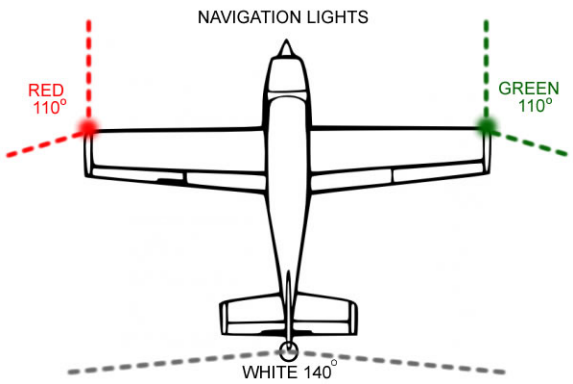
# OPERATIONAL PROCEDURES

## LIGHTING

### AIRCRAFT NAV LIGHTS




## OXYGEN

### REQUIREMENTS (Pressurised)

- **> FL250** – Quick Donning Required
- **> FL410** – One pilot on oxygen

- Masks sufficient to cover 110% of seating capacity must be carried.

### Supplemntal Oxygen Requirements - Pressurised

| | Duration (Cabin Altitude) | Minimum |
|---|---|---|
| **Flight Crew** | Total Time > 13,000 ft<br><br>(Total Time – 30 Mins)<br>10,000 ft – 13,000 ft | 30 Mins – Certified upto 25,000 ft<br>2 Hrs – Certified above 25,000 ft |
| **Cabin Crew** | Total Time > 13,000 ft<br><br>(Total Time – 30 Mins)<br>10,000 ft – 13,000 ft | 30 Mins |
| **100% of pax** | Total Time > 15,000 ft | 10 Mins |
| **30% of pax** | Total Time: 14,000 ft – 15,000 ft | N/A |
| **10% of pax** | (Total Time – 30 Mins)<br>10,000 ft – 14,000 ft | N/A |

### Supplemntal Oxygen Requirements – Unpressurised

| | Duration (Pressure Altitude) |
|---|---|
| **Flight Crew** | Total Time > 10,000 ft |
| **Cabin Crew** | Total Time > 13,000 ft<br><br>(Total Time – 30 Mins)<br>10,000 ft – 13,000 ft |
| **100% of pax** | Total Time > 13,000 ft |
| **10% of pax** | (Total Time – 30 Mins)<br>10,000 ft – 13,000 ft |

### FIRST AID OXYGEN

- Required when operating **above 25,000 ft**

- Enough to cover the remainder of the flight that operates with **a cabin altitude between 8,0000 ft and 15,000 ft**

- **Sufficient for 2% of pax carried with minimum for 1 pax**

# OPERATIONAL PROCEDURES

| MOPSC | Fire Extinguishers |
|---|---|
| 7 - 30 | 1 |
| 31 - 60 | 2 (1) |
| 61 – 200 | 3 (2) |
| 201 - 300 | 4 (2) |
| 301 - 400 | 5 (2) |
| 401 - 500 | 6 (2) |
| 501 - 600 | 7 (2) |
| 601 + | 8 (2) |
| --------- | *+ 1 BCF In Flight Deck* |

**CRASH AXE / CROW BAR**

- **MTOW > 5700 kgs** OR **MOPSC > 9** requires at least one crash axe
- **MOPSC > 200** requires additional crash axe in **rearmost** galley.
- The crash axe can be substituted for a crow bar

| MOPSC | First Aid |
|---|---|
| 0 - 100 | 1 |
| 101 -200 | 2 |
| 201 - 300 | 3 |
| 301 - 400 | 4 |
| 401 - 500 | 5 |
| 501 + | 6 |

**EMERGENCY MEDICAL KIT**

- **MOPSC > 30** AND
- Planned to operate more than **60 mins from aerodrome** with qualified medical assistance

**MEGAPHONES**

- **MOPSC 61 – 99 =** 1
- **MOPSC ≥ 100** = 2

**WIPERS**

- **MTOW > 5700 kgs**

**PA SYSTEM**

- Required for **MOPSC > 19**

| | Pressurised | Unpressurised |
|---|---|---|
| **AWR** | All | MTOW > 5700 kgs OR MOPSC > 9 |

| | Turbojet | Turboprop |
|---|---|---|
| **Altitude Alert** | All | MTOW > 5700 kgs OR MOPSC > 9 |
| **GPWS** | MTOW > 5700 kgs OR MOPSC > 9 | |
| **ACAS** | MTOW > 5700 kgs OR MOPSC > 19 | |
| **Radio Altimeter** | MTOW > 2700 kgs | |
| **2 Crew (IFR / Night)** | All | Seating Config > 9 |

# OPERATIONAL PROCEDURES

## FLIGHT CREW

### TRAINING VALIDITY

- **Line Check** – 12 Months
- **LPC –** 12 Months
- **OPC** – 6 Months
- **Dangerous Goods** – 24 Months

## CABIN CREW

### REQUIREMENTS

- **18 Years Old**

- Required when **more than 19 seats**
- **1 cabin crew per every 50 seats** (or fraction thereof) on the same deck.

### SENIOR CABIN CREW REQUIREMENTS

- 12 Months Experience
- Appropriate Training Course

## ALL CREW

### CREW BELTS AND HARNESS

- **T/O & LND:** Belts + Harness
- **Other:** Belts whilst at station

### DOCUMENT STORAGE

### FLIGHT DOCUMENTS

- Tech Log – 3 Years
- Everything Else – 3 Months

### FLIGHT CREW RECORDS

- FDL Records – 15 Months
- Recent Experience – 15 Months
- Everything Else – 3 Years

### CABIN CREW RECORDS

- FDL Records – 15 Months
- Dangerous Goods – 3 Years

## EMERGENCY EQUIPMENT

### EMERGENCY LIGHTING

- Required for **MOPSC > 19**

- Must last for at least **10 minutes**

### EMERGENCY SLIDES

- When sill height more than **6ft**

- **After 31 March 2000** – With collapse of one or more legs

### FDR / CVRs

- Any aircraft > 5700 kgs
- All ME Turbine with MOPSC > 9

- **FDR** – 25 Hours
- **CVR** – 30 Mins / 2 Hrs

- **FDR Storage** – 60 Days

### ELT BATTERY

- 48 Hours

# OPERATIONAL PROCEDURES

## SURVIVAL EQUIPMENT

### LIFEJACKET REQUIREMENTS

- **Landplane:**
  - More than 50 NM from shore OR
  - T/O & Landing gives likelihood of ditching
- **Sufficient for all on board**

### LIFERAFT REQUIREMENTS

- **Able to operate with critical engine inop**
  - When 120 mins / 400 nm (lesser) from suitable land.
- **All other aircraft**
  - 30 mins / 100 nm (lesser) from suitable land.
- Must assume largest liferaft is u/s

## SURVIVAL EQUIPMENT (REMOTE AREAS)

- Signalling Equipment
- At least 1 ELT
- Additional Survival Equipment suitable for route being flown

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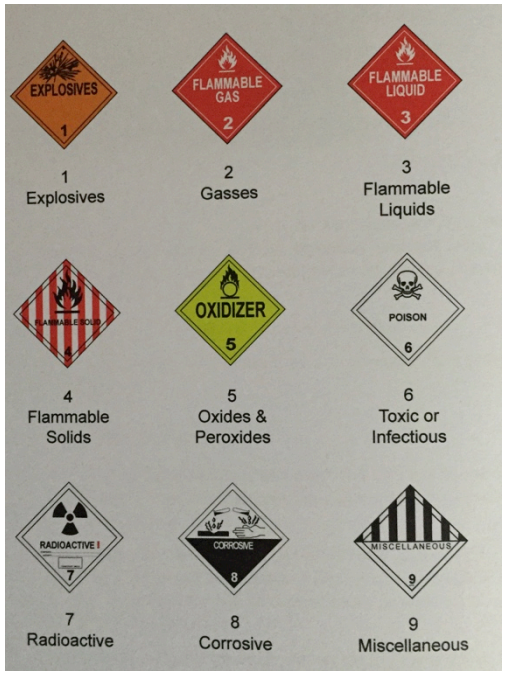
- Exception to carry when **within 90 minutes at cruising speed** of suitable landing area.

## DANGEROUS GOODS




## ICAO ANNEX LIST

### ANNEX LIST

- **1 – Personnel Licensing**
- **2 – Rules of the Air**
- **6 – Operation of Aircraft**
- **7 – Registration Marks**
- **9 – Facilitation**
- **11 - ATS**
- **14 – Aerodromes**
- **17 – Security**
- **18 – Safe Transport of DG**

# OPERATIONAL PROCEDURES

| CAT | DH | RVR | Rollout Control / Guidance |
|---|---|---|---|
| **I** | 200 ft | 550 m | |
| **II** | 100 ft | 300 m<br>*350 – ICAO* | |
| **III A** | < 100 ft | 200 m | |
| **III B** | < 50 ft | 125 m | Fail - Passive |
| | N /A | 75 m<br>*50 - ICAO* | Fail - Operational |
| **III C** | N/A<br>*0 - ICAO* | N/A<br>*0 - ICAO* | |

**Aircraft Categories**

| Category | $V_{AT}$ (IAS At Threshold) (1.3 $V_{so}$) |
|---|---|
| **A** | < 91 kts |
| **B** | 91 – 120 kts |
| **C** | 121 – 140 kts |
| **D** | 141 – 165 kts |
| **E** | 166 – 210 kts |

**Circling Minina + Max Speeds**

| | A | B | C | D |
|---|---|---|---|---|
| **MDH** | 400’ | 500’ | 600’ | *700’* |
| **VIS (m)** | 1500 | 1600 | 2400 | 3600 |
| **MAX SPEED** | 100 kts | 135 kts | 180 kts | 205 kts |

**System Minima**

| Facility | Lowest DH / MDH |
|---|---|
| VOR | 300 ft |
| VOR / DME | 250 ft |
| LOC | 250 ft |
| NDB | 350 ft |
| NDB / DME | 300 ft |
| SRA (1 nm) | 300 ft |

**LVTOs**

**“Low Vis Take-Off”**< 400 m RVR

ME must be able to stop / continue safely to height of 1500 ft after engine failure.

*Blue: Reduced Minima Ops*

| Facilities | Min RVR | CAT D |
|---|---|---|
| Edge Lights + Centreline Markings | 250 m | 300 m |
| Edge Lights + Centreline Lights | 200 m | 250 m |
| Edge + Centreline Lights + Multiple RVRs | 150 m | 200 m |
| HI Edge + Centreline Lights + Multiple RVRs | 125 m | 150 m |
| Lateral Guidance | 75 m | |

| Approach Type | DA | DH | MDA | MDH |
|---|---|---|---|---|
| **Precision** | MSL | Threshold | - | - |
| **Non-Precision CDFA** | | | - | - |
| **Non-Precision** | - | - | MSL | Aerodrome / Threshold * |
| **Circle To Land** | - | - | MSL | Aerodrome |

* Threshold referenced when threshold > 7 ft **below** aerodrome elevation

# PRE-FLIGHT PLANNING

**Planning Minima**
*Takeoff Alternate & Destination*

| Approach Type | VIS / RVR | Ceiling |
|---|---|---|
| **CAT I / II / II** | ✓ | |
| **NPA** | ✓ | ✓ |
| **Circling** | ✓ | ✓ |

**Planning Minima**
*Destination / ERA / Isolated Aerodrome*

| Approach Type | VIS / RVR | Ceiling |
|---|---|---|
| **CAT II / II** | CAT I | |
| **CAT I** | NPA | ≥ MDH |
| **NPA** | + 1,000 m | MDH + 200 ft |
| **Circling** | Circling | |

**Planning Minima**
*ETOPS Alternate*

| Approach Type | VIS / RVR | Ceiling |
|---|---|---|
| **Precision** | + 800 m | DA/H + 200 ft |
| **NPA / Circling** | + 1500 m | MDA/H + 400 ft |

## TAKEOFF ALTERNATE

- Required when not possible to return to aerodrome of departure due to weather or performance reasons.
- **2 Engine** - Within 1 Hour OEI
- **3 / 4 Engines** – Within 2 Hours OEI
- **Wx:** Within planning minima ± 1 Hr ETA

## DESTINATION

- **Wx:** Within planning minima ± 1 Hr ETA
- **2 destination alternates required** when:
  - Wx below planning minima
  - No met info available at destination

## DESTINATION ALTERNATE

- **Wx:** Within planning minima ± 1 Hr ETA
- Always required unless **isolated aerodrome** OR …
- Two runways available at destination and total flight time does not exceed 6 Hrs with wx ± 1 Hr ETA being:
  - Vis 5 km +
  - Ceiling at least 2,000 ft AAL or circling height + 500 ft (whichever is greater)

## ETOPS ALTERNATE

- **Wx:** Within planning minima ± 1 Hr ETA
- At expected time of use must have:
  - ATS Facility
  - At least one instrument approach procedure

# OPERATIONAL PROCEDURES

## ISOLATED AERODROME

- When diversion fuel to alternate exceeds….
- **Piston (lesser of):**
  - 45 Mins + 15% Cruise Flight Time
  - 2 Hrs
- **Jet:**
  - 2 Hrs Normal Cruise + Final Reserve

## PLANNING FACTORS

- Turbojet – Destination LDA factored by 0.6
- Turbojet – Alternate LDA factored by 0.7

## IN-FLIGHT MINIMA

### CONTINUATION OF APPROACH (DA/H < 1000' AAL)

- Approach can be commenced regardless of conditions.
- Cannot continue below 1000' AAL if RVR/VIS is below minima
- If RVR/VIS drops below minima after passing 1,000 ft AAL, approach can be continued to DA/H or MDA/H
- If required visual parameters are not met by DA/H or MDA/H and subsequently maintained, approach must be discontinued.

### CONTINUATION OF APPROACH (DA/H > 1000' AAL)

- Approach can be commenced regardless of conditions.
- Cannot continue into the final approach segment (usually marked with OM)
- If required visual parameters are not met by DA/H or MDA/H and subsequently maintained, approach must be discontinued.

## RVR REPORTS

- Issued when RVR falls **below 1500 m**

## ETOPS

### NON-ETOPS

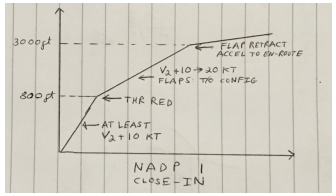
- Class A: MTOW ≥ 45,360 kgs / MOPSC ≥ 20
  - 60 Mins OEI
- Class A: MTOW < 45,360 kgs / MOPSC < 20
  - 120 Mins OEI
- Class B & C: 120 OEI / 300 nm

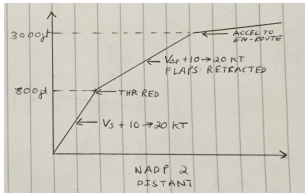
# OPERATIONAL PROCEDURES

## NOISE ABATEMENT

### NOISE ADAMETEMNT PROCEDURES

- NADP 1 – Close In Objectives
- NADP 2 – Distant Objectives




### TURN RESTRICTIONS

- At least 500 ft above obstacles / terrain
- Max $15^0$ AOB unless an acceleration provision is provided.
- No turns at same time as reduction of power

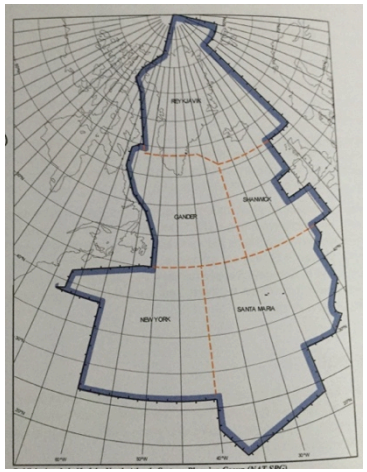
### RETRICTED CONDITIONS

- Crosswind (Inc Gusts) > 15 KTS
- Tailwind (Inc Gusts) > 5 KTS
- Contaminated Runway
- Adverse Weather (Windshear etc)
- For Takeoff – VIS < 1 NM
- For Landing – Ceiling < 500 ft AGL

## TRANSATLANTIC FLIGHTS

### MNPS AIRSPACE

- Between FL285 – FL420
- Available RVSM levels are therefore FL290 – FL 410 inclusive
- **$27^0$ N – $90^0$ N**




### MNPS REQUIREMENTS

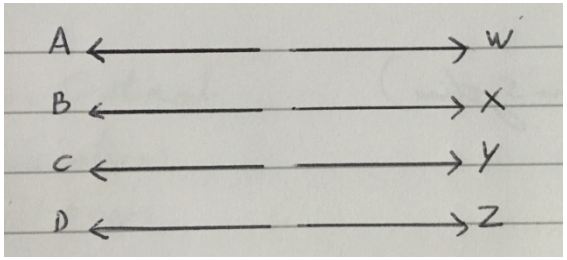
- 2 LRNSs (Long Range Nav Systems)
  - IRS / INS / GNSS
- Group Altimetry System: ± 80 ft
- Non-Group Altimetry System: ± 200 ft

## MANDATORY IFR

- Above FL060
- Above 2,000 AGL

## OTS (ORGANSIED TRACK SYSTEM)

- **Day (Westbound): 1130z – 1900z**
  - Published: 2200z by Shanwick
  - PRM deadline: 1900z
- **Night (Eastbound): 0100z – 0800z**
  - Published: 1400z by Gander
  - PRM deadline: 1000z
- Active based on timing at **30W**
- PRM: Preferred Route Message
- Aircraft on same track separated by **1,000 ft**



# OPERATIONAL PROCEDURES

## FIELD 10

- X – MNPS Approved
- W – RVSM Approved

## SEPARATION

- Mach No + Separation (mins) = 11
- Min Lateral: 60 nm

## SLOP

- Strategic Lateral Offset Procedure

- Centreline
- 1 nm right
- 2 nm right

## LRNS FAILURE

- **Before Boundary**: Avoid / Blue Spruce
- **Once Within:** Prepare proposal and advise ATC
- **Remaining Failure:** Notify ATC and attempt to contact other aircraft to establish drift, groundspeed etc.
    - If no ATC instructions received then climb / descend 500 ft and broadcast on 121.5 / 123.45

## OCEANIC CLEARANCE

- Required **40 mins** prior to entry point ETA

- Changes in ETA by **3 mins or more** most be reported to ATC

## NAT SQUAWK

- After 30 mins of entering NAT FIR, **squawk 2000.**

## UNABLE TO MAINTAIN LEVEL

- Attempt to obtain re-clearance

- If not possible, transmit position and intention of 121.5 / 123.45 as a backup.

- Offset by 15nm and use a level different by:
    - 500 ft – Below FL410
    - 1000 ft – Above FL410
    - + 1000 ft / - 500 ft when at FL410

## AIR-AIR VHF FREQUENCY

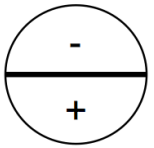
- 123.45 MHz

## FLIGHT PLANS

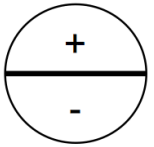
- 3 Hrs in advance of EOBT

## DG DRIFT

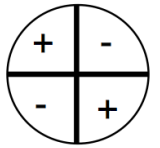
- ER ($^0$/hr) = ± 15.04 x sin(lat)




- LN ($^0$/hr) = ± 15.04 x sin(lat)




- TD ($^0$/hr) = ± GS / 60 x tan (lat)




- Total Drift = RD ± ER ± LN ± TD

## CONVERGENCE

$(CH\ LONG\ X\ SIN\ (MEAN\ LAT)$

## CONVERSION ANGLE

$\frac{1}{2}\ (CH\ LONG\ X\ SIN\ (MEAN\ LAT)$

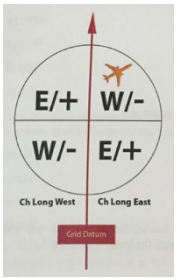
## DEPARTURE

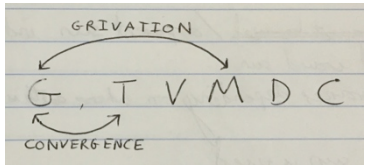
$(D\ LONG\ X\ COS\ (MEAN\ LAT)$

# OPERATIONAL PROCEDURES

## CONVERGENCE CALCULATIONS

Grid Track = True Track ± CH Long From Datum




## LEVEL-OFF

- With 1500 ft to go, vertical speed not greater than **1500 fpm**
- Do not overshoot / undershoot by more than **150 ft**

## ALTIMETER TOLERANCE (RVSM)

- **Pre Flight**: 75 ft
- **In Flight**: 200 ft (Max 1 Hr Intervals)

## POSITION REPORTS

- As per flight plan points
- ATC can request:
  - Above 70N: Every $20^0$ Longitude
  - Below 70N: Every $10^0$ Longitude

## "POLAR TRACK"

- When horizontal component is below **6 micro tesla**

## FIRE & SMOKE

| CAT | TYPE | IDEAL |
|---|---|---|
| **A** | Solid | Water |
| **B** | Liquid | Dry Powder |
| **C** | Gases | Dry Powder |
| **D** | Metal | Sand |
| **E** | Electrical | $CO_2$ |
| **F** | Oil | Wet Checmical |

## BEST EXTINGUISHERS

- Cockpit – Halon / $CO_2$
- Wheel – Dry Power / Water Spray Atomizer
- Engine - Halon

## RESTRICTIONS

- Halon / CO2 – Not Metal
- Water – Not Liquid / Electrical / Chemicals

## FUEL JETTISON

## CONSIDERATIONS

- Must jettison sufficient fuel within **15 mins**
- Should be **above FL060** if possible

## CONTAMINATED RUNWAYS

## DYNAMIC HYDROPLANING

- Likely to occur when above:

$$9\sqrt{PSI}$$

$$34\sqrt{BAR}$$

| Coefficient | Braking Action |
|---|---|
| ≥ 0.4 | Good |
| - | Medium / Good |
| 0.35 – 0.30 | Medium |
| - | Medium / Poor |
| ≤ 0.25 | Poor |
| 9 | Unreliable |

# OPERATIONAL PROCEDURES

**EASA DEFINITIONS**

- **Dry** – Neither wet nor contaminated. Includes sections which have 'effectively dry' braking action even when moisture is present.
- **Damp** – Surface not dry but moisture does not give it a shiny appearance.
- **Wet** – Appears reflective but without significant areas of standing water.
- **Contaminated** - 25% of runway surface covered by 3 mm of water or its equivalent depth (by use of SG) in:
    - Slush
    - Loose snow
    - Compacted snow
    - Ice