MEETING OF TECHNICAL EXPECTS OF CIVIL AVIATION OF AFRICA-INDIAN OCEAN REGION





Professionals for Aviation Study –

2022/2023

Consultant Report

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Background

- Challenge of inadequate Aviation professionals is prevalent globally and more so in the AFI Region
- ICAO Aviation Safety and Security Audits have identified the lack of enough qualified aviation personnel as one of the common deficiencies
- ❖ The enhancement of aviation human resource capacity in Africa remains a key component of the deliverables of the AFI Region
- ❖ The aim of the current project was to provide support or a basis for the development of sustainable aviation professional personnel to carry out effective regulatory and oversight responsibilities in each area of the ICAO Strategic Objectives

Status of Aviation professionals in AFI Region

Reports of the AFI Plan, AFI SECFAL Plan, and AFI Weeks indicate that:

- There is lack of qualified technical personnel in the AFI Region
- Data on the available aviation professionals in all areas is absent or inadequate
- Information on the gap between available and required aviation professionals is lacking, and
- Gender balance and parity is wanting in the AFI Region with very low female professionals employed in the aviation sector.

Overview

- Project Deliverables
- Methodology
- Outcome of work and
- Recommendations
- Limitations

Project Deliverables

- 1. A review and finalization of the existing analysis and assessment including SWOT and PEST on AFI States capacity building strategies in the areas of Safety and Air Navigation in the AFI Region.
- 2. Update the existing database on aviation professionals in major areas.
- 3. Analyze the existing professional gap and anticipated demand in various professional categories of Safety and Air Navigation capacity.

Project Deliverables (cont)

- 4. Propose an implementation strategy and plan to address the existing gap and future demand at least in the coming ten (10) years (2022 2032)
- 5. Review the present capacity of Aviation Approved Training centers to meet the forecast capacity building demand and
- 6. Propose mechanisms/options for the sustainable funding of the proposed implementation of the plan



Report Format

The report is in 4 Parts:

- ❖ Part 1. Review and finalization of the existing analysis and assessment Part 2. Propose an implementation strategy and plan including the required resource to address the existing gap and future demand at least in the coming ten (10) years (2022-2032)
- ❖ Part 3. Review of the Present Capacity of Aviation Approved Training Centres to Meet the Forecast Capacity Building Demand
- ❖ Part 4. Generic Formal Course Standards (Curricula)



Project Deliverable 1

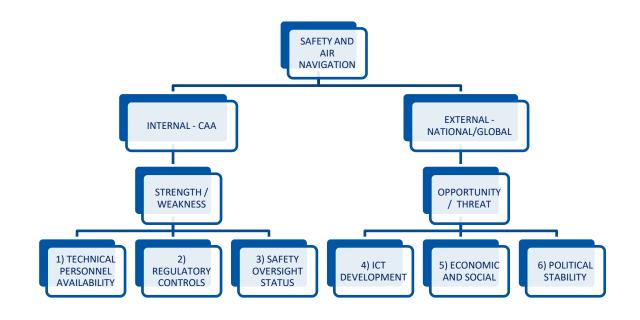
PART 1 OF REPORT

A review and finalization of the existing analysis and assessment including SWOT and PEST on AFI States capacity building strategies in the areas of Safety and Air Navigation in the AFI Region

Methodology

- ❖ Political, Economic, Social and Technological (PEST) Analysis
- Strength, Weakness, Opportunity and Threat (SWOT) Analysis
- "PEST" is summarized in "Review and Finalization of the Existing Analysis and Assessment" as Opportunity and Threat
- ❖ In the SWOT Opportunity and Threat are External Factors to the Aviation Entity
- ❖ Factors Internal to the Aviation Entity are summarized as Strength and Weakness

Methodology - PEST/SWOT



Methodology - PEST/SWOT

- PEST and SWOT Analysis and summary analysed along ICAO recognised regional lines:
 - ❖ WACAF 24 States
 - ❖ ESAF 24 states
 - ❖ AFI EUR/NAT Algeria, Tunisia and Morocco
 - AFI MID Egypt, Libya and Sudan
- ❖ This approach, is believed, will be more favourable allowing any proposed strategies to be monitored or driven by the ICAO Regional Offices.

Safety Oversight Variables

- Safety Oversight Index (ISTARS) Delete from GASP Analysis
 - The Safety Oversight Index is the ratio of the target EI and the actual EI
- State Safety Briefing (ISTARS)
 - USOAP EI, Number of SSC, Aerodrome Certification, and PBN % Implementation
- Global Aviation Training (Database)
 - Number of ICAO Global Aviation Training Academies per region
- Staff Needs (Database)
 - State number of safety oversight inspectors compared with those of other States that have similar operating environments

SWOT Analysis - WACAF States

	SWOT/PEST ANALYSIS – WACAF	SWOT ANALYSIS – WACAF		
	INTERNAL		EXTERNAL	
STRENGTHS	 No significant safety concerns 5 states (20.8%) have achieved the GASP Target of 75% EI 9 states (37.5%) have reached the world average target of world average 67.6%. >79% at 100% PBN Implementation 	OPPORTUNITIES	 Availability of GSI Courses OPS, Air and PEL High mobile telephone penetration Exceptional natural mineral resource and production of industrial crops Africa expected to have "demographic dividend" by 2035, 	
WEAKNESSES	 10 States fall below 60% and 6 states below 30% Weak performance in Licensing, Certification, Authorization and Approval Obligations (CE-6) in OPS, ANS and PEL No SSP Implementation Level 4 Staffing gaps all Strategic Objective Areas Unsatisfactory aerodrome certification Most CAAs underfunded and under resourced 	THREATS	 No GSI Courses for ANS No GSI Course for Surveillance and RSC Political instability and uncertainty in the region High rate of unemployment, poverty, and Low national GDP, Rising public debts and deteriorating exchange rate Insufficient, unreliable and unaffordable power(electricity) Limited ICT deployment, limited and expensive broadband internet connectivity 	

SWOT Analysis - ESAF States

SWOT/PEST ANALYSIS – ESAF		SWOT/PEST ANALYSIS – ESAF			
INTERNAL			EXTERNAL		
STRENGTHS	 No state has significant safety concern 6 states (25%) have achieved the GASP Target of 75% EI 7 states representing 29.16% have reached the world average of world average 67.6% >66.67% at 100% PBN Implementation One State at SSP Implementation Level 4 Strong RSOO – facilitates harmonization 	OPPORTUNITIES	 Availability of GSI Courses Air, OPS, and PEL The COVID-19 pandemic threat has reduced and economies opening up High mobile telephone penetration Strong ICT strides among some member states On-going TNAs supported by international orgs Natural resources, industrial & crops Africa expected "demographic dividend" by 2035, 		
WEAKNESSES	 Well established ATOs (ATNS, EASA) 12 States below 60%, 2 states below 30% Weak performance in CE 6 One State at SSP Implementation Level 4 Staffing gaps in all Strategic Objective Areas Unsatisfactory aerodrome certification Most CAAs underfunded and under resourced 	THREATS	 No GSI Course in area ANS No GSI Course for Surveillance & RSC Obligations Political instability and uncertainty Unemployment, poverty, low spending, low GDPs & exchange challenges Drought, locust infestation, floods natural problems Unreliable and unaffordable power(electricity) Limited ICT and expensive broadband internet The COVID-19 pandemic depressed economies 		

SWOT Analysis – AFI EUR States

SWOT/PEST ANALYSIS – AFI-EUR			
	INTERNAL		
STRENGTHS	 No significant safety concerns 2 of 3 (66.67%) have over 60% Target 		
WEAKNESSES	 No state has GASP 75% EI. 1 of 3 (33.33%) below 60% Target None at 100% PBN Implementation Weak performance in CE-6 in AGA, OPS and PEL No State at SSP Level 4 Staffing gaps Strategic Objective - NO DATA 		

SWOT ANALYSIS – AFI-EUR			
	EXTERNAL		
	 Availability of GSI OPS, Air & PEL 		
OPPORTUNITIES	COVID-19 pandemic reduced		
	3. High mobile telephone penetration		
	4. 2 of 3 States are Oil Producers		
	5. All 3 are high tourism destinations		
	6. Exceptional natural mineral resource		
	7. Relative pollical stability		
	8. Modest GDP		
	9. Good reliable and affordable power		
	10. Good ICT development		
	11. Production of industrial crops & food		
	12. Expected "demographic dividend" by 2035,		
	1. No GSI in area ANS		
THREATS	2. No GSI Surveillance & RSC		
	3. Limited and expensive broadband internet		
	connectivity		
	4. COVID-19 pandemic depressed the		
	economies		

SWOT Analysis – AFI MID States

SWOT/PEST ANALYSIS – AFI-MID		SWOT/PEST ANALYSIS – AFI-MID			
INTERNAL			EXTERNAL		
STRENGTHS	 No significant safety concerns One state is above 75% GASP 75%. 66.67% (2 of 3) have over 60% Target 66.67% (2 of 3) at 100% PBN Implementation 	OPPORTUNITIES	 Availability GSI Courses in Air, OPS,& PEL COVID-19 pandemic threat reduced High mobile telephone penetration Exceptional natural mineral resource Great production of industrial crops and food Expected to have "demographic dividend" by 		
WEAKNESSE S	 1 of 3 (33.33%) below 60% Target Weak performance CE-6 in OPS, AGA, and ANS No State at SSP Implementation Level 4 Staffing gaps Strategic Objective - NO DATA Sudan and Libya expected to have funding challenges for the CAA 	THREATS	 No GSI Course in ANS No GSI for Surveillance & RSC For some states Political instability and uncertainty Unemployment, poverty & low spending Low GDP, unreliable and unaffordable power Limited ICT deployment Sudan and Libya Limited & expensive broadband internet COVID-19 pandemic depressed 		



Project Deliverable 2 & 3

- ❖ Deliverable 2 Update the existing database on aviation professionals in major areas.
- Deliverable 3 Analyze the existing professional gap and anticipated demand in various professional categories of Safety and Air Navigation capacity.



Project Deliverable 4

PART 2 OF REPORT

"Propose an implementation strategy and plan including the required resource to address the existing gap and future demand at least in the coming ten (10) years (2022-2032)"



AFI Common Training Policy

The ICAO logical recommendation of the process for training from New Hire up to the time of exit includes:

- a. Initial Training
- b. Continuation or Recurrent Training
- c. On-the-Job Training
- d. Specialized Training
- e. Training Record Keeping

AFI Training Categories

First strategy is for AFI States to adopt a common formal training policy based on the following Training Categories:

- a. Administrative/General Technical Functions (CE1 to CE5)
- b. Certification, Authorisation and Approvals Functions (CE6)
- c. Personnel Licensing or Competence Assessment (CE6)
- d. Surveillance and AVSEC Quality Control Functions; (CE7) and
- e. Resolution of Safety Issues Functions (CE8)

Minimum Core

The recommended Minimum Core courses for Initial Training:

- a. New Hire Employee Indoctrination
- b. Certification, Authorization and Approvals of Service Providers
- c. Personnel Licensing Procedures or Competence Assessment Procedures
- d. Surveillance (of operators or service providers)
- e. Resolution of Safety Concerns including Compliance and Enforcement

Administrative/General Technical Functions (CE1 to CE5)

Administrative Training (Indoc)

- Overview of ICAO, the CC, SARPS etc
- Overview of the CAA and CAA's Safety Oversight Department(s)
- Employee benefits, time and attendance
- Employee training and development
- Managing Resources
- Employee ethics; Labour Union issues
- Conduct; Discipline; Travel; CAA Security

General Technical Training

- Auditing Techniques and CAA Auditing Procedures
- Safety Management Systems and Quality Systems
- State Regulations
- Human Factors Principles; and
- Training for the specific roles and tasks of the inspector

Certification, Authorisation and Approvals Functions (CE6)

- GSI Operations
- GSI Airworthiness and AMO Certification
- GSI Air Cargo
- Training Organisation Approvals
- ANS Inspector Courses (AIS, ATS, MET etc)
- Aerodrome Certification

Competence Assessment (CE6)

- Flight Standards (PEL, Air, Ops)
- *ANS Inspector Courses (AIS, ATS, MET etc)
- Aerodrome Personnel Competence Assessment
- AVSEC Quality Control Course



Surveillance and AVSEC Quality Control Functions (CE7)

- ❖ National Surveillance Programme
- Surveillance of Service Providers
- *ANS Inspector Courses (AIS, ATS, MET etc)
- Operations, Airworthiness, Aerodrome Inspectors Courses
- AVSEC Quality Control Course



Resolution of Safety Issues Functions (CE8)

- Resolution of Safety Issues/Concerns
- Accident and Incident Investigation
- Human Factors
- Compliance and Enforcement

Note: Comprehensive list of Formal Courses are contained in the Annexes to the Report



On-the-Job Training

- Each formal training in each Category comes with a list of Job tasks for which the inspector may undergo OJT.
- Ideally OJT should be undertaken after the formal course however circumstances may allow for OJT to be commenced before the formal course but can only be concluded after the formal course.

Note: List of Job Tasks are contained in the Annexes of the report



Specialty and Recurrent Training

- Generally, inspectors should complete two specialty or advanced training courses every three years, and recurrent training courses within three to five years after completion of a course requiring recurrent training.
- Specialty or Advanced courses are contained in Annexes of the Report in the Categories: Avionics, Aircraft dispatcher, Emergency Services, Cabin Safety, Aerodrome Engineering, Radio Navigation and Surveillance, Publications, Charting, Aerodrome Observation and Forecasting, Flight Procedure Design etc

Recommended Courses Based on SWOT – Short to Medium Term

- New Hire Employment Indoctrination
- Introduction to Authorizing Documents
- Introduction to Investigations
- GSI OPS; GSI AIR; GSI PEL
- CAA Approval of Training Organizations
- Surveillance of Service Providers
- Auditing Techniques
- Resolution of Safety Concerns (RSC)
- Aircraft Accident Investigation

- Human Factors Principles
- Safety Management (SM EN): Online
- State Safety Programme
- ANS ATM Inspector
- ANS AIS Inspector
- ANS MET Inspector
- ANS CNS Inspector
- Aerodrome Certification
- Incident Investigation Techniques
- Integrated Safety Management Systems

AIG Training Profile

AIG course profiles are summarized as:

- a. Indoctrination
- b. Basic Aircraft Accident Investigation
- c. Advanced Aircraft Accident Investigation and
- d. OJT

Recommended Courses Based per Specialty

Table 1 – Recommended Formal Courses for the Short Term

Speciality	Category	PRIMARY		SECONDARY	
		Formal Course	Priority	Formal Course	Priority
Flt Ops	Admin/Tech	New Hire Employment Orientation / Indoctrination		Introduction to Authorizing Documents / Introduction to Investigations	
Flt Ops	Certification	GSI OPS		SMS / SSP	
Flt Ops	Licencing	GSI PEL		CAA Approval of Training Organization	
Flt Ops	Surveillance	Surveillance of Service Providers		Auditing Techniques	
Flt Ops	RSI	Resolution of Safety Concerns (RSC)		Aircraft Accident Investigation	
		Human Factors Principles			
AIR	Admin/Tech	New Hire Employment Orientation/ Indoctrination		Introduction to Authorizing Documents / Introduction to Investigations	
AIR	Certification	GSI AIR		SMS / SSP	
AIR	Licencing	GSI PEL		CAA Approval of	

See Part 2 – Table 1 for the full table



General Recommendations – Formal Courses

- CAAs should develop New Hire Employment Orientation / Indoctrination course
- Call on partners to negotiate with ICAO to share resources for delivery of their courses
- Medium to long term encourage ATOs to develop GSI generic versions of Surveillance of Service Providers and Resolution of Safety Concerns



Virtual Classroom Courses

Recommended courses available as virtual classroom courses include:

- a) Safety Management System
- b) ICAO GSI Ops 3 weeks
- c) ICAO GSI Air 3 weeks
- d) ICAO GSI PEL 3 weeks
- e) 15209001 Resolution of Safety Concerns (RSC) also Takeoff Academy
- f) 15212001 Surveillance of Service Providers also Takeoff Academy



ONLINE OR WEB BASED TRAINING (WBT/CBT)

- * Recommended ICAO GAT online courses in Table 4 of report
- Recommended FAA online courses in Table 5 of report
- Recommend negotiate with FAA for FREE access to some of the FAA online courses (BAGASOO already has such an arrangement)



Virtual and Web Based Training Challenges

- Major advantage of Virtual and Web based training is reduced cost (DSA and Travel cost)
- Online or web based training are at participant's pace so reduces internet connectivity and power supply challenges.
- Major disadvantage is unreliable internet connectivity and unstable power supply in the AFI Region
- Time zone challenges for Virtual Classroom courses. May target training to limited or close time zones

Target States - Short Term (Based on SWOT)

WACAF

- Central African Republic
- Guinea Bissau
- Sierra Leone, Liberia
- Sao Tome and Principe
- Guinea
- Chad, Democratic Republic of Congo

ESAF

- Eritrea, Lesotho
- Eswatini, Comoros
- Djibouti, Malawi
- Seychelles, Burundi
- Angola
- Zimbabwe

Target States

RASG EUR

- Algeria
- Tunisia

RASG MID

Libya



Other Recommendations – Language Barriers

To improve on understanding in the medium to long term:

- Stakeholders to make available courses in other ICAO languages, especially English, French and Portuguese.
- ❖ AFI ATOs to work with partners to develop local content versions of courses in the various categories.
- AFI ATOs to develop specific course in uncovered areas

Current Number of GAT GSI Instructors in AFI Region

GAT GSI INSTRUCTOR DISTRIBUTION IN AFI REGION					
GSI AIRWORTHINESS		GSI PERSONNEL LICENCE		GSI FLIGHT OPERATIONS	
Ghana	3	Ghana	3	Ghana	1
Kenya	2	Kenya	2	Kenya	2
South Africa	1	Tanzania	1	South Africa	1
Tanzania	1	Nigeria	1	Nigeria	1
Nigeria	1				
Niger	1				
Total	8	Total	7	Total	5
WACAF	5	WACAF	4	WACAF	2
ESAF	3	ESAF	3	ESAF	3



Other Recommendations – GSI Instructors

To meet adequacy and regional balance in the medium to long term:

- States should encourage qualified individuals apply and enrol as qualified instructors
- States should provide motivational packages for instructors



Project Deliverable 5

PART 3 OF REPORT

"Review of the Present Capacity of Aviation Approved Training Centres to Meet the Forecast Capacity Building Demand"



Background

- 1. In 2019 the Association of African Aviation Training Organizations (AATO), prepared a report dubbed "The African Aviation Training Roadmap" for ICAO. The AATO was tasked, in collaboration with ICAO Global Aviation Training (GAT), by ICAO to research and design an Aviation Training Roadmap for the African Continent.
- 2. Appendix A and B of the Roadmap, reproduced in our report, contain the List of ATOs in Africa and List of ICAO Courses taught, respectively.
- 3. No further work has been done. Will be updated in "Database"

Recommended Courses – ATO Capacity

- a. New Hire Employment Orientation / Indoctrination CAA Specific
- b. FAA WBT/CBT Introduction to Authorizing Documents Web FAA
- c. FAA WBT/CBT Introduction to Investigations Web FAA
- d. ICAO 18700 GSI OPS All ICAO approved ATOs
- e. ICAO 18701 GSI AIR AII ICAO approved ATOs
- f. ICAO 18710 GSI PEL All ICAO approved ATOs
- g. ICAO CAA Approval of Training Organization All ICAO approved ATOs
- h. Surveillance of Service Providers FAA & Takeoff Academy or as in-house
- i. Auditing Techniques UK CAA International Online & Classroom; IATA & others
- j. Resolution of Safety Concerns (RSC) FAA & Takeoff Academy or as in-house

Recommended Courses -ATO Capacity

- a. Various Aircraft Accident Investigation IATA and Regional Training Partners
- b. Human Factors Principles IATA and Regional Training Partners
- c. ICAO Safety Management (SM EN): ICAO Online
- d. ICAO State Safety Programme IATA and Regional Training Partners; ICAO
- e. ICAO (STP) ANS ATM Inspector East African Aviation Academy (EASA)
- f. ICAO (STP) ANS AIS Inspector East African Aviation Academy (EASA)
- g. ICAO (STP) ANS MET Inspector East African Aviation Academy (EASA)
- h. ICAO (STP) ANS CNS Inspector East African Aviation Academy (EASA)
- i. UK CAA / ICAO ACI Aerodrome Certification UK; ICAO / Various ATOs
- j. ICAO Trainair ATM Incident Investigation Techniques UAE Global Air Navigation Services LLC (GANS) / ICAO & Various ATOs

AFI Approved ATOs Database

A database on aviation professionals when developed would continuously summarize the capability of the AFI Approved ATOs in conducting the above recommended courses and other courses



Project Deliverable 6

PART 2 OF REPORT

"Propose mechanisms/options for the sustainable funding of the proposed implementation of the plan"



Implementation Strategy and Funding

In the short to medium term:

- Call on ATOs to lower Course Fees and when possible conduct in-house
- Where a Training Centre can utilize staff of the local CAA an incentive teaching fee should be paid
- Negotiate with UK State to seek a direct funding support for UK Takeoff Academy RSC and Surveillance of Service Providers
- Negotiations should be made with the US DOT to seek a direct funding support for FAA 15209001 Resolution of Safety Concerns (RSC) and FAA 15212001 Surveillance of Service Providers

Implementation Strategy and Funding (cont)

In the short term it is recommended that one each of the following 5 courses be organised in the **virtual classroom** for the AFI region.

- 1. GSI Ops
- 2. GSI Air
- 3. GSI PEL
- 4. Surveillance
- 5. RSC

Implementation Strategy and Funding (cont)

Negotiate with the following institutions and agencies among others for financial support to meet the objectives of this project:

- FAA/DOT May sponsor courses developed by FAA
- EASA May sponsor courses developed by its Member States
- Singapore Government May sponsor Singapore Academy Courses
- World Bank
- ❖ IMF
- African Development Bank
- ICAO Member States May sponsor courses developed by State (e.g. UK, UAE etc)

Implementation Strategy and Funding (cont)

- Consider launching a special fund "AFI Aviation Professionals Fund" to be sponsored voluntarily by various Organisations, Agencies, States and Corporate bodies as a sustainable long time strategy to ensure continuous training of personnel
- Member States to equally contribute to the fund



