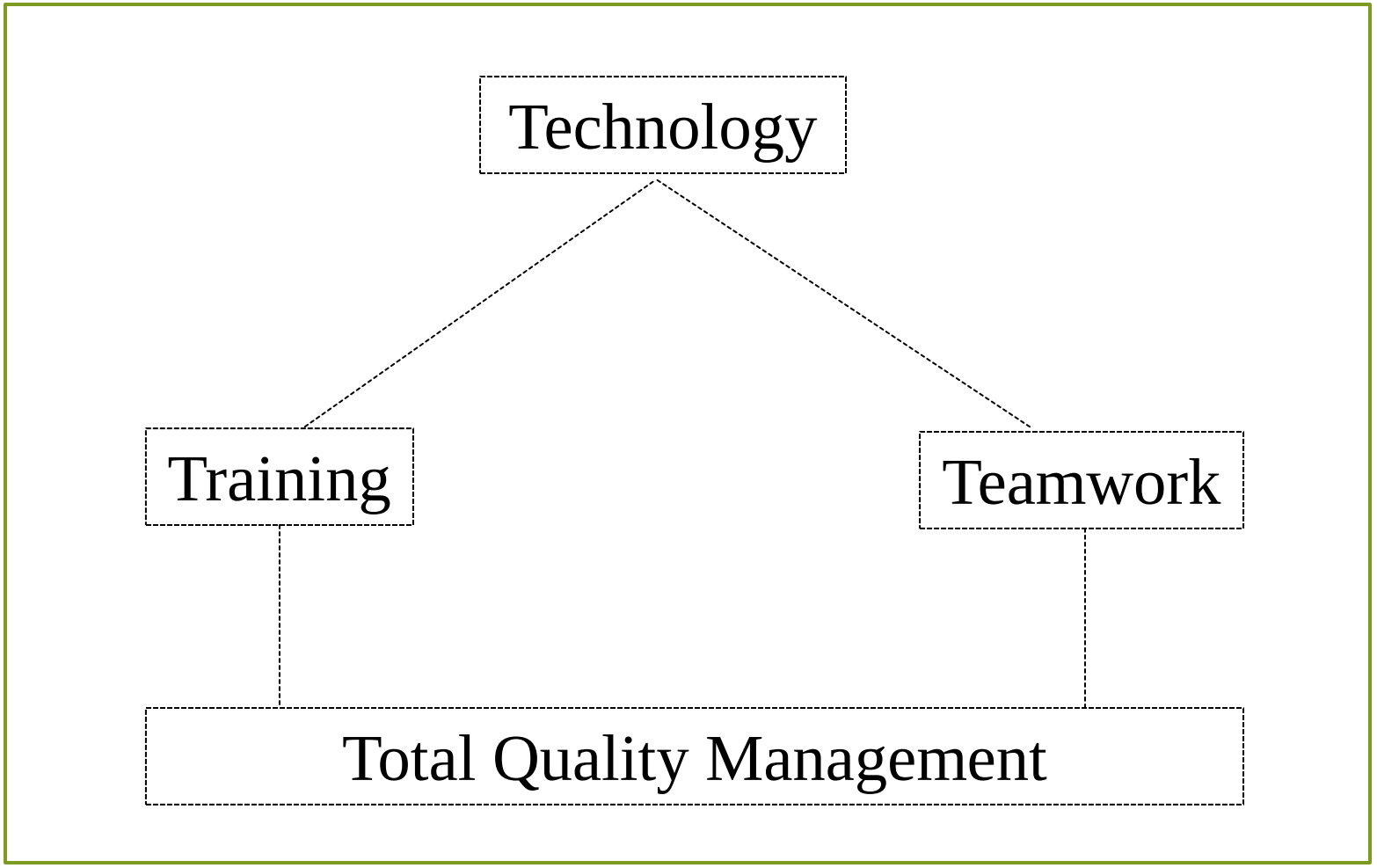
Challenges to Aviation and Aerospace Eco-System in Building a National Safety Culture

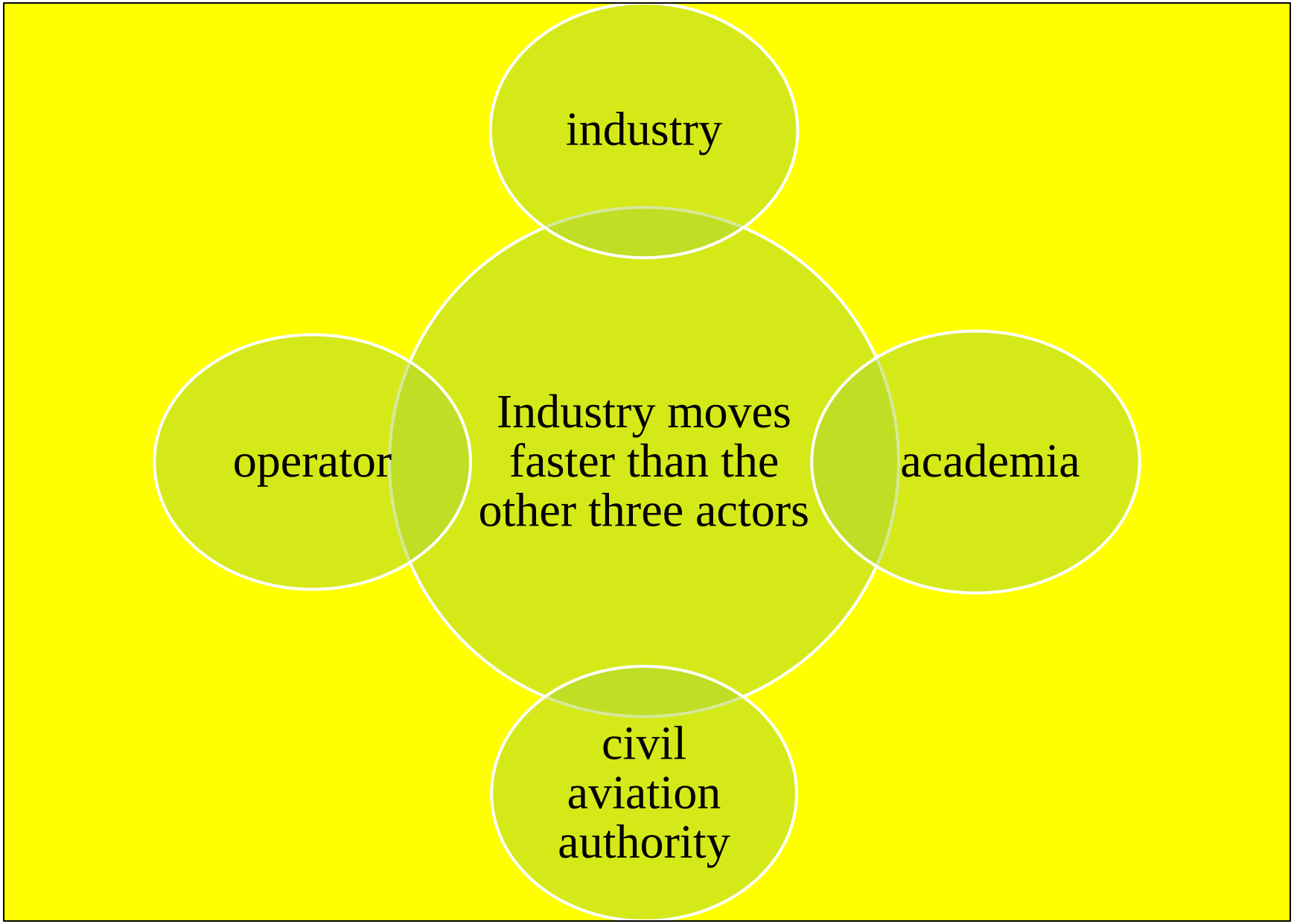
Air Vice Marshal Mahmud Hussain (Retd)

26 Oct 26

Core Inter-dependent Inspiration of “Safety Mindset”…



The Four Inter-locking Structures of Aviation



The Structure of Presentation

Explore Emerging Technologies
(in global aviation)

↓

Talk About Recently Introduced Training Agenda
(aviation safety objectives)

↓

Demonstrate Importance of Inter-locking Structure
(in aviation safety)

↓

Argue the Way Forward for Bangladesh
(national aviation safety mind-set)

What we mean by “Aviation” …..

Simple Definition:

Aviation includes all aspects of air travel and activities that help to facilitate it.

It includes:

- The entire airline industry.
- Aircraft Manufacturing.
- Maintenance Organizations.
- Research Entities.
- Civil & Military Aviation.
- Much More.



What we mean by “Much More” …..

Regulatory Body:

- That oversees and regulates the aviation activities.

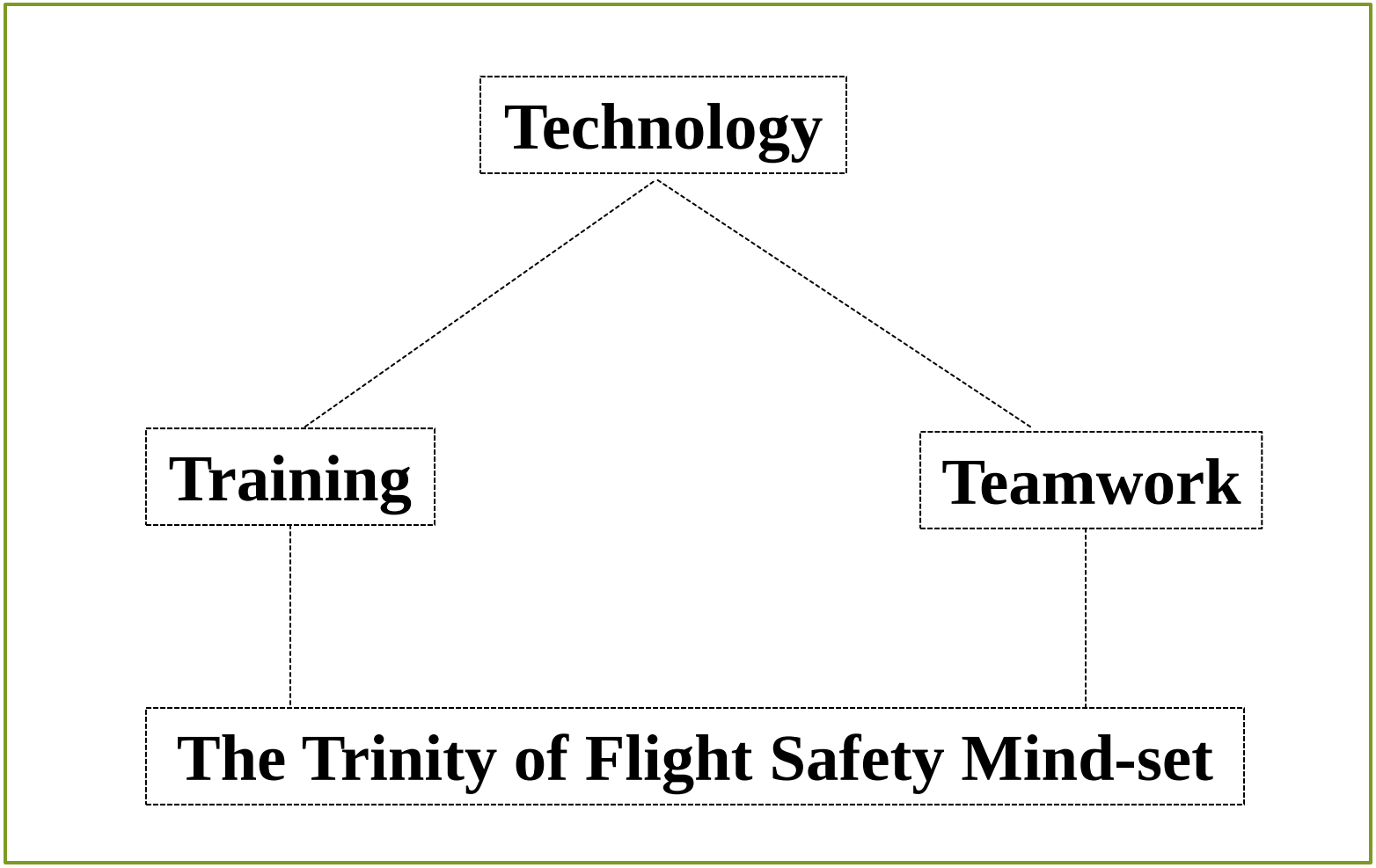


Academia:

- That pursues the aviation-related subjects.



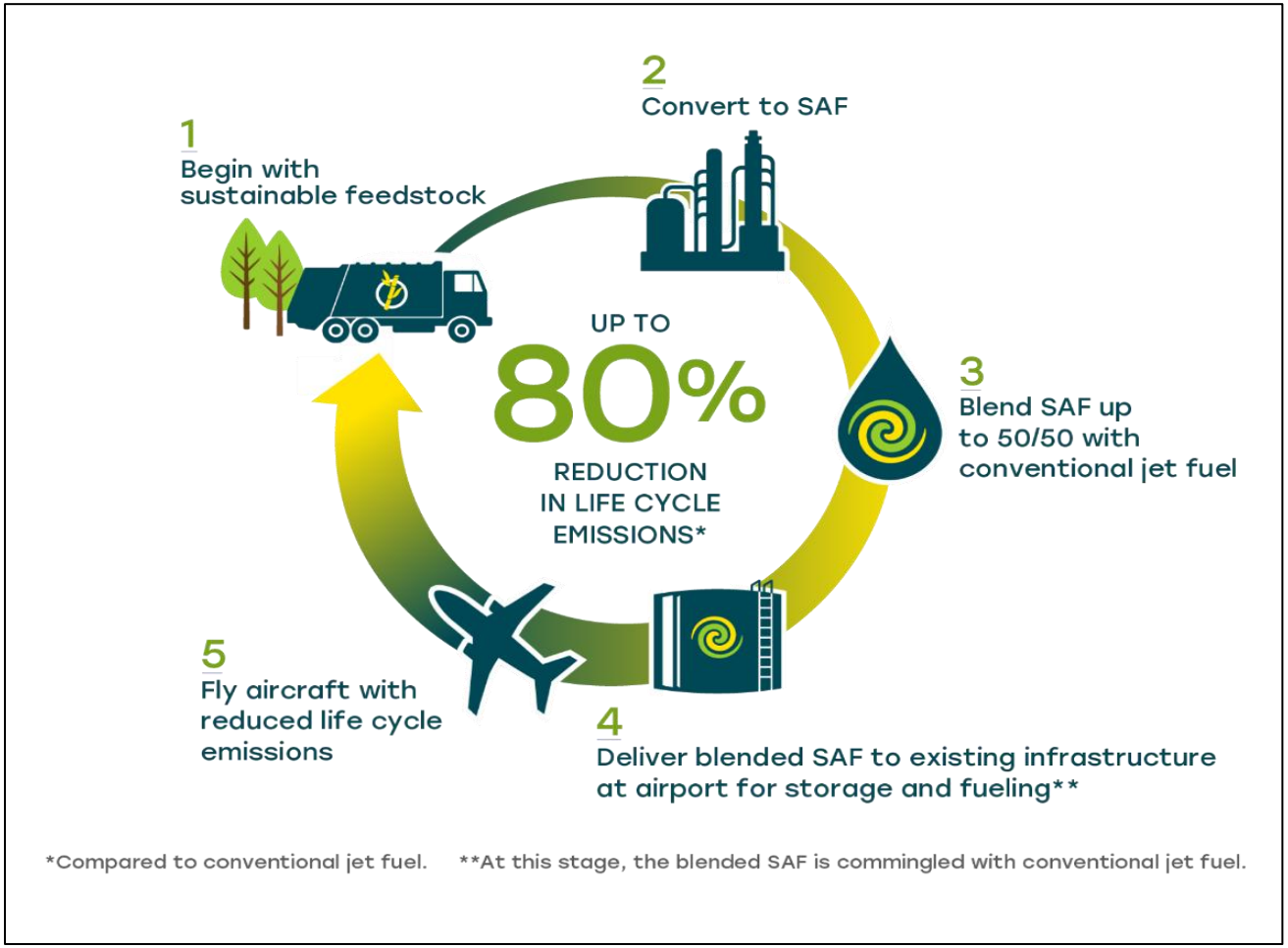
Aviation is a knowledge-based business


Technology
Training
Teamwork
The Trinity of Flight Safety Mind-set

Some of the Advanced Technological Innovations…

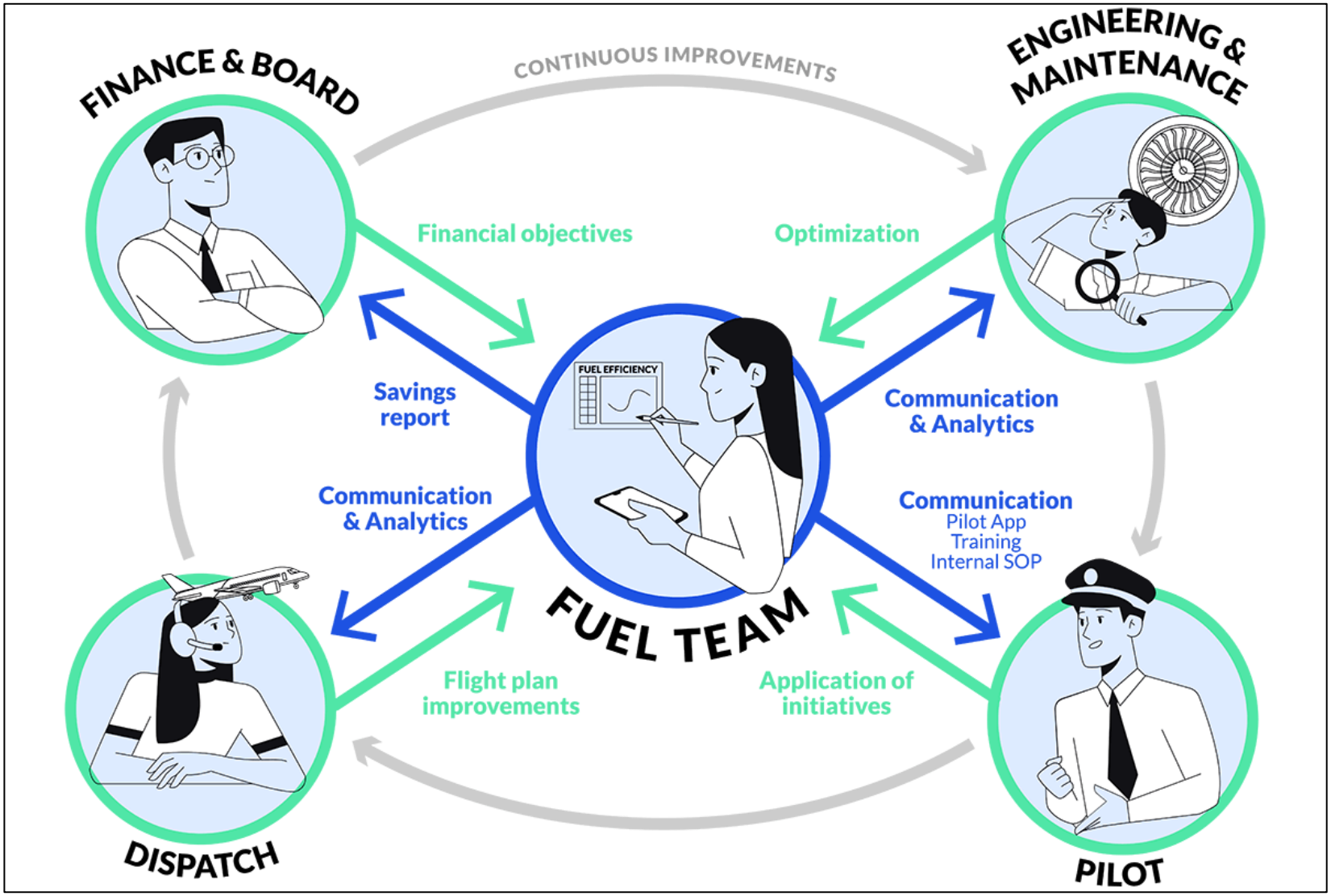


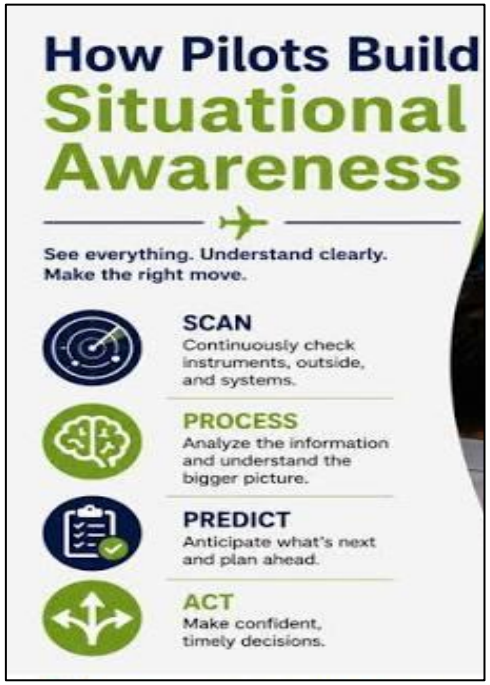
Sustainable Aviation Fuel (SAF) vis-à-vis Environment

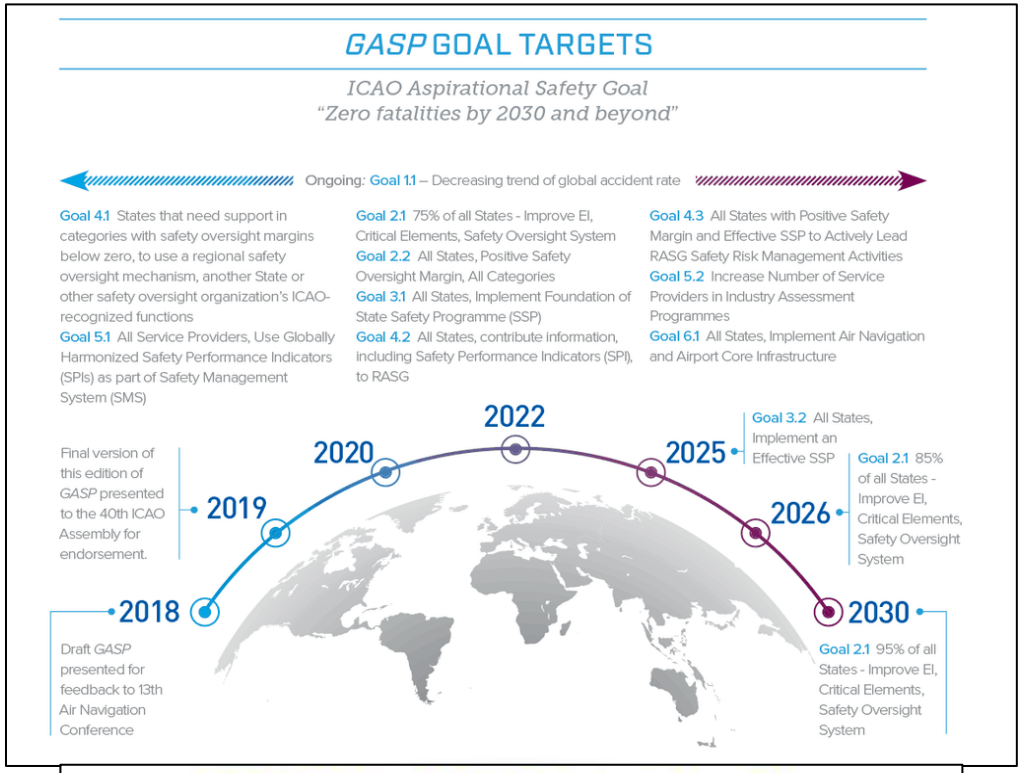


80% less CO_2 per seat than the first jets in the 1950s

Ensuring Fuel Efficiency is a Team Work …..



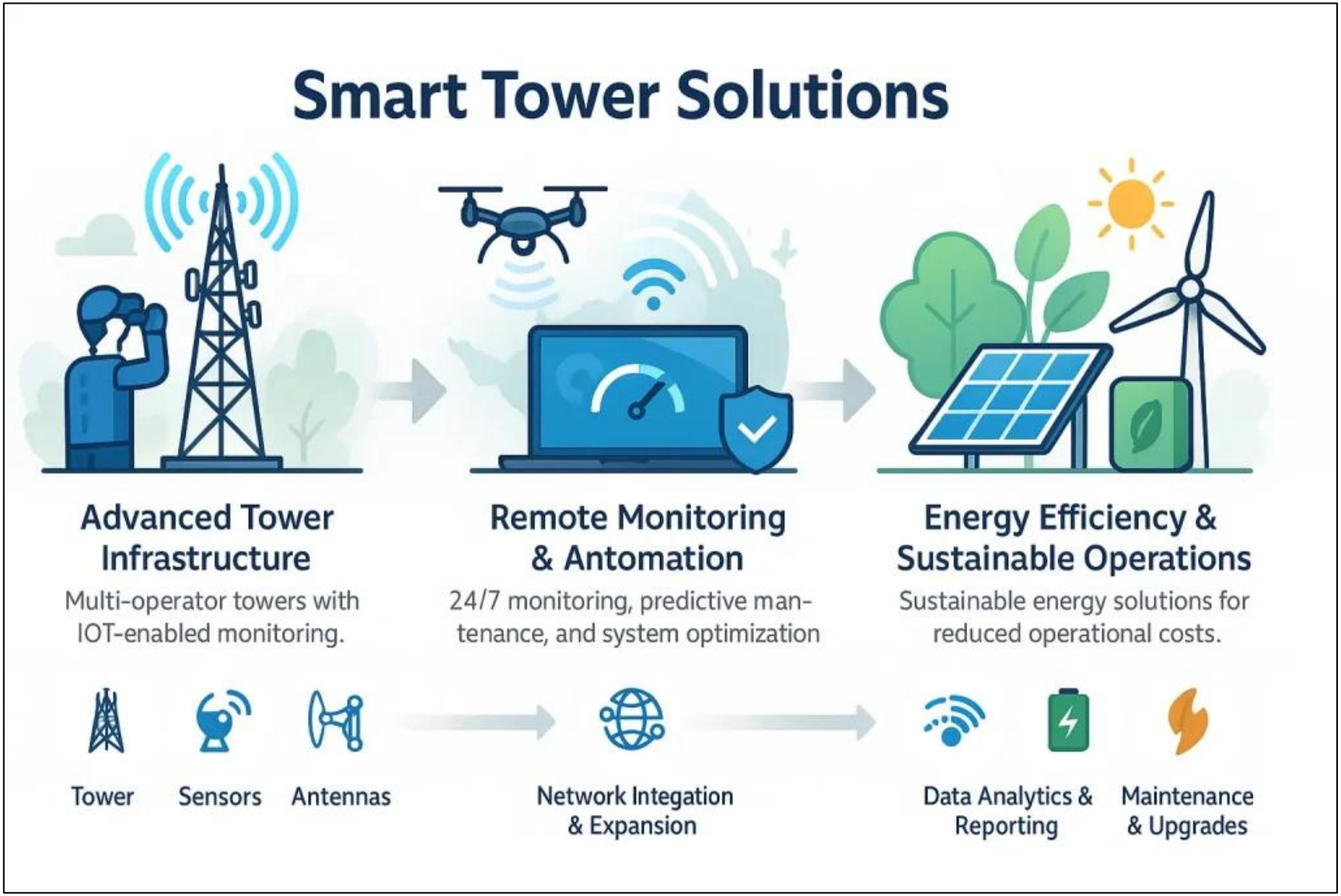

How Pilots Build
Situational
Awareness
See everything. Understand clearly.
Make the right move.
SCAN
Continuously check instruments, outside, and systems.
PROCESS
Analyze the information and understand the bigger picture.
PREDICT
Anticipate what's next and plan ahead.
ACT
Make confident, timely decisions.


GASP GOAL TARGETS
ICAO Aspirational Safety Goal
"Zero fatalities by 2030 and beyond"
Ongoing: Goal 1.1 – Decreasing trend of global accident rate
Goal 4.1 States that need support in categories with safety oversight margins below zero, to use a regional safety oversight mechanism, another State or other safety oversight organization's ICAO-recognized functions
Goal 5.1 All Service Providers, Use Globally Harmonized Safety Performance Indicators (SPIs) as part of Safety Management System (SMS)
Goal 2.1 75% of all States - Improve EI, Critical Elements, Safety Oversight System
Goal 2.2 All States, Positive Safety Oversight Margin, All Categories
Goal 3.1 All States, Implement Foundation of State Safety Programme (SSP)
Goal 4.2 All States, contribute information, including Safety Performance Indicators (SPI), to RASG
Goal 4.3 All States with Positive Safety Margin and Effective SSP to Actively Lead RASG Safety Risk Management Activities
Goal 5.2 Increase Number of Service Providers in Industry Assessment Programmes
Goal 6.1 All States, Implement Air Navigation and Airport Core Infrastructure
2018
Draft GASP presented for feedback to 13th Air Navigation Conference
2019
Final version of this edition of GASP presented to the 40th ICAO Assembly for endorsement.
2020
2022
2025
Goal 3.2 All States, Implement an Effective SSP
2026
Goal 2.1 85% of all States - Improve EI, Critical Elements, Safety Oversight System
2030
Goal 2.1 95% of all States - Improve EI, Critical Elements, Safety Oversight System

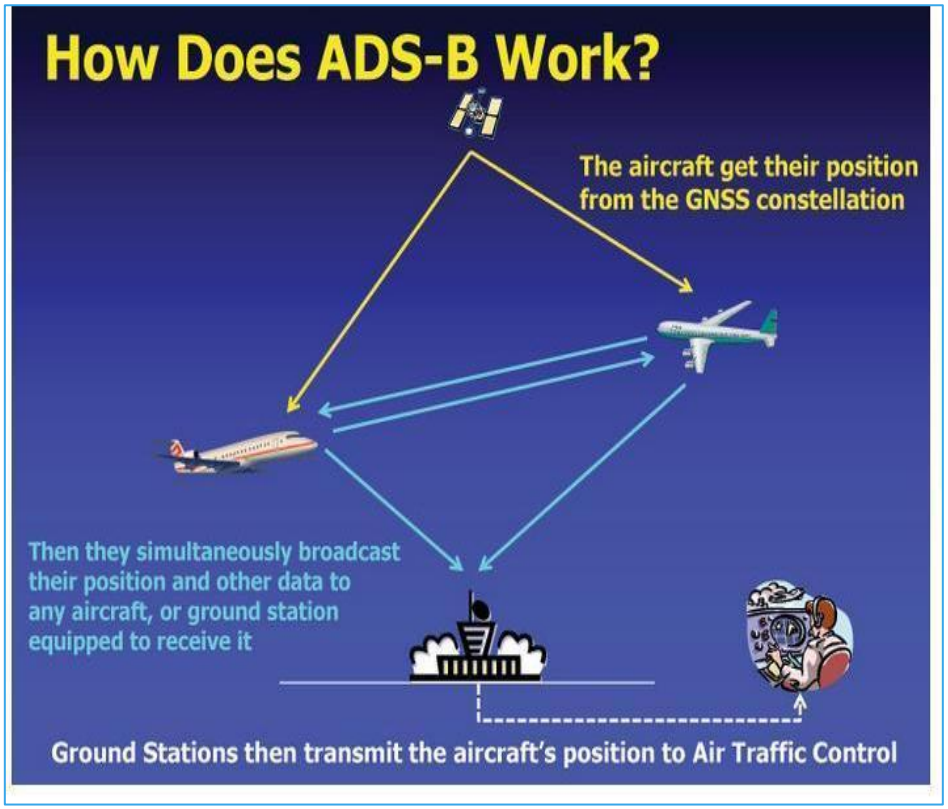

Plan and design with confidence
Core Performance-based Navigation (PBN) design principles
Airspace structure strategies
International Civil Aviation Organization Global Air Navigation Plan essentials


ICAO-Global Air Navigation Plan (GANP)
GANP
GLOBAL AIR NAVIGATION PLAN
Global harmonization
Interoperability
Safety & efficiency
Performance-based approach
Digital ATM modernization
ASBU framework
The ICAO Global Air Navigation Plan (GANP) is a long-term strategic roadmap that guides countries in modernizing their air navigation and air traffic management systems.
It provides a harmonized framework—through ASBU blocks—to help states adopt new technologies and procedures in a coordinated, safe, and efficient way.

Situational Awareness is important for air traffic controllers …..

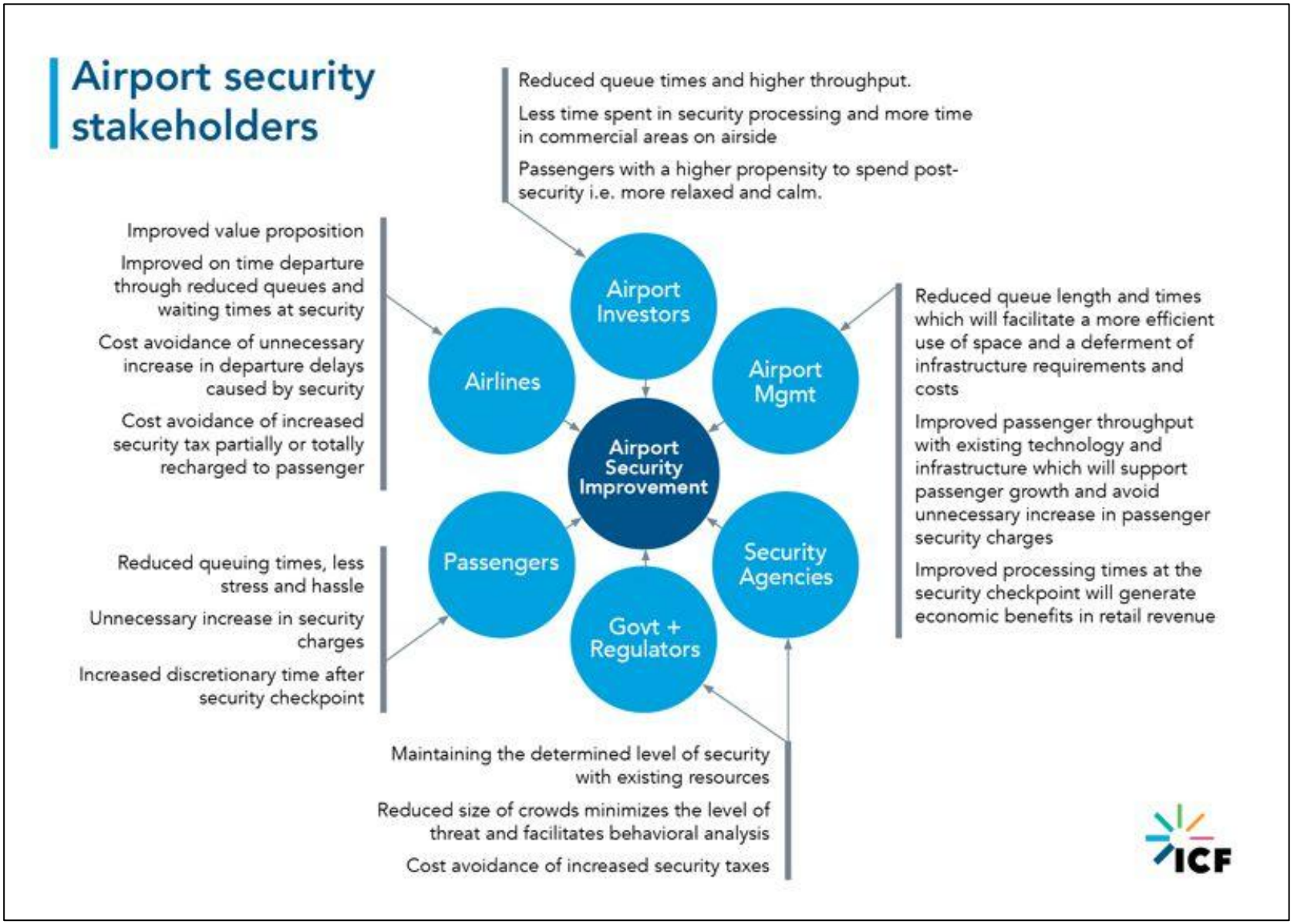


ADS-B and CDM frameworks facilitate seamless co-ordination …

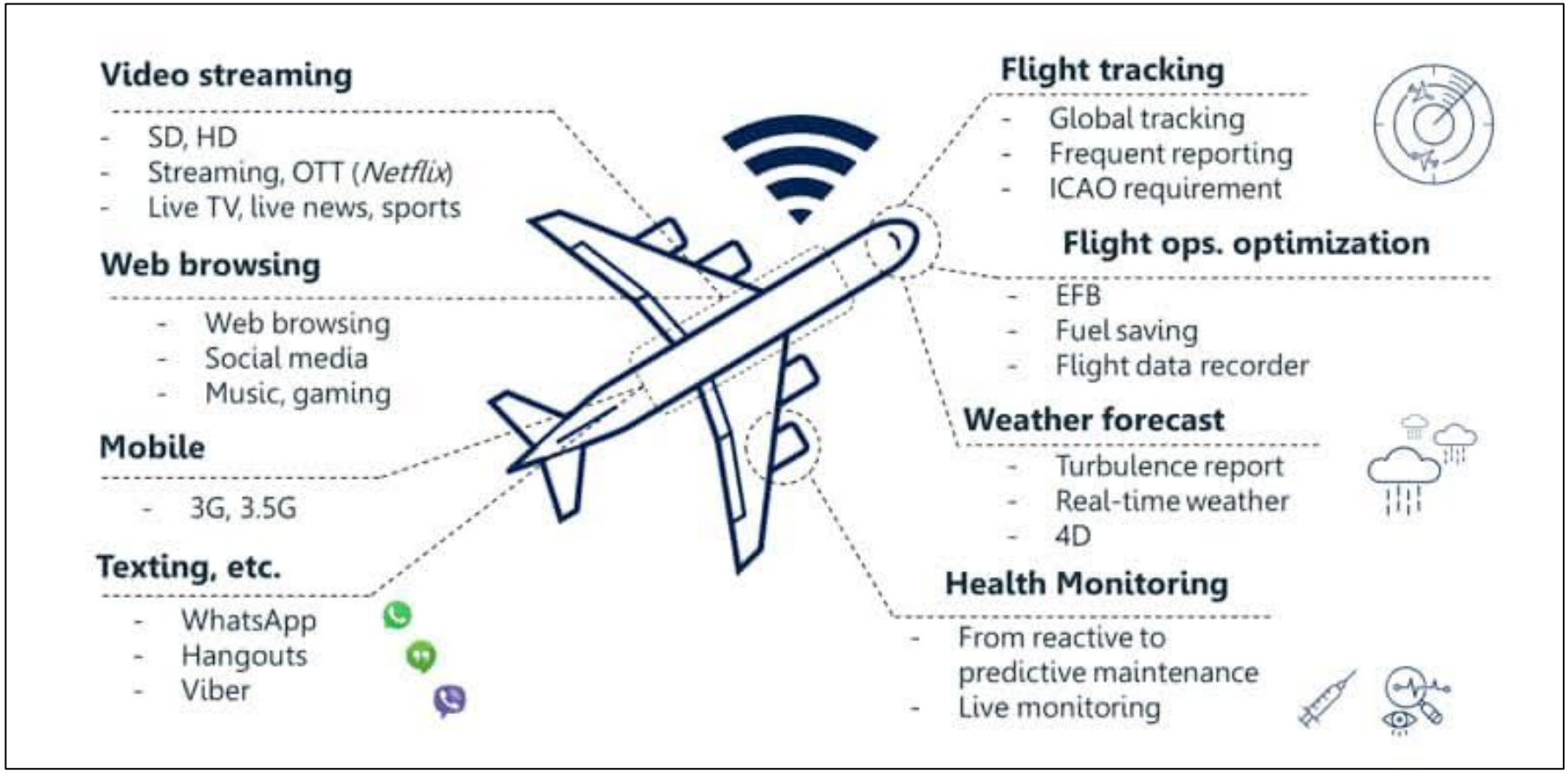




Technology making remarkable contribution to passenger facilitation …..

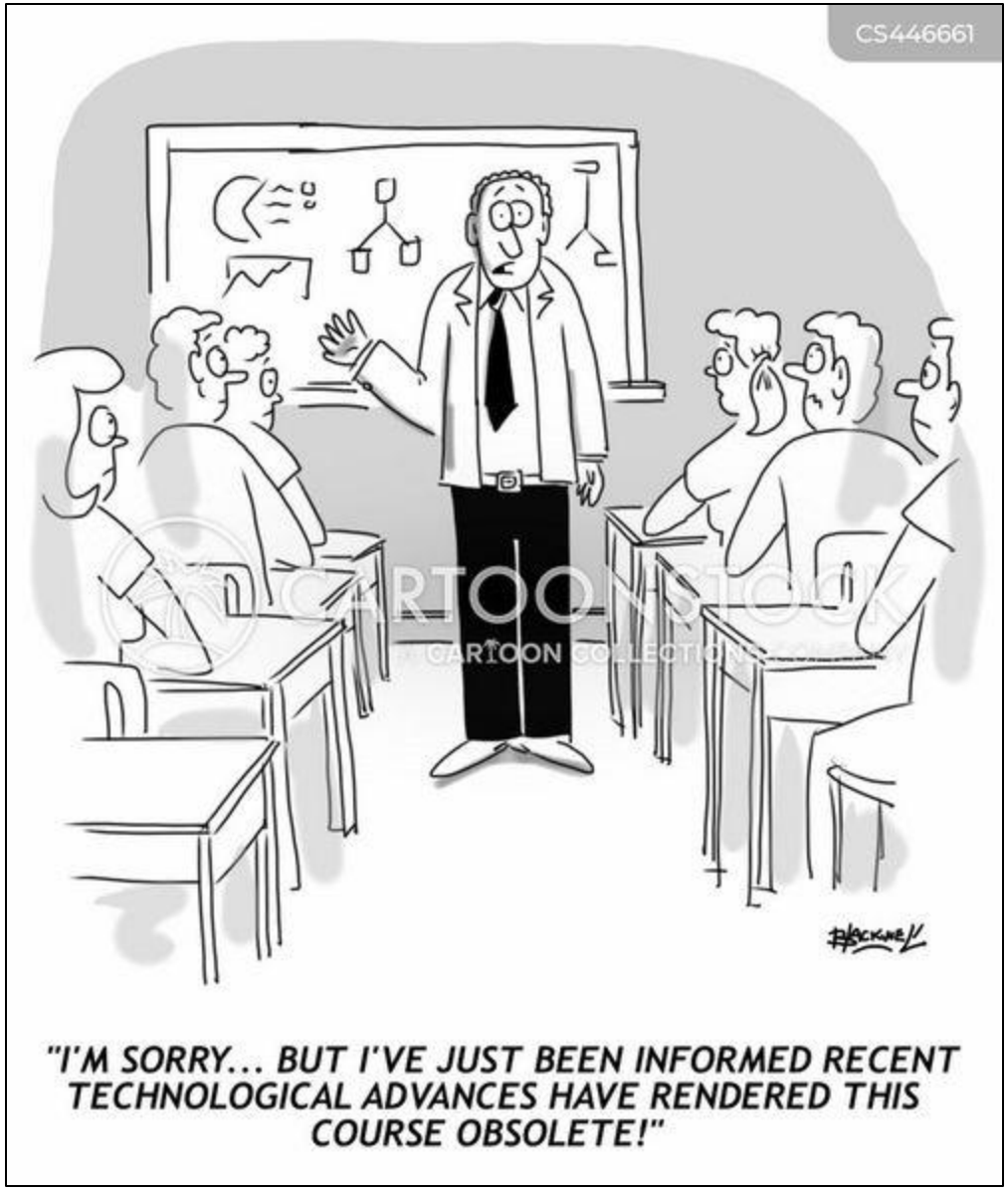


In-flight connectivity is crucial for real-time and route updates …..



To passengers, it introduces ceaseless communication

Without training, the handling of new technology remains outmoded



- Pilot training.
- Engineer training.
- ATC training



- Flight Simulators.
- Certifications: High Fidelity
  - virtual & augmented reality
  - procedural drills to full airline experience

The Future of Aircraft Maintenance Training



- Technology has moved maintenance training from traditional classroom manuals to immersive, data-driven, and on-demand experiences.

The Future of ATC Training







Safety in aviation isn't one specialized group's business …



- Coordinated Teamwork.
- Collaborative Decision-making
- A whole-team Approach.

GAPS IN PILOT TRAINING

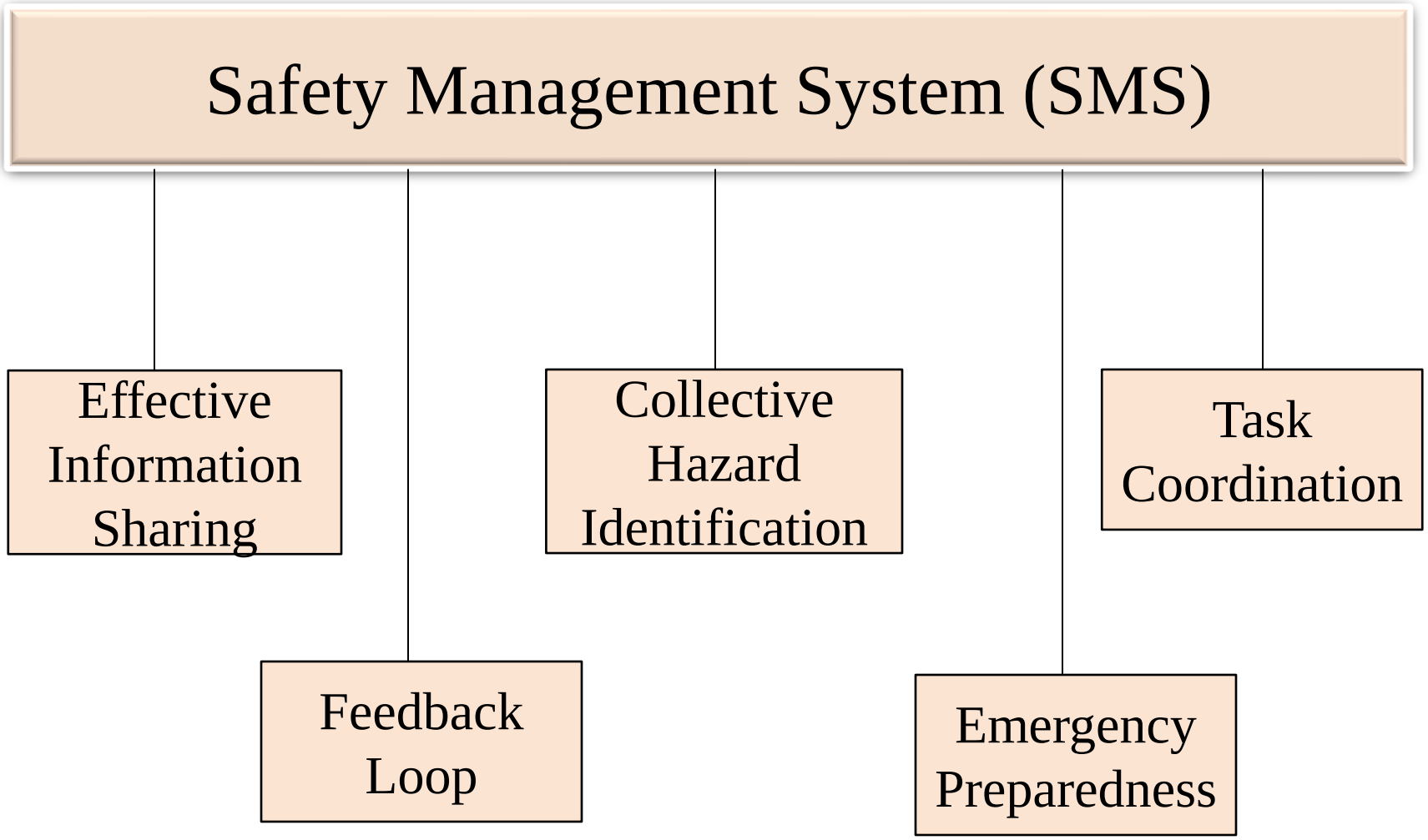


Crew Resource Management is a team work training program



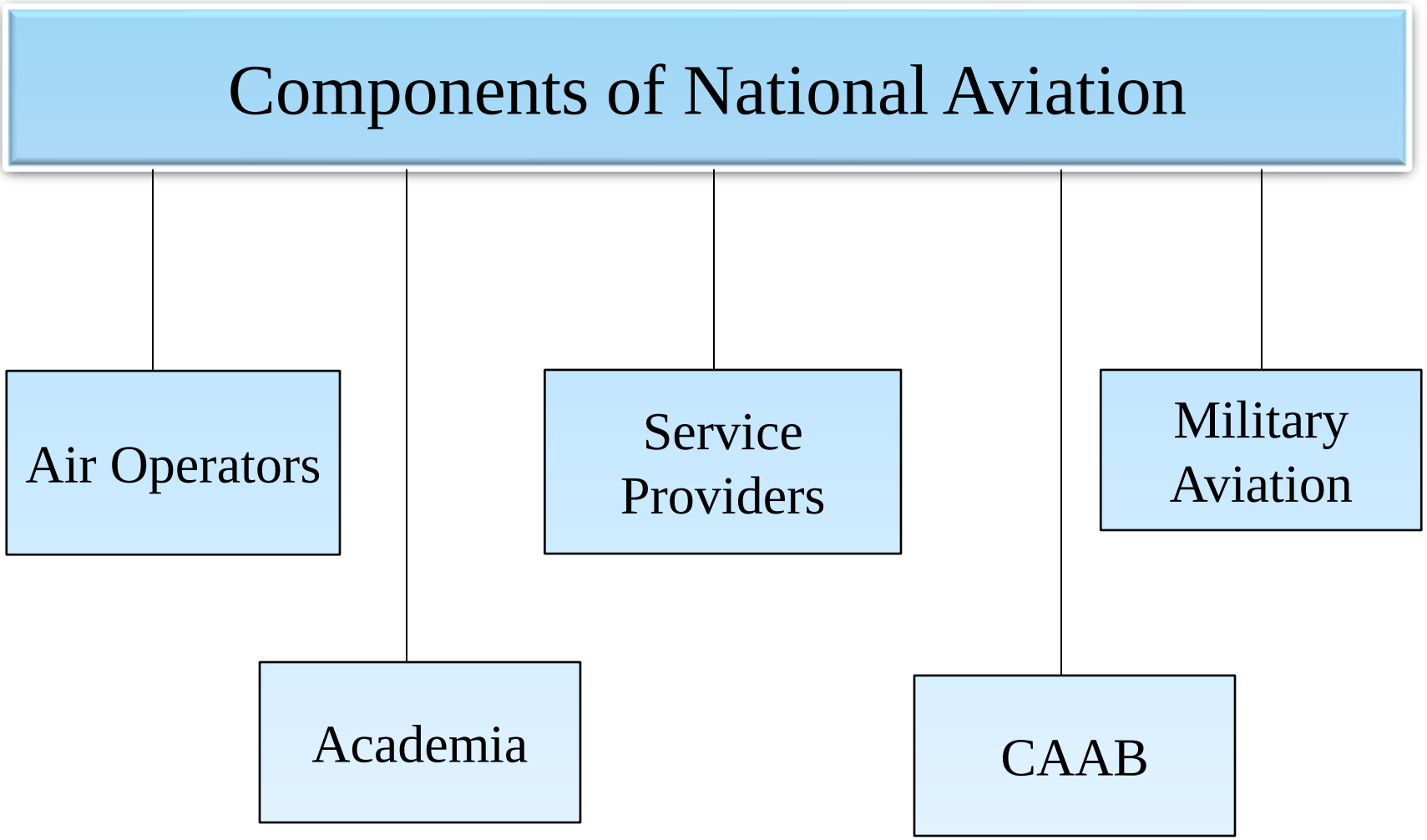
- Aircraft Dispatchers
- Cabin Crew
- Maintenance Crew
- ATC
- Other Groups

Safety Management System is a Structured Process

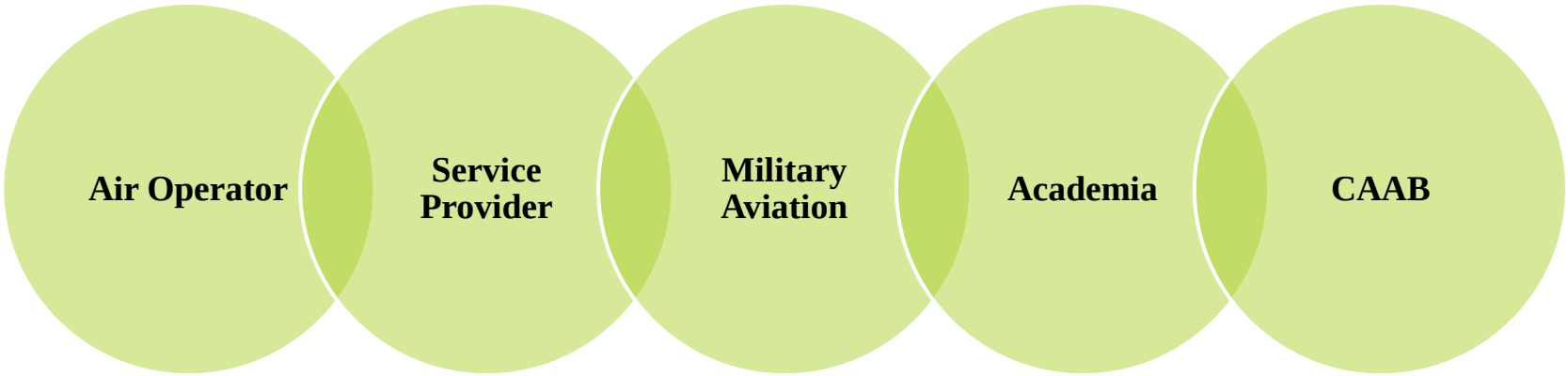


A Unified Team Mindset Helps Build Psychological Safety, Shared Mental Models And Continuous Improvement.




Components of National Aviation
Air Operators
Academia
Service Providers
CAAB
Military Aviation

TRAINING : OWNERSHIP OF SAFETY AS *ESPRIT DE CORPS*





- In Bangladesh, institutional culture is conservative.
- Industry moves faster than other institutions.
- Failure to produce pilots, technicians and engineers .

PILOT AND TECHNICIAN OUTLOOK

2026–2045 BOEING

2,425,000

New aviation personnel needed
over the next 20 years.



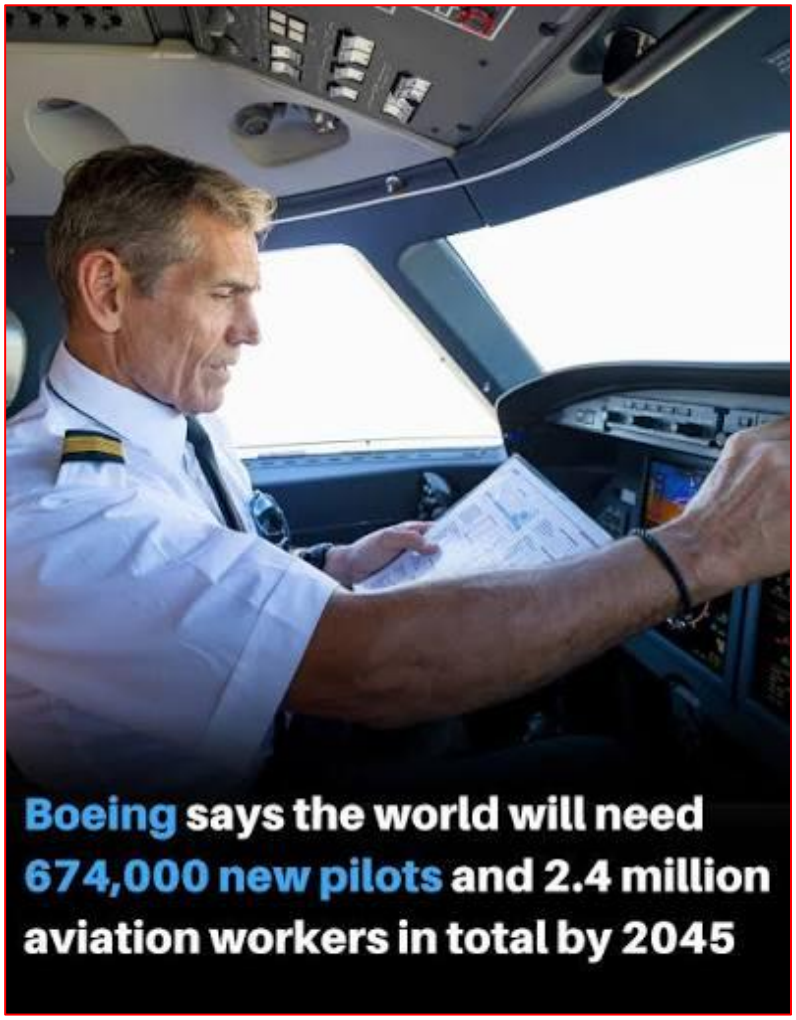
674,000
NEW PILOTS



728,000
NEW TECHNICIANS



1,023,000
NEW CABIN CREW



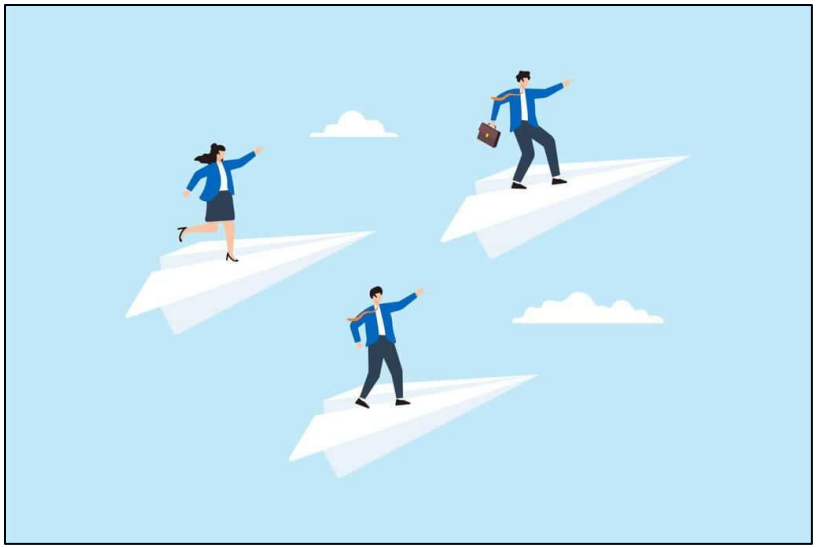




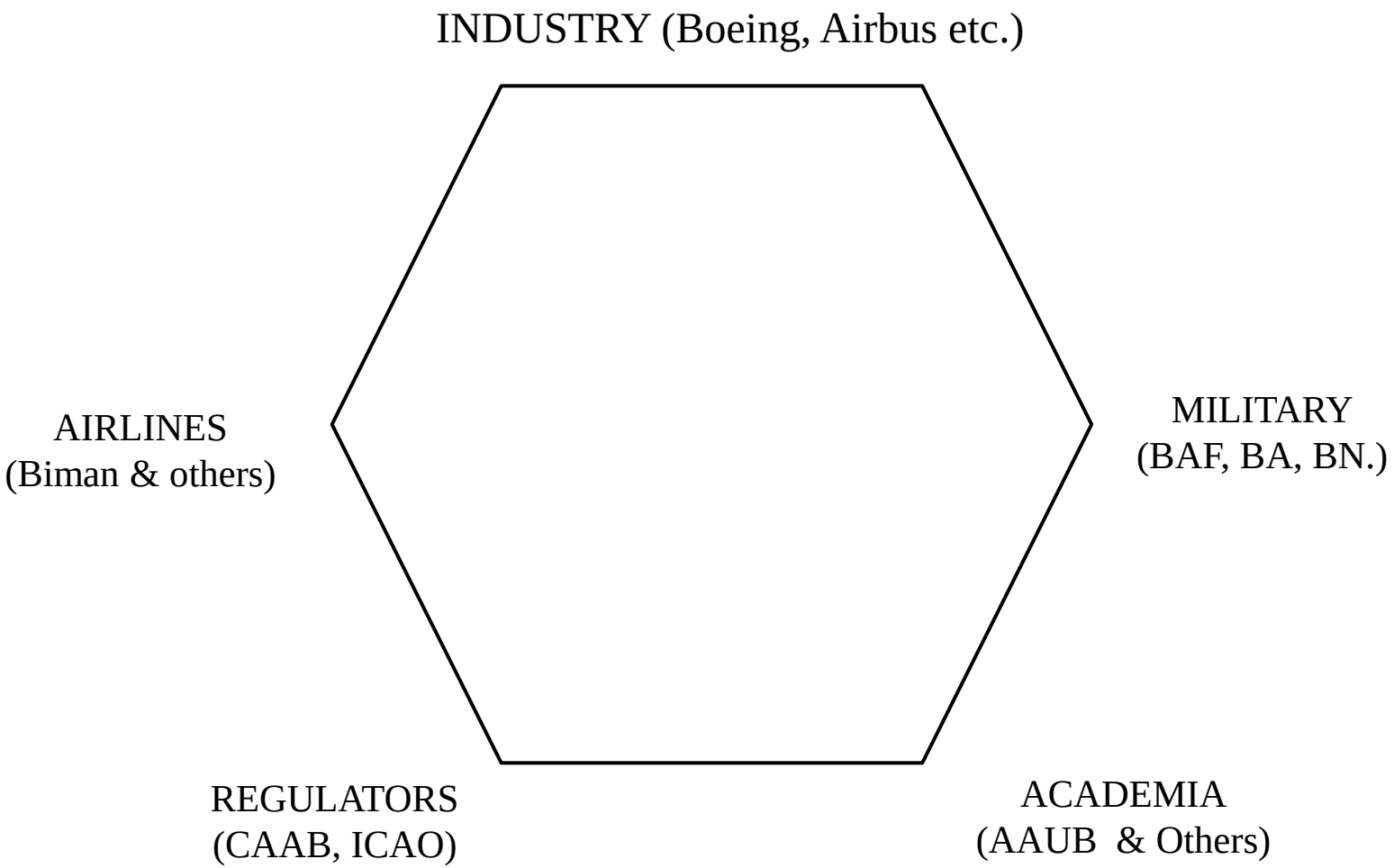
By 2034, 71,000 new Air Traffic Controllers, that is, 20 new Air Traffic Controllers per day.

Next Generation of Aviation Professionals (NGAP)

. It is a program.
. Airline Industry is moving faster.
. ICAO initiated program--- 2015.
. SDG 4 --- Quality Education.
. ICAO coordinating and collaborating with states.
. STEM --- Science, Technology, Engineering and Math.
. STEM training is paramount.



THE PENTAGON OF AVIATION ECO-SYSTEM



TO BE PARTNERS, NOT RIVALS

ACTION ITEMS FOR WAY FORWARD (*Building an Eco-System for Aviation Safety*)

- AAUB and BATC : Collaboration.
- AAUB and Airlines : Fill in the Gap in Professional Knowledge.
- CAAB and ICAO Regional Office: Prime Drivers.
- Civil-Military : Co-operation.

Conclusion

. Aviation & Aerospace Sector: Tech-Heavy.
. Aircraft Industry : Prime Mover of Technology.
. Airlines, Academia & Regulators: Layers of Aviation.
. Technology: Knowledge-based Function.
. Training: Pilots, Engineers, ATC & other aviation professionals.
. Safety : A Whole Cultural Approach.
. Aviation: The Pentagon of Partnership.
. Thrust: Next Generation of Aviation Professionals (NGAP)
. Role: BB, BATC, BAF, AAUB & CAAB.


Thank You