Flight Planning

Edition 1.1

Basics & Fuel Planning

BASICS

EQUATIONS

- $NAM/_{TAS} = NGM/_{GS}$
  - NAM = Nautical Air Mile
  - NGM = Nautical Ground Mile
- $NGM = NAM + (WC \times Time/_{60})$
  - WC = Wind Component
  - Time in Minutes
- $Mach\ No. = TAS/_{LSS}$
- $LSS = \sqrt{Temperature\ (°C) - 273}$
- $VHF\ Range = 1.23\sqrt{Altitude}$
- Heights in feet, Range in nm

ACRONYMS

- **ERA –** En-Route Alternate
- **MAPt –** Missed Approach Point
- **SEP –** Single Engine Piston
- **MEP –** Multi Engine Piston
- **MRJT –** Medium Range Jet Transport
- **SG –** Specific Gravity (1 for Water)
- ***For other definitions/acronyms, use GSPRM***

CONVERSIONS

- **Kg to Lbs –** x2.205
- **Lbs to Imp. Gallons –** x10 xSG ***(NOT IN CAP)***
- **Imp. Gallons to Litres –** x4.546

See CAP General Notes Section 5

Other conversions can be done on the ***CRP-5***

FUEL PLANNING

FUEL CATEGORIES

BLOCK FUEL

- Amount of fuel **legally** required to complete a flight
- Includes **Taxi**, **Trip** and **Reserve** Fuel

TAXI FUEL

- For all **pre-departure** operations
- Does **not** include taxiing at arrival airport

TRIP FUEL

- Fuel used between **take-off** and **landing**

CONTINGENCY FUEL

- Fuel for **unexpected changes** en-route
- It is the **higher** of either:
  - **5% of trip fuel**
  - **5 minutes** at **holding speed** at 1500ft above the destination aerodrome
- 5% trip fuel may be **substituted** by **3% trip fuel** (if **ERAs** are **available**) or **20 minutes of trip fuel** (based on trip fuel consumption) to **reduce** the required contingency fuel

ALTERNATE FUEL

- Fuel from **MAPt** to the **destination alternate**
- **Highest** amount if **2 alternates** are required
- **Excludes missed approach** at the **alternate**

FINAL RESERVE FUEL

- A fixed quantity of fuel for:
  - **30 minutes** holding at 1500ft (**Jets**)
  - **45 minutes** of cruise flight (**Pistons**)
- Using this constitutes a **fuel emergency**

ADDITIONAL RESERVE

- Fuel for **unusual operations**
- *i.e. ETOPS or isolated aerodrome procedure*

MINIMUM ADDITIONAL FUEL

- Fuel for **15 minutes flight time**
- It is **only** required when Trip + Contingency + Alternate + Final Reserve is **insufficient** to proceed to an alternate in the case of an **engine failure** or **loss of pressurization**

EXTRA FUEL

- Extra fuel carried at the **PICs discretion**
- *i.e Fuel Tankering*

CALCULATIONS

- Use **TTCAFA**
- *Includes* ***Taxi, Trip, Contingency, Alternate, Final Reserve*** *and* ***Additional***

ALTERNATE AERODROMES

- **Adequate Aerodrome –** Considered to be satisfactory including ancillary services
- **Suitable Alternate –** An **adequate** aerodrome where Wx reports indicate it will be safe to land

Fuel Planning & PET and PSR

ALTERNATE REQUIREMENTS

- **Minimum 1** alternate for *IFR* flights, unless:
  - Going to an **isolated aerodrome**
    OR
  - Remaining **flight time < 6 hours AND 2 runways** are available, **ceiling > 2,000ft** (or **circling height + 500ft**) and **visibility > 5km** within **±1 hour of ETA**

FUEL TANKERING

- Used if fuel is *particularly expensive* at arrival
- **Fuel penalty –** Fuel used to carry extra fuel
- **FPR –** Fuel Price Ratio
- **FPR =** $\frac{\text{Price at Departure}}{\text{Price at Arrival}}$
- **Must** be **<1** to consider tankering

REDUCED CONTINGENCY FUEL (RCF)

- a.k.a **Decision Point Procedure**
- Means of reducing the contingency fuel to extend range or reduce fuel burn
- Choose the **greater** of **RCF-1** or **RCF-2**

RCF-1

- Taxi Fuel
- **Trip Fuel** (***B via DP***)
- **Contingency Fuel** (**DP to B**)
- Alternate Fuel
- Final Reserve
- Additional Fuel
- Extra Fuel

RCF-2

- Taxi Fuel
- **Trip Fuel** (***C via DP***)
- **Contingency Fuel** (**A to C**)
- Alternate Fuel
- Final Reserve
- Additional Fuel
- Extra Fuel

PRE-DETERMINED POINT (PDP)

- Formerly ***Last Point of Diversion***
- Used when it is impossible to carry enough fuel to fly from the destination to the alternate
- A point is picked where a decision to divert or not is made – the **Pre-Determined Point**
- **Isolated aerodromes** use the PDP procedure
- The **additional fuel includes final reserve**
- Choose the **greater** of **PDP-1** or **PDP-2**

PDP-1

- Taxi Fuel
- **Trip Fuel** (**B via PDP**)
- **Contingency Fuel** (**A to B**)
- **Additional Fuel**
  - ***Pistons –*** 45 mins + 15% flight time or 2 hours (the **LEAST**)
  - ***Turbines –*** 2 hours flight time
- Extra Fuel

PDP-2

- Taxi Fuel
- **Trip Fuel** (**C via PDP**)
- **Contingency Fuel** (**A to C**)
- **Additional Fuel**
  - ***Pistons –*** 45 mins
  - ***Turbines –*** 30 mins (holding speed)
- Extra Fuel

INTEGRATED RANGE TABLES

- Accounts for **decreasing fuel flow** in **cruise**
- More **precise** than using fuel flow as it considers **different fuel consumptions**
- **Only** applies in the **cruise**

PET AND PSR

POINT OF EQUAL TIME

- a.k.a **Critical Point** (CP)
- Point at which it will take the same time to get to the destination as it would to return
- Used for **onboard emergencies**
- Always moves **into wind**
- $X = \frac{D \times H}{(O+H)}$
- X = Distance to PET (nm)
- D = Total Distance (nm)
- H = Groundspeed to get Home
- O = Groundspeed Outbound

OEI PET

- **Distance** - use **OEI TAS** *(both ways)*
- **Time** - use **AEO TAS**

SAFE ENDURANCE

- **Total time** an aircraft can remain airborne using **all FOB** (**except final reserves**)

POINT OF SAFE RETURN

- a.k.a **Point of No Return** (PNR)
- Last position to return with reserves intact
- Used for **isolated aerodromes**
- **Any** wind **decreases** PSR distance
- $X = \frac{E \times O \times H}{(O+H)}$
- X = Distance to PSR (nm)
- E = Safe Endurance (Hours)

PSR WITH VARYING FUEL FLOWS

- $X = \frac{E}{SFC_{OUT} + SFC_{HOME}}$

Flight Plans & Pre-Flight Preparation

FLIGHT PLANS

DEFINITIONS

- **Current Flight Plan –** Flight plan including **amendments** and **clearances**
- **EOBT –** Estimated Off Blocks Time
- **ATFM –** Air Traffic Flow Management

REQUIREMENTS TO SUBMIT A FPL

- Any flight provided with ATC
- IFR flights
- International flights
- Where required by an ATCU

SUBMISSION TIMES

- Normally **60 minutes prior** to **EOBT**
- **30 minutes** for **unforeseen circumstances**
- **3 hours** prior to an Atlantic/Pacific crossing or into **ATFM** airspace
- **10 minutes** prior if **airborne**

FLIGHT PLAN DEVIATION

- **Deviations** should be reported **ASAP**
- For track errors, pilot should **adjust heading** to regain track **ASAP**
- **Variations** in **TAS >5%** or **ETAs with difference > 2 minutes** must be **reported**
- **EOBT delay >30 minutes** (**controlled**) or **>60 minutes** (**uncontrolled**) requires FPL to be **cancelled** or **amended**

FLIGHT PLAN CLOSURE

- Closed ASAP after landing within **30 mins**

CHANGES TO THE FLIGHTPLAN

- A **new FPL** must be filed for changes to:
  - Callsign
  - Departure Airport
  - Arrival Airport
- Flights may go **to VFR from IFR** at the **commander's discretion**
- Use the phrase "**Cancelling my IFR flight**"

REPETITIVE FLIGHT PLANS

- Filed for flights on the **same route** at **similar times** on **consecutive days** for:
  - IFR only
  - Flights on **>10 occasions**
  - FPLs covering the whole flight

FLIGHTPLAN COMPONENTS

- ***All answers in the ATC section of the GSPRM!***
- **S –** Standard Equipment is considered to be **VHF Radios**, **VOR** and **ILS**

NOTAMS

DEFINITIONS

- **LO –** Locator
- **SVC –** Service
- **TEMPO –** Temporarily
- **PN –** Prior Notice
- **LGT –** Light
- **U/S –** Unserviceable
- **TRZ –** Temporary Restricted Area
  - Valid **30 mins before sunrise** to **30 mins after sunset**

DATES AND TIMES

- Dates/times formatted as **YY MM DD HHMM**
- All times are in **UTC**

TYPES OF NOTAM

- **NOTAMN – New**
- **NOTAMR – Replacing**
- **NOTAMC – Cancel**