STEP 1

IACM
INSTITUTO DE AVIAÇÃO CIVIL DE MOÇAMBIQUE

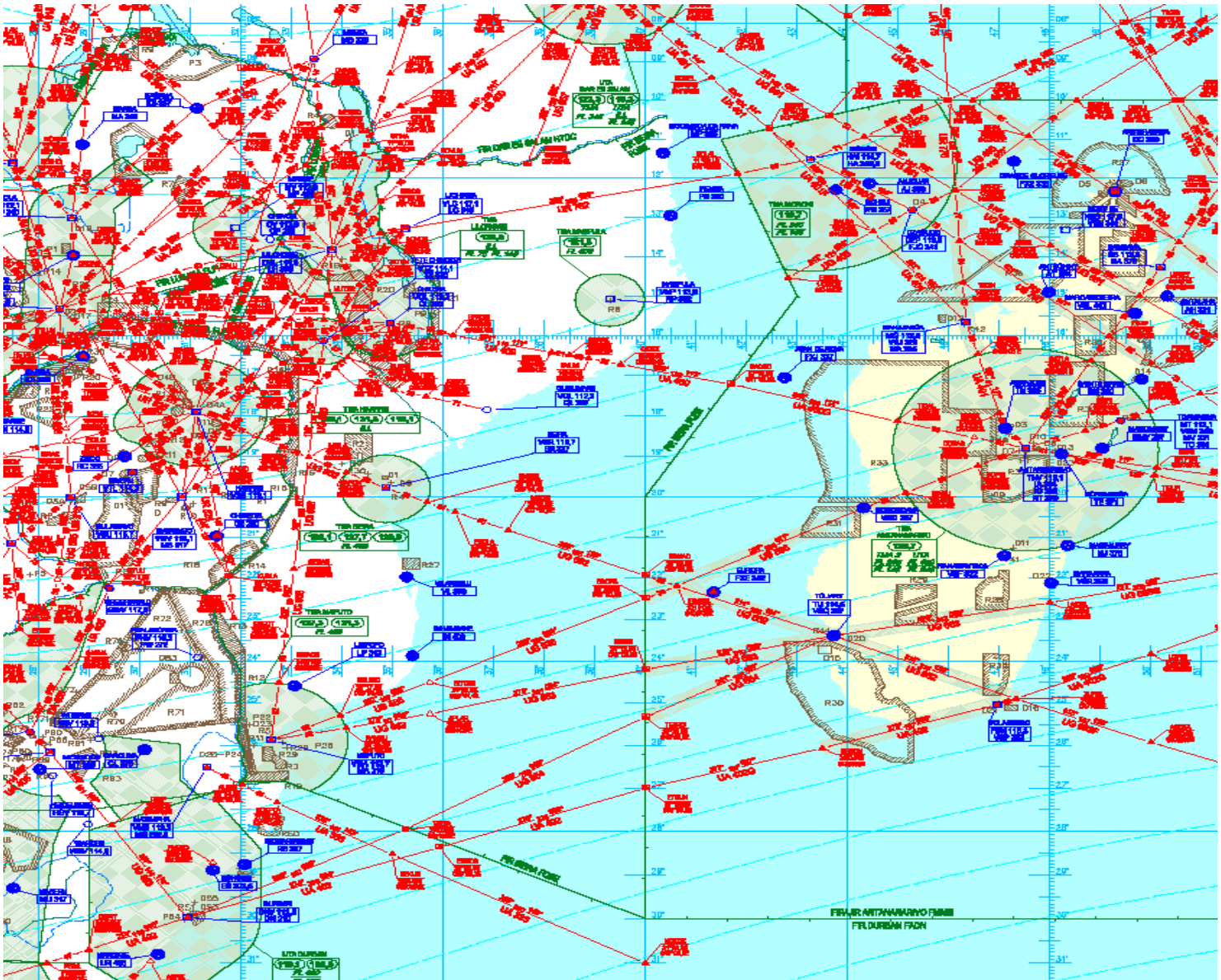
Mustapher Bakari

Emanuel Chaves

MOZAMBIQUE

IACM

INSTITUTO DE AVIAÇÃO CIVIL DE MOÇAMBIQUE



IACM
INSTITUTO DE AVIAÇÃO CIVIL DE MOÇAMBIQUE

AIRPORT NETWORK

Airport upgrade

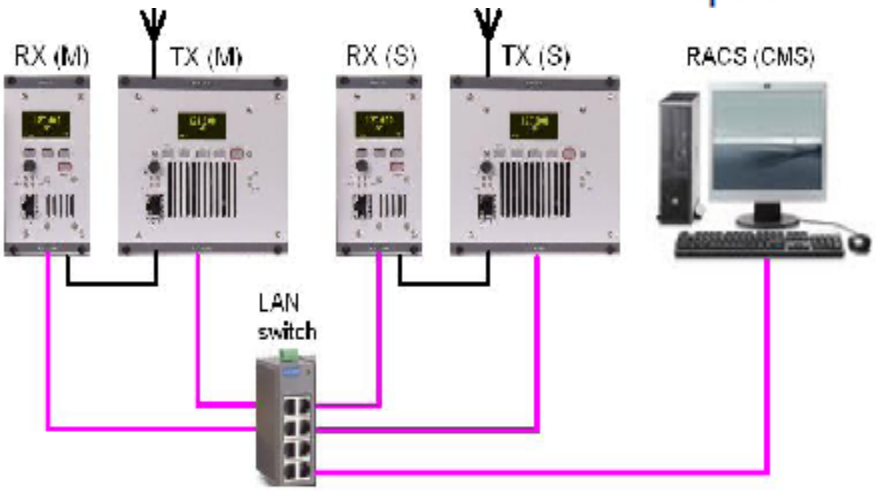
	2011	2026
Aircraft	87.500	192.500
Pax	1560000	4000000

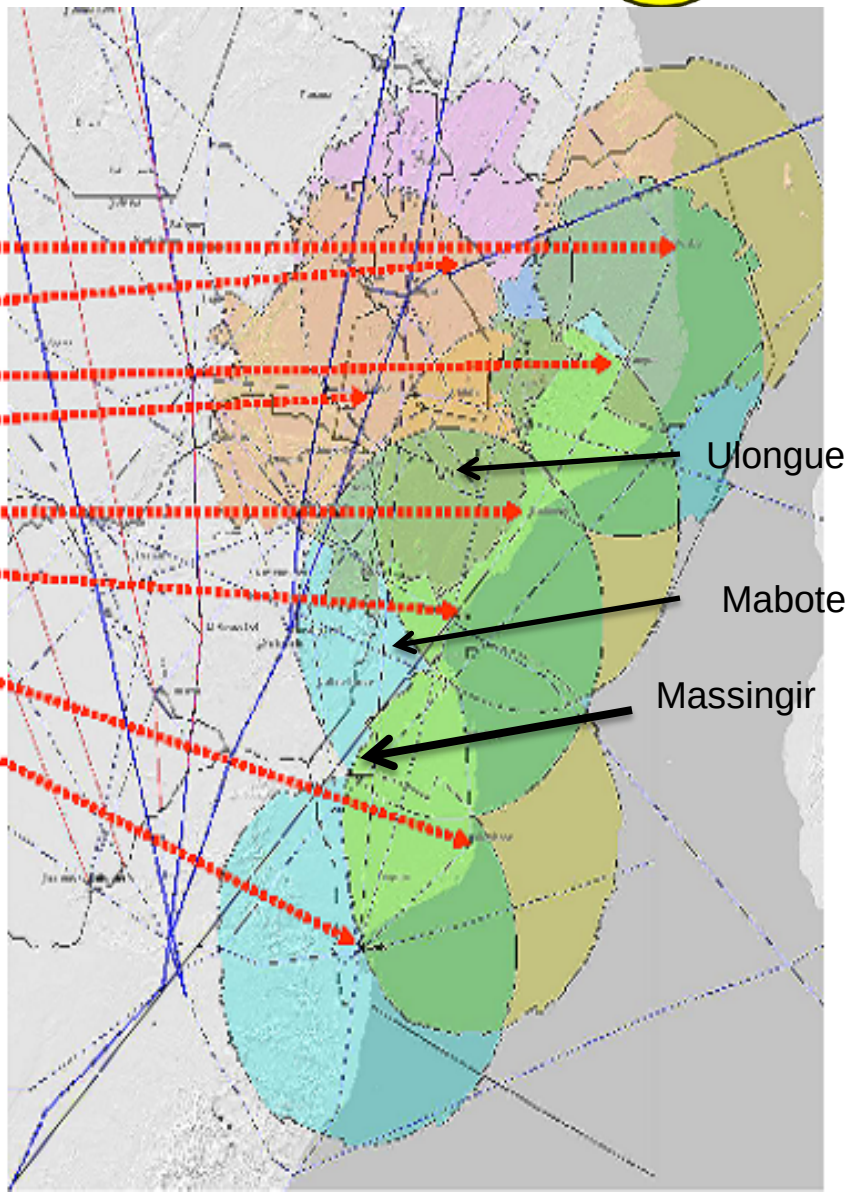
Landing Facilities

VHF Coverage/AFTN

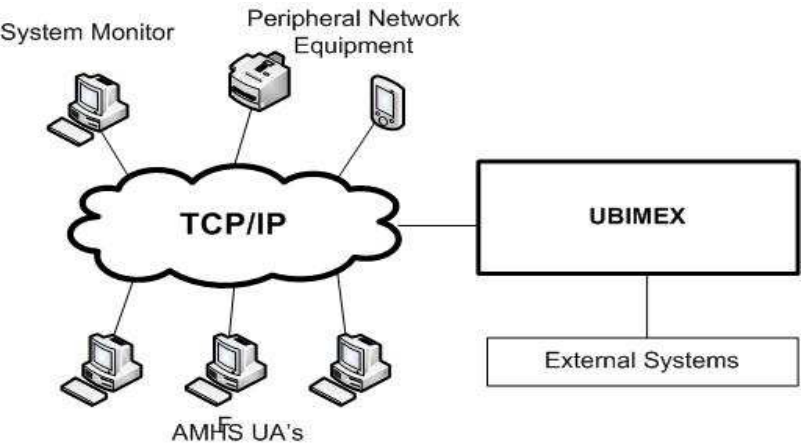
11 ACC VHF Stations

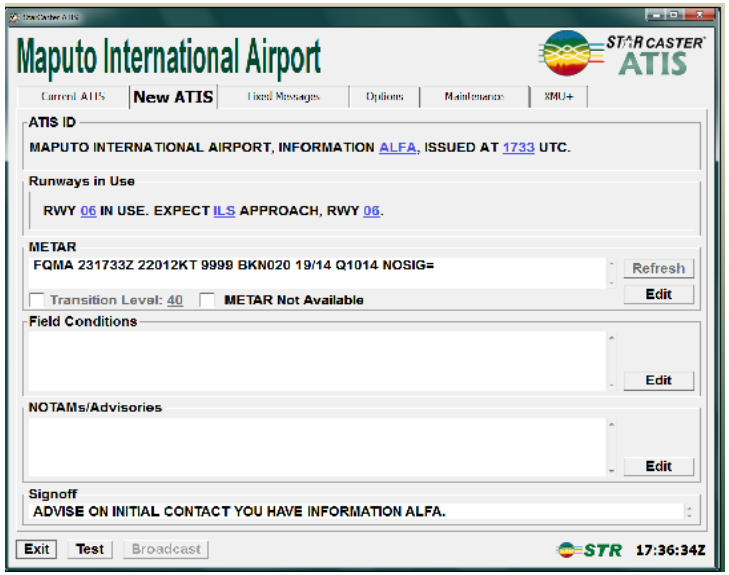
- Pemba
- Lichinga
- Nampula
- Songo
- Quelimane
- Beira
- Inhambane
- Maputo

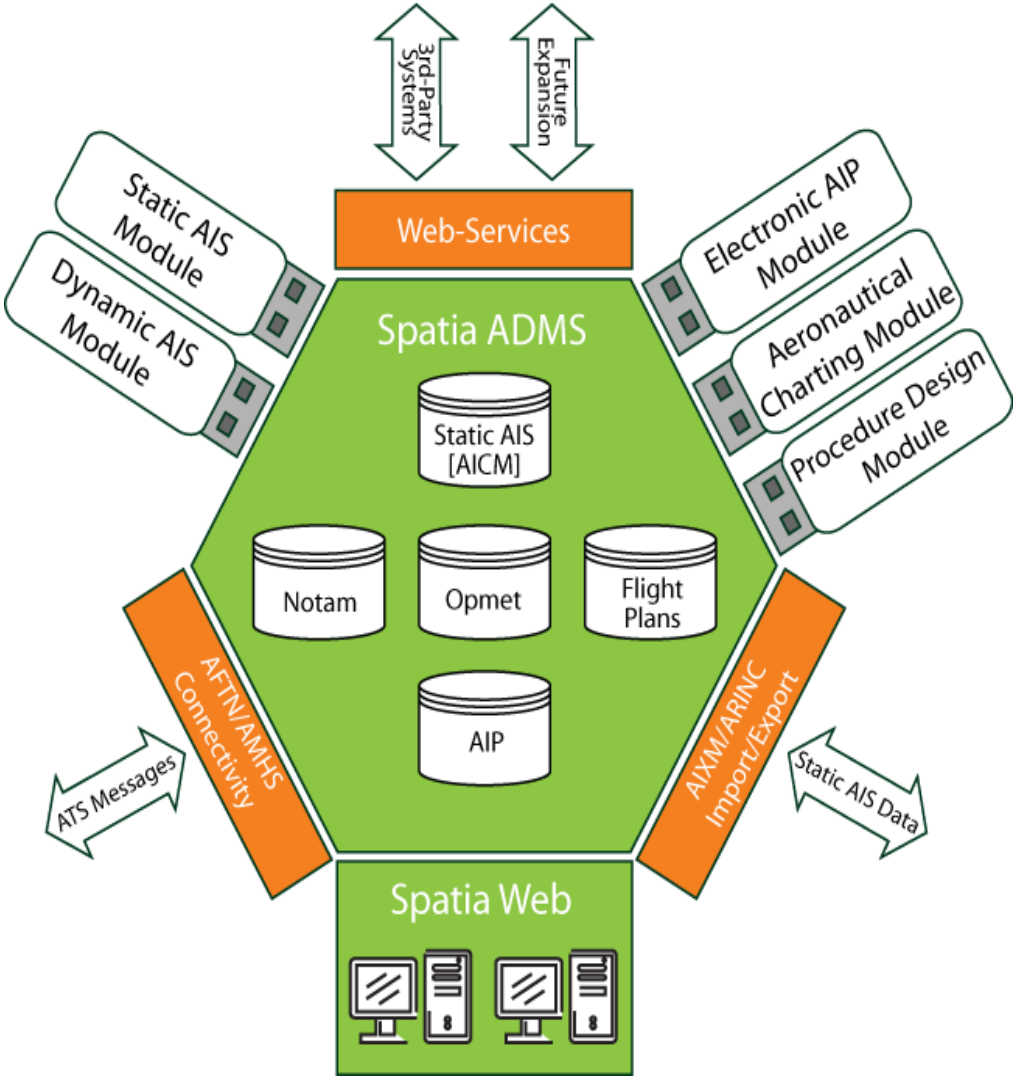




AMHS/AIS/ATIS







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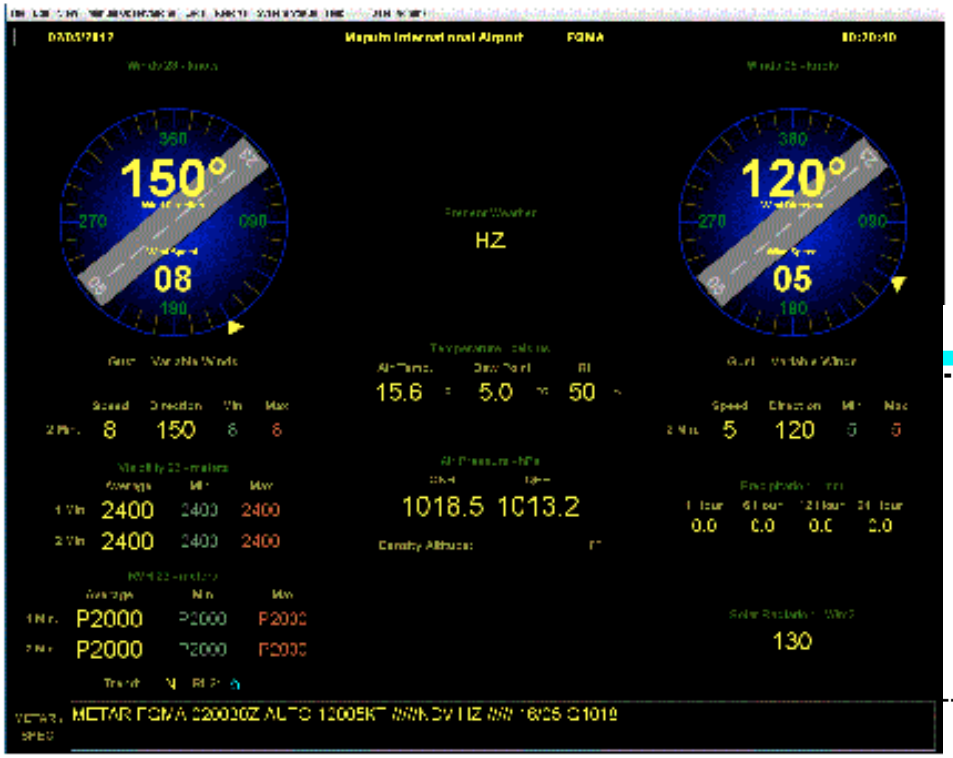
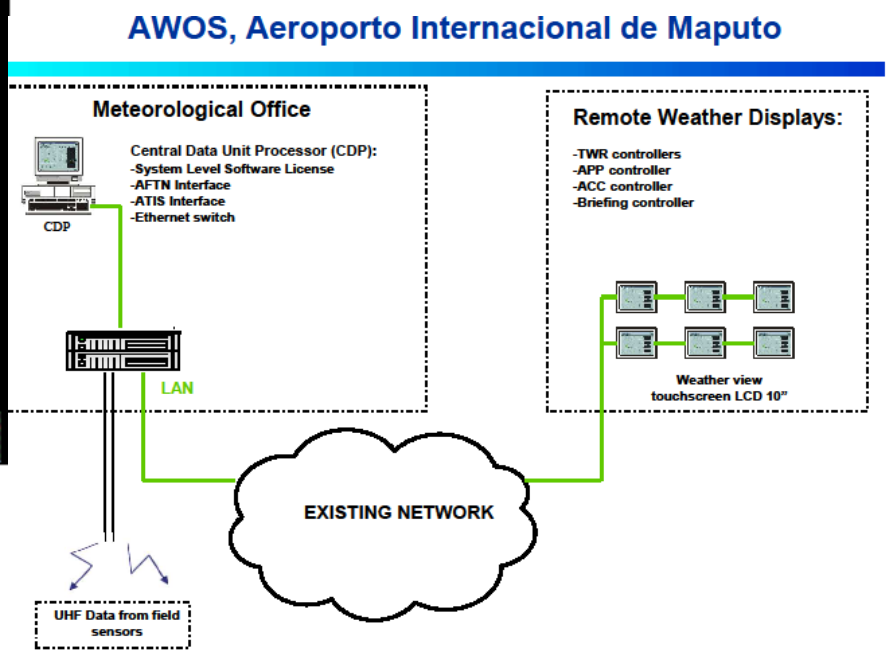

150°
08
HZ
15.6
5.0
50
8
150
2400
P2000
1018.5
1013.2
130
120°
05
5
METAR FQMA


AWOS, Aeroporto Internacional de Maputo
Meteorological Office
Central Data Unit Processor (CDP):
-System Level Software License
-AFTN Interface
-ATIS Interface
-Ethernet switch
CDP
LAN
Remote Weather Displays:
-TWR controllers
-APP controller
-ACC controller
-Briefing controller
Weather view touchscreen LCD 10"
EXISTING NETWORK
UHF Data from field sensors

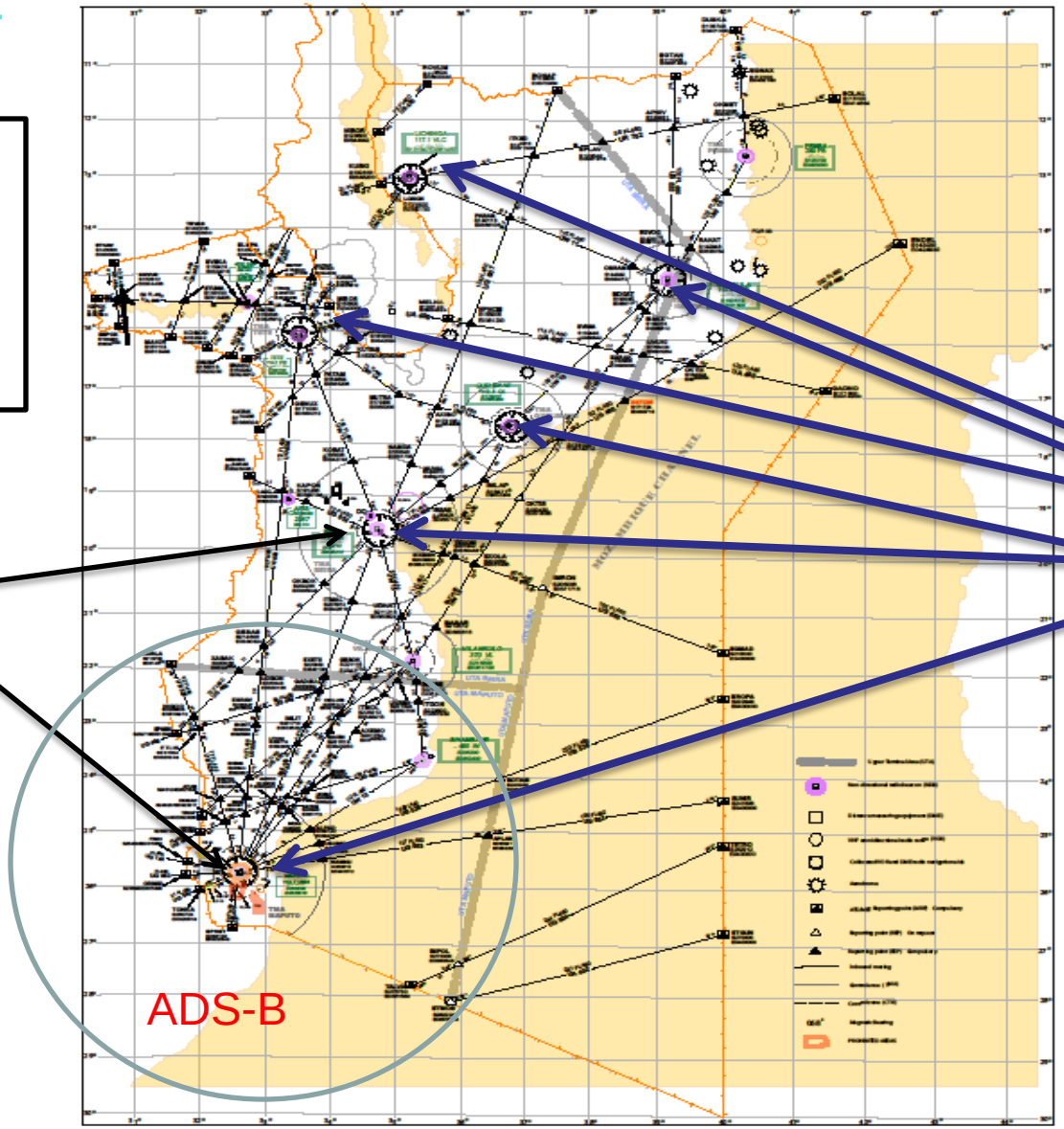
ENR 6. EN-ROUTE CHART

ENR 6.2 UPPER ATS ROUTES

RNAV APCH;
NBDs
10
Airports

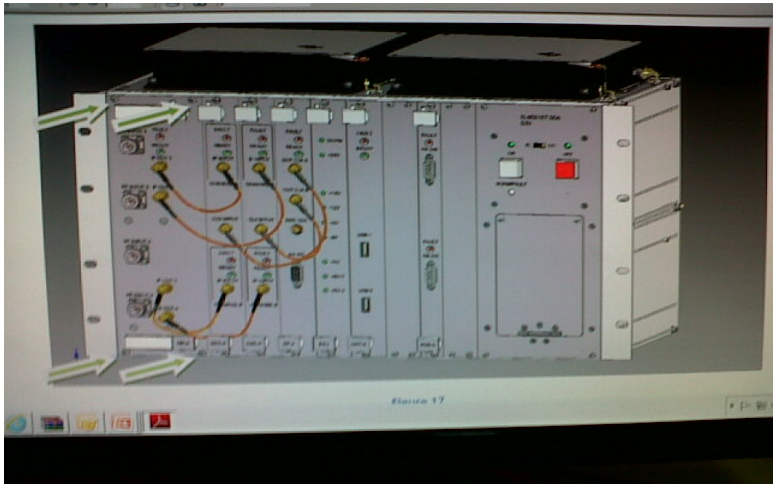
2
ILS/ DME
SID/STARS

6
DVOR
/ DME



ADS-B/ATM

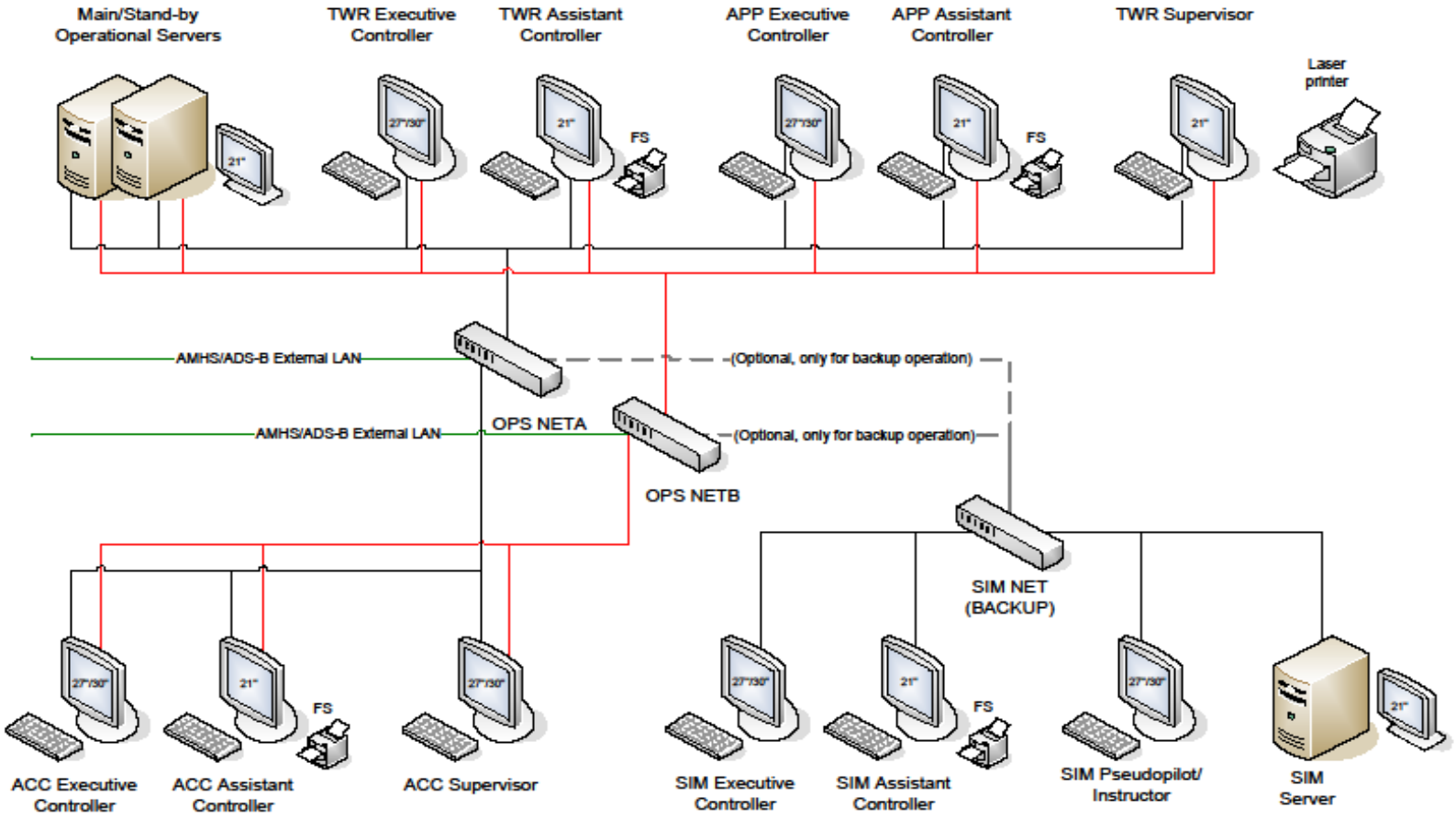
2012.7.18 13:27



2012/07/11
Ponta_De_Ouro
USUMO
NAMKU
EXEMA
EXANU
EGPON
ATUSI
TEVAP
OKMAD
TETEN
ORNAD
EPRET
B(T) : 197.7/R : 89.8
B(T) : 90.0/R : 0.0
B(T) : 187.3/R : 13.6
B(T) : 40.3/R : 4.0
B(T) : 82.2/R : 102.3 [T : 11:30:22]
B(T) : 80.0/R : 22.4
B(T) : 64.5/R : 11.0

RADAR/ADS-B SIMULATOR

Maputo International Airport (MPM)
ADS-B/ATM & Simulator Display Systems



STEP 2

Review 18 modules

	Module	Needs	Reason
PIA 1 Airport Operations	**B0-15** **Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)**	**Y**	
	B0-65 - Optimization of Approach Procedures including Vertical Guidance	**N**	Good wx most of the time
	B0-70 **Increased Runway Throughput through Wake Turbulence Separation**	**N**	Low Traffic Volume & mix
	B0-75 **Improved Runway Safety (A-SMGCS)**	**N**	Good wx & Low Traffic
	B0-80 **Improved Airport Operations through ACDM**	**Y**	

	Module	Needs	Reasons
PIA 2 Globally Interoperable Systems and Data	B0-25 Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	Y	
	B0-105 – Meteorological information supporting enhanced operational efficiency and safety	Y	
	B0-30 Service Improvement through Digital Aeronautical Information Management	Y	

	Module	Needs	Reasons
PIA 3 **Optimum Capacity and Flexible Flights**	**B0-10: Improved Operations through Enhanced En-Route Trajectories**	Y	
	B0-35:Improved Flow Performance through Planning based on a Network-Wide view	N	Low Traffic
	B0-101 ACAS Improvements	Y	
	B0-85: Air Traffic Situational Awareness (ATSA)	N	Low Traffic & availability of ACAS is sufficient
	B0-86: Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	Y	
	B0-84 – Initial surveillance capability ADS-B Out, MLAT	Y	
	B0-102 – Baseline Ground-based Safety Nets	Y	

	Module	Needs	Reasons
PIA 4 Efficient Flight Path	B0-05 Improved Flexibility and Efficiency in Descent Profiles (CDOs)	Y	
	B0-20 Improved Flexibility and Efficiency in Departure Profiles	Y	
	B0-40 Improved Safety and Efficiency through the initial application of Data Link En-Route	Y	

STEP 3

REGIONAL/NATIONAL PERFORMANCE OBJECTIVE
IMPROVED OPERATIONS THROUGH ENHANCED
EN-ROUTE TRAJECTORIES (ASBU B0-10)
Performance Improvement Area 3:
Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

ASBU B0-10: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	Y	Y	Y	Y	N

ASBU B0-10: Implementation Progress

Elements	Implementation Status (Ground and Air)
1. Airspace planning and application of CDM	60%
2. Flexible Use of Airspace	90%
3. Flexible Routing –Enroute PBN	0%

ASBU B0-10: Implementation Roadblocks/Issues

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. Airspace planning and application of CDM	**na**	**na**	**Proc. Not yet available**	**na**
2. Flexible Use of Airspace	National covarage FDPS	Increased equippage	**Proc. Not yet available**	na
3. Flexible Routing –Enroute PBN	En route WGS-84	Increased equippage	**PBN en route Proc. Not yet available**	Not yet

REGIONAL/NATIONAL PERFORMANCE OBJECTIVE
IMPROVED OPERATIONS THROUGH ENHANCED EN-ROUTE TRAJECTORIES (ASBU B0-15)
Performance Improvement Area 1:
Airport Operations – Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)

ASBU B0-15: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	Y	Y	N	N

ASBU B0-15: Implementation Progress

Elements	Implementation Status (Ground and Air)
1. AMAN	80%
2. DMAN	80%

ASBU B0-10: Implementation Roadblocks/Issues

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. AMAN	**na**	**na**	procedures for the extension of metering	**To be approved**
2. DMAN	**na**	**na**	procedures for the extension of metering	To be approved

REGIONAL/NATIONAL PERFORMANCE OBJECTIVE
IMPROVED OPERATIONS THROUGH ENHANCED EN-ROUTE TRAJECTORIES (ASBU B0-05)
Performance Improvement Area 1:
Efficient Flight Path– Improved Flexibility and Efficiency in Descent Profiles (CDOs)

ASBU B0-05: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	Y	Y	N	N

ASBU B0-05: Implementation Progress

Elements	Implementation Status (Ground and Air)
1. CDO	0%
2. PBN STARS	100%

ASBU B0-05: Implementation Roadblocks/Issues

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. CDO	**na**	**na**	Developing guidelines and Procedures	**To be approved**
2. PBN STARS	**continue implementing CNS/ATM**	**na**	Continue implementing guidalines from Doc 9613	Additional approvals

STEP 4

Module	KPA	Related Performance Metrics
B0-05 Improved Flexibility and Efficiency in Descent Profiles (CDOs)	Efficiency	Kilograms of fuel saved per operation
		Percentage of PBN routes
	environment	Kilograms of CO_2 emissions reduced per operation
B0-10 Improved Operations through Enhanced En-Route Trajectories	Access	Percentage of requested flight level vs cleared flight level
	Capacity	Number of aircraft entering a specified volume of airspace per hour
	Efficiency	Kilograms of fuel saved per operation
		Percentage of PBN routes
	Environment	Kilograms of CO_2 emissions reduced per operation

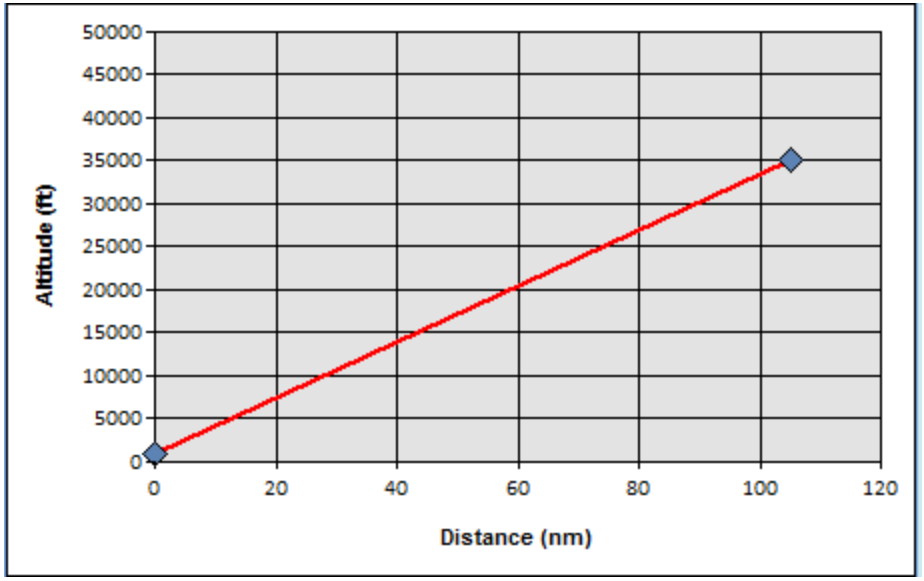
Module	KPA	Related Performance Metrics
B0-15 Improved Runway Traffic Flow through Sequencing (AMAN/DMAN)	Capacity	Number of movements per day per aerodrome
		Number of aircraft entering a specified volume of airspace per hour
	Efficiency	Kilograms of fuel saved per operation
		Percentage of PBN routes

STEP 5 to 7

Fuel Saving Report

Scenario	Old Fuel Consumption (Kg)	New Fuel Consumption (Kg)	Savings (Kg)	Savings (%)
AAAA	310400	293600	-16800	-5.4
AB	770700	656700	-114000	-14.8
AB1	6200	5600	-600	-9.7
BBBB	47300	47300	0	0.0

AAAA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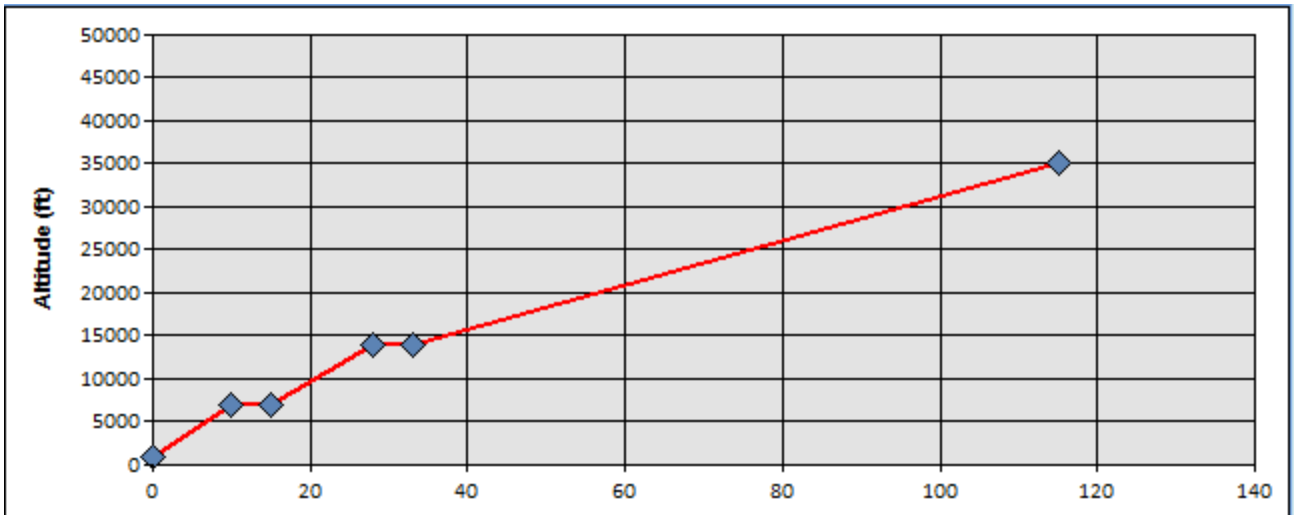
100
120
Distance (nm)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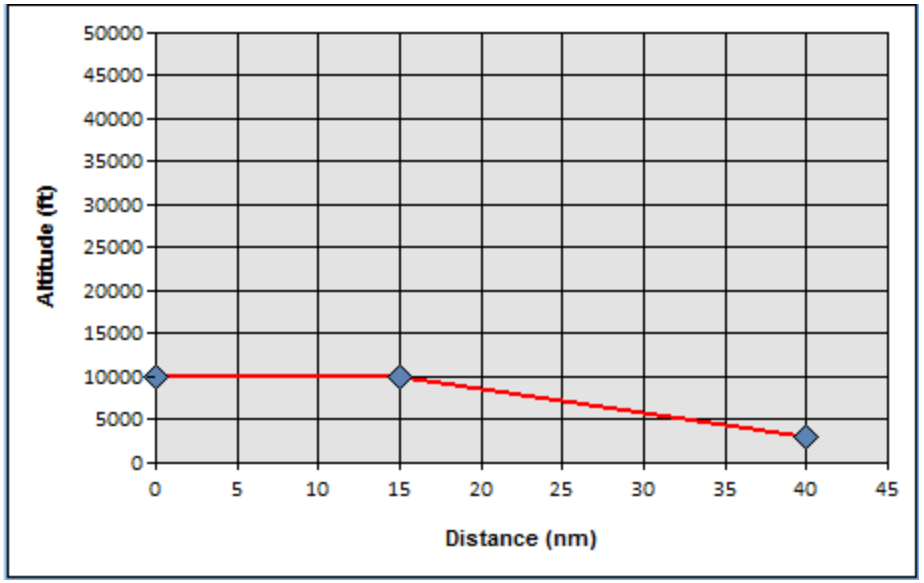
BBBB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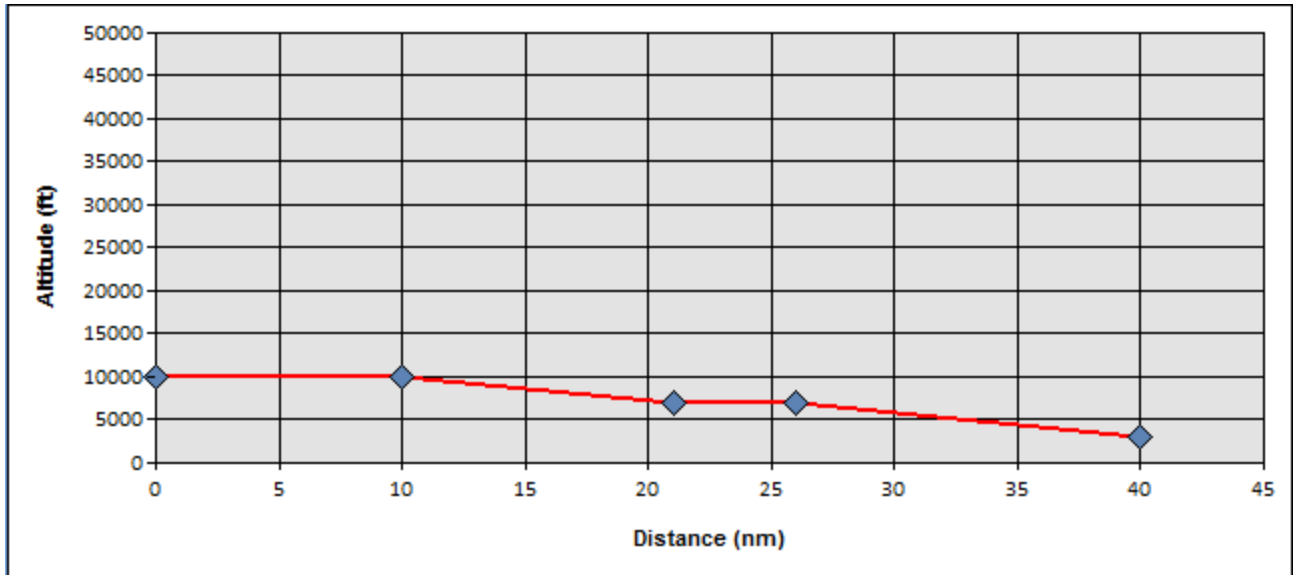
Distance (nm)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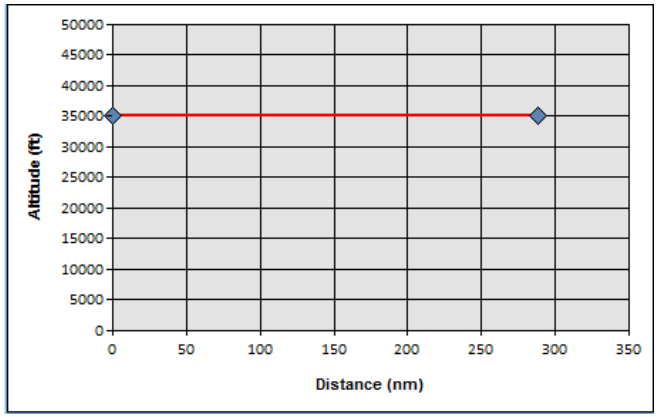
Distance (nm)

AB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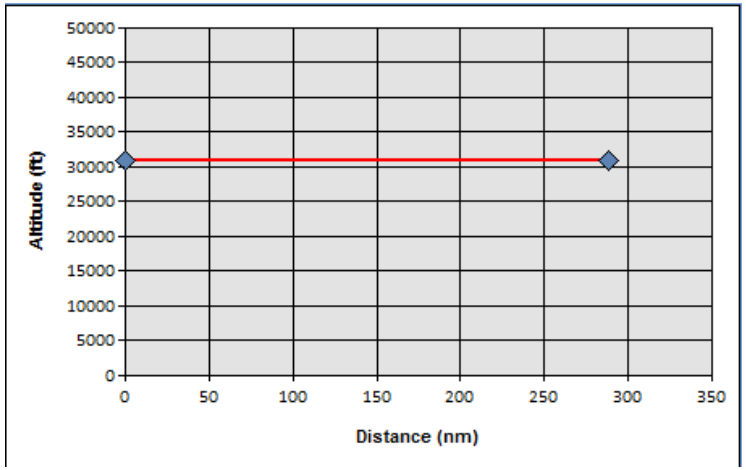
Distance (nm)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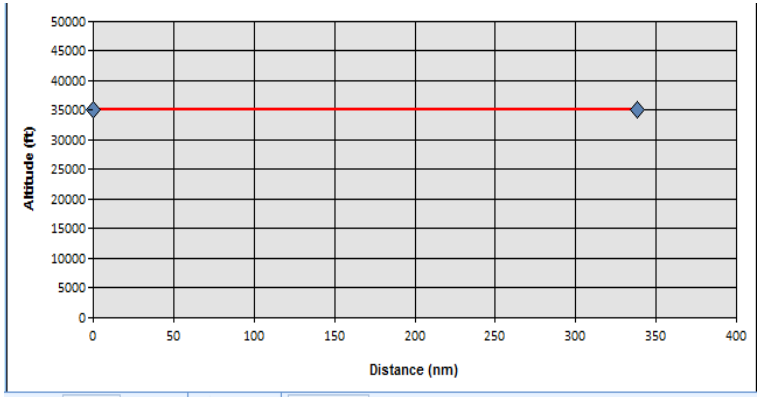
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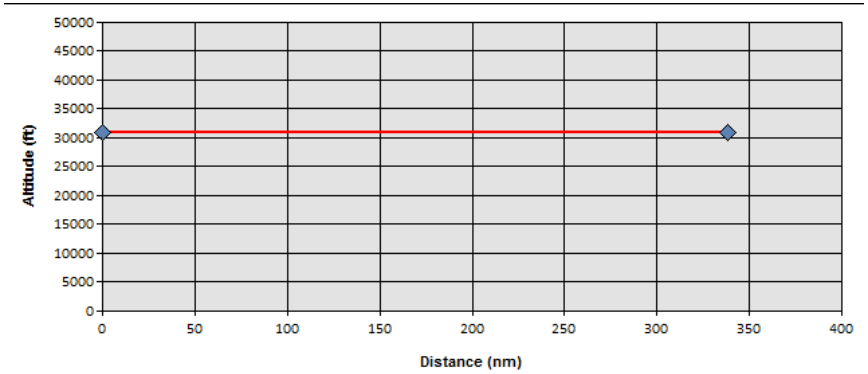
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Distance (nm)

STEP 8 & 9

GIS

Remarks

- In IFSET program include Aircrafts like B787, B747-800, which are already operational
- the IFSET exercise 3 is not clear