

**HANDS-ON EXERCISE:
PERFORMANCE BASED AIR
NAVIGATION PLAN FOR
DEMOCRATIC REPUBLIC OF CONGO**

NAIROBI, 10 DECEMBER 2010

Characteristics of the industry(1)

- The industry recorded an average of 150,000 aircrafts movements the last 4 years. There is 54 airports managed by RVA. Kinshasa FIR is divided in 3 sectors: Kinshasa , Lubumbashi and Kisangani sectors. There is 7 TMAs,13 CTRs,3 ATZ, 7 FIZ, 21 special use airspaces. The FIR has 29 upper ATS routes,17 lower ATS routes 32 ATS axis and 5 RNAV routes. Average overflying time is 02 hours and 10 minutes from North to South or from East to West ; and vice versa.

Characteristics of the industry 2

- Ground navaid infrastructure is poor :only 5VOR/DME.2 ILS, 5 NDB and 10 airports provided with GNSS approach. The communication infrastructure is constituted by 12 VSAT stations for VHF and AFTN; and HF.ATS/DS and AFTN are granted by national VSAT network and sub-regional network of SADC. There is no surveillance means and air traffic control is procedural.

The air navigation service provider

- RVA is a government organization in charge of air navigation service and airport management. It also have responsibility of building ,developing and collect fees for service offered to users . It depend to the ministry of transport and communication. RVA is the service provider . The CAA is the regulator and METTELSAT is the meteorological agency. RVA manage 54 airports

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Major stakeholders/partners

- The major stakeholders/partners are : CAA civil aviation authority, RVA(ANSP), METTELSAT(MET organisation) , commercial airlines(more than 20 domestic airlines and almost 10 international airlines) travel agencies, freight agencies, flying club, air defence, Monusco (UN mission in DRC which has a great fleet) and general aviation

Problem definition

- The current conventional air navigation system has several limitations such as degraded infrastructure, lack of automation, need of rehabilitation of several runways ,unavailability of WGS84 coordinates for the entire FIR except for 10 airports, energy problems for the remote VSAT stations, lack of surveillance means, training for technical personnel, training for ATCs for ICAO level 4 in English, etc...

Performance based National Air Navigation Plan (1)

- The national Air Navigation Plan concern Kinshasa FIR which has 2345000 square kilometres. This FIR is in the AR-4 EUR-SOUTH AFI routing area. It contains 4 RNAV routes oriented NORTH/SOUTH and another RNAV route oriented EAST/WEST. The major traffic flow is EUR –SOUTH AFI using these 4 RNAV routes. For domestic operations , with 54 airports, the traffic is relatively important and some of them use the upper airspace

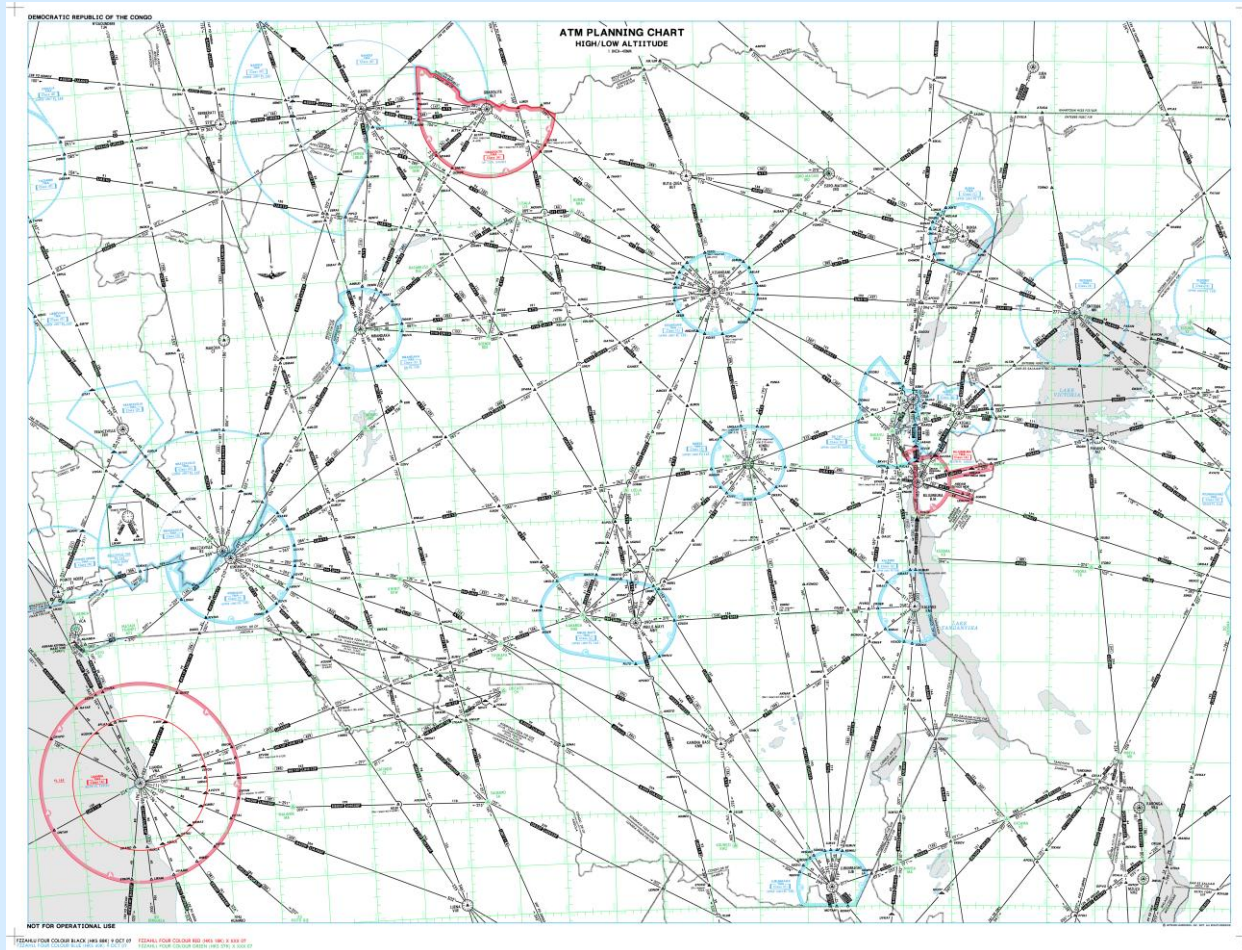
Performance based National Air Navigation Plan (2)

- For a seamless global ATM System, DRC is investing in automation and implementation of surveillance means. The current projects are :
- -1st phase of surveillance program (short term) : acquisition of an ATM automated system for Kinshasa ACC and 5 ADS-B to cover 4 RNAV routes .Ongoing project with Thales.
- -2nd phase of surveillance (short term 24 months): 11 more ADS-B stations to cover all the FIR; and acquisition of 2 others ATM systems for Lubumbashi and Kisangani approach purposes.

Performance based National Air Navigation Plan (3)

- -building of a new control-tower and ACC for Kinshasa.
- -Building of a new Tower for Lubumbashi.
- These programs will be financed by the World Bank and African Bank for Development

FIR KINSHASA



Risk Management

- The risks identified are the assumption of not receiving necessary funding from the banks. The schedule for implementation can be disturbed and the personnel training delayed. Issues for the procurement of surveillance funding can be partially mitigated by a government financing, or by the special infrastructure fund(IDEF) paid by the operators



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PERFORMANCE FRAMEWORK FORMS FOR EFFICIENCY

STRATEGIC OPERATIONAL IMPROVEMENT/ NATIONAL PERFORMANCE OBJECTIVE – 1				
ENHANCE CAPACITY AND EFFICIENCY OF ENROUTE AIRSPACE BY IMPLEMENTATION OF ADS-B				
Performance Benefits				
Safety	1. Safety level increased thanks to situational awareness for ATC, aircraft position well known traffic display for non radar region, conflict resolution by ADS-B IN aircrafts.			
Environment	1. Reduced emissions through shorter flights and use of optimum routes/trajectories			
Capacity	1. Increased capacity through better utilization of airspace resources; possibility of separation reduction			
Cost effectiveness	1. Fuel cost reduction through availability of more optimized routes/trajectories monitored visually by the ATC; and 2. Ability of aircraft to conduct flight more closely to preferred trajectories			
Performance Measurement				
Metrics	1. Number of ADS-B implemented(5 in 1 st phase and 11 in 2 nd phase)			
	2. Percent difference between optimal and actual route covered by ADS-B in 1 st phase: ±70% of traffic			
	3. Number of aircraft entering a specified volume of airspace/year: 20000 traffics.			
	4. Pounds of fuel burn per operations			
	5. Number of ASR for no contact with ACC: several in actual configuration			
Strategy Medium term (2011 - 2015)				
ATM Operational Concept Components	Projects/Tasks	Timeframe Start/End	Responsibility	Status (as of ...)
AOM, , TS and CM	1. Implement ADS-B for surveillance of 4RNAV routes	January 2011 - October 2011	RVA	Contract with THALES
	2. Analyze the en-route ATS route structure and enhance situational awareness by a surveillance mean. There were dangerous routes	2010 ongoing	RVA	

	crossings if the coordination fail or no communications.			
	3. Reduce incidents due to lack of surveillance	October 2011 ongoing	RVA	
	4. Implement electronic flight strips.It will be done with the ATM automated system EUROCAT	October 2011	RVA	
	5. Implement flexible use of airspace, improve civil/Military coordination and determine conditional routes. It was done with the Air Force for the implementation of UA617	21 October 2010	RVA/ARMY/CAA	Ongoing
	6. Improve data and voice communications. The Control centre will use data link and voice communications	2011	RVA	The control centre will be delivered in October 2011
	7. Implementation of GNSS			
	8. Enhance situational awareness on dangerous routes crossings in case of lack of coordination and communications.	2011	RVA	The ADS-B will be in use for visualization.
Risk Management	Risk factors: lack of funding; delay in aircraft equipage of domestic airlines. Delays due to Banks.			
	Risk mitigation: identification different funding sources; involvement of aircraft operators in the decision making (payment of the infrastructure development fund); involvement of the government			
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/17 Data link applications; GPI/20 WGS-84; GPI/21 Navigation systems; and GPI/22 Communication infrastructure.			

STRATEGIC OPERATIONAL IMPROVEMENT/ NATIONAL PERFORMANCE OBJECTIVE – 2				
ENHANCE CAPACITY AND EFFICIENCY OF AERODROMES BY USING GNSS PROCEDURES				
Performance Benefits				
Safety	1. Safety level maintained or improved .			
Environment	1. Reduced emissions through shorter procedures.			
Capacity	1. Increased aerodrome capacity through better utilization of shorts approaches			
Cost effectiveness	1. Potential cost reduction through shorter procedures and win of time.			
Performance Measurement				
Metrics	1. Number of operations with GNSS procedure			
	2. Number of diversion due to due to approach based on conventional nav aids.			
	3. Number of existing nav aids is very small.			
	4. Pounds of fuel burn per non GNSS operations			
	5.number of runway excursion due to lack of procedures.			
Strategy Medium term (2010 - 2015)				
ATM Operational Concept Components	Projects/Tasks	Timeframe Start/End	Responsibility	Status (as of ...)
AO, DCB, TS and CM	9. Formulate airspace concept and determine new aerodromes to be provided with GNSS procedures.	August 2010 - October 2010	RVA	Database contains 19 airports.
	10. Improve safety of departures and arrivals by the use of RNAV SIDs and STARS	JUNE 2011	RVA	Designing of SIDs and STARS is waiting obstacles data.
	11. Maximize runway capacity in all weather operations using GNSS procedures.	JUNE 2011	RVA	
	12. Make the site survey for obstacles data	January 2011	RVA	
	13. Procedures design		RVA	
	14. Flight tests		RVA	

	15. Make the site surveys for WGS-84	January 2011	RVA	
	16. Aerodrome ground lighting		RVA	
	17. Non-navigational visual aids such as PAPI	MARCH 2011	RVA	
Supporting tools	<ol style="list-style-type: none"> 1. Technology evaluation and gap analysis 2. Safety case and safety analysis 3. Business case and cost benefit analysis 4. Regional workshops and seminars 			
ATM Community members	States, Aerodrome operators, Airspace providers, Airspace users, ATM service providers, ATM support industry, Regulatory authorities and ICAO			
ATM Community expectations	<ol style="list-style-type: none"> 1. Safe landings even if there is not navigation aid. 2. Capacity to meets peak demands, while minimizing delays. 3. Cost effective air navigation services, no cost maintenance. 4. Minimize environmental impact 5. Flexibility in adapting flight trajectories 6. Safety is highest priority 			
Project Output	National performance plan for implementation of air navigation system elements that are operationally suitable, technically feasible and economically viable.			
Project Outcome	Enhanced capacity and efficiency of aerodrome operations.			
Risk Management	Risk factors: lack of funding for obstacle data survey, for WGS 84andFliht test Risk mitigation: identification of different funding source.			
Linkage to GPIs	GPI/5: performance-based navigation; ; GPI/13: Aerodrome design and management; GPI/14: Runway operations; GPI/15: Matching IMC and VMC operating capacity; GPI/18: Aeronautical information; ; GPI/20: WGS-84; GPI/21: Navigation systems; and GPI/22: Communication infrastructure.			