BOTSWANA
ASBU Workshop-Exercises

Performance Based Planning
and
use of IFSET

Team Members

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BOTSWANA INFRASTRUCTURE

Botswana is approximately the size of Kenya, France and Texas.

Air Navigation Systems :

- Multiple conventional airways,
- RNP 10 & 5 airways
- Conventional TMAs & Approaches
- PSR & SSR in Gaborone and one SSR in Maun
- VHF
- Class A- FL150+, C-FL145 & below and G elsewhere
- Four Airports, Meteorological stations and many Airstrips

PIA 1 Airport Operations – Through ACDM

MODULE	MODULE DESCRIPTION	Y/N	Justification
B0-15	Improved Runway Traffic Flow through Sequencing (AMAN/DMAN	No	Nil multiple RWYs
B0-75	Improved Runway Safety (A-SMGCS	No	Low TFC
B0-65	Optimization of Approach Procedures including Vertical Guidance	Yes	
B0-80	Improved Airport Operations through ACDM	Yes	
B0-70	Increased Runway Throughput through Wake Turbulence Separation.	No	Low TFC

PIA 2 Globally Interoperable Systems and Data - Through SWIM

B0-25	Increased Interoperability, Efficiency and Capacity through Ground-Ground	Yes	
B0-30	Service Improvement through Digital Aeronautical Information Management	Yes	
B0-105	Meteorological information supporting enhanced operational efficiency and safety	Yes	

PIA 3 Optimum Capacity and Flexible Flights-Through CDM

B0-10	Improved Operations through Enhanced En-Route Trajectories	Yes	
B0-85	Air Traffic Situational Awareness	Regional	Amend Doc 7474
B0-86	Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	Regional	Amend Doc 7474
B0-35	Improved Flow Performance through Planning based on a Network-Wide view	No	Low TFC
B0-101	ACAS Improvements	Yes	Doc 7474
B0-84	Initial surveillance capability ADS-B Out, MLAT	Yes	
B0-102	Baseline Ground-based Safety Nets	Yes	

PIA 4 Efficient Flight Path– Through TBO

B0-05	Improved Flexibility and Efficiency in Descent Profiles (CDOs)	Yes	
B0-40	Improved Safety and Efficiency through the initial application of Data Link En-Route	Yes	
B0-20	Improved Flexibility and Efficiency in Departure Profiles	Yes	

Improved Airport Operations through ACDM
(ASBU B0-80)

Performance Improvement Area 1:
Airport Operations – Through ACDM

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

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

ASBU B0-80: Implementation Progress

Elements	Implementation Status (Ground and Air)
1. Airport –CDM supported by Interconnection of various partners' information systems	Develop processes that enhance ACDM with the involvement of all stakeholders (concerned members of the ATM Community)
2.Aerodrome certification and planning	
3. Aerodrome emergency planning	
4. Heliport operations	

ASBU B0-80: Implementation Roadblocks/Issues

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. Airport –CDM supported by Interconnection of various partners' information systems	Nil	Nil	Required- TBD	Required- TBD

ASBU B0-80: Performance Monitoring and Measurement (Infrastructure)	
Infrastructure/Implementation referring to elements of the Module	**Performance Metrics**
1. Airport –CDM supported by Interconnection of various partners' information systems	No of stakeholders involved

ASBU B0-80: Performance Monitoring and Measurement(KPAs)	
Module benefits to Key Performance Areas	**Performance Metrics**
Access & Equity	N/A
Capacity	Number of movements per day per aerodrome
Efficiency	Kilograms of fuel saved per operation
Environment	Kilograms of CO_2 emissions reduced per operation
Safety	N/A

Initial Capability for Ground-based Cooperative Surveillance
(ASBU B0-84)

Performance Improvement Area 3:
Optimum Capacity and Flexible Flights – Through CDM

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

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

ASBU B0-84: Implementation Progress

Elements	Implementation Status (Ground and Air)
1. ADS-B	In plan
2.MLAT	To be considered

ASBU B0-84: Implementation Roadblocks/Issues

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. ADS-B	Required	Required	Required	Required
2. MLAT	Required	Required	Required	Required

ASBU B0-84: Performance Monitoring and Measurement (Infrastructure)	
Infrastructure/Implementation referring to elements of the Module	**Performance Metrics**
1. ADS-B	No. of ADSB ground stations installed

ASBU B0-84: Performance Monitoring and Measurement(KPAs)	
Module benefits to Key Performance Areas	**Performance Metrics**
Access & Equity	N/A
Capacity	Number of movements per day per aerodrome
Efficiency	N/A
Environment	N/A
Safety	1. Number of runway incursions per aerodrome per year 2. Number of incidents/accidents due to MET conditions

Improved Flexibility and Efficiency in Descend Profiles (ASBU B0-05)

Performance Improvement Area 4: Efficient flight path– Through TBO

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

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

ASBU B0-05: Implementation Progress

Elements	Implementation Status (Ground and Air)
1. CDO	TBD
2.PBN STARs	TBD

ASBU B0-05: Implementation Roadblocks/Issues

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. CDO	Nil	Nil	Required	Required
2. PBN STARs	Nil	Nil	Required	Required

ASBU B0-05: Performance Monitoring and Measurement (Infrastructure)	
Infrastructure/Implementation referring to elements of the Module	**Performance Metrics**
1. CDO	No. of CDO and PBN approach procedures implemented
2. PBN and STARs	

ASBU B0-05: Performance Monitoring and Measurement(KPAs)	
Module benefits to Key Performance Areas	**Performance Metrics**
Access & Equity	N/A
Capacity	N/A
Efficiency	No. PBN routes
Environment	% of fuel saved per operation
Safety	1.Stabilized approaches 2.Reduced missed approaches/CFIT

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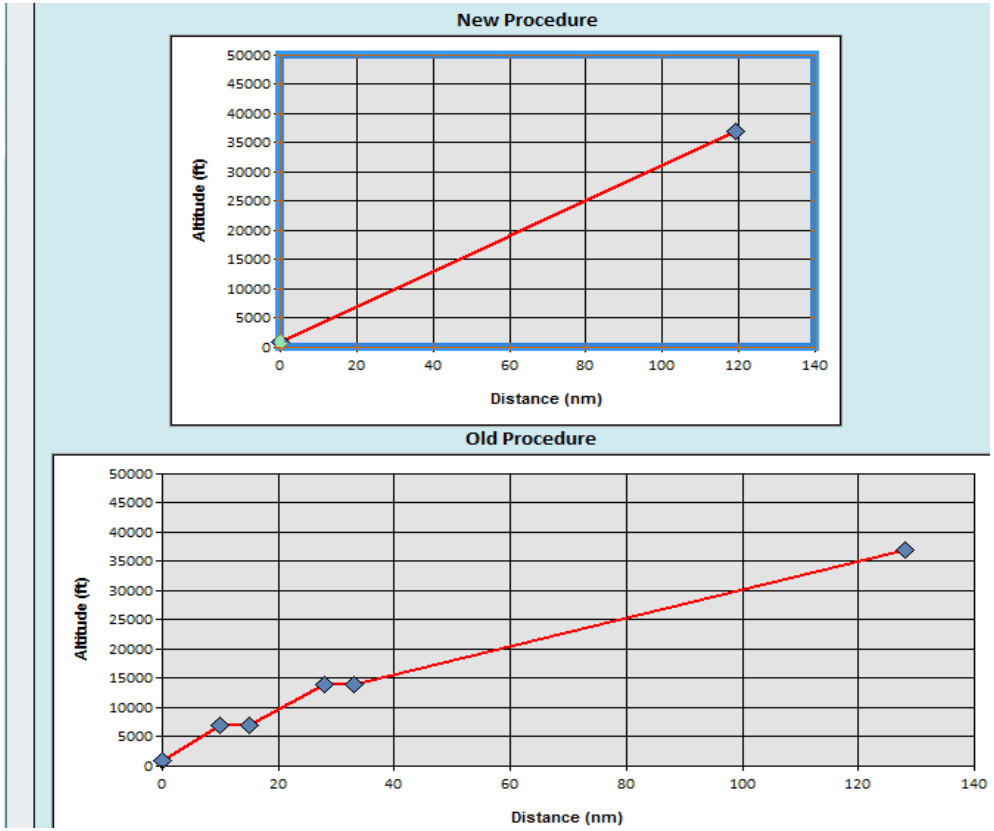
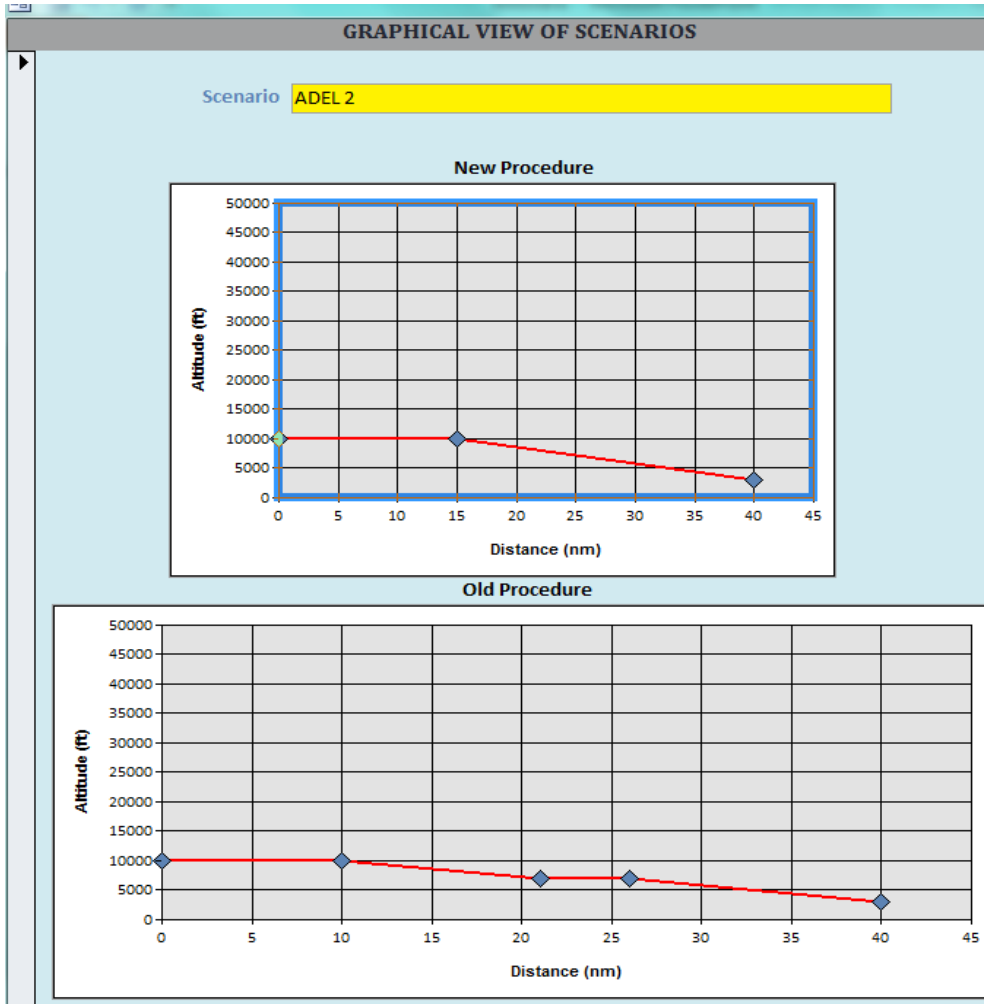
SUMMARY FOR FUEL SAVINGS

	A	B	C	D	E
1	Scenario	Old Fuel Consumption in K	New Fuel Consumption in Kg	Savings in Kg	Savings(%)
2	ADEL	328200	311400	-16800	-5.1
3	ADEL 2	47300	47300	0	0.0
4	ADEL 3	694900	592700	-102200	-14.7
5	ADEL 4	87500	74500	-13000	-14.9

ADEL 1


New Procedure
Altitude (ft)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
120
140
Distance (nm)
Old Procedure
Altitude (ft)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
120
140
Distance (nm)

ADEL 2


GRAPHICAL VIEW OF SCENARIOS
Scenario
ADEL 2
New Procedure
Altitude (ft)
50000
45000
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25000
20000
15000
10000
5000
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5
10
15
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30
35
40
45
Distance (nm)
Old Procedure
Altitude (ft)
50000
45000
40000
35000
30000
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10000
5000
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15
20
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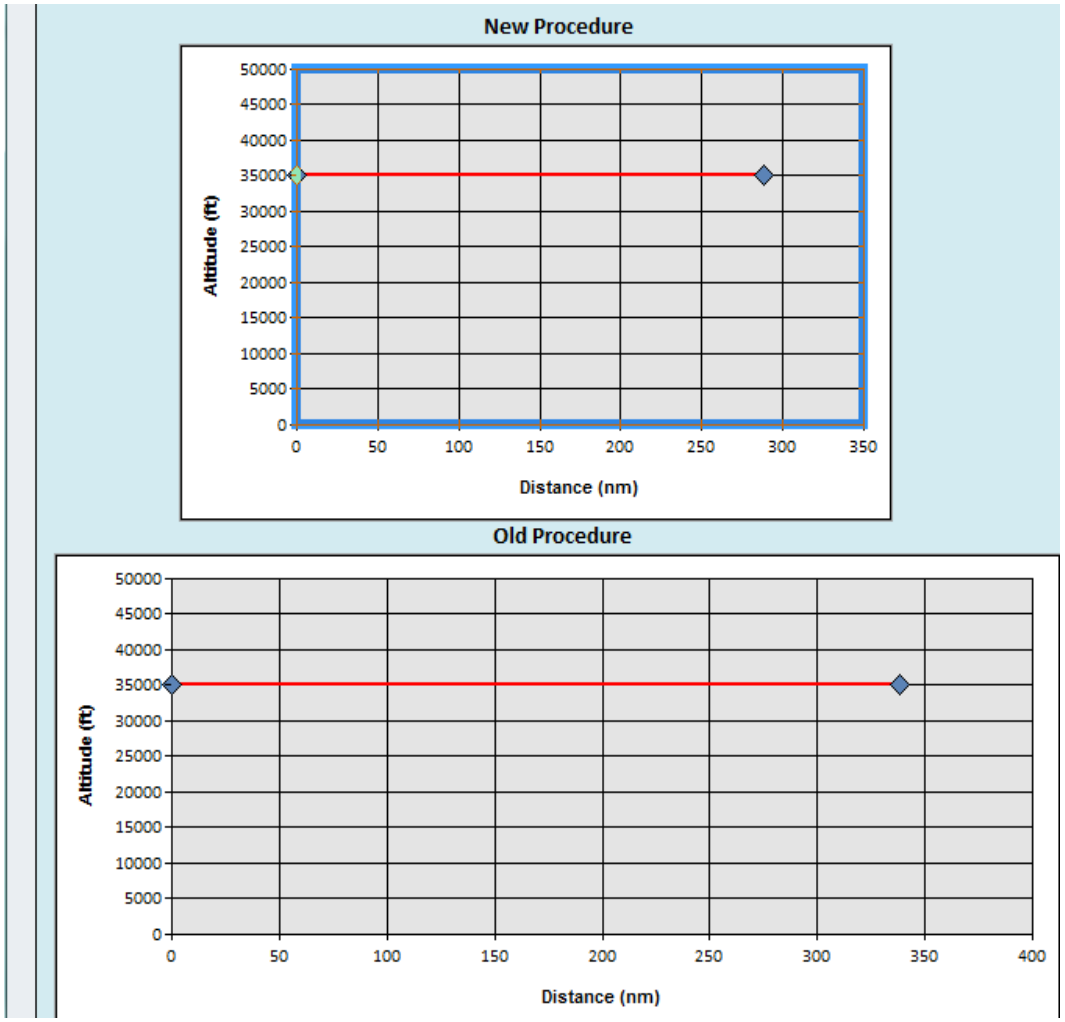
30
35
40
45
Distance (nm)

ADEL 3


New Procedure
Altitude (ft)
50000
45000
40000
35000
30000
25000
20000
15000
10000
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0
50
100
150
200
250
300
350
Distance (nm)
Old Procedure
Altitude (ft)
50000
45000
40000
35000
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10000
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150
200
250
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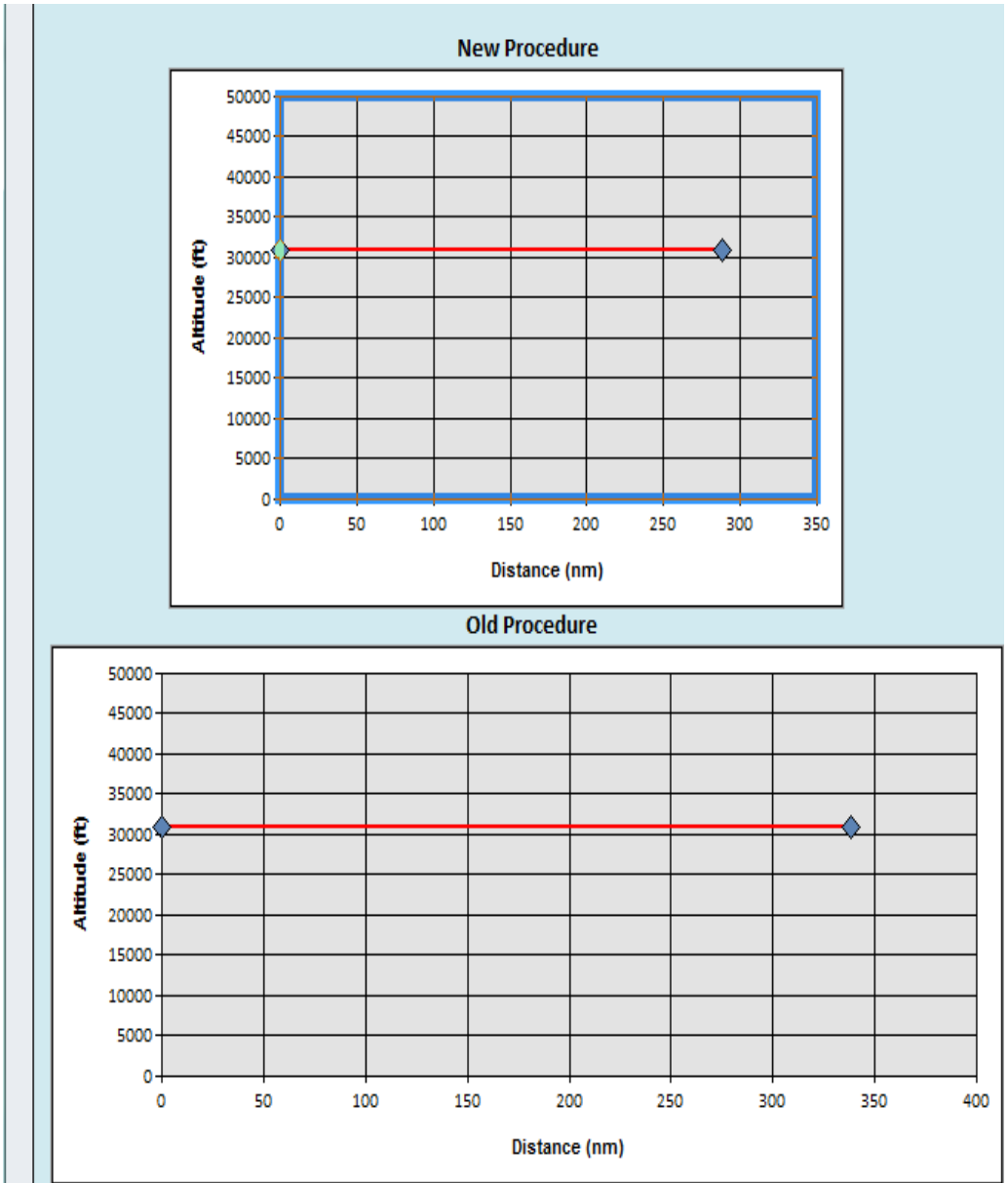
400
Distance (nm)

ADEL 4


New Procedure
Altitude (ft)
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Distance (nm)
Old Procedure
Altitude (ft)
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Distance (nm)

ASANTE

THANK YOU