Flight Planning and Fuel Management (FPFM)

Capt Yoseph Hailu/Capt. Dawit Araya (ETH)

October 20, 2021

11:06:28

Objectives

- Understand the basis for compliance-based flight planning and fuel management regulations.
- Guidance on how we implement performance-based methods to increase overall operational efficiency & enhance safety
- Fuel saving program to improve operational efficiency and protect the environment

Contents

- Pre-flight fuel Planning (Jet & Turbo prop)
- Reduced contingency fuel (RCF)
- Alternate airports selection
  - . T/O alternate
  - . Enroute alternate
  - . Destination alternate
- Inflight fuel management
- Fuel monitoring program
- Fuel efficiency & environment

Pre- flight fuel planning

- Fuel calculation should be based on:

  Econ cruise

  Long-range cruise Or Minimum time

  Cost index

Pre- flight fuel planning

- Considerations before the commencement of the flight are:
  - Taxi fuel
  - Trip fuel
  - Contingencies
  - Destination alternate fuel
  - Final reserve fuel (Holding fuel)
  - Extra fuel
  - Additional fuel

Pre- flight fuel planning

- Taxi Fuel

- Is planned to cover ground maneuvers from engine start to the beginning of takeoff roll & APU consumption where applicable

Pre- flight fuel planning

- Trip fuel includes:

- Take off (taking into account the departure procedure)
- Climb fuel
- Cruise fuel
- Descent fuel
- Approach procedure and landing fuel

Pre- flight fuel planning

- Contingency fuel

- It is an amount of fuel, which must be carried to cover unexpected deviations from Planned Operating Conditions.

Pre- flight fuel planning

- Destination alternate fuel

- Missed approach instead of T/O
- LRC/ECON Cruise Speed Schedule
- Cruise FL depending only on ground distance Maximum FL 370
- Descent from top of descent to the point where the approach is initiated

Pre- flight fuel planning

- Dest. Alter Cont…..

- Executing an approach & landing at the destination alternate airport.

- If two destination alternates are requited, alternate fuel shall be sufficient to proceed to the alternate which requires the greater amount of alternate fuel

- **DIVERSION FUEL MINIMUM**

Pre- flight fuel planning

- Final reserve fuel (Holding fuel)

- Fuel required to fly for 30 minutes at holding speed at 1500 ft above the alternate aerodrome under standard temperature conditions.
- Some operators may have minimum holding fuel

Pre- flight fuel planning

- Extra fuel

- Extra fuel covers anticipated deviations from the planned operating condition.

Pre- flight fuel planning

- **Additional fuel**

- additional fuel shall be planned by the flight dispatch to achieve the minimum diversion fuel value

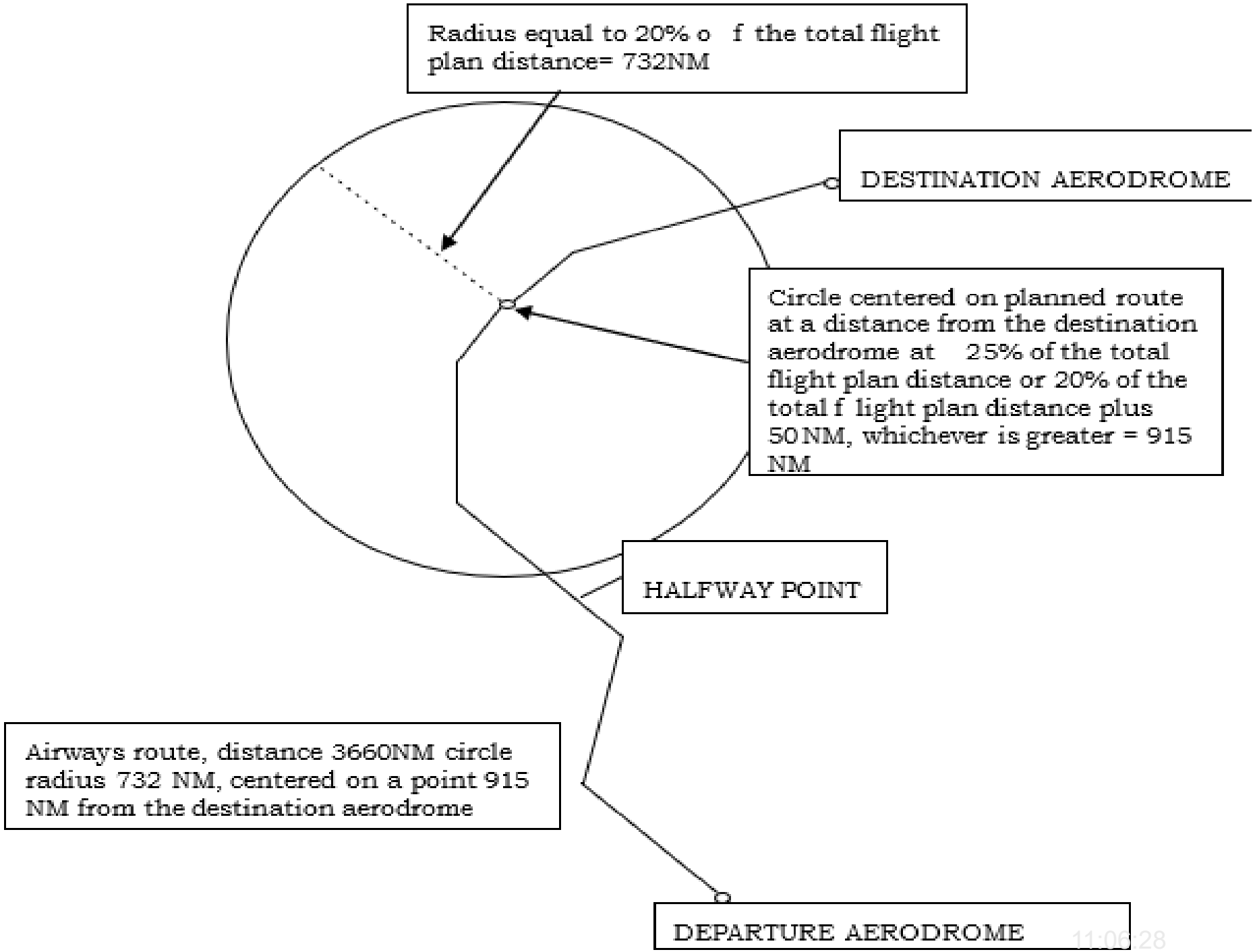
Pre- flight fuel planning

- A turbo propeller powered aircraft Considerations before the commencement of the flight are:

  - Trip fuel to destination
  - The most distant alternate airport
  - Thereafter, to fly for 45 minutes at normal cruising fuel consumption.

Reduced contingency fuel (RCF) Planning

- 3% contingency


Radius equal to 20% o f the total flight plan distance= 732NM
DESTINATION AERODROME
Circle centered on planned route at a distance from the destination aerodrome at 25% of the total flight plan distance or 20% of the total f light plan distance plus 50 NM, whichever is greater = 915 NM
HALFWAY POINT
Airways route, distance 3660NM circle radius 732 NM, centered on a point 915 NM from the destination aerodrome
DEPARTURE AERODROME

Alternate airports selection

- ***Take-off alternate aerodromes***
- ***En-route alternate aerodromes***
- ***Destination alternate aerodrome***
- **Isolation airport**

Alternate airports selection

- ***Take-off alternate aerodromes***

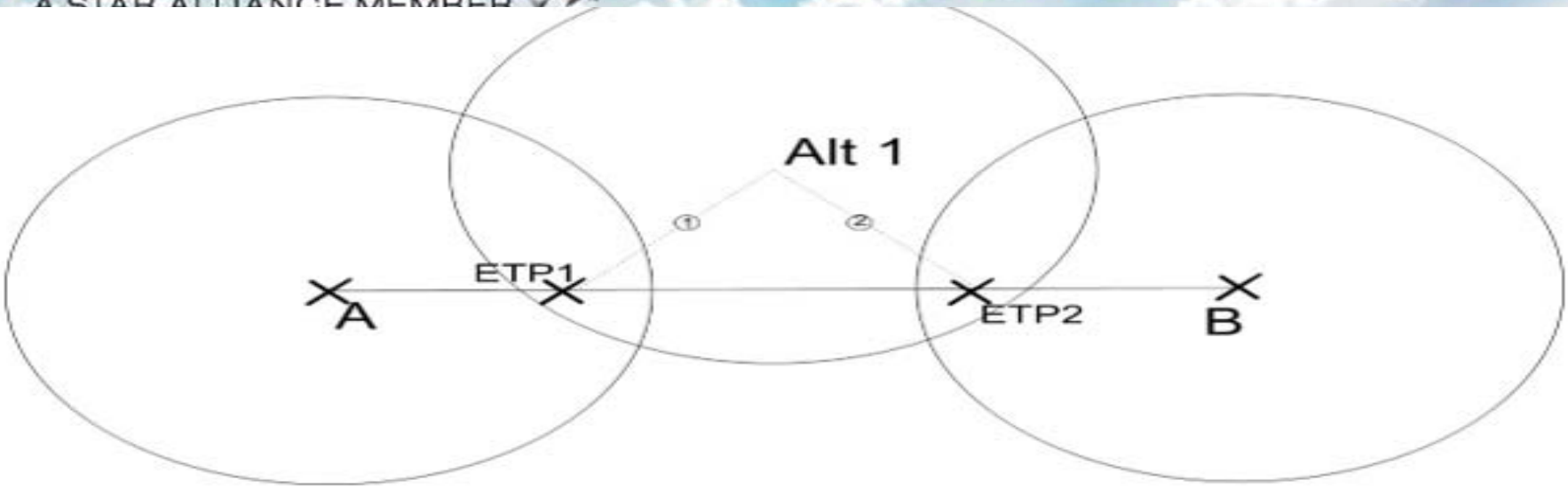
- Two engines, one hour of flight time at a one engine-inoperative cruising speed,
- With three or more engines, two hours of flight time at an all engines operating cruising speed
- Extended diversion time operations (EDTO), to the approved maximum diversion time considering the actual take-off mass.
-

Alternate airports selection

- ***En-route alternate aerodromes***

EDTO Alternate Dispatch weather minima

Approach Facility Configuration[1]	Alternate Airport IFR Weather Minimum Ceiling[2]	Alternate Airport IFR Weather Minimum Visibility[3]
For airports with at least one operational navigational facility providing a straight-in non-precision approach procedure or Category I precision approach, or, when applicable, a circling maneuver from an instrument approach procedure.	Add 400 ft. to the MDA (H) or DA (H), as applicable.	Add 1600m to the landing minimum.
For airports with at least two operational navigational facilities, each providing a straight-in approach procedure to different suitable runways.	Add 200 ft. to the higher DA (H) or MDA (H) of the two approaches used.	Add 800m to the higher authorized landing minimum of the two approaches used.
One usable authorized category II ILS Instrument Approach procedure (IAP)	300 feet	1200m or RVR 4000 feet(1200m)
One usable authorized category III ILS Instrument Approach procedure (IAP).	200 feet	800m or RVR 1800 feet (550m)



a) Estimated flight time from: Departure Airport to ETP1 = T1
Departure Airport to ETP2 = T2
ETP1 to Alternate airport = TA1
ETP2 to Alternate airport = TA2
Departure time = DT

b) Period of validity start : (DT+T1+TA1)-1 Hour

c) Period of validity end : (DT+T2+TA2)+1 Hour

Alternate airports selection

- ***Destination alternate aerodrome***

- Missed approach instead of T/O.
- LRC/ECON Cruise speed schedule.
- Cruise FL depending only on ground distance maximum FL 370.
- Descent from top of descent to the point where the approach is initiated.
- Executing an approach & landing at the destination alternate airport.
- If two destination alternates are requited, alternate fuel shall be sufficient to proceed to the alternate which requires the greater amount of alternate fuel.

.

Alternate airports selection

- **Isolation airport**

Approach Facility	Ceiling	Visibility
Precision Approach (CAT 1, 2 & 3)	Authorized DH/DA plus an increment of 200ft	Authorized visibility plus an increment of 800 meters
Non-Precision Approach of Circling	Authorized MDH/MDA plus an increment of 400ft	Authorized visibility plus an increment of 1500 meters

Inflight fuel management

A STAR ALLIANCE MEMBER

Ethiopian የኢትዮጵያ THE NEW SPIRIT OF AFRICA

MINIMUM FUEL
MAYDAY MAYDAY MAYDAY, FUEL

TYPE OF APPROACH	PLANNING MINIMA
ILS	Non-precision approach minima (ceiling/RVR or VIS)
Non-precision	Non-precision approach minima + (MDA + 200 ft. / RVR + 1000 m or VIS + 1000m)
Circling	Circling minima

Fuel monitoring program

- Flight Data Monitoring (FDM)
- Flight Watch System
- Movement Control System
- AIRCRAFT Performance monitoring System

Fuel efficiency & environment

Bps	Implementation rate %
APU taxi-in	
APU taxi-out	
Contingency fuel 3% ERA	
Continuous Descent	
Engine out taxi-in	
Engine out taxi-out	
Extra fuel pilot	
Holding fuel	
Idle reverse	
Minimum diversion fuel	
No holding pattern	
OFP adherence	
Potable water weight reduction	
Q400 climb optimization	
Q400 descent type	
Reduced acceleration height	
Reduced flaps landing	
Reduced flaps takeoff	
Speedbrakes with thrust	
Taxi fuel	
ZFW accuracy	


A STAR ALLIANCE MEMBER
Ethiopian
የኢትዮጵያ
THE NEW SPIRIT OF AFRICA

Thank you !!