time quality into everything we do. Across the company, Quality teams are implementing standard practices aimed at helping us all do our work the right way — the first time, every time — while solving problems using a structured methodology to eliminate root causes and prevent recurrence.

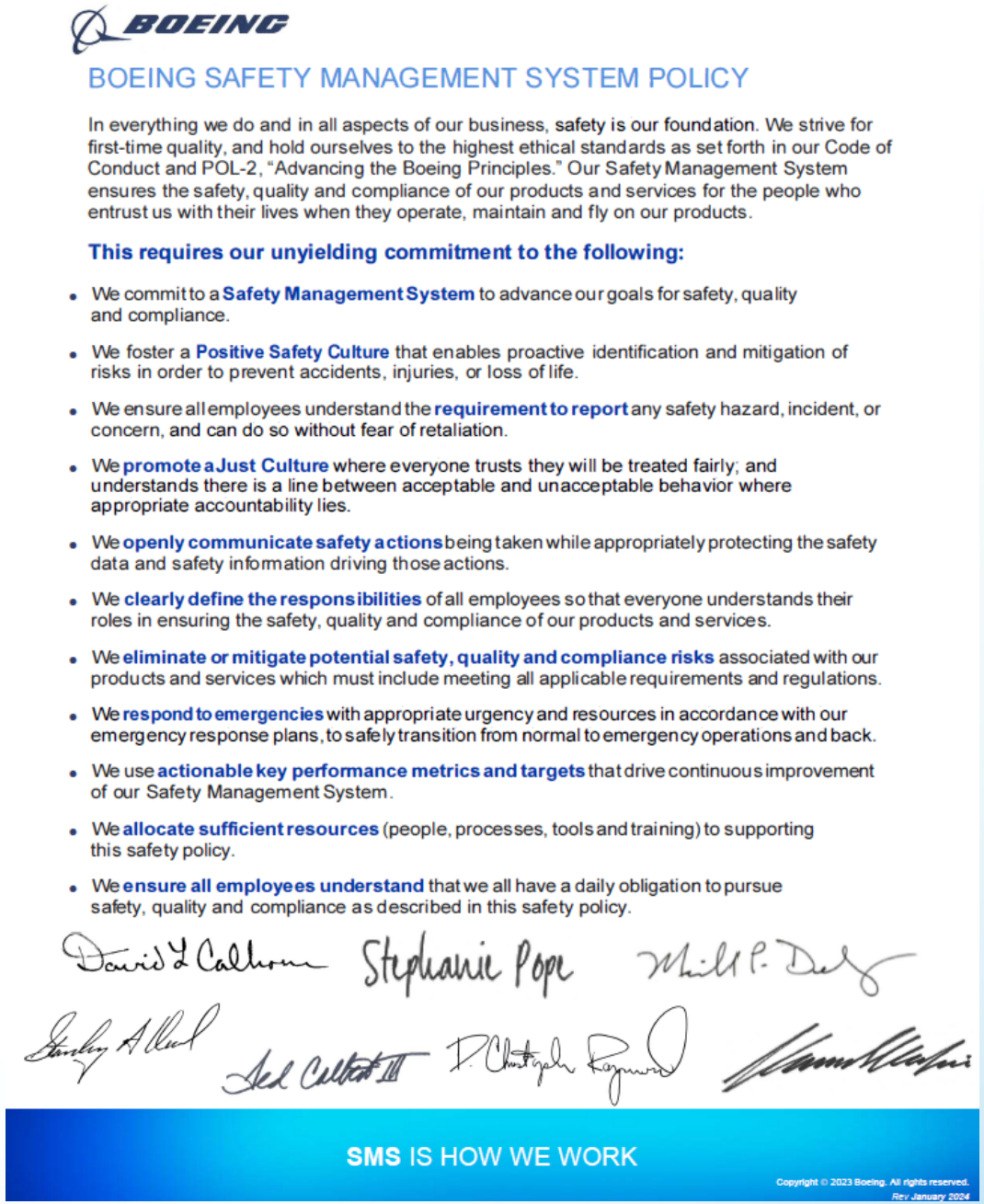
Production Engineering, Quality, Supply Chain and Manufacturing to ensure that quality is designed into the product and controlled throughout every step — from concept to production. The APQP framework ensures quality products are delivered on time while satisfying cost performance targets, by designing quality into the product — even before the first prototype is built — instead of detecting and addressing problems in the finished product.

2021 SUSTAINABILITY REPORT PRODUCTS & SERVICES 34

Commitment to Safety & Just Culture

Board of Directors Aerospace Safety Committee (ASC), assists the Board in the oversight of the safety of company products and services, formal lines of communication ensure all safety and potential safety issues are evaluated, discussed and addressed during weekly Safety Reviews with business unit presidents, Boeing's chief engineer, functional and program leaders, and members of the FAA.

The Chief Aerospace Safety Office (CASO), which was established in 2021, has developed a comprehensive strategy to strengthen Boeing's safety practices and culture and is collaborating with global regulators, airline operators and other industry stakeholders to improve the aerospace safety ecosystem – one of which is the **Global Aerospace Safety Initiative**



BOEING

BOEING SAFETY MANAGEMENT SYSTEM POLICY

In everything we do and in all aspects of our business, safety is our foundation. We strive for first-time quality, and hold ourselves to the highest ethical standards as set forth in our Code of Conduct and POL-2, "Advancing the Boeing Principles." Our Safety Management System ensures the safety, quality and compliance of our products and services for the people who entrust us with their lives when they operate, maintain and fly on our products.

This requires our unyielding commitment to the following:

- We commit to a **Safety Management System** to advance our goals for safety, quality and compliance.
- We foster a **Positive Safety Culture** that enables proactive identification and mitigation of risks in order to prevent accidents, injuries, or loss of life.
- We ensure all employees understand the **requirement to report** any safety hazard, incident, or concern, and can do so without fear of retaliation.
- We **promote a Just Culture** where everyone trusts they will be treated fairly; and understands there is a line between acceptable and unacceptable behavior where appropriate accountability lies.
- We **openly communicate safety actions** being taken while appropriately protecting the safety data and safety information driving those actions.
- We **clearly define the responsibilities** of all employees so that everyone understands their roles in ensuring the safety, quality and compliance of our products and services.
- We **eliminate or mitigate potential safety, quality and compliance risks** associated with our products and services which must include meeting all applicable requirements and regulations.
- We **respond to emergencies** with appropriate urgency and resources in accordance with our emergency response plans, to safely transition from normal to emergency operations and back.
- We use **actionable key performance metrics and targets** that drive continuous improvement of our Safety Management System.
- We **allocate sufficient resources** (people, processes, tools and training) to supporting this safety policy.
- We **ensure all employees understand** that we all have a daily obligation to pursue safety, quality and compliance as described in this safety policy.

SMS IS HOW WE WORK

Rev January 2024

Enterprise
Safety Management System

BOEING

Global Safety & Regulatory Affairs (GS&RA) Engagement

Integrate
with stakeholders

Identify regional risks & priorities

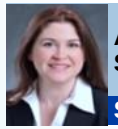
Champion
a safe, efficient aviation ecosystem

BOEING

Prior to 737MAX Accidents

Global Safety & Regulatory Affairs

Senior Director Global Safety & Reg. Affairs
Todd Sigler



Autonomous Systems
Stella Weidner

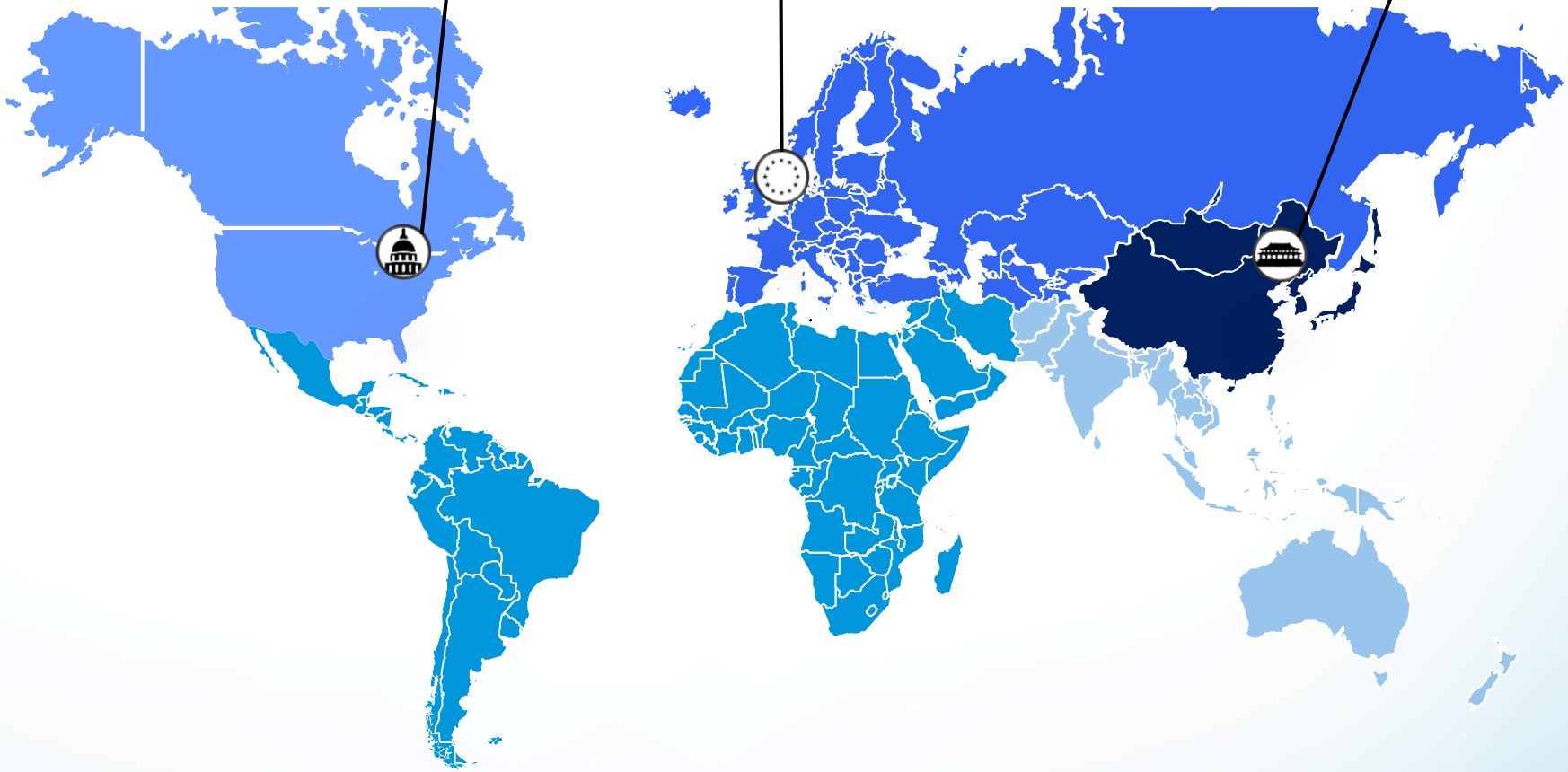
Global Regulatory Strategy
Mildred Troegeler

Global Safety & Regulatory Affairs
Washington, DC

Global Safety & Regulatory Affairs
Europe

Global Safety & Regulatory Affairs
China

GLOBAL LEADERS



Currently …

Chief Aerospace Safety Office

Chief Aerospace Safety Officer, Senior VP Global Aerospace Safety
Mike Delaney

Product & Services Safety

VP & General Manager, Product and Services Safety
Tom Galantowicz

Global Safety & Regulatory Affairs

Senior Director Global Safety & Reg. Affairs
Todd Sigler

Autonomous Systems
Stella Weidner

Liaison to ICAO & Global Reg. Strategy
Mildred Troegeler

Global Safety Strategy
David Zwegers

International Teams
Victoria Wilk

Ben Ivers
Regulatory Affairs
Autonomous Systems Engineering

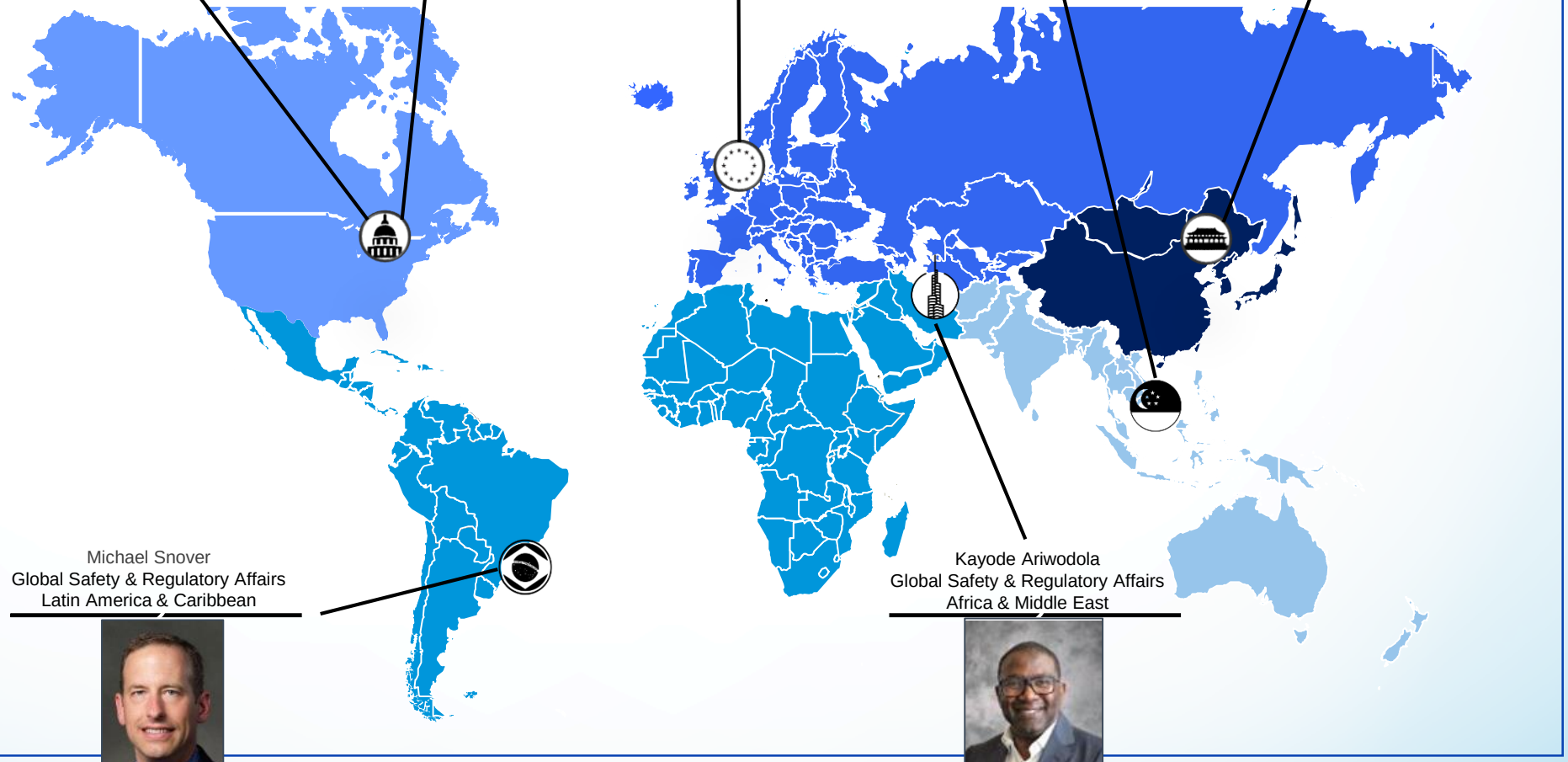
Kara Charles
Global Safety & Regulatory Affairs
Washington, DC

Eric DeMoney
Global Safety & Regulatory Affairs
Europe / CIS / Turkey

Myles Brown
Global Safety & Regulatory Affairs
Asia Pacific

Thomas Martig
Global Safety & Regulatory Affairs
North Asia

GLOBAL LEADERS



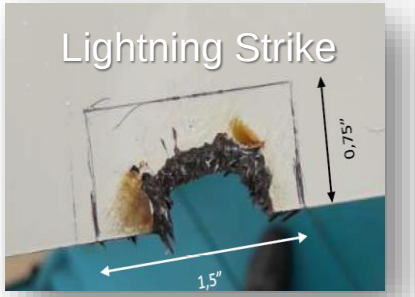
Michael Snover
Global Safety & Regulatory Affairs
Latin America & Caribbean

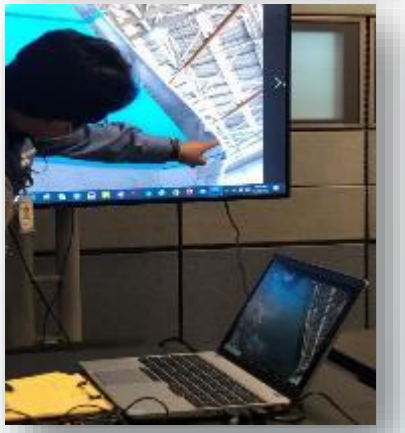
Kayode Ariwodola
Global Safety & Regulatory Affairs
Africa & Middle East

Using small Unmanned Aircraft Systems (sUAS) for General Visual Inspection (GVI)

Current Situation

- Several external General Visual Inspection (GVI) methods require lifts causing injury risk and significant inspection time
- Potential use of autonomous small Unmanned Aircraft Systems (sUAS) to complete aircraft inspections for improved safety and cost
- 2-D images to complete required aircraft inspections require human factors assessment, new skills and data delivery solutions





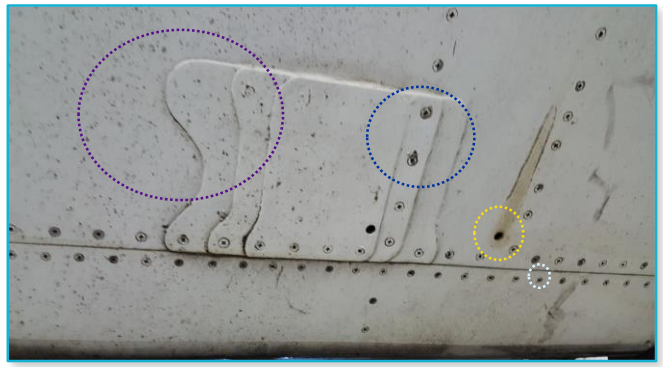
Using small Unmanned Aircraft Systems (sUAS) for General Visual Inspection (GVI)

General Visual Inspection process with sUAS value proposition

Data Collection

- Unsafe for personnel or aircraft
- Labor Intensive
- Time consuming

Data Analysis



- Subjective
- Inconsistent

Maintenance History

- Manual cataloging of damage in maintenance databases
- Manual research for referencing

Improved Maintenance Safety and Cost

Objective visualization technics

-

Consistent data driven engineering Insights

Build Regulator trust

-

Machine learning and predictive analytics

BOEING


Positive Safety Culture
Just
Safety Management System
Engagement
Protect
Speak Up
Dedication
Safety Assurance
Integrity
Compliance
Safety
Transparency
Collaboration
Humility
Trust


BOEING

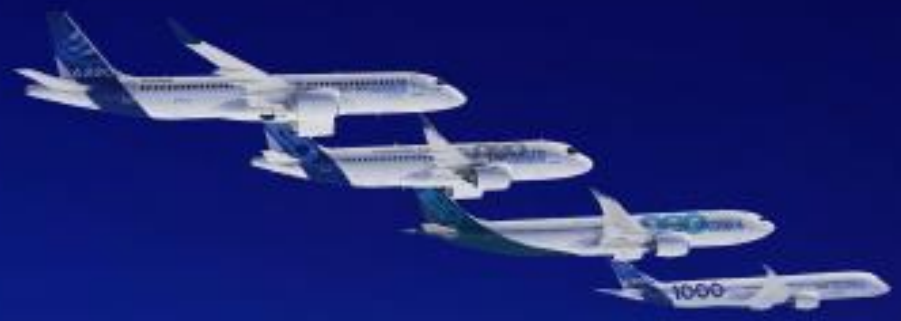
OEM's Perspective

The balance between automation and Safety in operations and maintenance – technological evolution of aircraft

Airbus Presentation: by Capt Malcolm Ridley, Chief Test Pilot of Airbus Commercial Aircraft - Airbus

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together



Smart Automation: A Toolbox for Pilots

Capt. Malcolm RIDLEY
Airbus Chief Test Pilot

AIRBUS

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY FOUNDATION

Smart Automation: A Toolbox for Pilots

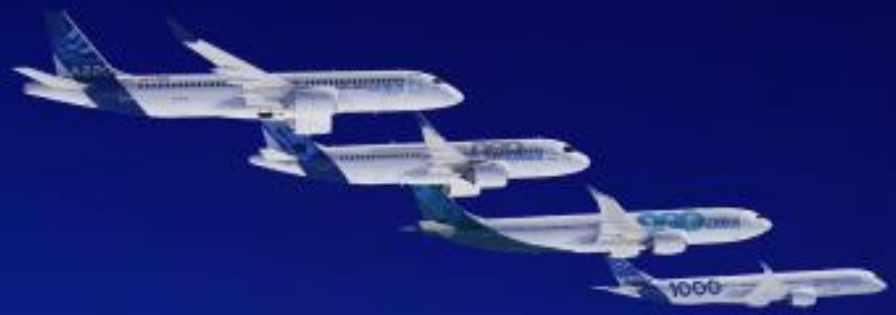
Capt. Malcolm RIDLEY
Airbus Chief Test Pilot

AIRBUS

Agenda

- Smart Automation - what is it?
- The pilot at the centre
- Developing robust automation
- Questions

AIRBUS



Smart Automation…What Is It?

AIRBUS

Automation - History

Early commercial jets — Generation 1

From 1952
Dials and gauges in cockpit, early autoflight systems
Comet, Caravelle, BAC-111, Trident, VC-10, B707, B720, DC-8, Convair 880/990

More integrated autoflight — Generation 2

From 1964
More elaborate autopilot and autothrottle systems
Concorde, A300, Mercure, F28, BAe146, VFW 614, B727, B737-100/-200, B747-100/-200/-300/SP, L-1011, DC-9, DC-10

Glass-Cockpit, FMS & TAWS — Generation 3

From 1980
Electronic displays, Flight Management System (FMS), and Terrain Awareness and Warning System (TAWS) reduced CFIT accidents
A300-600, A310, Avro RJ, F70, F100, B717, B737 Classic, B737 NG, B737 MAX, B757, B767, B747 - 400/-8, Bombardier CRJ, Embraer ERJ, MD-11, MD-90, MD-90

Fly-By-Wire — Generation 4

From 1988
Flight envelope protection enabled by fly-by-wire technology reduced LOC-I accidents
A220, A318/A319/A320/A321, A330, A340, A350, A380, B777, B787, Embraer E-Jets, Sukhoi Superjet

AIRBUS

Automation - History

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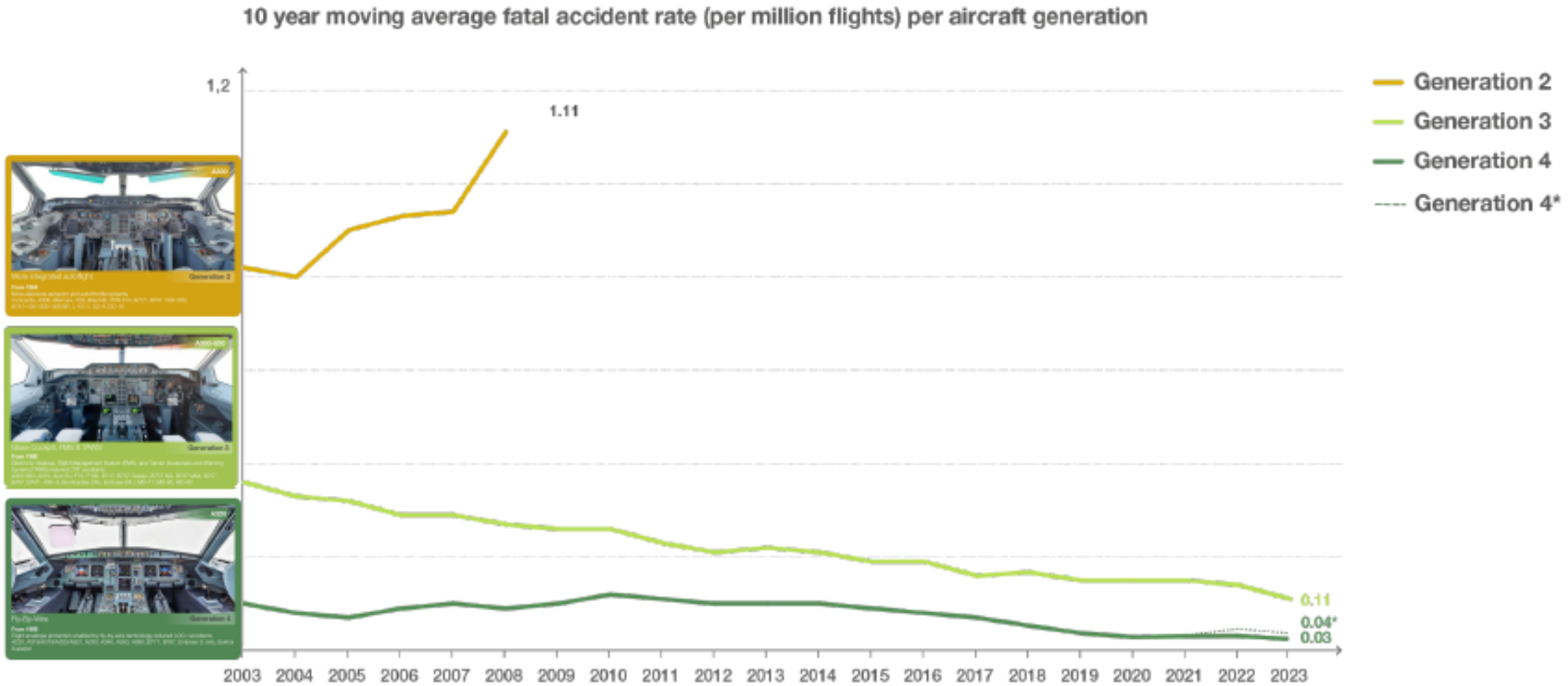
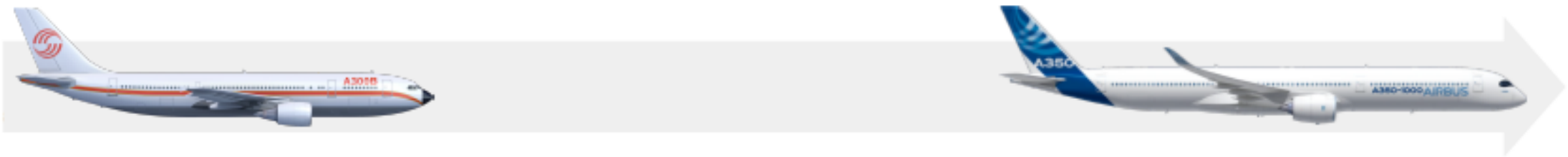
AIRBUS

Automation - The Safety Effect

AIRBUS

Automation - The Safety Effect



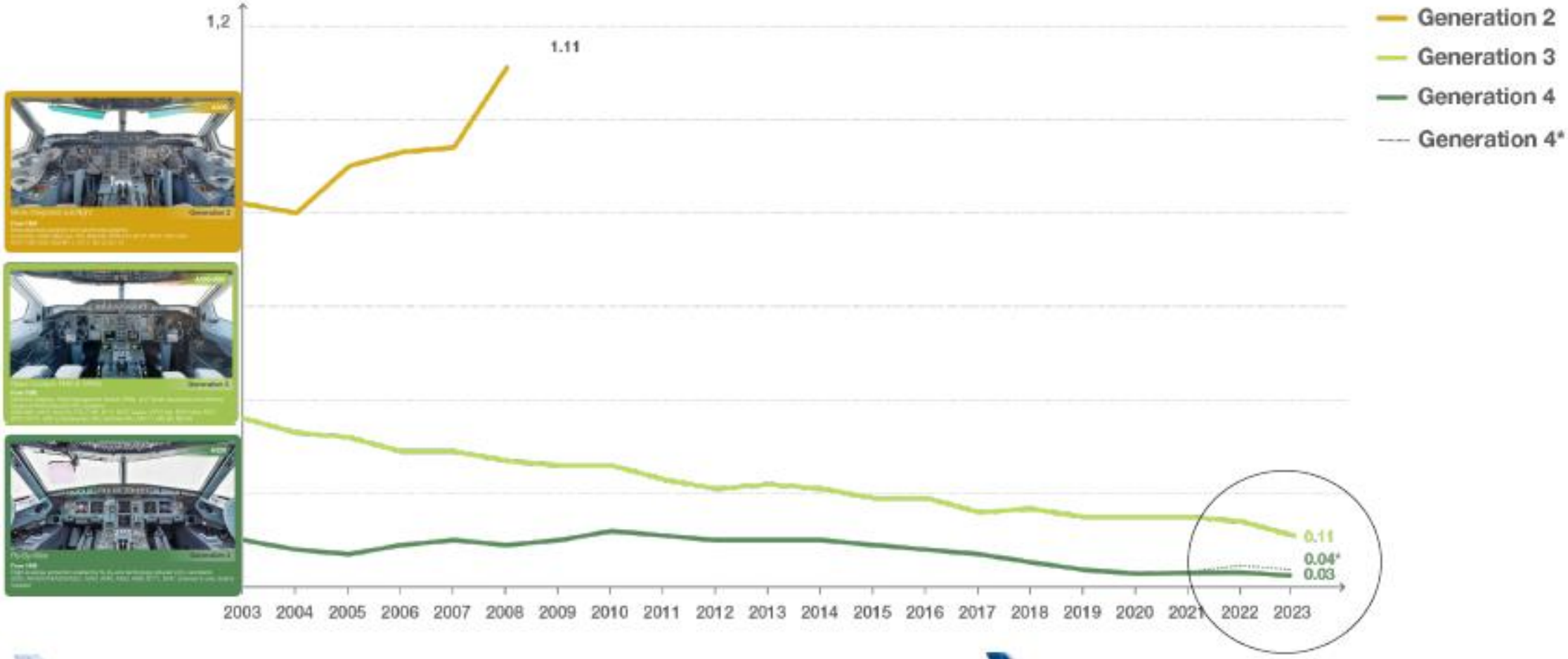


AIRBUS

Automation - The Safety Effect

Airbus Amber

10 year moving average fatal accident rate (per million flights) per aircraft generation

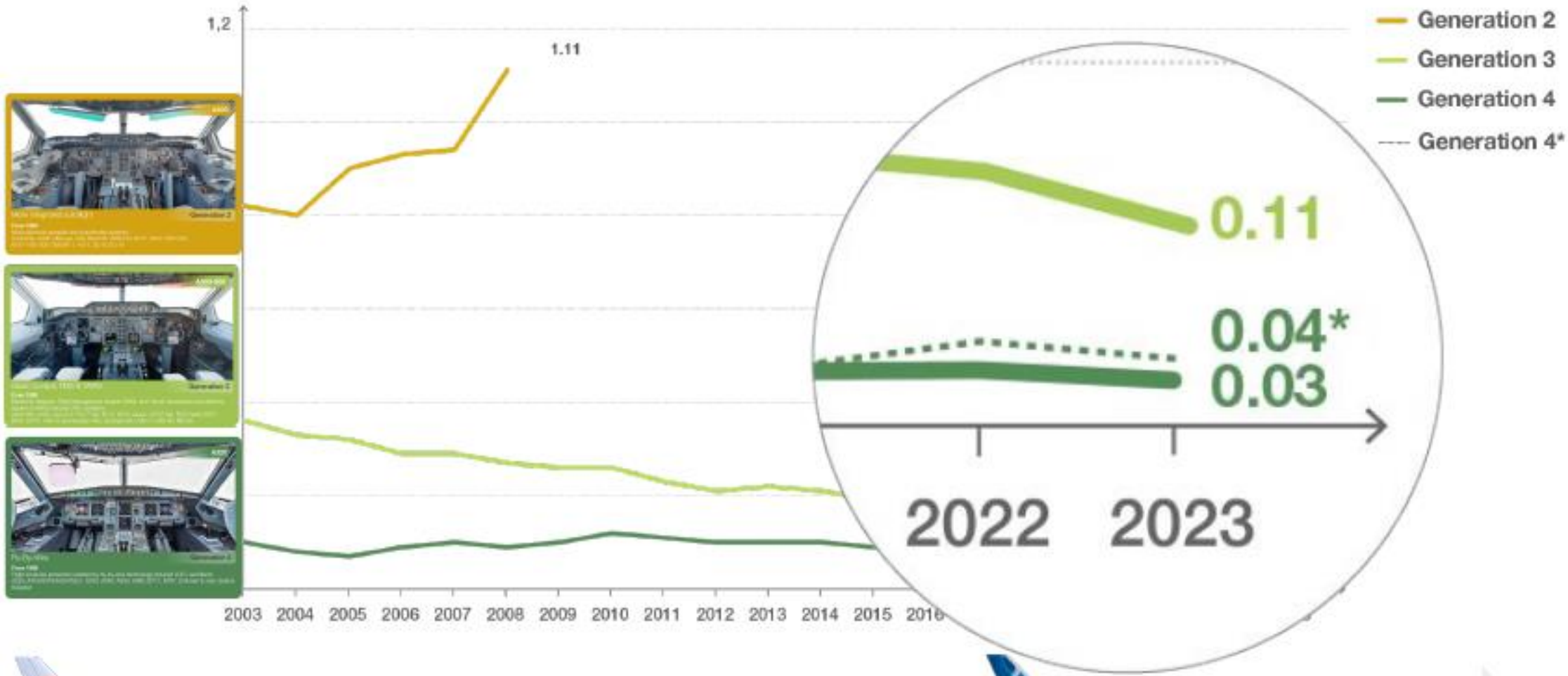


AIRBUS

Automation - The Safety Effect

Airbus Amber

10 year moving average fatal accident rate (per million flights) per aircraft generation

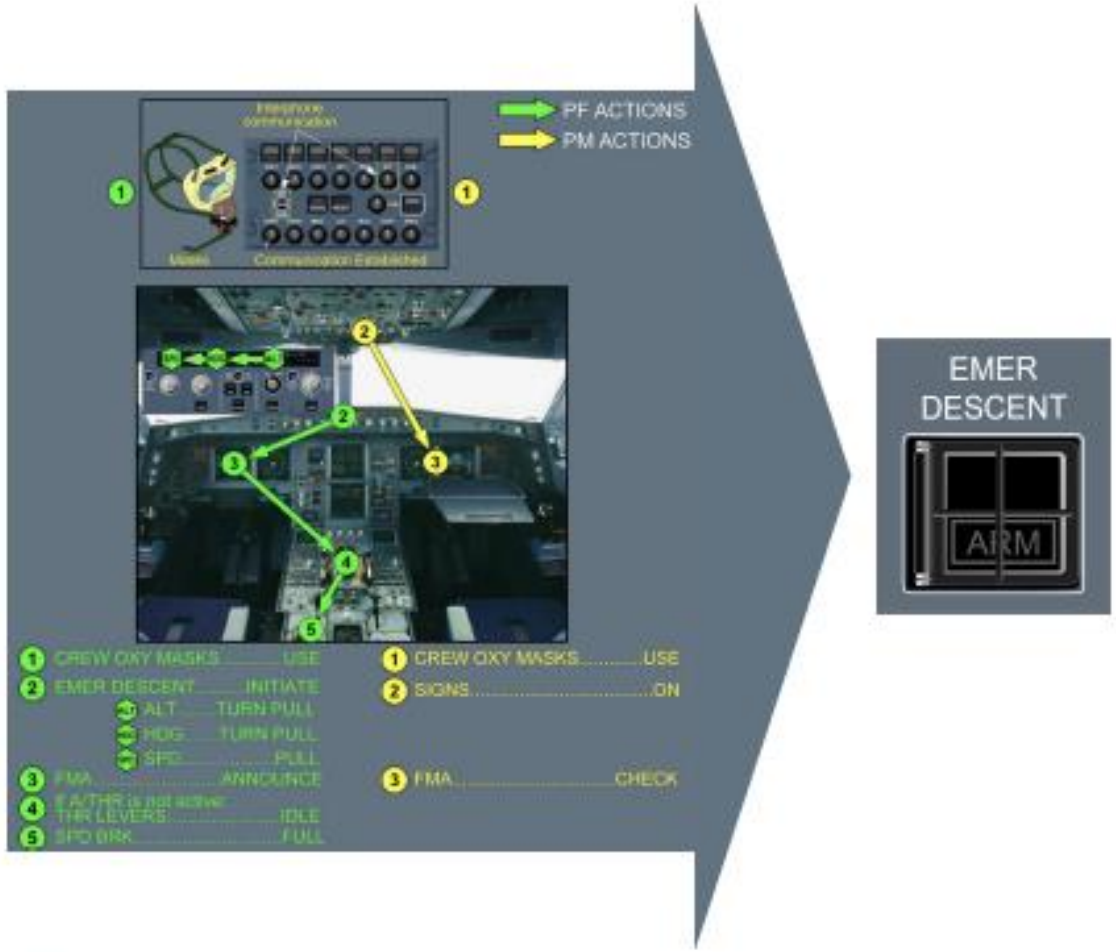


AIRBUS

Smart Automation?

AIRBUS

Smart Automation?



AIRBUS

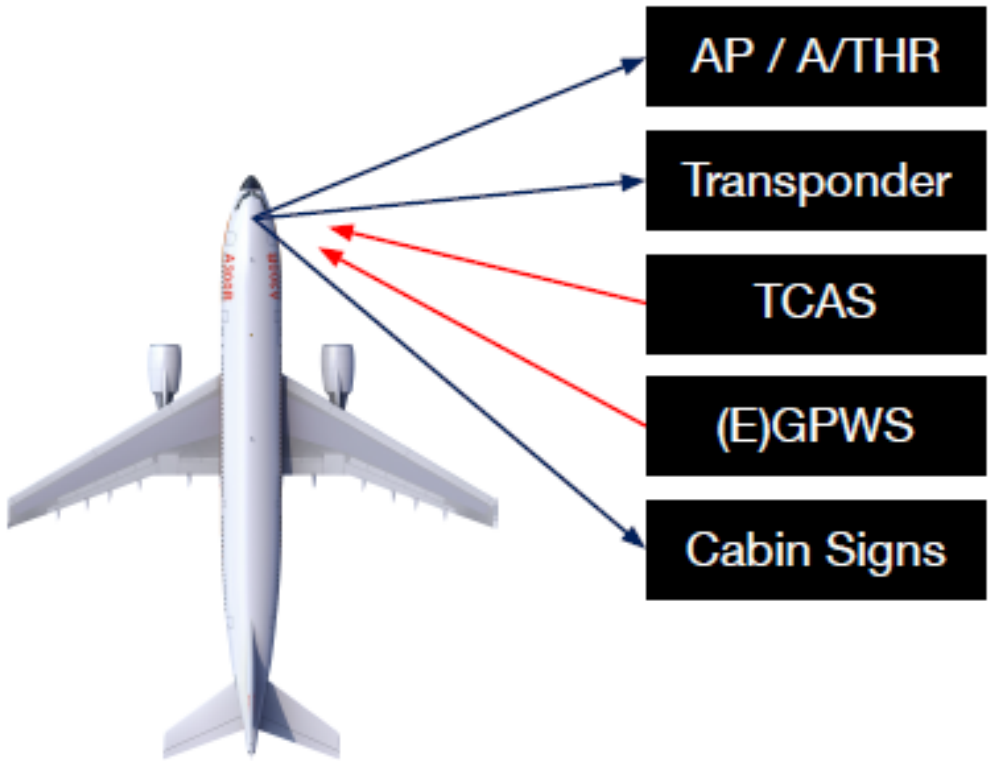
From Wires to Networks

From Wires to Networks

- AP / A/THR
- Transponder
- TCAS
- (E)GPWS
- Cabin Signs

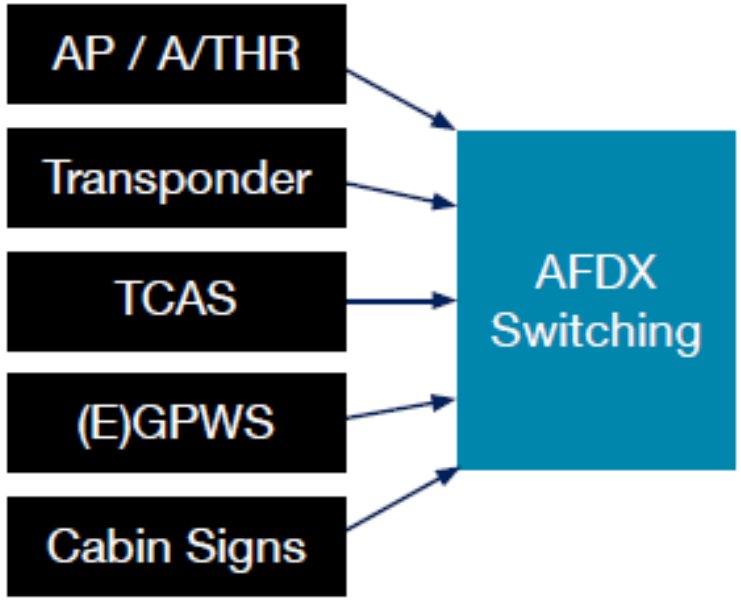
AIRBUS

From Wires to Networks



AIRBUS

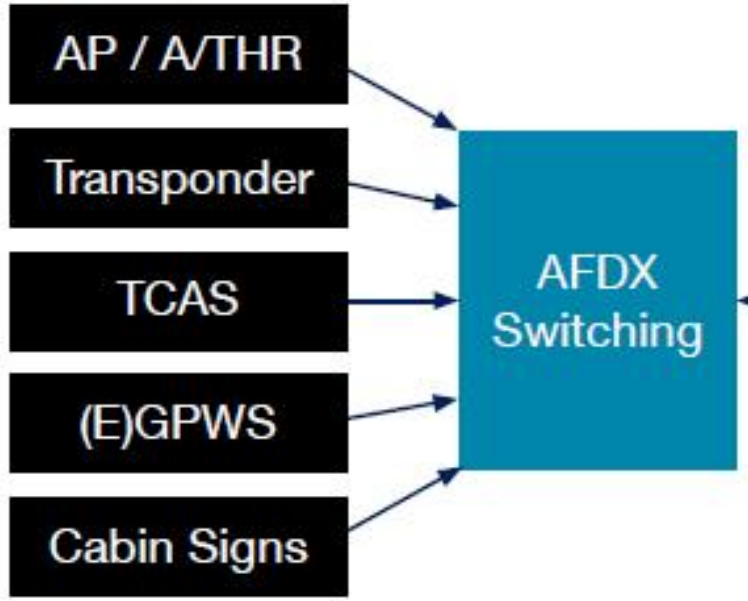
From Wires to Networks



AFDX:
Avionics Full Duplex Switched Ethernet

AIRBUS

From Wires to Networks



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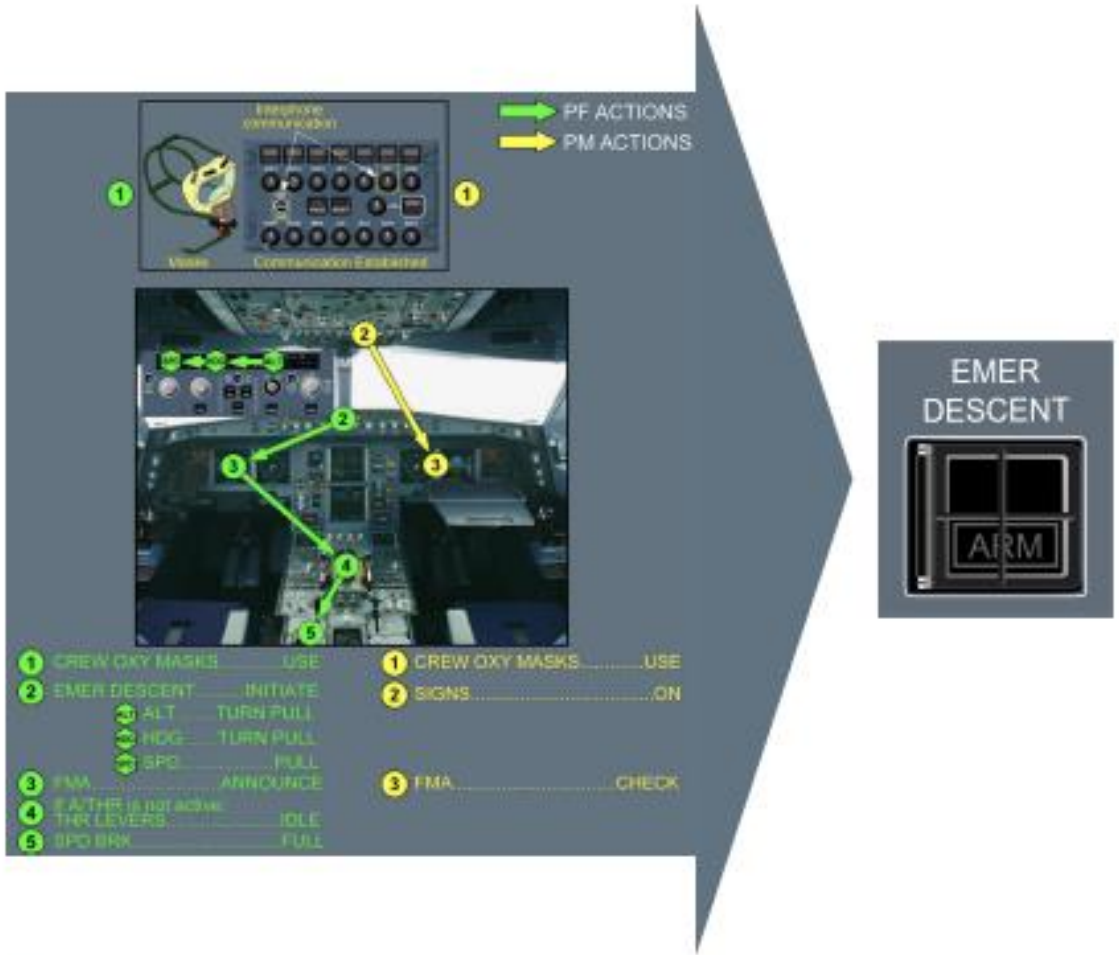
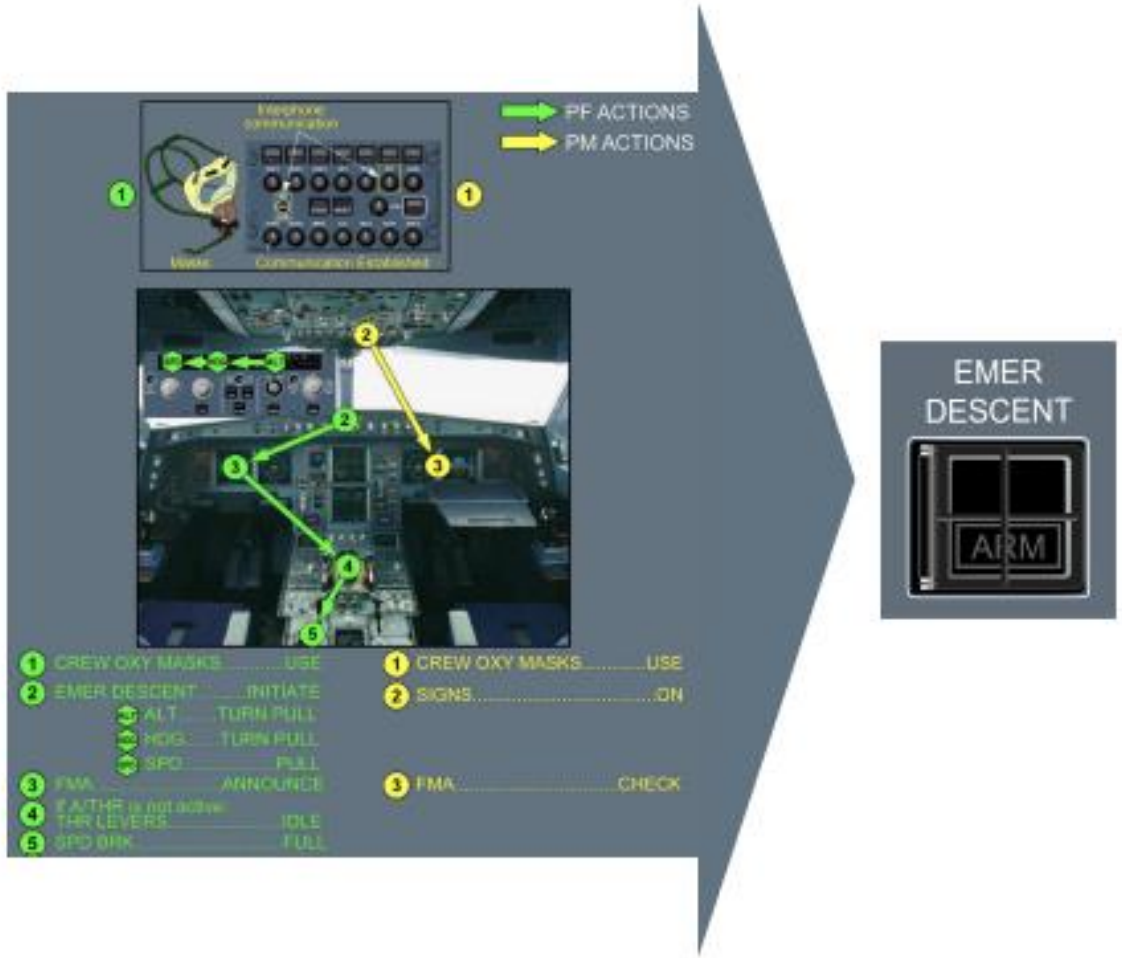
AIRBUS

Smart Automation?



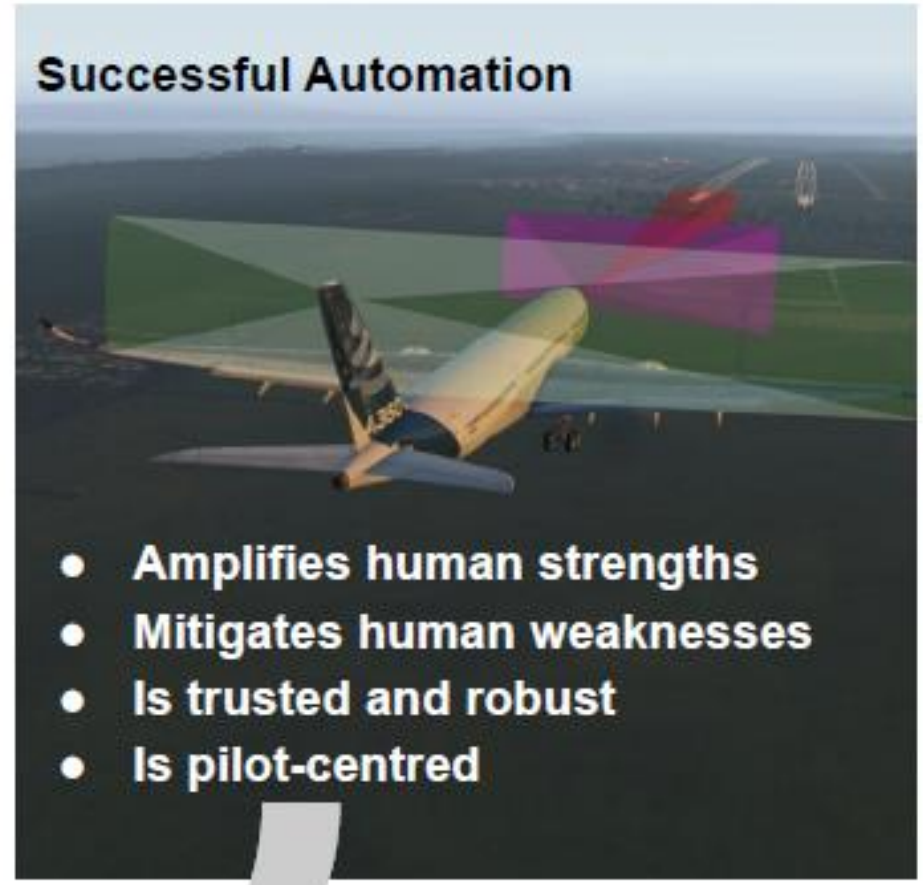
AIRBUS

Smart Automation?



AIRBUS

Smart Automation?



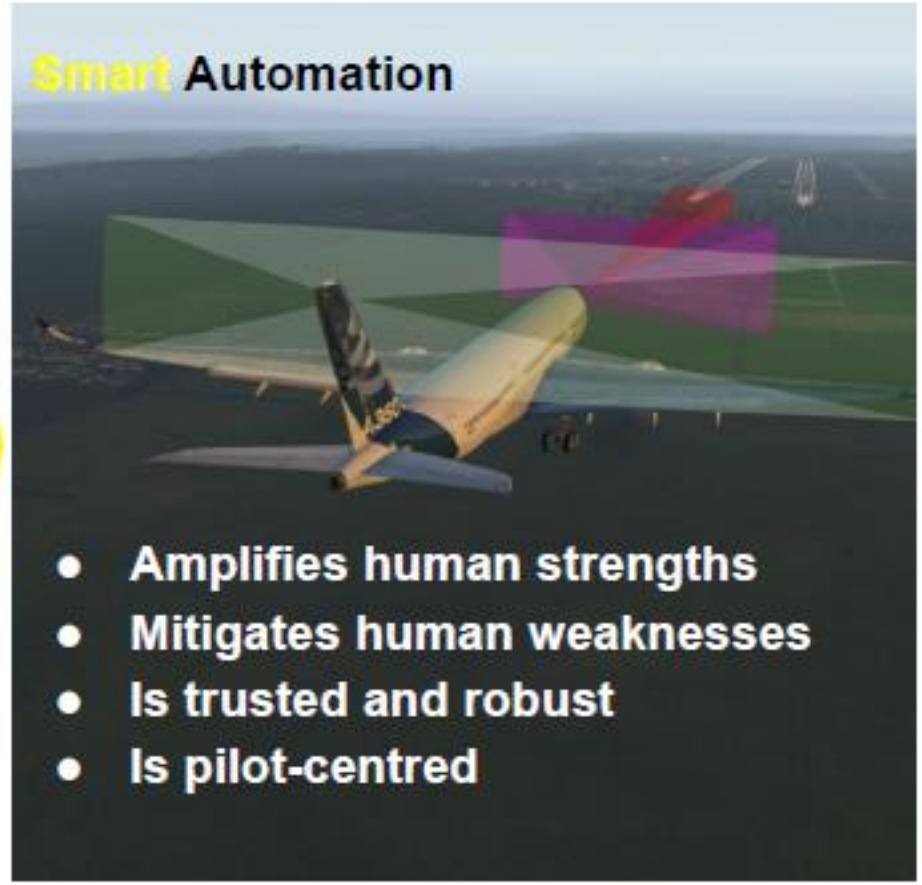
AIRBUS

Smart Automation?

DragonFly

EMER DESCENT

eMCO



AIRBUS

The Pilot at the Centre

AIRBUS

Amplifying strengths, mitigating weaknesses

Balancing Attributes

AIRBUS

Amplifying strengths, mitigating weaknesses

Resilience

Objectivity

Engagement

Incapacitation

Balancing Attributes

AIRBUS

Amplifying strengths, mitigating weaknesses

Human pilots

Automation

- Resilience
- Objectivity
- Engagement
- Incapacitation

Balancing Attributes

A trained, competent & well-rested pilot is key to a safe system

Good automation maximises human strengths, mitigates weaknesses

AIRBUS

Amplifying strengths, mitigating weaknesses

Human pilots

Automation

-Startle effect, manual flight -Dealing with 'black swans'	Resilience
Can be a weak area Rigorous CRM can assist	Objectivity
-Subject to fatigue -Good in critical flt phases	Engagement
Subject to incapacitation	Incapacitation

Balancing Attributes

A trained, competent & well-rested pilot is key to a safe system

Good automation maximises human strengths, mitigates weaknesses

Amplifying strengths, mitigating weaknesses

Human pilots		Automation
-Startle effect, manual flight -Dealing with 'black swans'	Resilience	Increasing, reducing need for rapid pilot intervention
Can be a weak area Rigorous CRM can assist	Objectivity	Could generate many objective options
-Subject to fatigue -Good in critical flt phases	Engagement	-Tireless monitoring -Permits pilot rest
Subject to incapacitation	Incapacitation	Fail-safe defence against pilot incapacitation

Balancing Attributes

A trained, competent & well-rested pilot is key to a safe system

Good automation maximises human strengths, mitigates weaknesses

Developing Robust Automation

AIRBUS

DragonFly

Current Research

Support to pilots
- taxi phase

Automated diversion in case of incap

Autoland anywhere

DragonFly

…Research only - not a product!

Current Research

Support to pilots
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DragonFly

…Research only - not a product!

Taxi assistance demonstrations, including CDG

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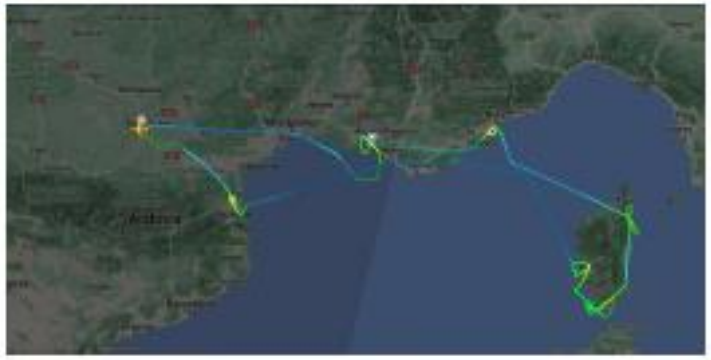
Taxi assistance demonstrations, including CDG

Emergency automated diversion in real-world environment



Current Research

Support to pilots - taxi phase

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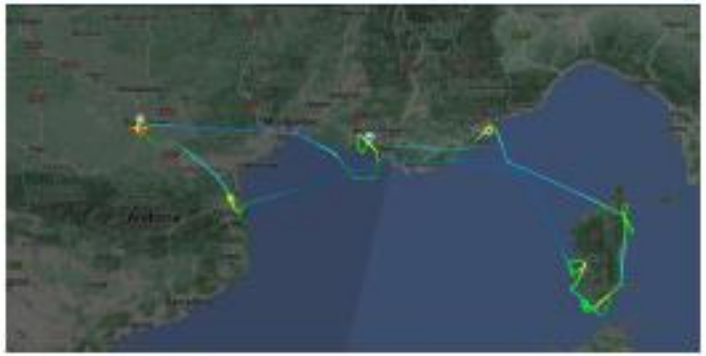
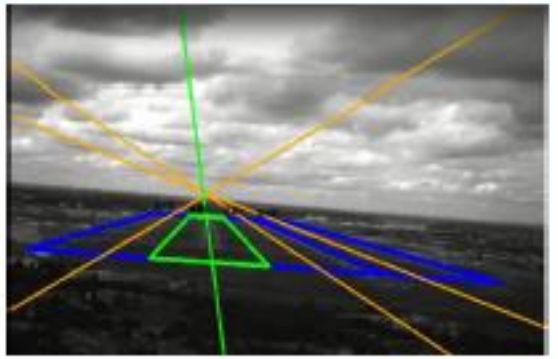


Autoland anywhere, with multiple demos and data-gathering



Current Research

Support to pilots
- taxi phase

Automated diversion in case of incap

Autoland anywhere

AIRBUS

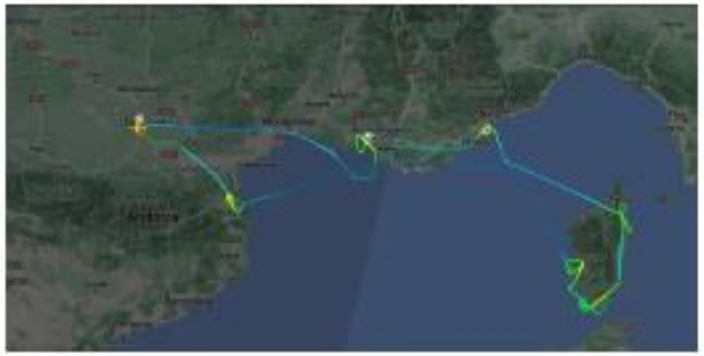
DragonFly

…Research only - not a product!

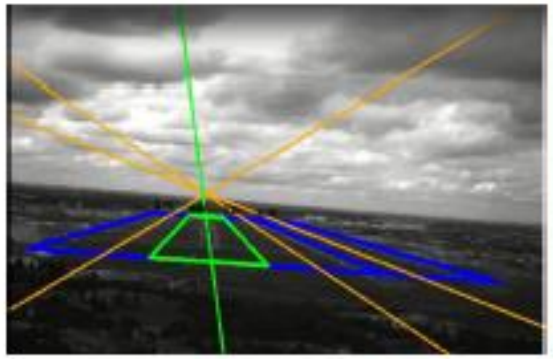
Data fusion:
Electro-optics
Radar
LIDAR

Taxi assistance demonstrations, including CDG

Emergency automated diversion in real-world environment



Autoland anywhere, with multiple demos and data-gathering



Current Research

Support to pilots
- taxi phase

Automated diversion in case of incap

Autoland anywhere

AIRBUS

Practical benefits need robust engineering

Automation solutions must be:

- Robust, to gain acceptance and trust
- Real-world practical
- Bring real value, no gimmicks
- Rigorously developed and tested
- Carefully certificated

Robust and Practical

True smart automation is on the horizon

Must be resilient and bring value

Rigourous development

Acceptance and certification…

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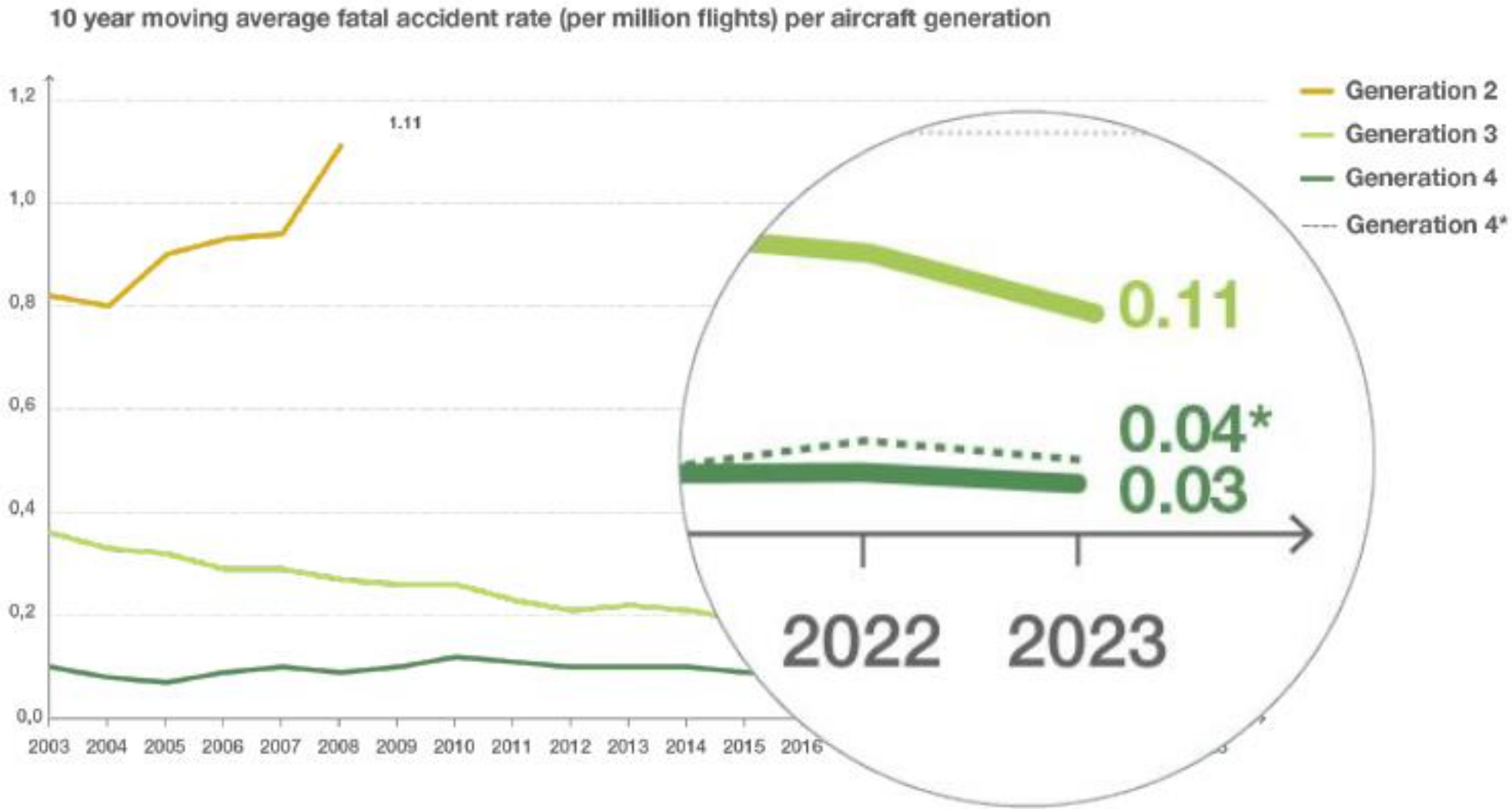
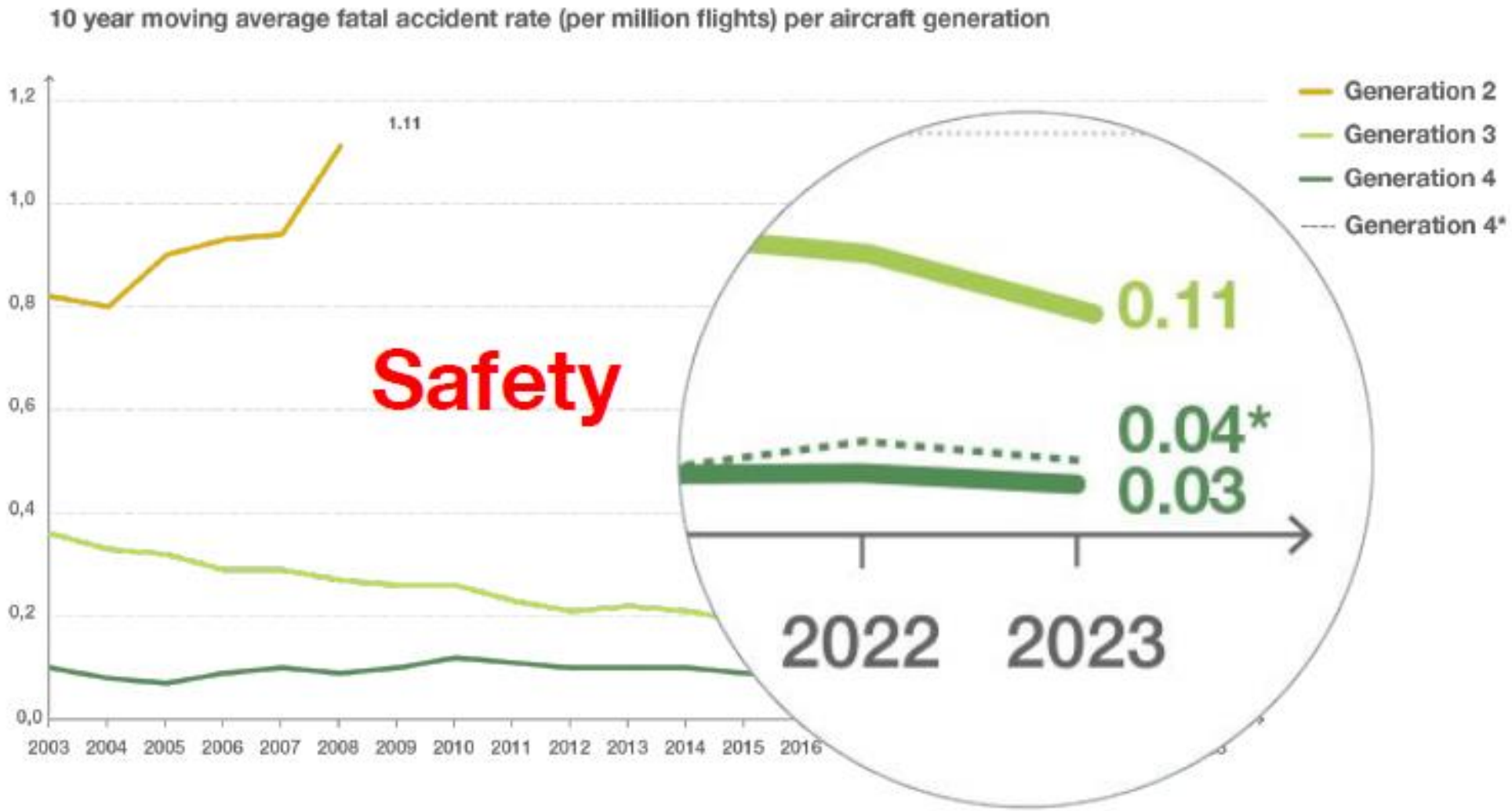
The Last Word Is Non-Negotiable



AIRBUS

The Last Word Is Non-Negotiable

The last word is…



AIRBUS

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY FOUNDATION

Smart Automation: A Toolbox for Pilots

Malcolm RIDLEY
Chief Test Pilot

AIRBUS

Thank you

AIRBUS

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

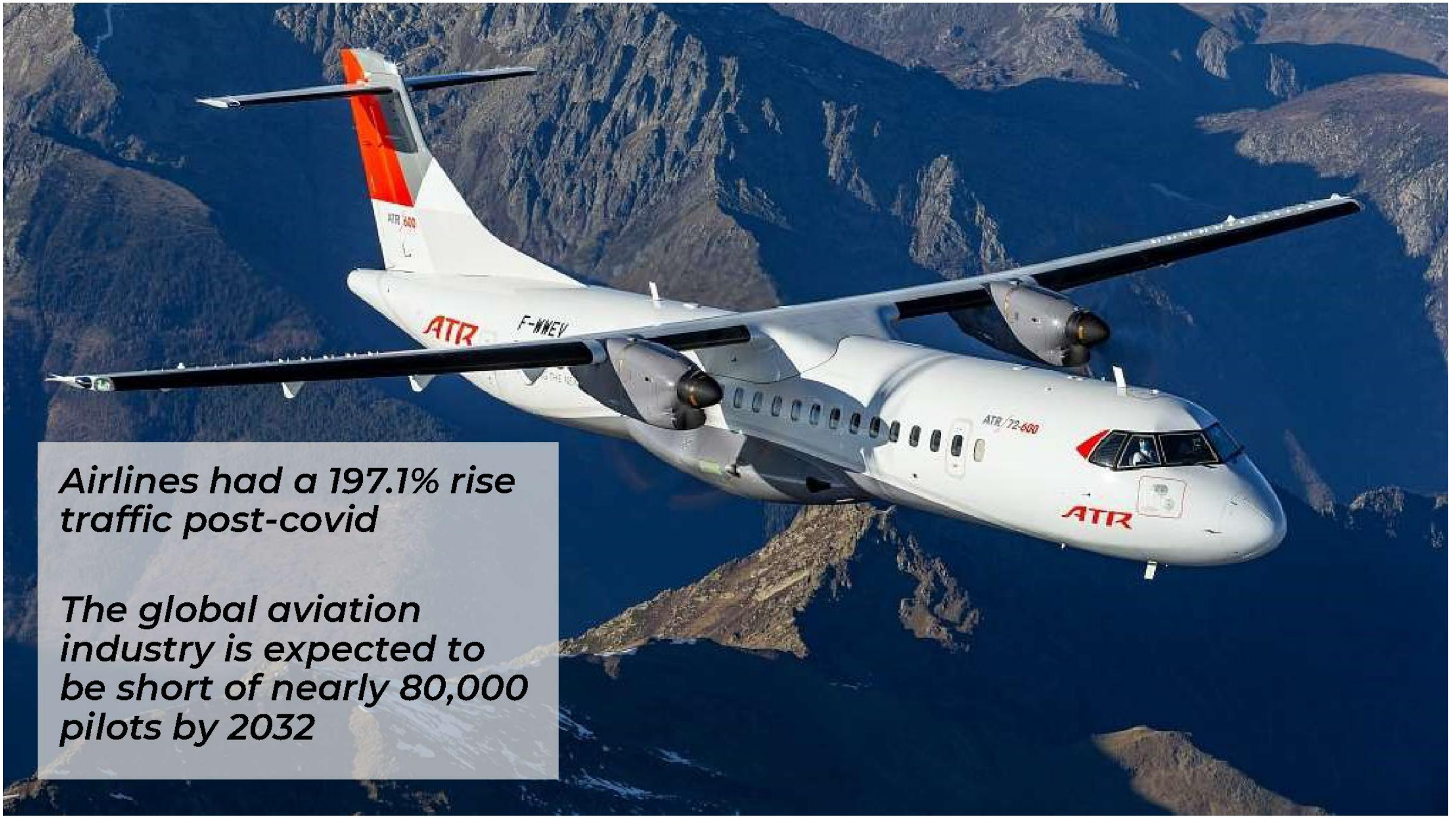
OEM's Perspective

The balance between automation and Safety in operations and maintenance – technological evolution of aircraft

ATR Presentation: by Mr. Christopher McGregor, Flight Safety Officer - ATR

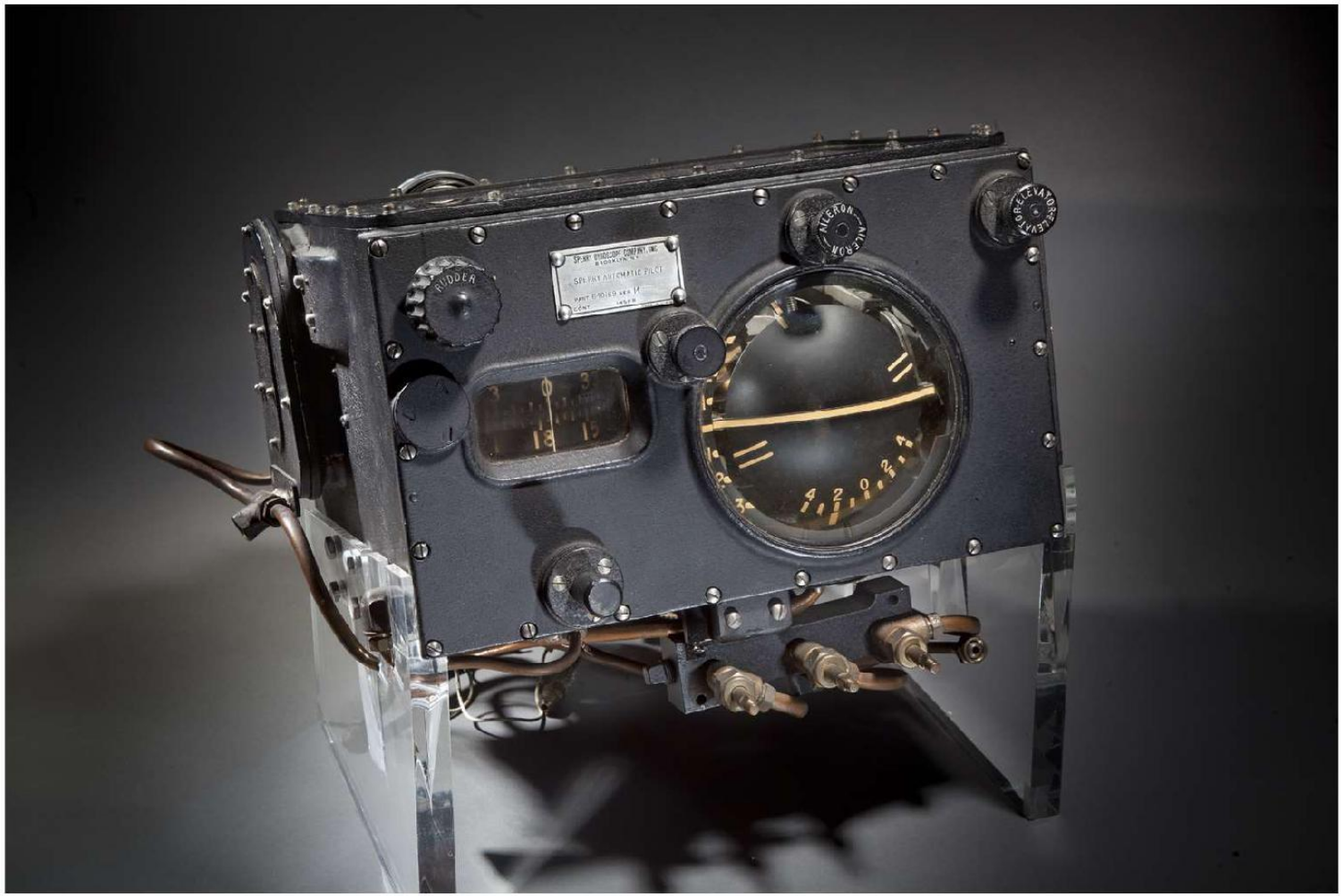
Flight Safety Developing Technologies

African Aviation Safety Summit



Airlines had a 197.1% rise traffic post-covid

The global aviation industry is expected to be short of nearly 80,000 pilots by 2032



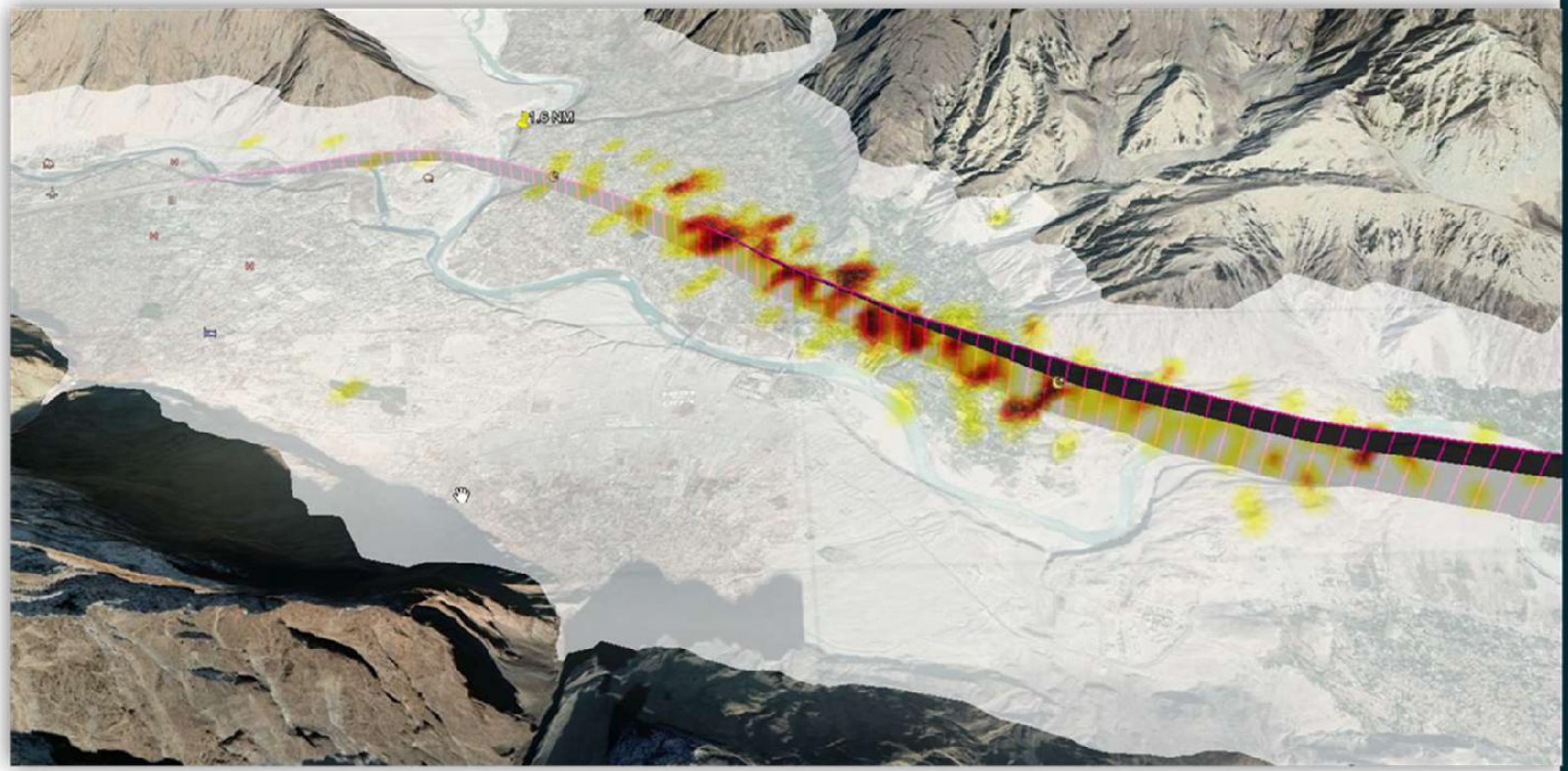
Flight safety trends demonstrate the overall benefit of emerging technologies.

Nobody would question autopilot, EGPWS, EEC and many other systems that today we consider to be the norm.


Everyday we create 2.5
quintillion bytes of data

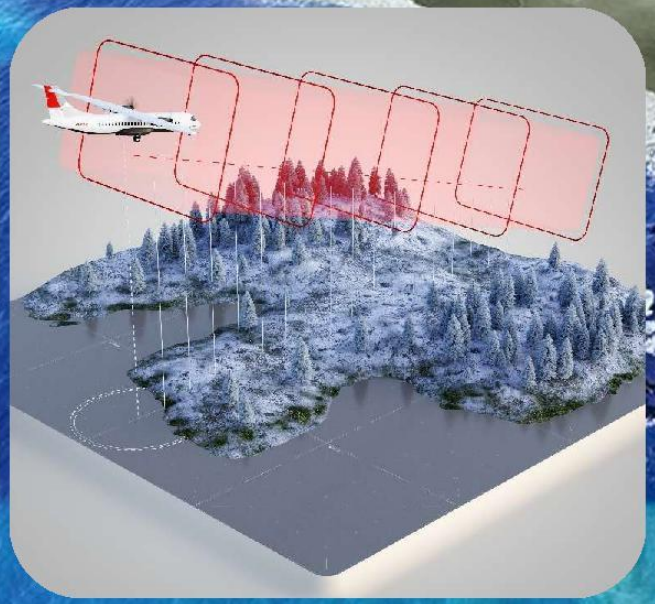

F-WWEY


ATR

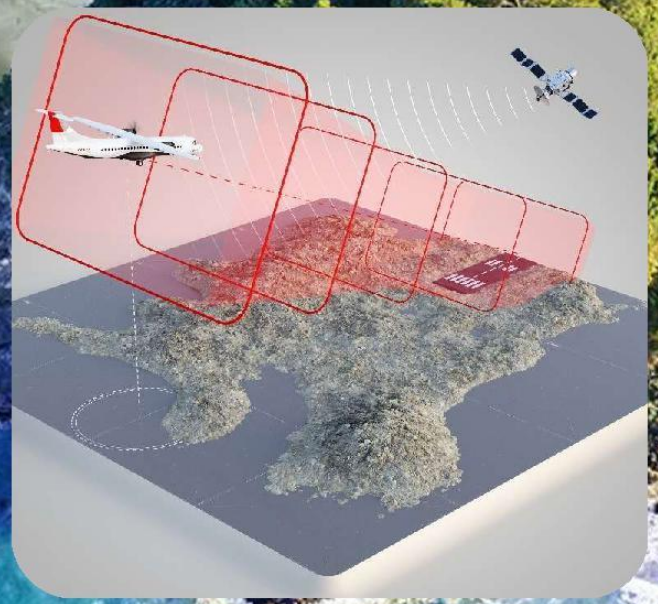


we operate into a large % of airfields with minimal navigation infrastructure.

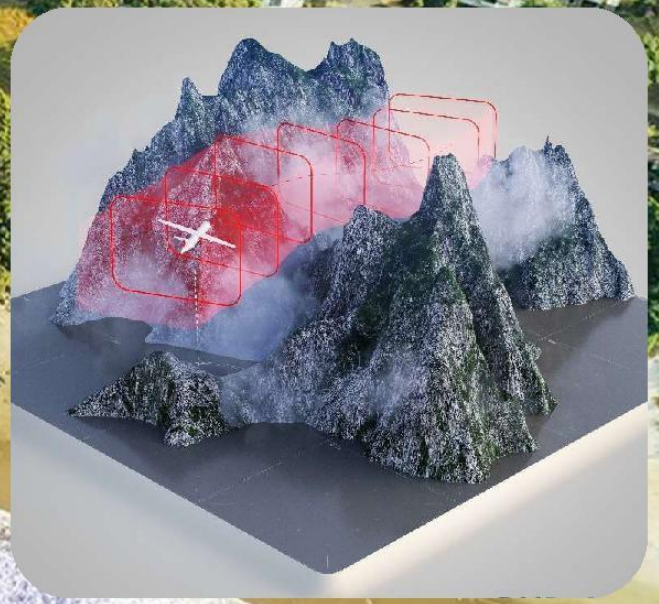
large % still classical VFR operations.



Baro-VNAV for continuous descent



LPV for approach with vertical guidance



RNP-AR 0.3/0.3 for challenging airports

Emerging technologies combined with effective training and supporting infrastructure can provide significant benefits.

threat and error management training needs to take into account the level and nature of automation being used.


Implement safety enhancements taking advantage of new technology, services, support & training

OEM's Perspective

The balance between automation and Safety in operations and maintenance – technological evolution of aircraft

Collins Aerospace Presentation: by Mr. Jens Ziesel - Marketing EuMEA Collins Aerospace Avionics

Collins Aerospace
An RTX Business

TECHNOLOGY INNOVATIONS

Supporting Pilots In Their Daily Job

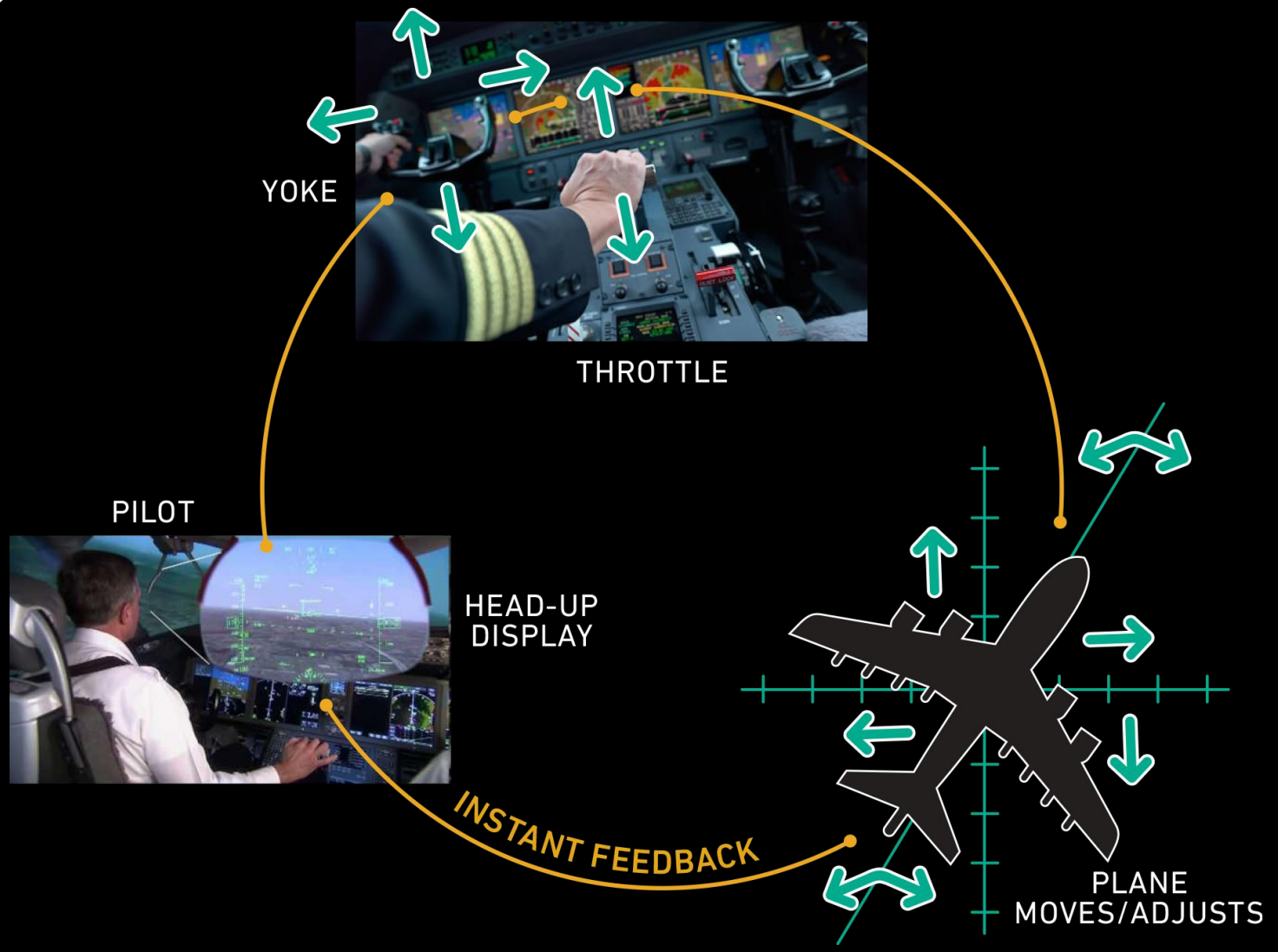
ENHANCED FLIGHT VISION SYSTEMS (EFVS)

Collins Aerospace
An RTX Business

A SEAMLESS EXTENSION OF THE PILOT

KEEPING THE PILOT IN THE LOOP

- Eyes forward reduces reaction time
- Best aircraft feedback system
- Visualize approaches
- Improved training methods
- Increased situational awareness



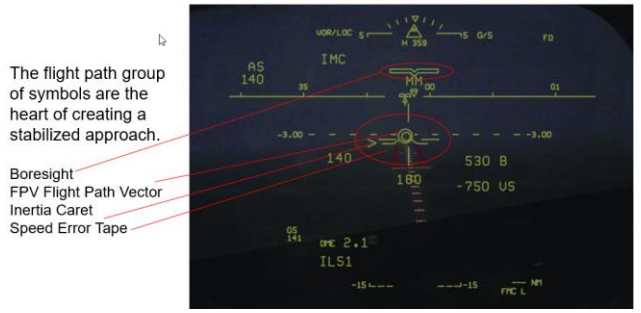
HGS A **PRIMARY FLIGHT REFERENCE DEVICE (PFR)**

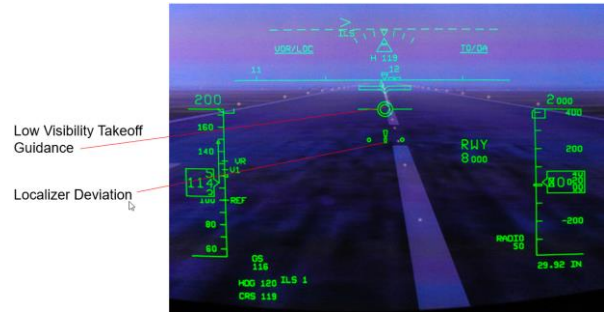
DUAL Configuration HGS 6000

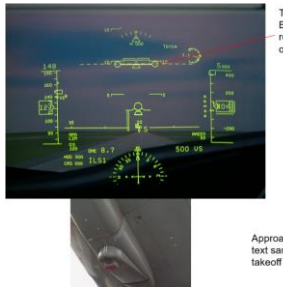
Collins Aerospace
An RTX Business

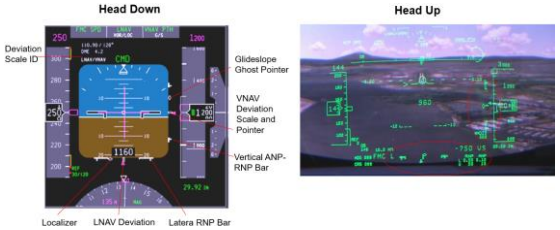
HGS BENEFITS

- Flight Path Group Heads Up
- Low Visibility Takeoff Guidance (LVTO)
- Rotation Guidance
- Tailstrike Avoidance
- Engine Failure Guidance on Takeoff
- Nav Performance Scales
- Optimizes Stabilized Approach
- Crosswind Landing

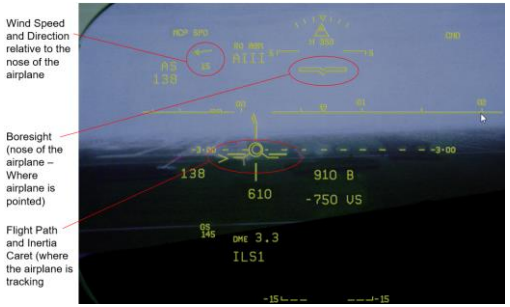






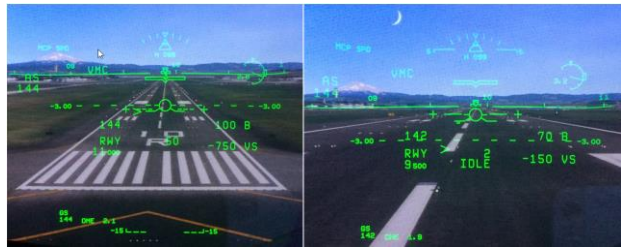


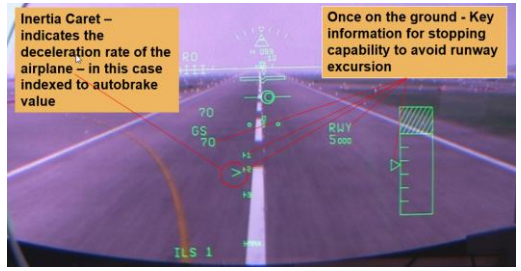
Provides consistent stabilized precision manual approach control of the airplane which delivers the airplane on profile and on speed to the desired touchdown point.

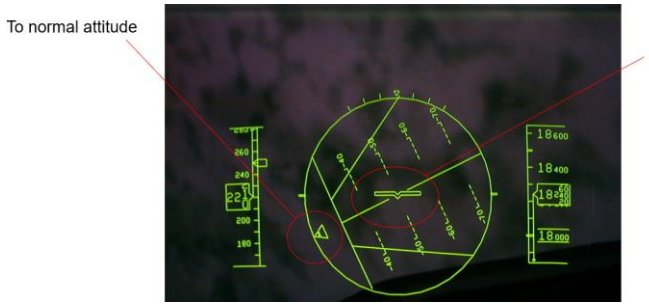


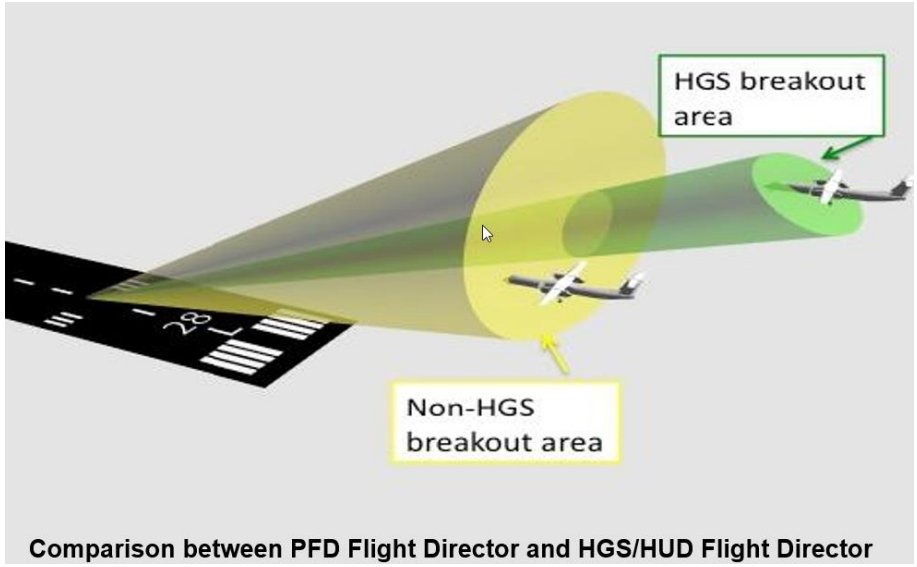
HGS BENEFITS

- Autonomous Flare – Full-Time Flare Guidance
- Rollout Information with Graphical Breaking
- Windshear Guidance and EGPWS
- Unusual Attitude Recovery
- Improves Accuracy and Allows the Pilot to Improve Flight Technical Error









ENHANCED FLIGHT VISION SYSTEMS (EFVS)

- Enhanced Vision Sensor (EVS) generates a real-world video image of scene ahead displayed on HUD
- We merge 3 wavelengths together, and the system is positioned in the airplane radome

ENHANCED FLIGHT VISION SYSTEMS (EFVS)

EFVS – Approach in Snow

EFVS IN ACTION

WEATHER RADAR

WEATHER RADAR UPDATE

MultiScan ThreatTrack™ Features

Automatic Threat Analysis

- Truly automatic radar
  - Temperature Based Gain
  - Quiet, dark cockpit
  - Path Attenuation Compensation (PAC)
  - Predictive Windshear Detection

Technology

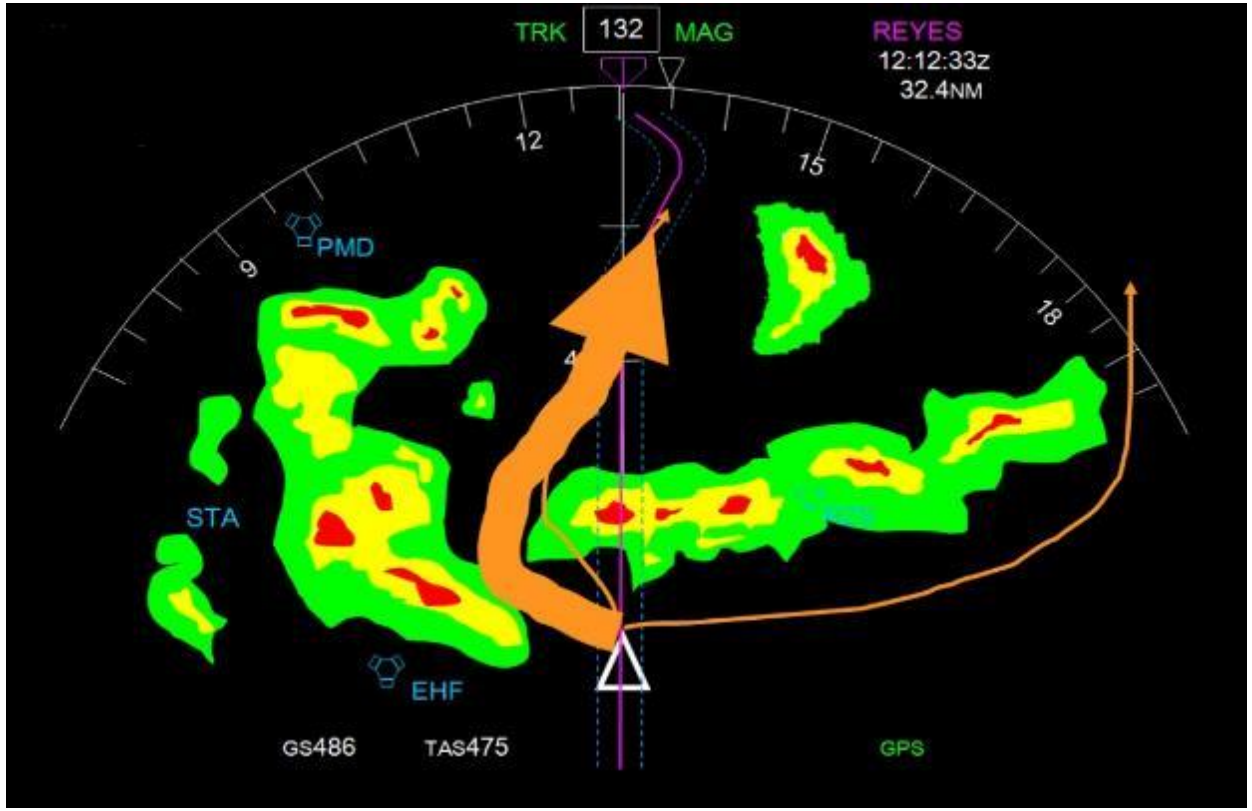
- “Track while scan” feature

ThreatTrack™ Features

- Core threat analysis
- Predictive OverFlight™ protection
- Associated Threat Assessment
- Lightning and hail prediction
- Two-level enhanced turbulence detection
- Flight path correlation

QUIET, DARK COCKPIT

- Shows threats at aircraft's altitude without pilot intervention
  - Other radars require pilots to look at altitude slices to determine if the weather is a threat at their altitude when they are above 25,000 feet
- Removes clutter from pilots' flight focus
- Increases efficiency
- Automatically provides threats at your altitude – even cruising
- Superior ground-clutter suppression



LEADING THE WAY TO SAFER FLIGHTS

12,000+=

MULTISCAN SYSTEMS FIELDED

60% fewer

Lightning strikes with MultiScan ThreatTrack

64 different cells

are scanned
are analyzed

INFERRED THREAT ASSESSMENT

160 NM

OPTIMAL THREAT SCAN TIME

MultiScan ThreatTrack™

Collins Aerospace
An RTX Business

Collins Aerospace
An RTX Business

THANK YOU

THE AFRICAN AVIATION SAFETY & OPERATIONS SUMMIT

Championing Africa Aviation Safety Together

FLIGHT SAFETY

Theme: Championing Africa aviation safety together

Questions

Closing

Mr. Sinaly Bagayoko, Senior Manager Technical & operations - AFRAA

Closing remarks by Mr. Abdérahmane Berthé, Secretary General - AFRAA