



# GHANA NATIONAL PERFORMANCE OBJECTIVE – 1

ENHANCE AERODROME AND  
APPROACH CONTROL  
OPERATIONS AT KIA, ACCRA





# Characteristics of the industry

- Ghana a bastion of democracy and peace
- Oil exploitation starts in 15<sup>th</sup> Dec 2010
- Influx of upstream and downstream business activities increase traffic
- Nigeria most populous country in Africa, vibrant oil industry & entrepreneurship drive is a leading market in Africa
- Lagos, commercial capital of Nigeria only 35 minutes flying time from Accra



# Characteristics of the industry

- The Accra FIR is the centre of the world with both the Equator and the Greenwich Meridian intersecting in the Accra FIR. special use or segregated airspace
- South Africa is the largest economy in Africa with developed markets and infrastructure for both trade and tourism
- flights between Europe and North Western Africa pass through the Accra FIR creating a significant north-south traffic flow.
- India and Brazil are the second and third fastest growing economies in the world respectively
- increasing East-West traffic flow in the Oceanic airspace of the Accra FIR
- projected Average traffic growth is 7.5%.



# Efficiency Challenges

- Lack of Airport capacity to accommodate growth-causing delays and increased incidents
- ANS CNS infrastructure has challenges: Radar 10years -frequent breakdowns. Inadequate surveillance over Oceanic airspace; Poor VHF, HF, V-SAT Comms; No RNAV/GNSS/PBN; No SIDS/STARS
- AIP outdated–lack of Approach/Landing charts
- Government of Ghana is 100% shareholder of GCAA
- Lack of independence from Regulator
- Lack of funds: ANS fees primary income for ANS and Regulatory services



# Operational Enhancement at Kotoka Int'l Airport

## Problem Definition

- Increasing traffic to KIA due stability and oil
- Lack of parking bays for influx of airlines
- Delay- 20 minutes from arriving to parking
- Seat of Govt. is on RWY 21 Hdg-3nm
- Air Force & military installations port RWY21
- Hospital & national radio and TV broadcasting facility at starboard about 2-3nm from RWY 21
- Noise Abatement Procedures published for departures but are infringed



# Operational Enhancement at Kotoka Int'l Airport

- KIA has single runway
- Runway extended by threshold displacement
- Taxiway not extended to displaced runway threshold
- directives issued for all departing a/c with take-off weight above 57,000 tons to use displaced threshold
- aircraft departing enter-and-backtrack on the runway
- Increased RWY Occupancy time
- signage, aerodrome markings, Apron lights poor
- one published Holding Pattern on ACC VOR/DME
- Air Force and commercial & civil a/c compete for ARR





## Enhance Aerodrome and Approach Operations at KIA

ANS Systems	Gap Analysis	Near Term Ops Improvements	Med Term Ops Improvements
<b>Communication Sys</b>			
VHF Radio (Main) VHF Radio (Stand by) ATSDSC Internal Communication sys	70% reliable Ok Ok Poor, cluster of different systems	Replacement NIL NIL Additional personnel to handle Comms	New Comms CPDLC New workstation New workstation
<b>Navigation</b>			
“AA” and “AL” NDBs	Redundant	Withdraw	Decommission
“ACC” DVOR/DME ACC ILS	10 old but reliable Old reliable used by many domestic and sub-regional aircraft	Replace	PBN
Holding Patterns GNSS/ RNAV/ PBN SIDS/ STARS	Inadequate NIL NIL	Publish new HP, GNSS/ RNAV and SIDS/ STARS based on traffic flows	Airspace Reorganisation and PBN





<b>Surveillance</b>			
PSR and SSR	Single radar, 70% availability with no backup radar	Refresher non radar training	MSSR MULTILAT
Brite Radar at Tower	NIL		
SMGSat Tower	NIL		
<b>Air Traffic Management</b>			
Sot Allocation Sys	NIL	Training and	New airspace concept
Noise Abatement	Infringed often	Refresher training;	
Arrival Sequencing sys	NIL	Implement Sots sys	
Enter and backtrack	Lack of procedures	RNAV/ SDS/ STARS Sequencing Tool; Meet Stakeholders;	
Aerodrome Control	Inadequate ATCOs	Additional ATCOs	
Ground Control	Not activated	Activate Ground Control	



### Performance Benefits

<b>Safety</b>	1. Reduction in ATSI incidents by 30% to improve Safety
<b>Environment</b>	1. Reduced emissions through shorter flights and use of optimum routes/trajectories and Noise Footprint
<b>Capacity</b>	1. Increased capacity through better utilization airspace resources reduces delays
<b>Cost effectiveness</b>	1. Fuel cost reduction through availability of more optimized routes/trajectories; and 2. Ability of aircraft to conduct flight more closely to preferred trajectories (Continued Descent Procedures)



## Performance Measurement

### Metrics

1. Number of PBN and RNAV/GNSS Approach Procedures implemented
2. Percent difference between optimal and actual route for arrivals and departures
3. Number of aircraft entering Restricted and Prohibited Areas per 1000 departures
4. Reduction in volume of CO<sub>2</sub> of fuel burn and Noise complaints 1000 per operations
5. Reduction in Go-Around and Miss Approaches



**Strategy**  
**Medium term (2011 - 2016)**

<b>ATM Operational Concept Components</b>	<b>Projects/ Tasks</b>	<b>Timeframe Start/ End</b>	<b>Responsibility</b>	<b>Status (as of 10/12/10)</b>
<b>AOM, DCB, TS and CM</b>	1. Formulate Terminal Airspace concept and determine near term operational improvements	June 2011 - October 2011	Kofi Bankye, Airspace Planning Manager	Database compilation of all reports and stakeholder inputs
	2. Implement RNAV/ GNSS/ PBN Approaches, Holding Patterns and SDS/ STARS	Oct 2011- Dec 2011	Efua Fufu Dokono, Procedure Designer	WGS-84 updated, eTOD system being established
	3. Implement Slot Allocation system, Sequencing and Collaborative Decision Making Tools	Dec 2012	Kwesi Mintsim Mbor, ATM Statistics officer	Research & Development, stakeholder consultation
	4. Install new VHF Radios, ATIS, CPDLC and new ATC workstations.	Dec 2012	Yaw Fulani-Koose, CNS Manager	Defining technical specifications
	5. Implement new MSR and MULTILAT/ ADS-B			



1.	Review the directive on departures from displaced runway threshold and enter and backtrack procedures	June 2011	Agbelema Kofigah, ATM Ops Manager	Stakeholder consultation, traffic modeling
1.	Training and Refresher Training of Operational personnel	March 2011	Adowa Prekese, Training Manager	Training needs identification
1.	Improve civil/Military coordination, provide data sharing with the military and publish a Civil/Military Coordination Manual	June 2011	Agbelema Kofigah, ATS operations	Joint training with Air Force personnel
1.	Implement new AIM, eAIP, digital NOTAM, AMHS, New ICAO Flight Plan systems	June 2012	Adwengo Kwelewele, AIM Officer	
1.	Install new AWOS and RVR system	October 2011	Shito Komeyke	Procurement process



<b>Risk Management</b>	Risk factors: lack of funding; delay in aircraft equipage; Insufficient databases
	Risk mitigation Register with the IATA billing for collection of ANS fees and create an escrow account with agreement of some major airlines to fund improvements.
<b>Linkage to GPIs</b>	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management; GPI/9: FMS based arrival procedures; GPI/17 Data link applications; GPI/18 Aeronautical information; GPI/19 Meteorological systems; GPI/20 WGS84; GPI/21 Navigation systems; and GPI/22 Communication infrastructure.



STRATEGIC OPERATIONAL IMPROVEMENT/  
GHANA NATIONAL PERFORMANCE OBJECTIVE– 2  
**ENHANCE CAPACITY AND EFFICIENCY**

Performance Benefits

<b>Safety</b>	1. Safety level maintained or improved
<b>Environment</b>	1. Reduced emissions through shorter runway occupancy time and taxi time, improve signage and markings
<b>Capacity</b>	1. Increased aerodrome capacity through better utilization airside infrastructure, increase number of Bays and better management of ground movements
<b>Cost effectiveness</b>	1. Potential cost reduction through shorter ground movements





## Performance Measurement

Metrics	
	1. Increase number of aircraft movement per hour by 10%
	2. Reduce average arrival/departure delay from 20 to 10 minutes per flight
	3. Increase number of Parking Bays for large body aircraft and link all bays to underground fuel hydrant network
	4. Reduce Pounds of fuel burn per operations by 5%



<b>Strategy</b> <b>Medium term (2010 - 2015)</b>				
<b>ATM Operational Concept Components</b>	<b>Projects/ Tasks</b>	<b>Timeframe Start/ End</b>	<b>Responsibility</b>	<b>Status (as of ...)</b>
<b>AO, DCB, TS and CM</b>	1. Formulate aerodrome concept and determine near term operational improvements	March 2010	John Amediou GACL, GAF, Airlines	Studies conducted
	2. Improve surface movement and guidance control systems through provision of signage, naming of taxiways routes and runway entry/exit points, improved aerodrome ground lighting	June 2011	Hans Adu, Dir Ops, GACL	Approval of proposed names



1. Maximize runway capacity in all-weather operations by providing RVR system	Dec 2011	Emmanuel Fynn, Manager Ops	Finalizing technical spec
2. Improve demand and capacity balancing through Slot Allocation /Apron management training process	June 2011	Jay Tee Amoah	Training Planned at GATA
3. Separate Aerodrome Control from Ground Control	October 2011	Yoke Gari, Tower Chief	Awaiting restoration of Ground frequency
4. Improve data and voice communications between Ramp Control and	August 2011	Matteer Perigrino, Radio Manager	Awaiting installation of comsat Ramp Control
5. Implementation of PBN and RNAV/ SIDS/ STARS	June 2011	Samuel Asante	WGS-84 Completed



1. Enhance situational awareness by installation of SMGS and Brite Radar	2016	Ben Nyavon	Selection of vendor
2. Review Directives on enter and backtrack procedures	August 2011	Esi Amoako	Awaiting review of infringement into restricted areas after PBN/ SDS/ STARS
3. Implement automation of weather systems at aerodromes	October 2011	Amos Naah	Factory Acceptance Test
4. Implement meteorological down links at MET and ATS units	Dec 2011	Ben Eshun	Network cabling
5. Wind shear and aerodrome weather warning	March 2011	Tsatsu Yaovi	FAT
6. Aerodrome ground lighting improvements	Sept 2011	Joe Kalala	FAT
7. Rapid exit taxiways and parallel runways, Link taxiway to displaced threshold	July 2012	Ama Fynn	Design phase
8. Non-navigational visual aids such as PAPI	Dec 2012	Kojo Sey	Selection of vendor



<b>Project Outcome</b>	Enhanced capacity and efficiency of aerodrome operations.
<b>Risk Management</b>	Risk factors: lack of funding; lack of technical expertise; insufficient data
	Risk mitigation: Access ECOBANK Loan; involvement of aircraft operators in the decision making; access to commercial databases; engage a consultant
<b>Linkage to GPs</b>	GPI/5: performance-based navigation; GPI/9: situational awareness; GPI/13: Aerodrome design and management; GPI/14: Runway operations; GPI/15: Matching IMC and VMC operating capacity; GPI/17: Data link applications; GPI/18: Aeronautical information; GPI/19 Meteorological systems; GPI/20: WGS84; GPI/21: Navigation systems; and GPI/22: Communication infrastructure.



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# THANK YOU

# GHANA NATIONAL PERFORMANCE FRAMEWORK FOR AIR NAVIGATION SYSTEMS

## 1. Characteristics of the industry

Ghana is a bastion of democracy in Africa and an Island of peace in a much troubled West African sub-region. This has made Ghana a preferred investment and business destination of choice in the ECOWAS Sub-region. Ghana has discovered oil in commercial quantities. Exploitation of oil and gas industry is scheduled to commence on 15<sup>th</sup> December 2010. There is an influx of both upstream and downstream business activities leading to rapid increase in air traffic operating to Ghana.

Nigeria being the most populous country in Africa with vibrant oil and gas industry and entrepreneurship drive is a leading market in Africa. Lagos is the commercial capital of Nigeria and is only 35 minutes flying time from Accra. Nigeria and Ghana have many similarities and share common culture and market trends.

Ghana is responsible for the provision of Air Navigation Services in the Accra FIR. The Accra FIR is the centre of the world with both the Equator and the Greenwich Meridian intersecting in the Accra FIR.

South Africa is the largest economy in Africa with developed markets and infrastructure for both trade and tourism. South Africa is therefore a major destination for business between Europe and southern Africa. A reasonable number of flights between Europe and North Western Africa pass through the Accra FIR creating a significant north-south traffic flow.

India and Brazil are the second and third fastest growing economies in the world. This has caused increased air traffic movement between Asia and the Americas thereby increasing air traffic crossing the Atlantic Ocean. There is therefore an increasing East-West traffic flow in the Oceanic airspace of the Accra FIR.

The projected Average traffic growth to Ghana and en route traffic through the Accra FIR is projected to be 7.5%.

Civil/Military cooperation is very good as Ghana does not have special use or segregated airspace. Use of airspace by the military is communicated with the ATS department and a NOTAM issued accordingly to cover the applicable area during the period of military activity.

## Efficiency Challenges



The unanticipated high traffic growth rate within a short period has become a major challenge to the industry. There is pressure on Airport and ANS infrastructure, ATM Service Delivery and personnel. Currently the Kotoka Int'l Airport is struggling to accommodate all the operators into Accra thereby causing huge delays and increased incidents.

The ANS infrastructure has huge challenges with HF and VHF Radios and V-SAT systems. Navigation equipment such as NDBs in some aerodromes needs to be replaced with better navigation equipment and/or RNAV procedures.

The Accra Radar system is ten years old and experiencing frequent breakdowns. There is no surveillance coverage over a larger portion of the Oceanic airspace.

V-SAT system is old and encountering outages.

Training of Air Traffic Controllers and Engineering maintenance personnel has not kept pace with growth.

Ghana's AIP is out-dated and the Approach and Landing charts have not been updated for ten years.

These challenges have led to increasing ATS incidents and filing of Air Safety Reports (ASRs) by airlines.

## **2. The air navigation service provider**

GCAA is an autonomous body which functions under the Ministry of Transport and supervised by a Board of Directors appointed by the Minister. It has representatives from some State institutions such as the Air Force, the ministry for transport, airline operators, etc. as members. It has a Director General as the Chief Executive Officer who is a member of the Board.

The provision of Air Navigation Services in Ghana is by the Ghana Civil Aviation Authority (GCAA) which is essential the Regulator of the aviation industry in Ghana. Technical and Economic regulation and Air Navigation Service provision all function under one management and administrative structure.

The Government of Ghana is 100% shareholder of GCAA. The GCAA is self-financing as the government does not provide any financial support to the organisation. It has the autonomy to plan its programmes, though the government does at times specify certain priority programmes that the organisation must undertake.

## **3. Major stakeholders/partners**

Ghana Air Force, Alitalia, British Airways, Brussels Airlines, Delta Airlines, United Airlines, Lufthansa, KLM, Virgin Atlantic, Eagle Nigeria, Emirates, Ethiopia Airways, Kenya Airways, South Africa Airways, Airik Airlines, Aero Contractors, Asky Airlines, Middle

East Airlines, Egypt Air, Air Maroc, Afriquiari, Air Namibia, Qatar Airways, Turkish Airlines, Air Ivoire, Air Portugal, Air Burkina, Air Mali, Air Senegal, Antrak, Citylink, Aerogem, Tullow, etc. Ghana Airports Company, General Aviation, Paragliding, WASP, Freight Forwarders, Banks, Customs, Immigration Service, Port Health, Security Services. Ghana Meteorological Agency provides ANS meteorological services to GCAA. An independent Accident Investigation group is established by the ministry to investigate all accidents and serious incidents.

### **Funding Sources**

Air Navigation Fees (En route, Approach and Aerodrome services fees) is the only source of funding. The government does neither provide funding to the industry nor the regulator. ANS fees are thus the primary source of funding for both ANS and Regulatory services, Search and Rescue Services. ANS fees also support the provision of ANS meteorological services and the independent Accident Investigation group under the ministry for transport.

### **4. Problem definition**

Current ANS systems are conventional ground based with its attendant propagation limitations, inadequate coverage over the oceanic area; maintenance of V-SAT facilities located in other countries pose challenges.

ANS infrastructure has challenges with HF and VHF Radios and V-SAT systems. There is a need to replace the VHF and HF radios in view of increasing growth in traffic to provide more reliable communication between ATC and pilots and also with adjacent ATS units.

Navigation equipment such as NDBs at some aerodromes needs to be replaced with better navigation equipment and/or GNSS/RNAV procedures. There is the need to establish SIDS/STARs and more RNAV/RNP routes.

The Accra Radar system is ten years old and experiencing frequent breakdowns. There is no surveillance coverage for a larger portion of the Oceanic airspace. There is the need to provide a more reliable surveillance service over the oceanic airspace and provide a backup for the single radar over the continental airspace.

V-SAT system is old and encountering outages. The Accra FIR extends from Latitude 11° N to 9°S. V-SAT is used to link radar and communication systems. There is therefore the need to acquire and install new V-SAT to increase availability, reliability, dependability and integrity of services.

There is congestion at the airport due to lack parking bays. This has increased ATC workload thus necessitating the need to separate Aerodrome Control from Ground Control services.

Training of Air Traffic Controllers and Engineering maintenance personnel has not kept pace with growth.

Ghana's AIP is out-dated; Approach and Landing charts have not been updated for ten years.

CNS systems with adjacent ATS units in Lagos, Kano, Luanda, Abidjan, Sao Tome, Niamey, and Ouagadougou are neither compatible nor interoperable.

## **5. Performance based National Air Navigation Plan**

The Accra FIR covers the upper airspace of Ghana, Togo and Benin and a large portion of the Atlantic oceanic. The FIR is part of Area or Routing Two (AR-2).

Major traffic flow patterns are as follows:

- West-East (Lagos-Accra-Abidjan) has the highest traffic flow
- North-South traffic flow between Europe and South Africa is the second highest

GCAA has decided to build a new Air Navigation Centre with new CNS/ATM systems which meet the ICAO Performance Based Navigation requirements and the Global ATM Operational Concept guidelines.

As part of the process, a series of stakeholders' meetings are planned with the ATM Community and adjacent FIRs to establish a Business Case for establishing the ANS centre with new systems.

### **Operational Enhancement at the Kotoka Int'l Airport**

Traffic has increased to the Kotoka Int'l Airport which is the main international airport of entry point to Ghana by air. In recent times Bilateral Air Services Agreements with other countries were signed by the Economic Regulator. Approvals have been given to many airlines to increase their frequency of operations to the KIA. Approvals have been given to new airlines to operate to KIA. There is no Slot Allocation system in operations at the KIA. Most of the long haul regional and continental flights operate to the KIA at night. There are few Parking Bays at the KIA with only a few of them able to accommodate aircraft operated by the major regional and continental airlines. There are delays up to twenty (20) minutes for some arriving aircraft before parking.

The Seat of Government and Presidential Office which is almost aligned to the runway is situated about 5nm from the end of the main runway (RWY 21). Besides the main Air Force Base, military installations and ministry of defence office is just at the port side of the main runway. The military hospital and national radio and TV broadcasting facility are starboard of the main runway, just 2-3nm from the end.

To avoid flights over these sensitive and security facilities, a Noise Abatement Procedure is published as part of the departure procedures at KIA. There have been several reports of aircraft flying over the Restricted Areas and infringing the Noise Abatement procedures.

The runway length was increased by displacing the threshold 300nm northwards to enable airlines operate full payload from Accra direct to long distant destinations and also to reduce the noise footprints over the sensitive national areas. The Taxiway however was not extended to link the new displaced runway threshold. Aircraft departing from the displaced threshold enter and backtrack on the runway.

Following complaints from the security agencies, directives have been issued requesting all departing aircraft with take-off weight above 57,000 tons to use the displaced threshold for departure.

Since the KIA has a single runway, this directive has increased runway occupancy time for departing aircraft and affected the previously flowing Arrival Sequence of landing aircraft. The directive does not give air traffic controllers the flexibility to manage the traffic flow efficiently. Only one arrival Holding Pattern is published for the KIA with the ACC VOR/DME 1nm from the runway threshold as the Holding Fix. The Ghana Air Force training aircraft at KIA competes with commercial and civil aircraft for the departure and arriving order of priority.

The signage, aerodrome markings and Apron lights at KIA are inadequate and posed problems for taxiing aircraft at night.

There is a significant increase in ATS incidents in aerodrome and ground operations and this is a major safety concern to all stakeholders.

The Presidential Lounge at the KIA is just 120 m from the Taxiway. The airport is closed to traffic for about one hour by the issuance of NOTAM whenever there are VVIP departures or arrivals.

## GHANA national performance objectives for the air navigation infrastructure –

### Enhance Aerodrome and Approach Operations at KIA

<b>ANS Systems</b>	<b>Gap Analysis</b>	<b>Near Term Ops Improvements</b>	<b>Med Term Ops Improvements</b>
<b>Communication Sys</b>			
VHF Radio (Main) VHF Radio (Stand by) ATS DSC Internal Communication sys	70% reliable Ok Ok Poor, cluster of different systems	Replacement NIL NIL Additional personnel to handle Comms	New Comms CPDLC New workstation New workstation
<b>Navigation</b>			
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Holding Patterns GNSS/RNAV/PBN SIDS/STARS	Inadequate NIL NIL	Publish new HP, GNSS/RNAV and SIDS/STARS based on traffic flows	Airspace Reorganisation and PBN
<b>Surveillance</b>			
PSR and SSR  Brite Radar at Tower SMGS at Tower	Single radar, 70% availability with no backup radar NIL NIL	Refresher non radar training	MSSR MULTILAT
<b>Air Traffic Management</b>			
Slot Allocation Sys Noise Abatement Arrival Sequencing sys Enter and backtrack  Aerodrome Control Ground Control	NIL Infringed often NIL Lack of procedures  Inadequate ATCOs  Not activated	Training and Refresher training; Implement Slots sys RNAV/SIDS/STARS Sequencing Tool; Meet Stakeholders;  Additional ATCOs Activate Ground Control	New airspace concept

**Performance framework forms (PFFs):** See PFF

### Risk Management

Register with the IATA billing for collection of ANS fees and create an escrow account with agreement of some major airlines to fund improvements.

STRATEGIC OPERATIONAL IMPROVEMENT/ GHANA NATIONAL PERFORMANCE OBJECTIVE – 1 <b>ENHANCE AERODROME AND APPROACH CONTROL OPERATIONS AT KIA, ACCRA</b>	
<b>Performance Benefits</b>	
<b>Safety</b>	1. Reduction in ATS incidents by 30% to improve Safety
<b>Environment</b>	1. Reduced emissions through shorter flights and use of optimum routes/trajectories and Noise Footprint
<b>Capacity</b>	1. Increased capacity through better utilization airspace resources, reduces delays
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<b>Metrics</b>	1. Number of PBN and RNAV/GNSS Approach Procedures implemented

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**Strategy  
Medium term (2011 - 2016)**

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	8. Improve civil/Military coordination, provide data sharing with the military and publish a Civil/Military Coordination Manual	June 2011	Agbelema Kofigah, ATS operations	Joint training with Air Force personnel
	9. Implement new AIM, eAIP, digital NOTAM, AMHS, New ICAO Flight Plan systems	June 2012	Adwengo Kwelewele, AIM Officer	Seeking ICAO TCB

	10. Install new AWOS and RVR system	October 2011	Shito Komeyke	Procurement process
<b>Risk Management</b>	Risk factors: lack of funding; delay in aircraft equipage; Insufficient databases			
	Risk mitigation Register with the IATA billing for collection of ANS fees and create an escrow account with agreement of some major airlines to fund improvements.			
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Performance Benefits				
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<b>AO, DCB, TS</b>	11. Formulate aerodrome	March 2010	John Amediou	Studies



<b>and CM</b>	concept and determine near term operational improvements		GACL, GAF, Airlines	conducted
	12. Improve surface movement and guidance control systems through provision of signage, naming of taxiways routes and runway entry/exit points, improved aerodrome ground lighting	June 2011	Hans Adu, Dir Ops, GACL	Approval of proposed names
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	aerodromes			Test
	21. Implement meteorological down links at MET and ATS units	Dec 2011	Ben Eshun	Network cabling
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	24. Rapid exit taxiways and parallel runways, Link taxiway to displaced threshold	July 2012	Ama Fynn	Design phase
	25. Non-navigational visual aids such as PAPI	Dec 2012	Kojo Sey	Selection of vendor
<b>Project Outcome</b>	Enhanced capacity and efficiency of aerodrome operations.			
<b>Risk Management</b>	Risk factors: lack of funding; lack of technical expertise; insufficient data			
	Risk mitigation: Access ECOBANK Loan; involvement of aircraft operators in the decision making; access to commercial databases; engage a consultant			
<b>Linkage to GPs</b>	GPI/5: performance-based navigation; GPI/9: situational awareness; GPI/13: Aerodrome design and management; GPI/14: Runway operations; GPI/15: Matching IMC and VMC operating capacity; GPI/17: Data link applications; GPI/18: Aeronautical information; GPI/19: Meteorological systems; GPI/20: WGS-84; GPI/21: Navigation systems; and GPI/22: Communication infrastructure.			