Air Law

Edition 1.1

Rules of the Air (Annex 2)

APPLICABILITY

- The **PIC** has **final authority** over the operation of the aircraft
- They must be familiar with all available and appropriate information (including weather)
- **Laws** can **only** be broken for **safety**

GENERAL RULES

- Aircraft shall not be operated in a **negligent** or **reckless manner** that **endangers life** or **property**
- **Cruising Levels** are:
  - **Flight Levels above transition altitude**
  - **Altitudes below** the **transition level**
- Aircraft shall not be flown into **prohibited/restricted** airspace

COLLISION AVOIDANCE

- Aircraft should not be operated in such proximity to create a collision hazard
- An aircraft with **right of way** will **maintain heading** and **speed** (*though they must best avoid collision*)
- An aircraft obliged to give way should **not pass over**, **under** or **ahead** (*unless well clear*)

ORDER OF PRIORITY

1. Balloons
2. Airships
3. Gliders
4. Airplanes
5. Rotorcraft
6. Powered Lift
7. Ornithopter

RIGHT OF WAY RULES

- Approaching **head-on – turn right**
  - If on the **ground**, they should **stop**
- **Converging** – aircraft on the **left must give way** ***(give way to aircraft on the right)***
  - *Except if the aircraft has higher priority*
- **Overtaking** (<70°) – aircraft being **overtaken has priority**
- **Landing – Lowest** landing aircraft has priority over those in flight
  - Powered heavier than air aircraft must however give way to gliders
  - Emergency landings have *highest priority*
- Aircraft must obey all **lit stop bars** and **taxi-holding positions**

LIGHTS

- Flashing lights may be turned off if they affect performance of duties or cause dazzle
- **Anti-collision lights** should:
  - **always be on** (engine running)
  - show **in all directions**
  - be **red** or **white**
- **Navigation lights** should:
  - be on at **night** when moving
  - be **red** (port) and **green** (starboard) through **110°**
  - be **white** at the rear through **140°**

SIMULATED INSTRUMENT FLIGHT

- Requires **dual controls** and a **qualified safety pilot/flight instructor**
- A 'competent observer' does **not** count

OPERATIONS AROUND AN AERODROME

- **Default** traffic pattern = **Left-hand**
- An aircraft shall:
  - Observe other traffic
  - Conform with or avoid the traffic pattern
  - Land/take-off into wind

FLIGHT PLANS

CONTENTS

- Aircraft Identification
- Type of Flight
  - I = IFR
  - V = VFR
  - **Y = IFR to VFR**
  - **Z = VFR to IFR**
- Type of Acft and Wake Turbulence Category
- Equipment
- Departure Aerodrome and EOBT
- Cruising Speed, Level and Route
- Destination Aerodrome, ETE and alternate(s)
- Fuel Endurance, POB, Emergency and Survival Equipment
- ***See GSPRM ATC Section***

SUBMISSION

- A flight plan is required when:
  - Provided with an ATC service
  - IFR within advisory airspace
  - Along designated routes when FIS, alerting and search and rescue is required
  - Into designated areas or across borders
- Must be **submitted 60 minutes prior**, unless **airborne** (**10 minutes**)
- Must be **closed** after use

Rules of the Air (Annex 2)

REPETITIVE FLIGHT PLANS (RPL)

- Used for **IFR** flights operated **regularly** on the **same day** of **consecutive weeks** or at least **10 occasions**

FLIGHT PLAN DEVIATION

- Cannot **deviate** from FPL unless **requested** or under **emergency**
- **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**

TIME

- All times are in UTC
- Given in **hours**, **minutes** and **seconds**
- A **time check** shall be obtained **prior to operating** a **controlled** flight
- Must be accurate to **±1 second** of UTC

AIR TRAFFIC CONTROL SERVICES

CLEARANCES

- Needed for **controlled flights** and **ground movements**
- PIC may request an **amended clearance**
- ATC must be informed if leaving an ATS area (except landing)

WEATHER DETERIORATION BELOW VMC

When VFR, the pilot should:

- Request an **amended clearance** or **leave controlled airspace**
- Maintain **VMC** and notify ATC
- Request **Special VFR** if in a **CTR**
- Request to operate **IFR**

REPORTING POINTS

- Controlled flight should report **time** and **level** at **compulsory reporting points**

COMMS FAILURE

- VMC -

- Land at the **nearest airport** and **report ASAP** to ATCU

- IMC -

- Maintain last assigned **speed** and **level** for:
  - **ATC** has **no radar – 20 minutes** following failure to report at CRP
  - **ATC** has **radar –7 minutes** following either the last assigned level being reached, squawking 7600 or not reporting at a CRP, whichever occurs latest
- They should then:
  - Adjust to speed & level in the flight plan
  - Proceed to nav aid/fix at destination and hold until descent
  - Descend at last acknowledged and received EAT (or ETA)
  - Use a normal instrument approach
  - **Land** within **±30 minutes of EAT/ETA**

UNLAWFUL INTERFERENCE

- Notify the appropriate ATSU that there is unlawful interference and of any significant circumstances or deviation from flight plan

INTERCEPTION OF CIVIL AIRCRAFT

- Interception is a last resort
- Visual signals should be used
- Done to either identify the aircraft, return it to its planned track or bring it to the ground
- This may not be practiced (on civil aircraft)
- They must land somewhere safe
- No weapons should be used (if possible)
- Communicate on **121.5 MHz** and squawk **7700** (**Mode A**)

'INTERCEPTOR' PHRASES

- **CALL SIGN**
- FOLLOW
- **DESCEND**
- **YOU LAND**
- PROCEED

'INTERCEPTED AIRCRAFT' PHRASES

- **CALL SIGN**
- WILCO
- **CAN NOT**
- REPEAT
- **AM LOST**
- MAYDAY
- HIJACK
- **DESCEND**
- **LAND**

SIGNALS FROM INTERCEPTOR

- **Rock Wings** and **Slow Turn – Follow Me**
- **Abrupt Breakaway – Proceed**
- **Lowers Landing Gear – Land Here**

Rules of the Air (Annex 2)

SIGNALS FROM INTERCEPTED AIRCRAFT

- **Irregular Lights Flashing – Cannot Comply**
- **Regular Light Flashing – Mayday**
- Will Land – Landing Gear Lowered
- Cannot Land Here – Landing Gear Lowered then Raised
- Will Follow – Rock Wings and Flash Nav Lights

VISIBILITY

- **Flight Visibility –** Forward from the cockpit
- **Ground Visibility –** At an aerodrome as reported by a qualified observer or automatic system

RULES FOR VFR

- Unless SVFR, cloud separation of that required for VMC
- Shall not enter a CTR, ATZ or pattern when ceiling <1500ft or visibility <5km (unless cleared)
- **Not above FL200** (**FL290 if RVSM in-use**) or transonic speeds unless authorized
- **Not in RVSM airspace**
- At a **VFR level above 3,000ft**
- **Not lower than 1,000ft above the highest obstacle within 600m radius**
- Reduced to **500ft** above **uncongested ground/water**

SPECIAL VFR

- Must be **Clear of Cloud and In Sight of Ground** (COCIS)
- **Visibility >1500m**
- Can **only** be conducted inside a **CTR**

VMC CRITERIA

- **5km visibility**
- **1,000ft vertical** and **1500m horizontal separation from cloud**
- **Above 10,000ft**, visibility must be **8km**
- In **Class F/G airspace**, **visibility > 1500m** and **Clear of Cloud and In Sight of Ground** if **below 3,000ft AMSL/1,000ft AGL**

RULES FOR IFR

- **Minimum IFR level** is **1,000ft above highest obstacle within 8km** or **3,000ft AMSL**
- Raised to **2,000ft** if in **mountainous areas**

CRUISING LEVELS

- **000-179° - Odd Flight Level**
- **180-359° - Even Flight Level**
- For **VFR**, add **500ft**
- These are **magnetic tracks**
- In **RVSM airspace** (**FL290-FL410**), **1,000ft separation** continues
- **Elsewhere** separation must be **2,000ft**

HAND SIGNALS FROM THE PILOT

- Brakes Engaged – Fingers out then into a fist
- Brakes Released – Fist to outstretched fingers
- Chocks In – Palms out, hands in to form cross
- Chocks Out – Palms out, hands out from cross
- Start Engine X – Number of fingers shown for engine to start
- Connect Ground Power – Hands into T formation, inserting stem
- Disconnect Ground Power – Hands from T formation, removing stem

HAND SIGNALS TO THE PILOT

- **Identify Gate –** Wands above head
- **Proceed to Next –** Wands in intended direction
- Straight Ahead – Wands from sides to above head
- Turn Left/Right – Wands stationary in desired direction
- Stop – Crossed above head
- Start Engine – Spinning wand
- Cut Engine – Wand across throat
- Slow Down – Patting gesture
- Fire – Figure of 8 Motion
- Dispatch – Standard salute

SIGNALS FOR AERODROME TRAFFIC

	In Flight	On Ground
Steady Green	Cleared to Land	Cleared for T/O
Flashing Green	Return to Land	Cleared for Taxi
Steady Red	Give Way/Circle	Stop
Flashing Red	Do Not Land/Aerodrome Unsafe	Taxi Clear of Landing Area
Flashing White	Land and Proceed to Apron	Return to Starting Point
Red Pyrotechnic	Do Not Land	

- **Red** and **Green pyrotechnics** show approaching a **danger area**

Acknowledgment shown by…

- In the Air
  - Rocking wings (Day)
  - Flashing Landing Light (Night)
- On the Ground
  - Move Rudder/Ailerons (Day)
  - Flashing Nav Lights (Night)

Aerodromes (Annex 14)

AERODROME REFERENCE CODE

- Quickly determines if an aerodrome is suitable for operations
- Does not substitute ACN/PCN classifications
- **Element 1 – Runway Length** (1-4)
- **Element 2 – Wingspan** and **Main Gear Wheel Span** (A-F)

AERODROME REFERENCE POINT (ARP)

- Defined **latitude** and **longitude** of an airport
- **Centre** of the **largest runway**

PAVEMENT STRENGTH

- **MCTOM > 5700kg –** Use **ACN** and **PCN**
- **MCTOM < 5700kg –** Max Allowable **Aircraft Mass** and **Tyre Pressure**

WATER ON THE RUNWAY

- **Damp –** Change of colour
- **Wet –** Soaked but no standing water
- **Standing Water -** >25% covered in water deeper than 3mm

BRAKING ACTION

Coefficient	Braking Action	Code
>0.4	Good	5
0.39 to 0.36	Medium to Good	4
0.35 to 0.30	Medium	3
0.29 to 0.26	Medium to Poor	2
<0.25	Poor	1

- *Operations <0.25 is extremely hazardous*

RUNWAYS

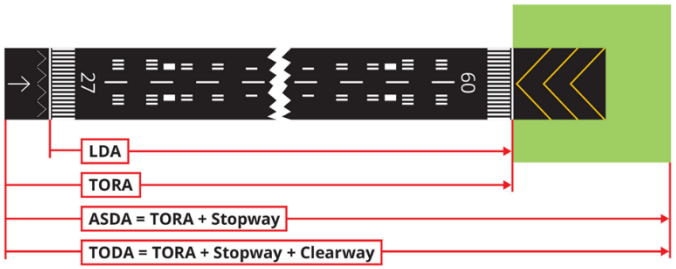
DISPLACED THRESHOLD

- May be **temporary** or **permanent**
- Should be **greater than 60m**

STOPWAY AND CLEARWAY

- **Stopway –** Can support the aircraft in the event of an **RTO**
- **Clearway –** Area where the aircraft may climb over to an initial specific height

DECLARED DISTANCES



- **TORA –** Length suitable for the **take-off ground run**
- **ASDA – TORA + Stopway**
- **TODA – TORA + Clearway**
- **LDA –** Length suitable for the **landing ground run**

RADIO ALTIMETER OPERATING AREA

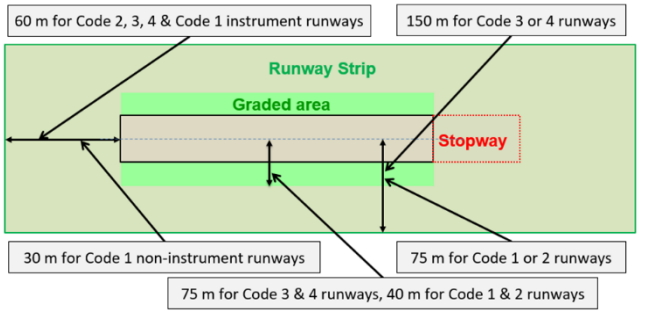
- **Flat area** for the rad alt to work in **auto-coupled approaches** and **auto-lands**
- No more than **2% per 30m**
- **300m** beyond the threshold
- **60m width** (30m if it does not affect safety)

RUNWAY END SAFETY AREA (RESA)

- Area to reduce damage on an under/overrun
- **Starts** at the **end of the runway strip**
- Minimum **90m length** and **2x runway width**
- May include an **Engineered Materials Arresting System** (EMAS)

RUNWAY STRIP

- Defined area to reduce damage in the event of an excursion



RUNWAY MARKINGS

BASICS

- Markings are **white** and **reflective** for night
- If background is light, black outline is used
- **Closures** are marked with **white crosses**
- Markings should not affect braking action
- Each runway has a designator
  - **2-digit** number corresponding to **magnetic heading**
  - **L**, **R** and **C** for **parallel** runways
  - If 4+ parallel runways, 1 pair takes the closest number to its heading

Aerodromes (Annex 14)

CENTRELINES

- **Stripe + Gap - 50-75m** in length
- **Stripe – Greater of** the **length of the gap** or **30m**
- **0.9m width** on **ILS CAT II & III**
- **0.45m width** elsewhere
- **More important** centerline continues at runway **intersection**

THRESHOLD MARKINGS

Runway Width	No. of Stripes
18m	4
23m	6
30m	8
45m	12
60m	16

- Stripes extend to within **3m of the edge** of the runway or **27m either side** of the centerline (smaller)
- **30m long** with **1.8m spacing**
- Displaced threshold marking **<1.8m wide**
- **Unusable area** before the displaced threshold marked with **yellow chevrons**

AIMING POINT

LDA	Distance from Threshold
<800m	150m
800-1199m	250m
1200-2399m	300m
>2400m	400m

- Shown by a **pair** of **conspicuous stripes**

TOUCHDOWN ZONE (TDZ)

LDA	Pairs of Markings
<900m	1
900-1199m	2
1200-1499m	3
1500-2399m	4
2400m+	6

- **Pairs** of **rectangular markings** not as wide as the aiming point markings
- **TRICK – Divide LDA by 400**

SIDE STRIPE MARKINGS

- **2 stripes** along each runway edge
- If **strip >60m**, stripes should be **30m from centerline**

TAXIWAYS AND APRONS

BASICS

- **Taxiway**, **aircraft stand** and **runway turn pad** markings are **yellow**
- **Safety lines** must be a **different** colour (**red**)
- Reflective paint enhances visibility at night
- **Minimum 15cm wide**
- Designers assume **pilots** will remain **overhead the centerline**
- **Closures** are marked with **yellow crosses**

TAXIWAY/RUNWAY INTERSECTION

- Extended until taxiway centerline meets runway centerline at the '**point of tangency**'
- Extended **60m** for code 3/4 runways, **30m** for 1/2

RAPID EXITS

- **25-45°** from runway
- **50kts** for Code 3/4
- **35kts** for Code 1/2
- Centerline begins **60m before** the turn

RUNWAY HOLDING POSITION

- **2 solid** and **2 dashed lines**
- **Closest** holding point is for **CAT I** ops
- **Ladder markings** are used for **inferior** holding points i.e CAT II
- **Not closer** than **50m** if runway **>900m** or **30m** if **shorter**
- **Pattern A – RWY Designator Sign**
- **Pattern B – CAT I/II/III** sign as necessary

INTERMEDIATE HOLDING POSITIONS

- Used at **taxiway intersections**
- **Single broken line**
- Allows enough clearance for maneuvering aircraft

VOR CHECKPOINTS

- **6m diameter circle**, **15cm line width**
- Line showing the direction to face extending out 6m
- **White**

APRON SAFETY LINES

- **Red**
- Define **areas that can be used for ground vehicles**
- **10cm in width**

Aerodromes (Annex 14)

MANDATORY INSTRUCTION MARKINGS

- White writing on a red background
- Signs follow the same colour scheme
- No entry signs go across the centerline
- May not be passed without clearance

INFORMATION MARKINGS

- Location – Yellow writing on black background
- Direction – Black writing on yellow background
- Signs follow the same colour scheme

LIGHTING

BEACONS

- Provided at aerodromes used at night and is flashing white
- An identification beacon is flashing green (land) or yellow (water aerodromes) and shows identification in morse code

SIMPLE APPROACH LIGHTING

- Unnecessary if only used in good visibility or other guidance is in place
- Row of lights on the extended centerline at 60 or 30m intervals
- Crossbar lights up to 30m long, 300m from the threshold

CAT I APPROACH LIGHTING

- Extended centerline lights to 900m with gaps <30m
- 5x 30m crossbar 300m from the threshold with gaps <6m
- 0-300m – 1 light source
- 300-600m – 2 light sources
- 600-900m – 3 light sources
- If 1 light source is used for the whole distance, there should be crossbars every 150m

CAT II/III LIGHTING

CAT I lighting, plus:

- 2 red side rows extending 270m from the threshold
- 2 crossbars at 150 and 300m extending 15m from the centerline
- Runway touchdown lights 900m into runway or to midpoint (smaller)

CALVERT LIGHTING

- 5 crossbars
- 1, 2 and 3 light units on the centerline

VASIs

- Visual Approach Slope Indicators
- Provided if turbojets use the runway, there is inadequate/misleading visual guidance, there are obstacles or bad weather/terrain

PAPIs AND A-PAPIs

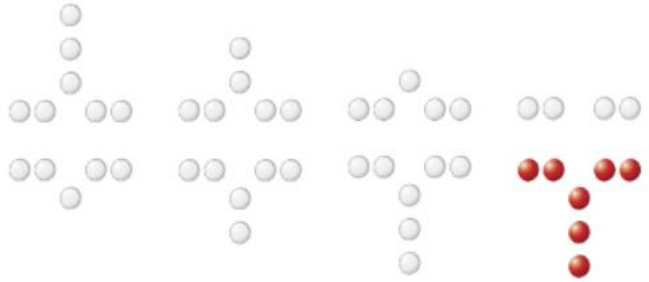
- Located on the left hand side (or both)
- PAPI – 4 light wing bar
- APAPI – 2 light wing bar

Too Low | On Glide | Too High

T-VASIs AND AT-VASIs

- T-VASI – 20 lights, 10 each side of the rwy
- AT-VASI – 10 lights on only one side
- 4 lights per unit

Too High | On Glide



Too Low | Very Low

LEAD-IN LIGHTS

- Groups of lights that guide into the runway
- <1600m between groups
- Curved or straight
- Group >3 in a cluster or linear
- Flashing White

THRESHOLD IDENTIFICATION

- 10m beside the edge line
- 60-120 flashes per minute
- White

Aerodromes (Annex 14)

RUNWAY EDGE LIGHTS

- Required when **RVR <800m**, used at **night** or for **precision approaches**
- **<3m** from runway **spaced <60m** apart (**<100m** for **non-instrument rwys**)
- **White**, except for **displaced thresholds**
- **Last 600m** or **last 3rd** may be **yellow**

WING BARS

- Mandatory on **non-instrument/non-precision** runways
- **Minimum 5 lights** extending **10m** outwards
- **Green**

THRESHOLD LIGHTS

- **<3m** from the runway
- **6m** intervals for **NPA**s, **3m** for **precision approaches**

RUNWAY END LIGHTS

- Required if **edge lights** are used
- **Red**

CENTRELINE LIGHTS

- Required for **CAT II/III** and **RVR <400m**
- Uniformly offset up to **60cm**
- Start to Last **900m – White**
- Last **900-300m – White** and **Red**
- Last **300m – Red**

STOPWAY LIGHTS

- **Red** lights the **length of the stopway <3m** away

RAPID EXIT LIGHTS

- Recommended when **RVR <350m**
- Placed on the **side** of the **rapid exit**
- Indication lights start **300m** out (**3**) then **200m** (**2**) then **100m** (**1**)

TAXIWAY CENTRELINE LIGHTS

- Normally **Green**
- **Yellow/Green** on a **Taxiway – ILS Sensitive Area**
- **Yellow/Green** on a **Runway – Rapid Exit**
- May be offset **<30cm**
- Intervals **<30m** (**<60m** if good weather) or **15m if RVR <350m**

EDGE LIGHTS

- **Blue**
- Up to **75° upwards**

RUNWAY TURN PAD

- Required if **RVR <350m**
- **Green**

STOP BARS

- Required if **RVR <350m**
- **3m intervals**, **selectively switchable**
- Must have **3 taxiway centreline lights beyond the bar**

INTERMEDIATE HOLD LIGHTS

- Required if **RVR <350m**
- **0.3m** before the marking, **1.5m** spacing
- **Yellow**

DE-ICE FACILITY EXIT LIGHTS

- **0.3m** inside the boundary, **6m** spacing
- **Yellow**

RUNWAY GUARD LIGHTS

- Required if **RVR <550m** with **no stop bar** or **RVR 550-1200** if traffic density is **heavy**
- At sides of taxiways or across the taxiway
- **Yellow**, 30-60 cycles per minute

ROAD HOLDING LIGHT

- Required if **RVR <350m**
- Adjacent to the marking
- Either a **red**/**green** traffic light or a **flashing red light**

OBSTACLES

- **Low** Intensity – **Fixed Red** Lights
- **Medium** Intensity – **Flashing Red** Lights
- **High** Intensity – **Flashing White** Lights
  - Used when **height >150m** and must be **visible in the day**
- **Mobile Obstacles - Flashing Yellow** Lights
- **Service Vehicles** should be **yellow**

FLAGS

- **Fixed obstacles** marked with an **orange** flag

EMERGENCY SERVICES

- Category of aerodrome based on the **longest aircraft length** and **widest fuselage width**
- Vehicles marked **red** or **yellowish green**
- Response time is '**phone to foam**'
- **2–3-minute response** time necessary

DEFINITIONS

- **CTA –** Controlled area extending upwards from a specified limit above the **Earth**
- **CTR –** Controlled zone extending upwards from the **surface**
- **ADA –** Advisory Area
- **ADR –** Advisory Route
- **ADS –** Automatic Dependent Surveillance – Gives 4D position and additional info via datalink
- **AFIS –** Aerodrome Flight Information Service
- **ATCRU –** ATC Radar Unit
- **ETA:**
  - **IFR –** Arrive overhead **IAF**
  - **VFR –** Arrive overhead **aerodrome**
- **Ceiling –** Clouds cover more than ½ the sky
- **Strayed Aircraft –** Reports it is lost or deviated from intended track
- **Unidentified Aircraft –** Reported to be in a given area but identity not established
- **Maneuvering Area –** Aerodrome parts used for T/O, landing and taxi excluding aprons
- **Aerodrome Traffic –** On the maneuvering area and in the vicinity

SCOPE

- **Complimentary** to **SARP**s (**not** an Annex)
- **No differences** need be filed

RESPONSIBILITY FOR PROVISION

- Within **FIR**, services are provided by a **Flight Information Centre**
- In **controlled airspace**, an **ATCU** provides all services

GENERAL PRACTICES

IFR TO VFR

- **Pilot -** "*CANCELLING MY IFR FLIGHT*"
- **Controller -** "*IFR FLIGHT CANCELLED AT TIME*"
- ATC will inform other ATS units on the flight plan route of the changes

TRANSITION ALTITUDES/LEVEL

- Change at Transition ***Altitude*** when **climbing**
- Change at Transition ***Level*** when **descending**
- Transition **Level** set by **ATS**
- Transition **Altitude** **fixed** and found on **charts** or in **AIP,** usually **>3,000ft**

ALTIMETER SETTINGS

- **QFE datum** is the **aerodrome elevation** unless:
  - **Instrument** runway **>2m** below elevation OR
  - **Precision approach** runway
- In which case **threshold elevation** is used
- If **QNH** not already given, pilot will be told when on **approach**, entering **circuit** or getting **departing taxi clearance**
- Always rounded **down** to **nearest hPa**

POSITION REPORTS

- ATS can **excuse** aircraft from making reports
- Contents:
  1. Aircraft Identification
  2. Position
  3. Time
  4. Flight Level/Altitude
  5. Next Position and Time
  6. Next Significant Point
- 4,5 and 6 may be **omitted** if specified in **regional air navigation agreements**
- 4 may be **omitted** if **SSR Mode C** equipped

ROUTINE AIR REPORTS (AIREP)

- Contains **meteorological info**, including severe turbulence, severe icing, severe mountain waves, thunderstorms, heavy dust/sandstorms and volcanic activity

ATC

CLEARANCE LIMIT

- Point to which a specific clearance is valid
- May be defined by a **reporting point**, **aerodrome** or controlled airspace **boundary**

READBACK

Required for the following information:

- **Level**, **Heading** and **Speed** Instructions, **Clearances**, **Runway in Use**, **VDF** info, **Frequency Changes** (*only the frequency*), **SSR**, **Radar Service** and **Altimetry**
- ***Anything with numbers involved***

AIR TRAFFIC INCIDENT REPORT

- **AIRPROX –** Aircraft that have lost separation
- Should be **reported** to the **ATSU** concerned
- **Procedures** should be established for reporting to promote aircraft safety

SLOTS

- Valid between **-5** to **+10 minutes** of **Calculated Take-Off Time** (**CTOT**)

SPEED CONTROL AND SEPARATION

GENERAL PROVISIONS FOR SEPARATION

- Provided for:
  - **All** flights in **Class A/B**
  - **IFR** and **VFR** in **C**
  - **IFR** in **C**, **D** and **E**
  - IFR and Special VFR
  - **Special VFR** when **prescribed**
- **Exceptions** exist in **daytime VMC** when traffic is visually separated
- **Maintaining own separation** is allowed:
  - In **Class D** or **E** airspace
  - When **VMC**
  - In **Daylight**

VERTICAL SEPARATION

- **1,000ft below FL290**
- **2,000ft above FL290** (**Non-RVSM**)
- **1,000ft above FL290** (**RVSM**)
- May be cleared to a **previously occupied** level when it is **vacated** (**±300 feet**) except:
  - **Severe turbulence** exists
  - Higher aircraft is cruise climbing
  - Performance delta impacts separation
- In which case it must have vacated by the normal minima
- Assigned levels must be **maintained** by:
  - **Non-RVSM - ±300ft**
  - **Non-RVSM** with **Exceptions - ±200ft**
  - **RVSM – ±200ft**

HORIZONTAL SEPARATION

- Achieved by **geographical location** or **navigational aids**
- 1 aircraft **>15nm away** and…
- **VOR - >15°** radial difference
- **NDB – >30°** radial difference
- **Dead Reckoning Fix - >45°** radial difference

LONGITUDINAL SEPARATION DEFINITIONS

- **Same tracks –** same direction intersecting ***within 45°***
- **Reciprocal tracks –** Opposite and intersecting tracks ***45° either side*** of the nose
- **Crossing tracks –** Other than those above

LONGITUDINAL SEPARATION METHODS

- Specified **departure time**
- **Speed** adjustments
- **Holding** for a specified time

COMPOSITE SEPARATION

- Combines **vertical** and **horizontal** sep.
- Allows minima to be **reduced**

SPEED CONTROL

- **Above FL250**, speed adjustments in multiples of **.01 Mach**
- **Below FL250**, speed adjustments in multiples of **10kts IAS**
- **Not** applied **within 4nm** of **landing**
- **Not** changed by **>20kts** for aircraft on **intermediate/final** approach

SEPARATION BY TIME

- Standard is **15 mins**
- **10 mins** if **nav aids** give position and speed

Same Track and Cruising Level:

- **5 mins** if preceding aircraft **20kts faster**
- **3 mins** if preceding aircraft **40kts faster**
- *As long as aerodrome/reporting point is the same!*

Reciprocal Tracks:

- Vertical sep. required for **±10 minutes** of time of passing

SEPARATION BY DME/GNSS

Same track (or **crossing <90°**) and **cruising level** with **same 'on track' waypoints:**

- **20nm**
- **10nm** if leading aircraft is **20kts faster**
- **10nm** if **climbing/descending** (**same track**)
- Climb through levels occupied if they have passed each-other by **10nm** apart

SEPARATION BY RNAV/RNP

- **80nm** separation (**RNAV** Airspace)
- **50nm** if **RNP 10**
  - Position reports every **24 mins**
  - Failure to report requires **controller response** after **3 mins**
  - Alternative sep. required after **8 mins**

SEPARATION IN THE HOLD

- **5 mins** or **prescribed distance**
- Must be **lateral** or **vertical separation**

SEPARATION OF DEPARTING AIRCRAFT

- **1 min –** tracks diverge **>45°** after take-off
- **2 mins –** first aircraft **>40kts faster**, same track
- **5 mins –** if later aircraft will **outclimb** and **outperform** the first aircraft
- Departures are allowed **until**:
  - An aircraft on a **straight in** approach is **5 mins** away
  - An aircraft on an instrument approach has started a **procedure** or **base** turn

SEPARATION OF ARRIVING AIRCRAFT

- **Complete instrument approach –** aircraft has started a **procedure** turn or **base** turn if take-off is **3 mins** before arrival
- **Straight in approach – 3 mins** before arrival overhead the runway

WAKE TURBULENCE

CATEGORIES

- **Heavy -** >136,000kg
- **Medium –** 7,000-136,000kg
- **Light -** <7,000kg
- *Can be found in Jepp (ATC Flight Plan Section)*

MINIMA (NO RADAR)

- **3 mins** if from an **intermediate position** or **light** aircraft arriving behind **medium**/**heavy**
- **ALL** other categories are **2 mins**
- ***Not required*** to apply sep. if VFR are landing after medium or heavy aircraft or the aircraft behind has the other in sight (if cleared)

ATC PROCEDURES

ESSENTIAL TRAFFIC

- **Controlled** traffic **not separated** from **other controlled** traffic where ATC must apply separation
- **Class B** is the **only** airspace where **VFR** may be **essential traffic** to **IFR**

PROCEDURES FOR ARRIVING TRAFFIC

- Clearance for **IFR visual approach** may be requested by either **ATC** or **flight crew**
- If **ATC** request, **flight crew** must **agree**
- Requires **visual reference**, **ceiling** at or above **initial approach level** and the **pilots** to **report suitable weather conditions**
- Separation must be provided until **visual contact** with preceding aircraft

INSTRUMENT APPROACHES

- ATC specifies approach to be followed
- Alternative may be requested
- Must be completed **IFR until cleared** visual

HOLDING

- Turbojets should be permitted to hold **higher** to **reduce fuel consumption** whilst **maintaining position** in sequence

FINAL APPROACH CHANGES

Aircraft on final should be told about changes in...

- Headwind **±10kts**
- Tailwind **±2kts**
- Crosswind **±5kts**
- Windshear
- Turbulence
- Visibility
- RVR Trends

APPROACH SEQUENCE

- **Emergencies**, **Hospital** and **SAR** aircraft have **priority** (*in that order*)

Aircraft may be **cleared** for approach when:

- 1st aircraft can complete approach in **VMC**
- 1st aircraft is **in comms** and **seen by tower**
- **Defined point** passed (*timed approaches*)
- **Required longitudinal spacing** established (*with **radar***)

EXPECTED APPROACH TIME (EAT)

- If **delay** **>10 mins**, EAT should be given
- Transmitted to aircraft **ASAP** and **not later** than **initial descent**
- **Revised EAT** given if **varies** by **>5 mins**
- **>30 mins delay** transmitted to **aircraft** AND **operator ASAP**

PARALLEL RUNWAY OPERATIONS

ZONES

- **Normal Operating Zone (NOZ) –** Airspace either side of the localizer centerline
- **No Transgression Zone (NTZ) –** Corridor between parallel approaches where penetration would require controller intervention. Extends from closest threshold to point where 1,000ft vertical separation is reduced. **Minimum** **610m wide**

TRACK DIVERGENCE

- **Departures** and **approaches** require **>30° divergence** for **simultaneous parallel ops**

MODE 1

- **Independent Parallel Approaches**
- **No** Radar Separation Minima
- **1035m** distance between centerlines
- ILS interception **<30°** with **1nm straight and level before localizer** and **2nm before glideslope**
- Both aircraft established on localizer before 1,000ft separation minima reduced
- Once 1,000ft separation broken, aircraft **must not penetrate NTZ** and must have **3nm longitudinal separation** on ***same track***
- **>30°** track divergence at **missed approach**

MODE 2

- **Dependent Parallel Approaches**
- **Minimum 1,000ft vertical** or **3nm radar separation** for turn onto localizer
- **915m** distance between centerlines
- **3nm** separation on **same** ILS localiser
- **2nm** between **adjacent** ILS tracks

MODE 3

- **Independent Parallel Departures**
- **760m** centerline distance

MODE 4

- **Segregated Parallel Ops** (1 T/O, 1 Landing)
- **760m** centerline distance
- May be **decreased by 30m** for every **150m** that arrival runway is staggered towards arriving aircraft to **minimum of 300m**

OTHER MODES

- **Semi-Mixed –** One exclusive runway, one for T/O and Landing
- **Mixed –** Simultaneous approaches with departures
- **Segregated –** 1 T/O and 1 landing runway

AERODROME CONTROL SERVICE

DEPARTING TRAFFIC SEPARATION

T/O is permitted once preceding aircraft has:

- **Crossed end** of runway in use
- Started **turn**
- Landed and **clear** of the runway

ARRIVING TRAFFIC SEPARATION

- Landing **clearance** may be given after preceding aircraft has **crossed threshold**
- Reduced separation minima applies **30 mins** after **sunrise** to **30 mins** prior to **sunset**
- Reduced sep. **doesn't** apply between **departing** acft and preceding **landing** acft

SPECIAL VFR

- Ground visibility **>1500m** in a **CTR only**
- Within **Class E**, SVFR can take place **without** a **functioning radio receiver**

SUSPENSION OF VFR OPS

- Triggered by **ACU**, **ACC**, **Tower** or **ATS**
- Tower will **hold** all VFR **departures**, **recall local** VFR **flights** (or go **Special VFR**), **notify ACU/ACC** and **notify operators**

RADAR SERVICES

RADAR IDENTIFICATION

- **IDENT** shows for **20 seconds**

Other means of identification:

- Change of **heading >30°**
- Radar position within **1nm** of **DER**

RADAR VECTORING

- **ATC** has **obstacle clearance responsibility**
- When **5nm separation**, will not be vectored within **2.5nm** of **airspace limits**
- **Not** vectored into **uncontrolled airspace** (unless on pilots request or in an emergency)
- If instruments are **unreliable**, all turns must be at **agreed rate** and done **immediately**
- **Cannot** be vectored onto localizer with interception **>45°**

RADAR SEPARATION

- **Standard – 5nm**

Can be **reduced** to...

- **3nm –** If **radar capability** allows
- **2.5m –** Aircraft on **same final track** within **10nm** of runway end

WAKE TURBULENCE RADAR SEPARATION

Heavy	***BEHIND***	**Heavy**	**4nm**
Medium			**5nm**
Light			**6nm**
		Medium	**5nm**

- **Light = 8-**, **Medium – 3+**, **Heavy – 2+**

e.g Light behind Heavy = 8-2 = ***6nm***

EMERGENCIES AND FAILURES

EMERGENCIES

- In an emergency, set **Mode A 7700**
- Only different if ATC requests a specific code
- Otherwise keep squawk unless advised

TRANSMITTER FAILURE

- Continued control when SSR fitted using ***code changes*** or ***IDENT*** to acknowledge clearances

COMPLETE COMMS FAILURE

- Radar sep. between all aircraft where required until assumed out of the airspace

TRANSPONDER FAILURE

- **Before** departure – Depart only to get **repaired**
- **After** departure – ATC **notified** who will try and get you to destination following **FPL**

EMERGENCY DESCENT

- ATCU **broadcast** message to all aircraft in the area to **clear** the specified area and **standby**

FUEL DUMPING

- Aircraft should advise ATC of **duration**
- Preferably over **water**, **away** from **towns** and **thunderstorms**
- **Never below 6,000ft**
- **10nm** horizontal separation (NOT behind)
- Aircraft behind within **15 mins** flying time or **50nm**
- Vertical sep. **1000ft above** and **3000ft below**

RADAR APPROACHES

APPROACH

- Radar controller will notify aerodrome controller **8nm** from touchdown
- If landing clearance not given, notified again at **4nm** and **clearance requested**
- **Clearance** required **before** **2nm** or **DA**

SURVEILLANCE RADAR APPROACH (SRA)

- Precomputed glidepath and distance to be reported every **1nm**
- **Terminated** **2nm** from **touchdown**, before aircraft is in **area of continuous clutter** or if the pilot can perform a **visual** **approach**
- If accuracy allows, approach can be continued <2nm to 0.5nm providing:
  - Distance given every **0.5nm**
  - Transmission interruption not **>5 seconds** within **4nm** of touchdown
  - Radar controller has **no other duty**
- Advised to go **missed** if position/ident unclear for **2nm** period

AIR TRAFFIC SERVICES

ALERTING SERVICE

- Aerodrome control tower will alert **fire and rescue** when an **incident** **occurs** near the aerodrome or if **requested** by **flight crew**
- If an aircraft fails to contact tower and fails to land after **5 mins** past expected landing time should be reported to **ACU**, **ACC** or **FIC**

FLIGHT INFORMATION SERVICE

- **Class C – VFR** about **VFR** traffic
- **Class D – IFR** about **IFR** traffic and **VFR** about **all** traffic
- **Class E – All** flights get traffic info ***as far as possible***
- **Class F & G – All flights** get service ***if requested***

Includes information about:

- SIGMET (**60 mins** after issue) + AIRMET (**1hr ahead** of route)
- Volcanic Activity
- Radioactive Activity
- Nav Aid Availability
- Aerodrome Availability + Facilities
- Free Balloons

TRAFFIC ADVISORY SERVICE

- Available in **advisory airspace**
- Designed to **mitigate** **collision hazards** more effectively

Air Traffic Services (Annex 11) & Airworthiness (Annex 8)

AIR TRAFFIC SERVICES

TYPES

- **3 types** of ATS (in order of control):
  - **Control** – Tower/Approach/Area
  - **FIS**
  - **Alerting**

DEFINITIONS

- A **FIR** (**Flight Information Region**) goes up to **FL195**
- A **UIR** (**Upper Information Region**) is **above** this
- **CTR – Control Zone** (starts at **surface**)
  - **5nm radius**
  - May include **multiple airports** if close
- **CTA – Control Area** (sits **above** a **CTR**)
  - **>700ft** above the **surface**
- **TMA – Terminal Movement Area** (**above** a **CTA**)
- Airspace may be **Prohibited**, **Restricted** or **Danger** Areas
- **ADIZ –** Air Defence Identification Zone

ROUTES

- **Not more** than **6 characters**, ideally **max 5** starting with a **letter** then **numbers**

Part of Regional Network:

- Non RNAV - A, B, G, R
- RNAV Routes - L, M, N, P

Not Part of Regional Network:

- Non RNAV - H, J, V, W
- RNAV Routes - Q, T, Y, Z

Prefixes:

- **K** = Low Level (Helicopters)
- **U** = Upper
- **S** = Supersonic

Suffixes:

- **Y** - RNP 1 above **FL200**, **22.5nm** ROT
- **Z** - RNP 1 below **FL195**, **15nm** ROT
- **F** - Advisory only
- **G** - FIS only

AIRSPACE CLASSIFICATIONS

- **Class A -** IFR Only, Separated, ATC Service
- **Class B -** IFR and VFR, Separated, ATC Service
- **Class C -** IFR Separated, VFR Separated from IFR, ATC Service or Traffic Information Service, 250kts IFR speed limit below 10,000ft

↓ 250kts Speed Limit Now Applies Below 10,000ft ↓

- **Class D -** IFR Separated, VFR Not. ATC Service for IFR and Traffic Information for VFR
- **Class E -** IFR Separated, VFR gets Traffic Information (as far as applicable) and need not be in communication and does not need clearance

ATC Clearance/Comms No Longer Necessary when ↓ VFR as it is Uncontrolled Airspace ↓

- **Class F –** Advisory Airspace. IFR Separated (as far as applicable). VFR Not Separated, FIS
- **Class G –** Open FIR, Same as F but IFR not separated

ATIS

- **Automatic Terminal Information Service**
- **D-ATIS -** Datalink ATIS
- Can be on a **Terminal VOR** channel
- Should not exceed **30 seconds**
- **Surface Wind** and **RVR** averaged over **2** and **1 minute** respectively
- Updated **immediately** after **significant change**
- If weather is **rapidly changing** you should **ask ATC** instead

AIRWORTHINESS

GENERAL

- **Certificate of Airworthiness –** Issued by **State of Registry** once satisfied that the aircraft complies with Annex 8
- Required for **any flight**
- If an aircraft is damaged, the **State of Registry** will determine whether the aircraft is still **airworthy**
- If **damage** is sustained in another state, that authority can prevent the aircraft from flying if they **notify** the **State of Registry**
- The **State of Design** must ensure that aircraft >5700kg MCTOM have a **system** related to **continued airworthiness**

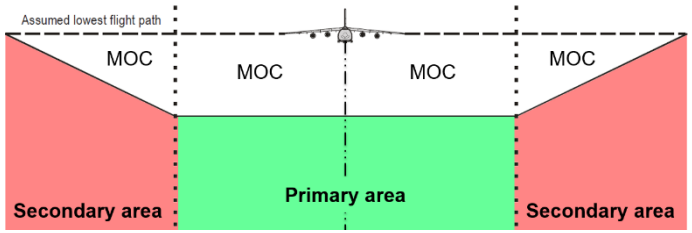
DEFINITIONS

- **Balked Landing –** Landing discontinued below Obstacle Clearance Alt./Height (OCA/H)
- **MEA -** Minimum Enroute Altitude – Adequate reception of relevant nav aids and obstacle clearance
- **MSA -** Minimum Sector Altitude – Minimum clearance of **300m** within **25nm** radius of nav aid
- **AAL –** Above Aerodrome Level
- **PDG –** Procedure Design Gradient
- **DER –** Departure End of the Runway
- **STAR –** Standard Instrument Arrival
- **PA –** Precision Approach – Azimuth, Elevation and Distance Information
- **NPA –** Non-Precision Approach – No Elevation Information

PROCEDURES

OBSTACLE CLEARANCE

- **Primary Area – ½ Total Width** with **Full** Minimum Obstacle Clearance (MOC)
- **Secondary Area – ¼ Total Width** and down to **0ft** MOC



- **Turns with No Track Guidance = Full Primary**
- **En-Route Obstacles - >150m** AGL

OBSTACLE CLEARANCE ALTITUDE/HEIGHT

- **PA –** OCH **above** Runway **Threshold**
  - OCA/H + Margin = **DA/DH**
- **NPA –** OCH **above Aerodrome Elevation** OR **Threshold** if **>2m below aerodrome**
  - OCA/H + Margin = **MDA/MDH**
- **Circling –** OCH **above Aerodrome Elevation**
- All **OCA**s are referenced to **MSL**
- Determined by the **State**

FIX TOLERANCES

	VOR	ILS	NDB
Has Track Guidance	±5.2°	±2.4°	±6.9°
No Track Guidance (*"Intersecting Facility"*)	±4.5°	±1.4°	±6.2°
x1.5 for **Reduced Obstacle Clearance**			

- **DME - ±0.25nm + 1.25% of distance**

FIX TOLERANCES WHEN OVERHEAD

VOR:

- Cone of ambiguity **50°** from vertical
- **±5°** on **entry and** when **tracking** through

NDB:

- Inverted cone of ambiguity **40°** each side
- **±15°** on **entry**, **±5°** when **tracking** through

SURVEILLANCE RADAR TOLERANCES

- **Terminal Area** (within **20nm**) **- ±0.8nm**
- **Enroute - ±1.7nm**

DEPARTURE PROCEDURES

OPERATORS RESPONSIBILITY

- **Operator** must make procedures for **engine failure** after V1
- **Published** procedures assume **AEO**
- **Turning** procedures in the **Ops Manual**

PROCEDURE DESIGN GRADIENT (PDG)

- **5m**/16ft **above DER**
- **Obstacle Identification Surface = 2.5%**
- **Additional margin** of **0.8%** applied
- Normal **PDG** is therefore **3.3%**
- Published gradients are until the altitude after which the standard 3.3% PDG is suitable
- Clearance at DER is assumed to be **0ft**

STANDARD INSTRUMENT DEPARTURES

- **Departure** procedure that **terminates** at the **first fix** of the **en-route** phase
- Pilots expected to make **wind corrections** to follow **stated tracks**

OMNIDIRECTIONAL DEPARTURES

- Used with **no track guidance**

STRAIGHT DEPARTURES

- **Track guidance** within **20km** of **DER**
- Within **15° of centerline** (or it is a **turning** departure)
- PDG may be **>3.3%** until obstacles cleared
- Gradients **below 200ft** for close in obstacles are **not published** but will be **noted**

TURNING DEPARTURES

- **Track guidance** within **10km** after **completion** of **turns**
- **Minimum** turn height is **120m** (395ft)
- **90m** (295ft) **obstacle clearance** required **before turn** may be specified
- Turn may start at **600m** from threshold, **DER** or a **specified point**
- **ISA +15°C** used to determine turning area

ARRIVAL/APPROACH PROCEDURES

SPEED CATEGORIES

Category	V_{AT} Speed
A	>91kts
B	91-120kts
C	121-140kts
D	141-165kts

- Based on **1.3 V_{S0}**
- Provides a **standardized** basis to relate **aircraft maneuverability**

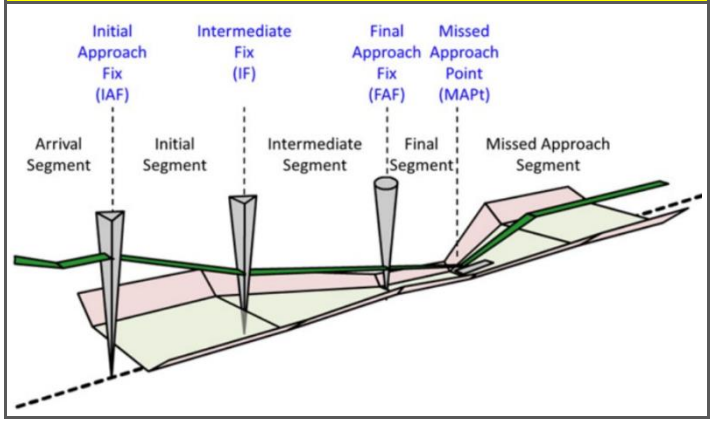
APPROACH TYPES

- **Straight In –** Angle between **Runway** and **Final Approach Track** **<30°**
- **Circling – Not** a **Straight In** Approach

RNAV APPROACHES

- In order of **precision** (though all are **NPA**s):
  - **DME/DME** (*No Reference Facility Required*)
  - **DME/VOR**
  - **DME/LOC**
  - **LOC**
- Each RNAV category requires **approval**

APPROACH SEGMENTS/FIXES



ARRIVAL SEGMENT

- May be **omnidirectional** or **sector** arrivals (dependent on MSA)
- **Protected area decreases** from **enroute** to **initial approach** value with maximum convergence angle of **30°**
- **±5nm corridor**
- Begins **25nm** before **Initial Approach Fix** (**IAF**) if arrival is **>25nm** or at the **start of the arrival route** if **<25nm**
- Ends at the **IAF**

INITIAL APPROACH SEGMENT

- **IAF** to **Intermediate Fix** (**IF**)
- **>300m** (984ft) **clearance** in **primary** area, **0** at outer edge of **secondary** area
- **Track guidance** to **IF** with **max interception** of **90°** (**PA**) or **120°** (**NPA**)
- If **no IAF/IF** then reversal/racetrack/holding pattern is required with **max 25° AOB**
- **Established** inbound when:
  - **VOR – Half-scale** deflection
  - **NDB - ±5°**

REVERSAL PROCEDURES

- **Procedure Turns –** Inbound track is **reciprocal** of the outbound track
  - Can be **45/180** or **80/260**
  - **1-min** straight leg for **Category A/B**
  - **1 min 15** for **other categories**
- **Base Turns – Specified** outbound track (not reciprocal!)
- **Racetrack –** End of outbound leg defined by **timing**, **radial**, **bearing** or **DME distance**

INTERMEDIATE APPROACH SEGMENT

- **IF** to **Final Approach Fix/Point** (**FAF/FAP**)
- Or from a **reversal** procedure to a **FAF/FAP**
- Can include a **dead reckoning** segment intercepting **ILS at 45° <10nm long**
- **Speed reduced** and **aircraft configured**
- **300-150m** (492ft) clearance in **primary** area, **0** at outer edges of **secondary** area

FINAL APPROACH SEGMENT

- **Alignment** for **descent** and **landing**
- **FAP –** Point of **interception** of **ILS glideslope**
- **3-10nm** from threshold and **1-3,000ft**
- Where there is **no FAP**, **inbound track** is the **final approach segment**
- **90m** MOC **without** FAF, **75m with** FAF
- **Maximum 6.5%** descent gradient

NPA WITH FAF

- **5.2%** or **3°** Descent Gradient
- **5-10nm** is **optimal** distance from threshold
- May use a **stepdown fix** with **2 OCA/H** to ensure clearance before reaching MDA/H

PRECISION APPROACHES

- Begins at **FAP**
- Intercepts **glideslope** at **300m** (1,000ft) or **900m** (3,000ft) above **threshold** elevation
- **Minimum 2.5°**
- **Optimum 3°** (and maximum for **CAT II/III**)
- **Maximum 3.5°**

MISSED APPROACH SEGMENT

- From **MAPt** when **not visual**
- **Minimum 2.5%** Climb Gradient
- **2%** may be approved if **safeguards** in place
- If started **before MAPt**, pilot should **continue to MAPt** albeit at higher altitude
- **Initial – MAPt** to **Start Of Climb** (SOC) – Config changed but **no turns**
- **Intermediate – Max** change **15°** from initial track with **30m** obstacle clearance
- **Final –** From **50m** (164ft) obstacle clearance is **first obtained** to point where **new approach/hold** can start. **Turns possible**
- **Up to 3 second** turning reaction time

VISUAL APPROACH PROCEDURES

PROTECTION CIRCLING AREA

- Visual manoeuvring area for circling is **arcs** from runway thresholds based on:
  - Aircraft **Category** and **Speed**
  - Wind Speed of **25kts**
  - Average **AOB** of **20°/3° per second**
- Obstacles **outside final/missed approach** areas may be **ignored**
- Cannot then circle in **that sector**

CIRCLING SPEEDS

Category	Max. Circling Speed
A	100kt
B	135kts
C	180kts
D	205kts
E	240kts

MISSED APPROACH WHEN CIRCLING

- **Visual reference** maintained, **landing threshold** in sight and **required clearance** maintained before descent **below MDA/H**
- If visual reference is **lost**, carry out **missed approach** for the **original instrument approach**
- Climbing turn **towards landing runway** to return to circling altitude
- **Cannot** exceed IAS for visual maneuver

HOLDING PROCEDURES

GENERAL

- **25° AOB/3° per second (least)**
- **Right hand turns are standard**
- **Max 230kts below 14,000ft**
- **Shuttle –** Climb/descent in the hold
- **Outbound leg** is…
  - **1 min at or below 14,000ft**
  - **1.5 mins above 14,000ft**
  - **DME distance** (*if specified*)
- Aircraft may adjust pattern to leave the hold at a specified time if necessary
- Timings begin **over** or **abeam** the fix (latest)

ENTRY PROCEDURE

- Governed by **inbound magnetic heading**
- Flexibility of **5°**

If **outbound course** is within:

- **110° left** of heading – **Parallel** entry
- **70° right** of heading – **Teardrop/Offset** entry (within **30°** of **reciprocal**)
- **Beyond** this – **Direct** entry
- This is **inverted** for **left hand** turns!

OBSTACLE CLEARANCE IN THE HOLD

- **Holding Area – Basic** Hold Area + **Entry** Area
- **Buffer Area – 5nm boundary** of **holding area**
- **Minimum Holding Level** gives 300m (984ft) clearance except for **high terrain** where it is up to **600m** (1969ft) down to **60m**

MISCELLANOUS

TRANSPONDERS

- Should **always** be **on**
- **2000** set when there is **no ATC**
- Accurate to **25ft**
- Reported in **100ft** increments
- **TA**s prompt to make **visual contact**
- **RA**s may only be **ignored** for **safety reasons**

ALTIMETER TOLERANCES

- Known height **±20m** (60ft) up to **30,000ft**
- Known height **±25m** (80ft) up to **50,000ft**

7 Personnel Licensing (Annex 1), Part FCL and Part MED

DEFINITIONS

- **Proficiency Check –** Demonstration of skill to **revalidate** or **renew ratings** including oral exams. Valid for 6 months and can be revalidated 3 months in advance
- **Skill Test –** Demonstration of skill for a **license** or **rating issue** including oral exams
- **Revalidation –** License has **not yet expired**
- **Renewal –** License has **expired**
- **Night –** Period where the disc of the Sun is **6°** below the horizon (**twilight**)
- **Flight Time –** From first movement for the purpose of taking off until coming to rest
- **Cross Country (XC) –** Flight using a pre-planned route using standard navigational procedures arriving somewhere different
- **Instrument Time –** In flight and on ground
- **CAT** – Commercial Air Transport
- **MPA –** Multi-Pilot Aircraft
- **ATO –** Approved Training Organization

ALLOWED AGES

- **PPL –** ≥17
- **CPL –** 18-64
- **ATPL –** 21-64
- **MPL –** 18-64
- Cannot operate CAT **>60 except <65** and **multi-crew** with **another <60**

DOCUMENTS

- Must carry valid **license**, **medical** & **photo ID**
- Must present **flight time record** without undue delay
- XC solo students should carry **authorization**

COMMERCIAL PILOTS LICENSE

- Gives privileges of:
  - **PPL** and **LAPL**
  - Act as **PIC** (**except** for **MPA CAT**)
  - Act as **co-pilot** for **CAT**
- **Integrated – 150hrs**, **70hrs** as **PIC**
- **Modular – 200hrs**, **100hrs** as **PIC**
- Both require:
  - **20hrs** VFR **XC** as **PIC** with 1x **300nm trip** landing at **2 additional aerodromes**
  - **10hrs instrument** (***<5hrs** on the **ground***)
  - **5hrs night** (***5 TOs** and **5 LDGs** as **PIC***)

AIRLINE TRANSPORT PILOTS LICENSE

- Can act as **PIC** of a **multi-crew** plane in **IFR**
- Gives privileges of **PPL**, **CPL** and **LAPL**
- **1500hrs flight time**, including:
  - **100hrs sim** time **(<25hrs** in **FNPT**)
  - **500hrs multi-pilot CAT**
  - **500hrs PICUS** (or **250** as **PIC**)
  - **200hrs XC** (**>100** as **PIC**/**PICUS**)
  - **75hrs instrument** (**<30** on the **ground**)
  - **100hrs night**

CO-PILOT TIME

- Used for application of a higher license
- **ICAO – 50%** time ***OR*** **Part FCL – 100%** time

RATINGS

- **Type Ratings** established for **MPA** **>5700kg**, have **abnormal handling** characteristics or are **deemed necessary** by the Authority
- **MCC** required for **first type-rating** on **MPA**
- **Class rating** required for **self-sustaining gliders**

INSTRUMENT RATING

Requirements:

- **50hrs XC PIC** time (**10** in **planes**)
- Able to operate **OEI** if for **multi-engine**

INSTRUCTOR RATINGS

- Require **CPL theory** exams, **valid license** and **Flight Instructor rating**
- Can conduct instruction for **PPL**, **SPL**, **BPL** and **LAPL** and for **CPL** if they have **500hrs** on **type** (**200hrs instruction**)
- Instructor categories end with an **I** (e.g TRI)

EXAMINERS

- Authorization valid for **3 years**

VALIDITY, REVALIDATION & RENEWAL

- Ratings valid for **1 year**
- May be revalidated **3 months** prior to expiry
- **Exception** is **SEP** class - valid for **2 years**
- If expired by **3+ years**, **refresher training** at an ATO necessary and a **proficiency check** (equivalent to **initial training**)
- **IR revalidation** can be combined with **type/class proficiency check**
- **Night** currency - **1 landing** in past **90 days**
- **Theory** training is valid for **7 years**
- Other State may accept licenses for a period of **1 year** (whilst **original** is **valid**)

Part MED & Aircraft Accident Investigation (Annex 13)

MEDICALS

- **3 types** of **certificate** with **2 classes**:
- **Class 1 –** CPL, MPL and ATPL
- **Class 2 –** Other flying
- **LAPL Medical**

MEDICAL VALIDITY

From **date of examination** until:

- **Class 1 – 12 months**
  - **Single pilot CAT 40+** or **60+ – 6 months**
- **Class 2 – 60 months**
  - **24 months** if **40-50**
  - **12 months** if **50-65**
  - **6 months** if **65+**
- **Revalidation** may be up to **45 days** prior to expiry to get the original expiration date

DECREASE IN MEDICAL FITNESS

- Seek **medical advice** from AME/AeMC (Aeromedical Centre) when:
  - Ill for >21 days
  - In **hospital** for **any period**
  - Started new **regular medication**
  - First need **correcting lenses**
- **Never** fly under the influence of **psychoactive substances**
- **Limitations** only removed by the **Authority**

MEDICAL DEFERMENT

- Medicals may be deferred (at **Licensing Authority's discretion**) up to:
  - **Single period** of **6 months** (**non-CAT**)
  - **2 consecutive 3-month periods** (**CAT**)
  - **<24 months** for **private pilots**

AIRCRAFT ACCIDENT INVESTIGATION

OBJECTIVE

- To **prevent accidents** and **incidents**
- Annex 13 applies ***wherever accidents occur***

DEFINITIONS

- **Occurrence –** Circumstance that has/may have influenced flight safety that **has not** resulted in an **accident** or **serious incident**
- **Incident - Could** affect the safety of the operation (*e.g incapacitation*)
- **Serious Incident –** Incident where an accident nearly occurred
- **Accident**
  - Injury resulting in death within 30 days is classed as fatal
  - As a result of being ***in/around*** the aircraft
  - Applies if someone had the ***intention of flight*** if occurs before or after
  - Aircraft sustains **damage**
  - **Missing** aircraft = Accident
- **Serious Injury**
  - **Hospitalization >48 hours** starting within **7 days** from date of injury
  - Also includes 2nd/3rd degree burns or any burns >5% of the body

GENERAL

- State of **Occurrence** will notify:
  - State of **Registry**
  - State of **Operator**
  - State of **Design**
  - State of **Manufacture**
  - **ICAO** if **MCTOM >2250kg**
- State of **Registry**, **Operator**, **Design** and **Manufacture** will forward any **necessary information** to State of **Occurrence**
- All may appoint **representatives**
- State of **Occurrence** will **carry out investigations** into **accidents** and **serious incidents** (>2250kg MCTOM) **unless delegated**
- If in a **non-contracting state** or **undefined territory**, responsibility falls to State of **Registry**

REPORTS

- Should be in an **ICAO working language**
- **Draft** final report sent to State of **Registry**, **Operator**, **Design** and **Manufacture**
- **Comments** received within **60 days** and final report issued with minimum delay
- **Final** report sent to State that **started investigating**, **Registry**, **Operator**, **Design**, **Manufacturer**, those that **suffered serious injuries/fatalities** and those that **provided information**
- Will comply with **ICAO standards**
- Released within **12 months** of **occurrence**
- **Interim** reported required if **not possible**
- If MCTOM >5700kg final report should be sent to **ICAO**

Nationality (Annex 7) & Search and Rescue (Annex 12)

AIRCRAFT NATIONALITY/REGISTRATION

GENERAL

- **Only standards** in this Annex so any **difference must be filed**
- **Hyphens** are used to separate the **nationality mark** and the **registration mark *if a letter comes after it*** (e.g G-KEYS)
- **Nationality marks** are chosen by the **International Telecommunications Union** (**ITU**)
- A **common mark** is used if a nationality mark is not used which is **allocated by ICAO**
- Heavier than air aircraft – get lift chiefly through aerodynamic forces

REGISTRATION MARKS

- **Registration** is assigned by the **State of Registry** or **Common Mark Registry Authority**
- **XXX**, **PAN**, **TTT** and any **Q codes** or any **5 letter codes** from the **international code of signals** may **not** be used

LOCATION

- **Wings –** Left half of the lower surface (or the whole surface) and at-least **50cm**
- **Fuselage –** Each (or both) side(s) of the aircraft and at-least **30cm**

SEARCH AND RESCUE

DEFINITIONS

- **INCERFA – Uncertainty** Phase
  - "**Uncertainty**" exists
- **ALERFA – Alert** Phase
  - "**Apprehension**" about an aircraft
  - SAR is **prepared**
- **DETRESFA – Distress** Phase
  - "**Reasonable certainty**" that an aircraft is **threatened**

GENERAL

- Contracting States must make a **Search and Rescue** provision **available** **24 hours/day**
- Each region has a **Rescue Co-ordination Centre** that may have **sub-centres**
- If a PIC observes a craft in distress, they will **take charge** until S&R arrives
- You may **handover comms** to a **more suited aircraft**
- **121.5** and **243 MHz** are used for **emergency operations**

CONTAINER COLOURS

- **Red –** Medical
- **Blue –** Food & Water
- **Yellow –** Clothes & Blankets
- **Black –** Miscellaneous

SYMBOLS

- **V –** Requires Assistance
- **X –** Requires Medical Assistance
- **N –** No/Negative
- **Y –** Yes/Affirmative
- ↑ **-** Preceding this Way
- **LLL –** Operation Complete
- **LL –** Everyone Found
- **++ -** Only Some Found
- **XX –** Unable to Continue/RTB
- ⇄ **-** Divided into 2 Groups
- ←← **-** Info Received that the Aircraft is this Way
- **NN –** Nothing Found, Continuing

RECEIVING SIGNALS

- By **Day** – Rock Wings
- At **Night** – Flash Landing/Nav Lights Twice

Facilitation (Annex 9) & Security (Annex 17)

FACILITATION

AIP

- Gives **Facilitation** information

OPERATOR RESPONSIBILITY

- Terminated from the moment of **admittance** to the State
- If they are **inadmissible**, they should be taken to a *State that will take them*
- The costs inferred may be **recuperated**
- **Disruptive** passengers should be loaded **first** and may be **unloaded in any State**

AIR WAYBILL

- Document detailing the cargo carried
- May be part of the Cargo Manifest
- Both filled by the **Operator/their Agent**

GEN DEC

- Short summary of the journey including **names of crew**, passenger numbers etc.
- Signed by **PIC** or **authorized agent**

DOCUMENTS

- General public need a **passport and visa**
- Required for **all ages**
- **No visa** required for transit **<2 days**
- **Exit visas** are **not required**
- **Entry documents** should be received **2 hours** prior to arrival
- States should **not require >3 copies** of any documents

FLIGHT CREW

- **CMC –** Crew Member Certificate
- **Machine readable** crew ID card
- **Visa free entry** when ***on duty*** and ***in transit***
- Allows a license to serve its main purpose
- Contracting states should **expedite** inspection for **crew** and their **bags**

BAGGAGE/CARGO

- Cargo in **transit** should ***not be charged*** for
- An **oral declaration** should be **accepted**
- Personal effects can be transported unaccompanied if cleared
- Air mail procedures defined by the **Universal Postal Union**

SECURITY

DEFINITIONS

- **Aircraft Security Check –** Inspection of passenger and cargo compartments
- **Airside – Movement** area of an airport and adjacent terrain/buildings to which access is controlled
- **Screening –** Application of means to **identify** prohibited articles
- **Security –** Safeguarding **international** civil aviation against unlawful interference
- **Security Control –** Application of means to prevent **introduction** of prohibited articles
- **Security Restricted Area –** Airside area identified as a risk priority where additional security measures are applied
- **Unidentified Baggage –** Baggage not **picked up** or identified by a passenger

OBJECTIVES

- **Safeguard** against **unlawful interference**
- Protect the safety of **passengers**, **crew**, **ground personnel** and the **general public**

ORGANIZATION

- **States** must establish a **national security program**
- **Operator** should have a **written security program** that meets ***national requirements***
- **Operator** will maintain and establish an **approved security training program**
- Facilities must be available at all civil airports
- Each airport should have a **written security program** assisted by an **Airport Security Committee**

MEASURES

- Security measures in place for **cabin/checked bags**, **cargo**, **access control** and **airport design**
- **PIC**, **Police** or **Airport Manager** contacted if a security threat is present
- **Airside** and **non-airside** passengers **cannot mix**
- If they do **re-screening** must take place
- Unaccompanied baggage requires **additional security measures**

SPECIFIC MEASURES

- Required for **deported**, **inadmissible** and **people in custody**
- **Operator** and **PIC** must be **informed**
- Usually boarded **before** any passengers

Security (Annex 17) & Aeronautical Information Service (Annex 15)

CARRIAGE OF WEAPONS

- **Cannot** carry weapons unless **authorized**
- Must **not** **be accessible** in flight
- Armed personnel are only allowed if **all States** involved agree
- **PIC** notified of the **number** and **location** of armed personnel

REPONSES TO UNLAWFUL INTERFERENCE

- State must take **appropriate measures** for **safety** of passengers and crew **until their journey can be continued**
- States shall aid aircraft with **nav aids**, **ATS** and give **permission to land**
- State should **detain** aircraft unless it **prejudices human life**
- State should notify **State of Registry**, **State of Operator** & **ICAO** about the aircraft

FROM OTHER ICAO ANNEXES

- Flight deck doors locks **only** from **inside**
- Must be **locked** from **main doors** **closed** to **main doors** **open**
- If hijacked, pilot should fly at an **IFR** level:
  - 1,000ft separation – fly **±500ft**
  - 2,000ft separation – fly **±1,000ft**
- Or use ***Regional Supplementary Procedures*** (ICAO **Doc 7030**)
- Also attempt to **broadcast** **warnings**
- Isolated Parking **>100m** from other stands

AERONAUTICAL INFORMATION SERVICE

GENERAL

- **AIRAC – Aeronautical Information Regulation and Control**
  - Updated every **28 days**
  - Distributed **42 days in advance**
  - Significant changes published in accordance with ***AIRAC***
- **Integrated Aeronautical Information Package (AIP)**
  - **AIP** + **Supplements**
  - **NOTAM** and **PIB** (***Pre-Flight Info Bulletin***)
  - **AIC**
  - **Checklists**
- **Each Contracting State must either:**
  - Provide **AIS**
  - Delegate this to a **non-governmental service**
  - Agree with another state to do a **joint service**
- Available **24 hours a day** or if not, **2 hours before/after flight**
- Based on the **WGS-84 model**

AIC

- **Aeronautical Information Circular**
- A notice from the AIS about **flight safety**, **administration** etc.
- White = Administrative
- **Yellow** = ATC
- **Pink** = Safety
- **Mauve** = Danger Areas
- **Green** = Maps and Charts

AIP

- **1 – GEN (General)**
  - Includes **weather** (SIGMETs), **charges** (parking and landing fees), **differences from SARPs**, **Search and Rescue** etc.
- **2 – ENR (Enroute)**
  - VFR, IFR, ADIZs, routes, approaches, danger areas etc.
  - Names of **danger areas** should not be reused for **1 year**
- **3 – AD (Aerodromes)**
  - Landing aids, taxiways, declared distances etc.
- **Amendments –** Permanent Changes
- **Supplements –** Temporary Changes (**3+ Months**) issued at intervals **<1 month**

NOTAMs

- **AFTN** (**Aeronautical Fixed Telecommunication Network**) used for NOTAM distribution
- Delivered by **PIB**
- Checklist issued every **month** by AFS
- **N** = **New**, **R** = **Replacing**, **C** = **Cancel**
- **SNOWTAM** and **ASHTAM** are **valid** for **24 hours**
- **ASHTAM**s are colour-coded (section **F**)
  - **Red –** Affects above **FL250**
  - **Orange –** Affects below **FL250**
  - **Yellow –** Not currently dangerous
  - **Green –** Normal

BASIC RULES

- Rules of **that territory** apply when **overflying** it
- Over **high seas**, **ICAO** rules apply

ICAO

- Created in **1944 Chicago Convention**
- HQ in **Montreal**
- **Council** is **responsible** for the **Assembly**
- **Assembly** meets **every 3 years**
- **Council** and **Assembly** **elect** a **President** for those **3 years**
- **Air Navigation Commission** finalizes **SARP**s for **submission** and **adoption**
- Has **19** members **appointed** by ICAO **Council**

ANNEXES AND SARPs

- ICAO created **19 Annexes**
  - Annex 1 – Personnel Licensing
  - Annex 7 – Aircraft Registration
  - Annex 9 – Facilitation
  - Annex 11 – Air Traffic Services
  - Annex 13 – Accident Investigation
  - Annex 14 – Aerodromes
  - Annex 17 – Security
  - Annex 18 – Dangerous Goods
  - *Should also know the other Annexes covered*
- These contain **Standards and Recommended Practices** (**SARP**s)
- ICAO **Council** should be **informed** **immediately** when a State **deviates** from a **standard** through a filed difference
- These differences are also published in the **AIP**

FREEDOMS OF THE AIR

- **International Air Transport Agreement –** Carriage of traffic between State of **Registration** and **any other** participating State
- **1st Freedom –** Fly **across** a territory **without** **landing**
- **2nd Freedom – Land** in a territory for **non-traffic** purposes
- **3rd Freedom – Put down traffic** from the home state in another
- **4th Freedom – Take on traffic** in another state to the home state
- **5th Freedom – Put down** and **take on** traffic in **another** **state** to a **3rd party**
- **6th Freedom -** Fly to another country from a foreign one whilst **stopping** **in one's own**
- **8th Freedom –** Fly between **2 airports in a foreign country** before continuing to one's own

IATA

- **International Air Transport Organization**
- **Trade association** for **aviation operators**
- *"Represent, lead and serve the airline industry"*

EASA

- Produces **rules** and **regulations**
- **NAA**s act as **competent authorities**
- Provides **legislative proposals** to **European Commission**
- Promotes highest common safety standards
- **EUROCONTROL –** Manages **Air Traffic Flow Management** in Europe

ICAO CONVENTIONS

- **Rome –** Damage caused by **foreign** **aircraft** to **3rd party's** (within **2 years**)
- **Warsaw –** Operator's liability for damage on **international flights** to passengers and goods
- **Montreal –** Unlimited liability for above **OR**
- **Montreal –** Acts of violence, destruction of aircraft and of navigation facility punishments
- **Tokyo –** Offences against **penal law** (**NOT damages**)
- **Agreement of Paris – Non-scheduled** EU flights
- *May be denounced **6 months** after **immediate notification***