



EFFICIENCY PFFs FOR ENROUTE, TERMINAL & COMMUNICATION UGANDA-CIVIL AVIATION AUTHORITY

INTERNATIONAL CIVIL AVIATION ORGANIZATION EASTERN AND SOUTHERN AFRICAN OFFICE WORKSHOP ON THE DEVELOPMENT OF NATIONAL PERFORMANCE FRAMEWORK FOR AIR NAVIGATION SYSTEMS (NAIROBI, 6-10 DECEMBER 2010)

HANDS-ON EXERCISE: PFF EXPLANATION FOR EFFICIENCY

1. Characteristics of the industry

- ✓ *Current traffic in 2009/10 FY is estimated 32,575 (commercial & over flights) and projected growth is 4.9% per annum.*

2. The air navigation service provider

Describe briefly the organization providing the air navigation services in your State including its institutional format, capital structure, principal shareholders and the management.

- ✓ *Civil Aviation Authority-Uganda was established in 1992 by Act of Parliament, under the Civil Aviation Authority Act (CAP 354) with the objective to promote the safe, regular, secure and efficient use of and the development of civil aviation inside and outside Uganda.*
- ✓ *It is headed by the Managing Director-MD at corporate level, has 5 Directorates each headed by a Director. Directorates are; Human Resource & Administration; Air Navigation Services; Safety, Security & Economic Regulation; Finance and Airport & Aviation Security.*

3. Major stakeholders/partners

Identify the major stakeholders/partners such as the air navigation service providers, the airspace users (the commercial airlines using the airspace, business aviation, general aviation, military, etc.) and the potential funding sources.

- ANS Service Provider-Directorate of Air Navigation Services CAA-Uganda.*
- Airspace users*
 - *Airline Operators-BA, KLM, BEL, MSR, KQA, SAA, THY, UAE, ETH, MKA, RWD, DTA, OAL, UGB, UN, etc*
 - *Military, Police & GA.*
- Other stakeholders*
 - *ICAO*
 - *Ministry Transport & Communication*
 - *MET Dept*

iv) Funding by the Civil Aviation Authority

4. Problem definition

The current conventional air navigation systems might have several limitations, which would depend on the State or the region concerned. List such limitations in your State.

- ✓ *Aging equipment.*
- ✓ *High Maintenance cost*
- ✓ *Limited automation leading to inadequate information exchange*
- ✓ *Existence of airspace restrictions located on ATS ROUTES leading to complexity of airspace.*
- ✓ *Dependence on VOR/ILS approaches reduce on the rate of access to the runway.*
- ✓ *Conventional Route separation limits capacity*
- ✓ *Separation standard in use limits capacity.*
- ✓ *Conventional clearance/procedure limits efficiency –excessive levellings*
- ✓ *Lack of Enabling Regulation for use of GNSS procedures*

5. Performance based National Air Navigation Plan

Define the geographical scope of the National Air Navigation Plan and determine the major traffic flows. Explain briefly the vision of your State for achieving a seamless Global ATM system. Specifically, establish national performance objectives for the air navigation infrastructure, list current air navigation systems and through gap analysis define near and medium term operational improvements.

a) *Scope: FIR Entebbe*

b) *Major traffic flows on routes:*

- *Conventional: UA609, UG656, UA408, UA401, UA610, UB527.*
- *PBN Routes: UM216, UT238, UT236.*

c) *Vision: To implement a seamless air traffic management system for all users during all phases of flights within Uganda FIR:*

- *meeting agreed levels of safety,*
- *providing for optimum economic operations,*
- *meeting national security requirements and,*
- *Environmentally sustainable.*

The strategy is to continuously improve provision of facilities and services in Uganda's airspace in collaboration with all parties in a safe and efficient manner. Our efforts are focussed on maximising capacity, utilisation of our navigation facilities, minimising costs in systems acquisition, maintenance, and minimising traffic delays.

Plans are underway to;

- *Conduct WGS-84 & eTOD.*
- *Carry out Airspace design for PBN.*
- *Optimise ATS Routes in terminal airspace*
- *Optimise vertically guided RNP approaches*
- *Improve VHF Communication availability and reliability.*
- *Operationalize GNSS Procedures.*
- *Operationalize the New Flight Plan*

Air Navigation Systems: VHF, HF, NDB, DVOR/DME/, ILS/DME, MSSR-MODE S Radar, AMS, AWOS, VSAT/NAFISAT, Gap Analysis:

- *Lack of Legislation for GNSS and PBN*
- *Lack of capacity to implement WGS-84 & eTOD Survey.*
- *Lack of internal capacity for Airspace Design & Procedure design*
- *Partial ATM Automation*
- *Slow transition of AIS to AIM*
- *Aging Nav aids & Communication infrastructure.*

6. Performance framework forms (PFFs)

Using the standard approach, develop PFFs for different national performance objectives by determining relevant projects/tasks and ensuring the linkage to Key Performance Areas (KPA) and Global Plan initiatives (GPIs).

7. Risk Management

What are the risks identified for this National Air Navigation Plan and if any, briefly describe the risk mitigation plans/techniques.

1)

PERFORMANCE FRAMEWORK FORMS FOR EFFICIENCY

STRATEGIC OPERATIONAL IMPROVEMENT/ NATIONAL PERFORMANCE OBJECTIVE –ENHANCE CAPACITY AND EFFICIENCY OF ENROUTE AIRSPACE				
Performance Benefits				
Safety	1. Safety level maintained or improved			
Environment	1. Reduced emissions through shorter flights and use of optimum routes/trajectories			
Capacity	1. Increased capacity through better utilization airspace resources			
Cost effectiveness	1. Fuel cost reduction through availability of more optimized routes/trajectories; and 2. Ability of aircraft to conduct flight more closely to preferred trajectories			
Performance Measurement				
Metrics	1. Number of PBN routes implemented			
	2. Percent difference between optimal and actual route			
	3. Number of aircraft entering a specified volume of airspace/hr			
	4. Pounds of fuel burn per operations			
	5. Percent of time the fixed airspace unavailable to civil users			
<i>Strategy</i> Medium term (2010 - 2015)				
ATM Operational Concept Components	Projects/Tasks	Timeframe Start/End	Responsibility	Status (as of ...)
AOM, DCB, TS and CM	1. Formulate airspace concept and determine near term operational improvements	Sept. 2010 –June 2011	Directorate of Air Navigation Services	CNS/ATM Master plan under review
	2. Analyze the en-route ATS route structure and implement identifiable improvements such as RNAV10 routes	June 2010-Dec 2011	Directorate of Air Navigation Services	Two Routes UM216 & UT236 Implemented. UT238 pending Letter Of Procedures(LOPs)
	3. Review existing conventional & RNAV routes to transition to RNAV 5.	June 2011-2012	Directorate of Air Navigation Services	
	4. Develop in house capacity for procedure design .	March 2009-2012.	Directorate of Air Navigation Services	Training of Personnel ongoing
	5. Implement flexible use of airspace, improve civil/Military coordination and determine conditional routes	May 2010-2015	Directorate of Air Navigation Services/Military	-New Restricted Airspace were subjected to reviewed parameters. -Prohibited/Danger areas parameters to be reviewed.
	6. Transition to new flight plan	June 2010-15/Nov 2012	Directorate of Air Navigation Services	Evaluation of existing system.
	7. Migration to WGS-84 & eTOD .	Jan 2010-Dec 2011	Directorate of Air Navigation Services/Min. Lands & Surveys.	WGS-84 done for Entebbe, Kasese, Soroti airports.

	8. Implementation of GNSS	Jan 2010-Dec 2011	Directorate of Air Navigation Services	SIDS & STARS For Entebbe airport. Other airports pending WGS-84 Survey.
Risk Management	Risk factors: lack of funding; delay of aircraft equipage ; Insufficient data ;			
	Risk mitigation: identification of different funding sources; involvement of aircraft operators in the decision making; access to commercial databases			
Linkage to GPIs	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management ; GPI/12: FMS-based arrival procedures; GPI/18 Aeronautical information; GPI/20 WGS-84; GPI/21 Navigation systems;			

2.

STRATEGIC OPERATIONAL IMPROVEMENT/ NATIONAL PERFORMANCE OBJECTIVE – ENHANCE CAPACITY AND EFFICIENCY OF ENTEBBE TERMINAL AIRSPACE				
Performance Benefits				
Safety	1. Safety level maintained or improved			
Environment	<ol style="list-style-type: none"> 1. Reduced emissions through shorter flights and use of CDO for better/direct approaches to runway end & CCO for departures. 2. Reduced noise for sensitive areas 			
Capacity	1. Increased capacity through reduced separation.			
Cost effectiveness	<ol style="list-style-type: none"> 1. Fuel cost reduction by use of more optimized procedures(SIDS/STARS); 2. Ability for aircraft to conduct flight more closely to preferred trajectories; 3. Increased availability of restricted airspaces for civil use. 			
Performance Measurement				
Metrics	1. Number of GNSS &PBN SIDS/STARS implemented			
	2. Percent deviation between optimal (SIDS/STARS) and actual.			
	3. Number of aircraft entering/exiting the TMA /hr			
	4. Pounds of fuel burn per SID/STAR operations			
	5. Percent of time the restricted airspace unavailable to civil users			
	6. Percent of current to previous number of noise complaints.			
Strategy Medium term (2010 - 2015)				
ATM Operational Concept Components	Projects/Tasks	Timeframe Start/End	Responsibility	Status (as of ...)
AOM, DCB, TS,AO and CM	1. Formulate airspace concept and determine near term operational improvements	Sept. 2010 –June 2011	Directorate of Air Navigation Services	CNS/ATM Master plan under review .
	2. Analyze the conventional & GNSS SIDS/STARS and implement identifiable improvements such as RNAV/RNP SIDS/STARS	July 2011-2015	Directorate of Air Navigation Services	Analysis ongoing.
	3. Reduce horizontal separation between aircraft through RNAV/RNP 1&2	July 2011-2015	Directorate of Air Navigation Services	GNSS Procedures being used on test basis.

	4. Develop in house capacity for procedure design .	March 2009-2012.	Directorate of Air Navigation Services	Training of Personnel ongoing
	5. Implement flexible use of airspace, improve civil/Military coordination and determine conditional SIDS/STARS.	May 2010-2015	Directorate of Air Navigation Services/Military	-New Restricted Airspace were subjected to reviewed parameters. -Prohibited/Danger areas parameters to be reviewed.
	6 Transition to new flight plan	June 2010-15/Nov 2012	Directorate of Air Navigation Services	Evaluation of existing system.
	7. Migration to WGS-84 & eTOD .	Jan 2010-Dec 2011	Directorate of Air Navigation Services/Min. Lands & Surveys.	WGS-84 done for Entebbe, Kasese and Soroti airports.
Risk Management	Risk factors: lack of funding; delay of aircraft equipage ; Insufficient data ;			
	Risk mitigation: identification of different funding sources; involvement of aircraft operators in the decision making; access to commercial databases			
Linkage to GPIs	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management; GPI/9: situational awareness; GPI/12: FMS-based arrival procedures; GPI/17 Data link applications; GPI/18 Aeronautical information; GPI/21 Navigation systems; and GPI/22 Communication infrastructure.			

3.

STRATEGIC OPERATIONAL IMPROVEMENT/ NATIONAL PERFORMANCE OBJECTIVE – ENHANCE THE EFFICIENCY OF COMMUNICATION.				
Performance Benefits				
Safety	<ol style="list-style-type: none"> Safety level improved Improved availability, reliability and integrity 			
Environment	<ol style="list-style-type: none"> Reduced noise level during transmission More audible transmission 			
Capacity	<ol style="list-style-type: none"> Improved infrastructure to support coverage of VHF; Implementation of future Network to support AFTN & ATS-DS. Reduce Frequency congestion for airport operations. 			
Cost effectiveness	<ol style="list-style-type: none"> Implement new systems with low life cycle cost Automated monitoring and maintenance. 			
Performance Measurement				
Metrics	1. Number of new communication equipment installed			
	2. Percent improvement in coverage.			
	3. Percent improvement in voice/data integrity per transmission.			
	4. Percent availability of service per month.			
	5. Percent reduction in cost of maintenance.			
Strategy				
Medium term (2010 - 2015)				
ATM Operational Concept Components	Projects/Tasks	Timeframe Start/End	Responsibility	Status (as of ...)
AO, ATM SDM.	1. Migration from AFTN to AHMS to support AIS Automation.	June 2010-June 2012	Directorate of Air Navigation Services.	Procurement of AHMS/AFTN Switch ongoing.

	2.Upgrade of VHF Systems for Terminal & Approach.	Sept 2010-2011	Directorate of Air Navigation Services	-Upgrade of 5 channel VHF System under way -Implementation of Trunk Radio System for airport.
	3.Implementation of Future Network to support Voice and Data distribution.	July 2011-June 2012	Directorate of Air Navigation Services	System study ongoing
	4.Improve performance of VHF Extended Range to support Data Link Application.	July 2011-June 2012	Directorate of Air Navigation Services	System study ongoing
Risk Management	Risk factors: lack of funding; Delayed implementation.			
	Risk mitigation: identification different funding sources; Use alternative means of communication & data distribution.			
Linkage to GPIs	GPI/9: situational awareness; GPI/17 Data link applications; GPI/18 Aeronautical information; and GPI/22 Communication infrastructure.			

4.

STRATEGIC OPERATIONAL IMPROVEMENT/ NATIONAL PERFORMANCE OBJECTIVE – TRANSITION TO AIM				
Performance Benefits				
Safety				
Environment				
Capacity				
Cost effectiveness				
Performance Measurement				
Metrics				
<i>Strategy</i> Medium term (2010 - 2015)				
ATM Operational Concept Components	Projects/Tasks	Timeframe Start/End	Responsibility	Status (as of ...)
AO, ATM SDM.	.		.	
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Risk Management	Risk factors: lack of funding; Delayed implementation.			
	Risk mitigation: identification different funding sources; Use alternative means of communication & data distribution.			
Linkage to GPIs	GPI/9: situational awareness; GPI/17 Data link applications; GPI/18 Aeronautical information; and GPI/22 Communication infrastructure.			