

Technical Interview/ATPL WizzAir

Tell me all you know about lift:

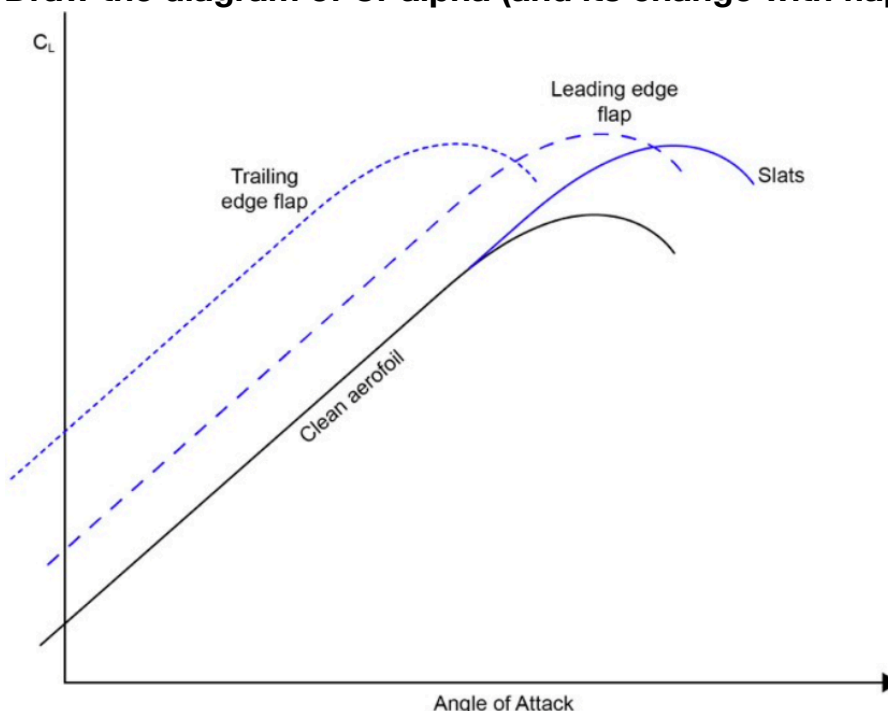
It is generated by the wings through a combination of Bernoulli's principle (faster moving air on top has lower pressure, air below has higher pressure -> lift) and Newton's third law (for every action, there is an equal and opposite reaction) -> calculated by $\frac{1}{2} \rho v^2 S C_L$ -> amount of lift depends on the airspeed, wing area, air density and AoA (look at lift formula) -> values change with:

- Flaps -> when extended C_L increases
- Increased AoA -> lift increases as long as the airflow stays attached to the surface (up until critical angle -> separation -> stall -> decrease in lift)
- Weight -> heavier aircraft need more lift (may need a higher airspeed or AoA to generate same amount of lift)
- Load factor -> during turns/manoeuvres -> n increases (requires lift) -> wings must generate extra lift to overcome increased effective weight
- Altitude -> in less dense air there is less lift produced -> higher airspeed or AoA needed

C_L depends on:

- Camber / Thickness
- Angle of Attack
- Aspect Ratio

Draw the diagram of C_L -alpha (and its change with flaps/slats):



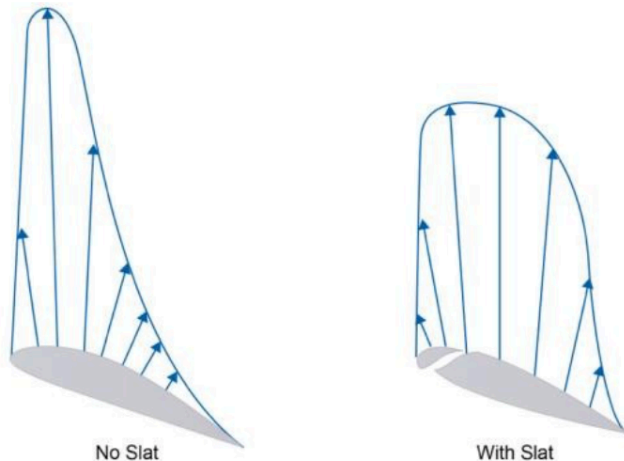
High lift devices (slats/flaps):

Intended to increase lift during certain flight conditions. They include common devices such as **leading edge and trailing edge flaps and slats**. **Larger wing provide more lift and reduce takeoff and landing distance, but increase drag during cruising flight and thus increase the fuel consumption. High-lift devices are allowing the use of an efficient cruising wing, and adding lift for takeoff and landing.**

Draw a typical air foil, add a slat to it, what does this slat do?

Increases wing area and camber, energizes airflow to delay separation

- Types -> Kreuger, variable camber or slat (create slot)
- Used in conjunction with trailing edge devices
- Increase effective camber without changing the position of the CP
- Provide only a modest increase in lift -> main purpose is to increase the stalling angle



What are V_X and V_Y ?

V_X -> Best angle of climb -> steepest climb with a slower rate (shorter horizontal distance).

V_Y -> best rate of climb -> fastest climb in terms of time (longer horizontal distance and).

V_Y is always higher than V_X

Coffin corner:

Is the altitude at or near which an aircraft's stall speed is equal to the critical Mach number, at a given gross weight and G loading. At this altitude the aircraft becomes nearly impossible to keep in stable flight. Since the stall speed is the minimum speed required to maintain level flight, any reduction in speed will cause the airplane to stall and lose altitude. Since the critical Mach number is maximum speed at which air can travel over the wings without losing lift to flow separation and shock waves, any increase in speed will cause the airplane to lose lift, or to pitch heavily nose-down, and lose altitude.

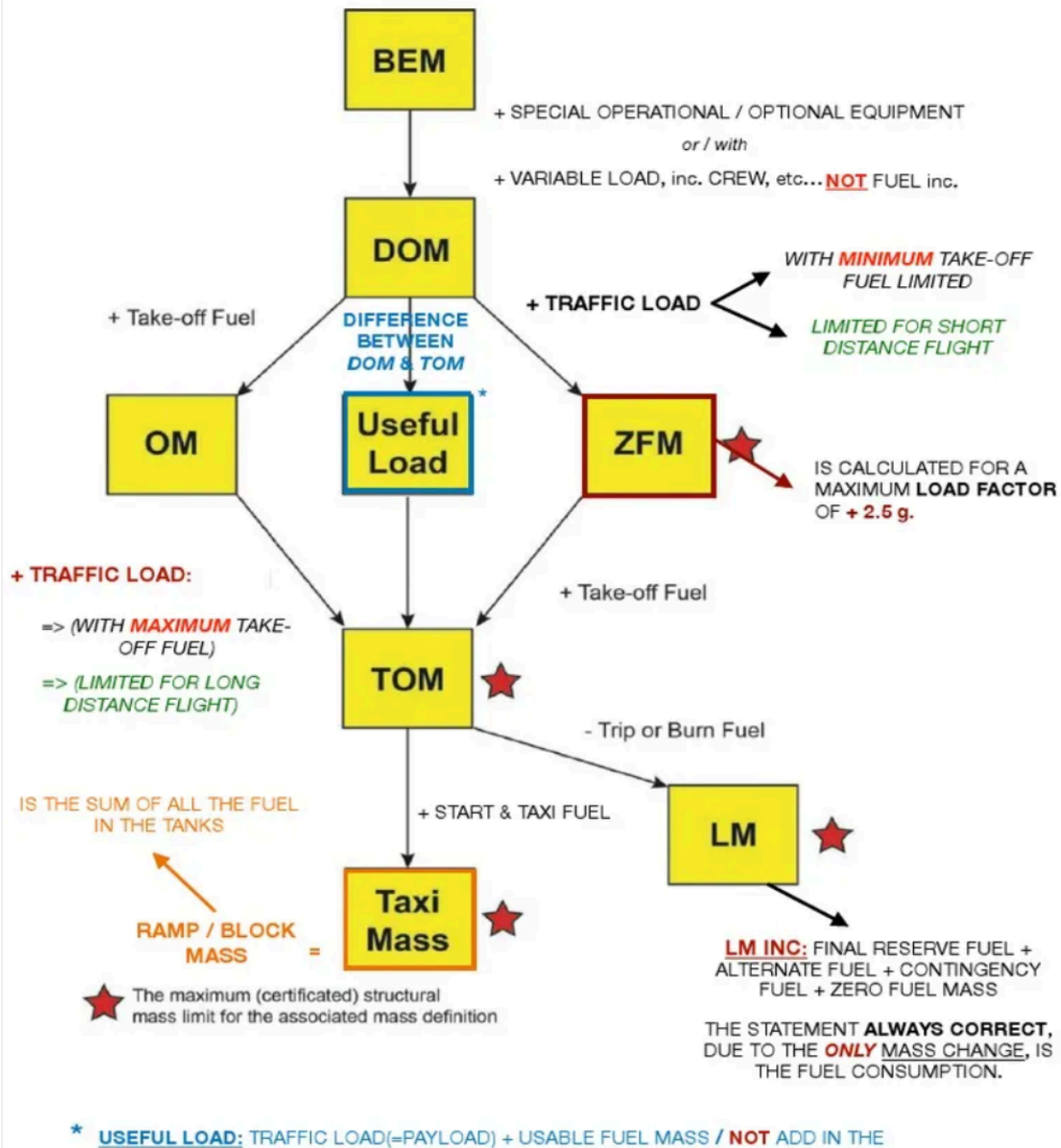
Deep stall:

(or super-stall) is a dangerous type of stall that affects those aircraft which designs with a T-tail configuration. In these designs, the turbulent wake of a stalled main wing "blankets" the horizontal stabiliser, thus the elevators ineffective and preclude the aircraft from recovering from the stall.

Weight planning:

ALEXANDER ZVEREV - MASS & BALANCE

DEFINITIONS AND FLOW DIAGRAM MASS & BALANCE



What if ZFM is over limit, but MTOM is not?

The aircraft's weight must be reduced (offloading passengers, cargo, other payload items) -> ZFM may not be exceeded since it's crucial to avoid over-stressing the aircraft structure and ensure safe flight

Minima for an alternate, when you don't need one or when you need two:

[EASA Air OPS – Regulation \(EU\) No 965/2012, Annex IV \(Part-CAT\)](#)

Table 2 — Basic fuel scheme — planning minima — aeroplanes

Destination alternate aerodrome, fuel ERA aerodrome, isolated destination aerodrome

Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
Type B instrument approach operations	DA/H + 200 ft	RVR/VIS + 800 m
Type A instrument approach operations	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m
Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m
Crosswind planning minima: see Table 1 of AMC3 CAT.OP.MPA.182		
Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).		

- **CAT.OP.MPA.182 — Selection of Aerodromes**
- **CAT.OP.MPA.180 — Planning minima for IFR flights**
- **CAT.OP.MPA.186 — Fuel policy** (cross-reference)

Summary:

- ***Take-off alternate*** → required if you cannot return to the departure aerodrome after takeoff due to weather, performance, or other operational reasons.
→ Must be within:
 - 1 hour's flight time (one-engine inoperative) for 2-engine aircraft, or
 - 2 hours' flight time (one-engine inoperative) for 3 or 4 engines.
- ***Destination alternate*** → required **unless**:
 - For **isolated aerodrome** operations, or
 - **Weather conditions at destination (and trend forecast) are above specified limits for ±1 hour around ETA, and**
 - **There is no indication of deterioration.**
(See CAT.OP.MPA.182 (b) for the “no alternate required” conditions.)
- ***Two destination alternates*** → required when:
 - The **weather at the destination is below planning minima**, or
 - **The forecast is uncertain (e.g. PROB, TEMPO below minima).**
(See CAT.OP.MPA.182 (c))
 - **When no meteorological information is available**

NO DESTINATION ALTERNATE AERODROME

(c) The operator may operate with no destination alternate aerodrome when the destination aerodrome is an isolated aerodrome or when the following two conditions are met:

(1) the duration of the planned flight from take-off to landing does not exceed 6 hours or, in

the event of in-flight re-planning, in accordance with point **CAT.OP.MPA.181(d)**, the remaining flying time to destination does not exceed 4 hours; and

(2) two separate runways are usable at the destination aerodrome and the appropriate weather reports and/or weather forecasts indicate that for the period from 1 hour before to 1 hour after the expected time of arrival, the ceiling is at least 2 000 ft (600 m) or the circling height + 500 ft (150 m), whichever is greater, and ground visibility is at least 5 km.

CAT.OP.MPA.305 Commencement and continuation of approach

Regulation (EU) 2021/2237

- (a) For aeroplanes, if the reported visibility (VIS) or controlling RVR for the runway to be used for landing is less than the applicable minimum, then an instrument approach operation shall not be continued:
 - (1) past a point at which the aeroplane is 1 000 ft above the aerodrome elevation; or
 - (2) into the final approach segment (FAS) if the DH or MDH is higher than 1 000 ft.
- (b) For helicopters, if the reported RVR is less than 550 m and the controlling RVR for the runway to be used for landing is less than the applicable minimum, then an instrument approach operation shall not be continued:
 - (1) past a point at which the helicopter is 1 000 ft above the aerodrome elevation; or
 - (2) into the FAS if the DH or MDH is higher than 1 000 ft.
- (c) If the required visual reference is not established, then a missed approach shall be executed at or before the DA/H or the MDA/H.
- (d) If the required visual reference is not maintained after DA/H or MDA/H, then a go-around shall be executed promptly.
- (e) Notwithstanding point (a), in the case where no RVR is reported, and the reported VIS is less than the applicable minimum, but the converted meteorological visibility (CMV) is equal or greater than the applicable minimum, then the instrument approach can be continued to the DA/H or MDA/H.

Approach categories:

Aeroplane category	V _{AT}
A	Less than 91 kt
B	From 91 to 120 kt
C	From 121 to 140 kt
D	From 141 to 165 kt
E	From 166 to 210 kt

Approach Speeds for Category C Airplane					
V _{AT} (KIAS)	Range of Speeds (KIAS) for:		Maximum speeds (KIAS) for:		
	initial approach	final approach	Circling	Intermediate missed approach	final missed approach
121/140	160/240	115/160	180	160	240

What is LVTO? When do we have this, what do we need to see and do we need special approval?

GM1 SPA.LVO.100(a) Low-visibility operations and operations with operational credits

ED Decision 2022/012/R

CLASSIFICATION OF LVTO OPERATIONS

Take-off operations are classified as 'normal take-off operations' with an RVR at or above 550 m and 'LVTO operations' with an RVR below 550 m. Only LVTO operations in an RVR of less than 400 m require a specific approval.

Approach ban

CAT.OP.MPA.115 Approach flight technique — aeroplanes

Regulation (EU) 2021/2237

- (a) All approach operations shall be flown as stabilised approach operations unless otherwise approved by the competent authority for a particular approach to a particular runway.
- (b) The continuous descent final approach (CDFA) technique shall be used for approach operations using non-precision approach (NPA) procedures except for such particular runways for which the competent authority has approved another flight technique.

APPLICATION OF RVR OR VIS REPORTS — ALL AIRCRAFT

- (d) If a deterioration in the RVR or VIS is reported once the aircraft is below 1 000 ft or in the FAS, as applicable, then there is no requirement for the approach to be discontinued. In this situation, the normal visual reference requirements would apply at the DA/H.

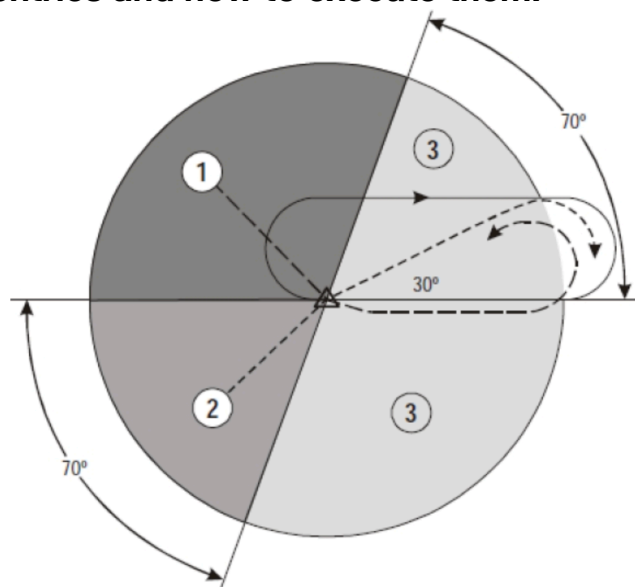
Stabilization Criteria @1000ft AAL

SPEED ± 5 kts
HEADING $\pm 10^\circ$
ALTITUDE ± 100 ft
Rate of Descent ≤ 1000 fpm
Radio NAVAID tracking $\pm 10^\circ$
Glide slope ± 1 DOT
Localizer ± 1 DOT
Landing configuration
Stable Thrust

The following criteria should be satisfied for all stabilised approach operations with aeroplanes:

- (a) The flight management systems and approach aids should be correctly set, and any required radio aids identified before reaching a predetermined point or altitude/height on the approach.
- (b) The aeroplane should be flown according to the following criteria from a predetermined point or altitude/height on the approach:
 - (1) the angle of bank should be less than 30 degrees; and
 - (2) the target rate of descent should be that required to maintain the correct vertical path at the planned approach speed.
- (c) Variations in the rate of descent should normally not exceed 50 % of the target rate of descent.
- (d) An aeroplane should be considered stabilised for landing when the following conditions are met:
 - (1) the aeroplane is tracking within an acceptable tolerance of the required lateral path;
 - (2) the aeroplane is tracking within an acceptable tolerance of the required vertical path;
 - (3) the vertical speed of the aeroplane is within an acceptable tolerance of the required rate of descent;
 - (4) the airspeed of the aeroplane is within an acceptable tolerance of the intended landing speed;
 - (5) the aeroplane is in the correct configuration for landing, unless operating procedures require a final configuration change for performance reasons after visual reference is acquired; and
 - (6) the thrust/power and trim settings are appropriate.
- (e) The aeroplane should be stabilised for landing before reaching 500 ft above the landing runway threshold elevation.
- (f) For approach operations where the pilot does not have visual reference with the ground, the aeroplane should additionally be stabilised for landing before reaching 1 000 ft above the landing runway threshold elevation except that a later stabilisation in airspeed may be acceptable if higher than normal approach speeds are required for operational reasons specified in the operations manual.

Holding entries and how to execute them:



- Sector 1 entry is called **parallel** entry
- Sector 2 entry is called **offset** entry (or **teardrop** entry)
- Sector 3 entry is called **direct** entry

What is MSA

49. MSA – Minimum Safe / Sector Altitude

An altitude, which can found on an instrument approach chart and identified as the minimum safe altitude that provides a **1000ft obstacle clearance** within a **25NM radius from the navigational facility**. If MSA is divided into sectors, each sector a different altitude, the altitudes in these sectors are referred to as Min. Sector Altitudes.

Noise abatement departure procedures

52. Noise Abatement Departure Procedure 1 – NADP 1

Provide noise reduction for noise sensitive areas in **close proximity** to the DEP end of the RWY.

- **T/O THR: $V_2 + 10$ kt** → power/thrust reduction at or above the prescribed minimum altitude (**800ft** above APT elevation) and
- **CLB THR: $V_2 + 10$ to 20 kt** → delaying flap/slat retraction until the prescribed max. altitude (3000ft above APT elevation) is attained.
- Then accelerate smoothly and retract flaps/slats on schedule while maintaining a positive rate of climb.

53. Noise Abatement Departure Procedure 2 – NADP 2

Provide noise reduction to areas **more distant from the runway** end.

- **T/O THR: $V_2 + 10$ to 20 kt** → at minimum altitude (**800ft** above APT elev.) positive rate of climb, body angle is reduced and flaps/slats are retracted on schedule
- **V_{ZF} (green DOT)** → power/thrust is reduced during the flap/slat retraction sequence at a point that ensures satisfactory acceleration performance.
- At the prescribed altitude (3000ft above APT elev.) transition smoothly to en-route climb speed



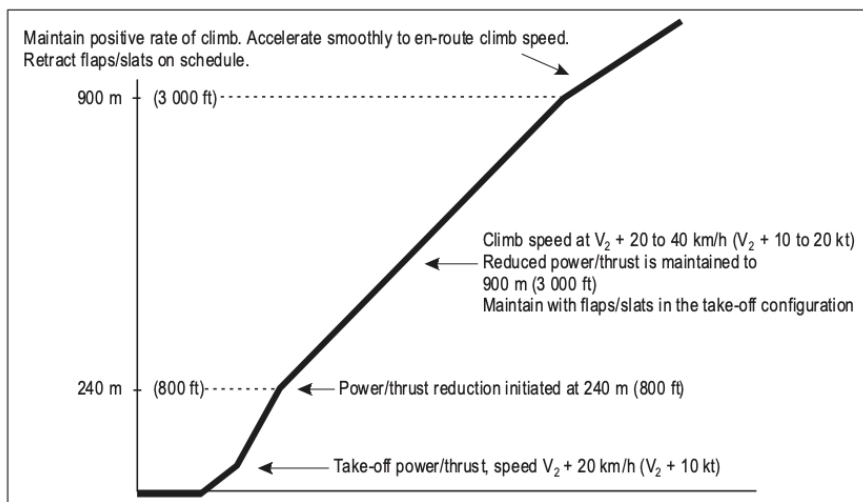


Figure 9-3-App-1. Noise abatement take-off climb — Example of a procedure alleviating noise close to the aerodrome (NADP 1)

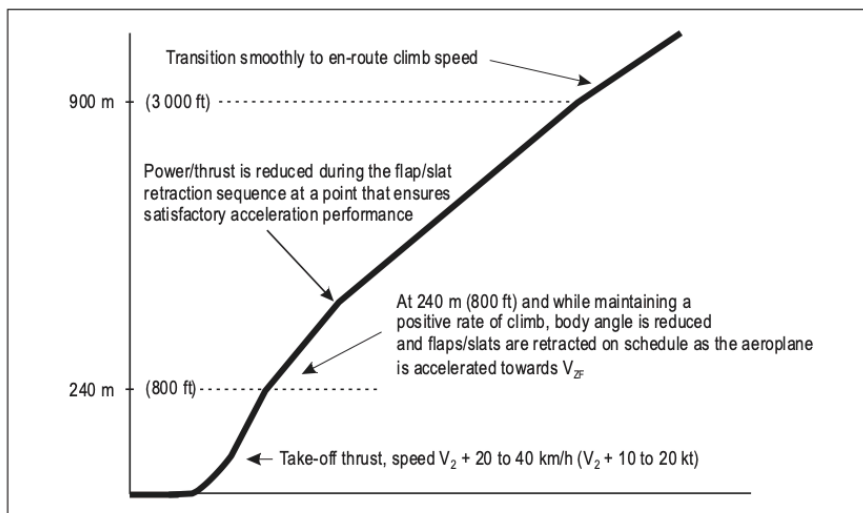
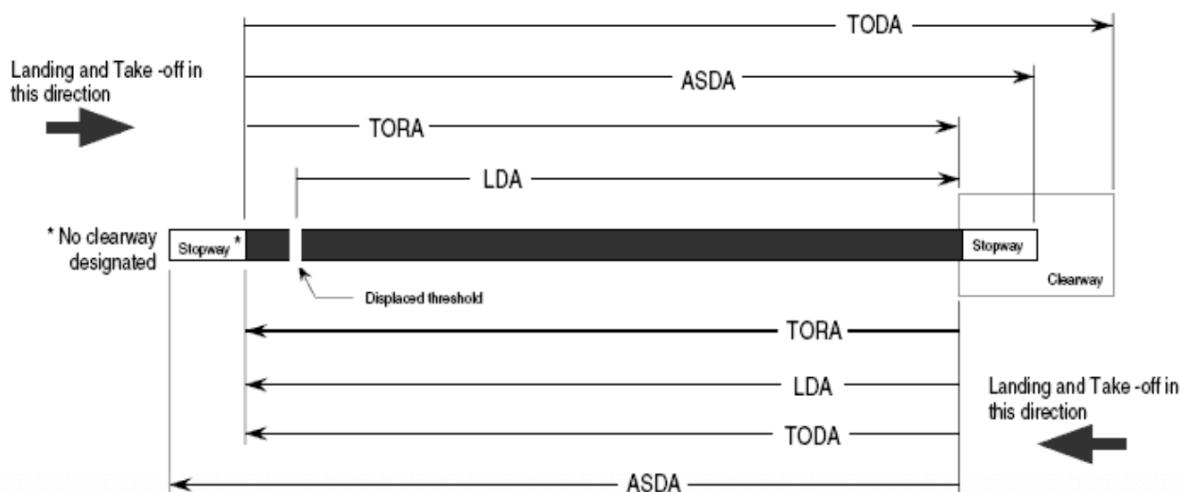


Figure 9-3-App-2. Noise abatement take-off climb — Example of a procedure alleviating noise distant from the aerodrome (NADP 2)

Runway lengths (TORA, TODA...) (draw it):



Clearway:

It is the length of an obstacle-free area at the end of the runway (upward slope not exceeding

1.25%), with a minimum width of 150m (500ft) and centrally located about the extended centreline of the runway.

Displaced thresholds:

They refer to the point on a runway that is shifted further down the runway from its physical beginning - > not available for landing, but available for T/O -> purpose is to ensure obstacle clearance and operational flexibility (simultaneous T/O and landing operations)

What is the screen height for landing, and T/O and does it stay the same when wet?

An imaginary screen that is just cleared by the lowest part of the aircraft with undercarriage extended and in an unbanked attitude when taking off and landing.

The height at the end of the take-off distance required and at the beginning of the landing distance required.

Jets – 50 ft Land, 35 ft TO (15ft wet rwy)

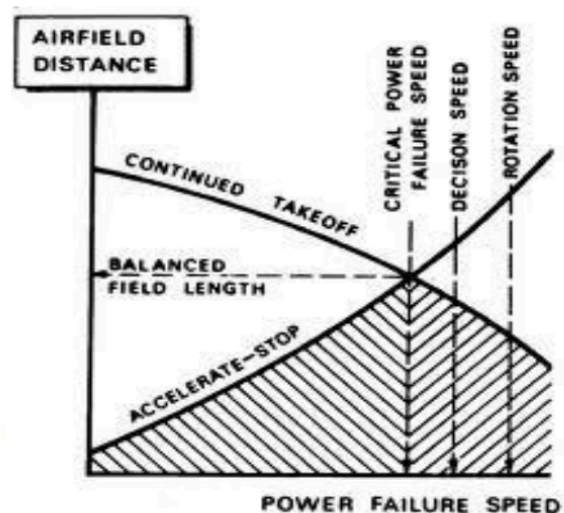
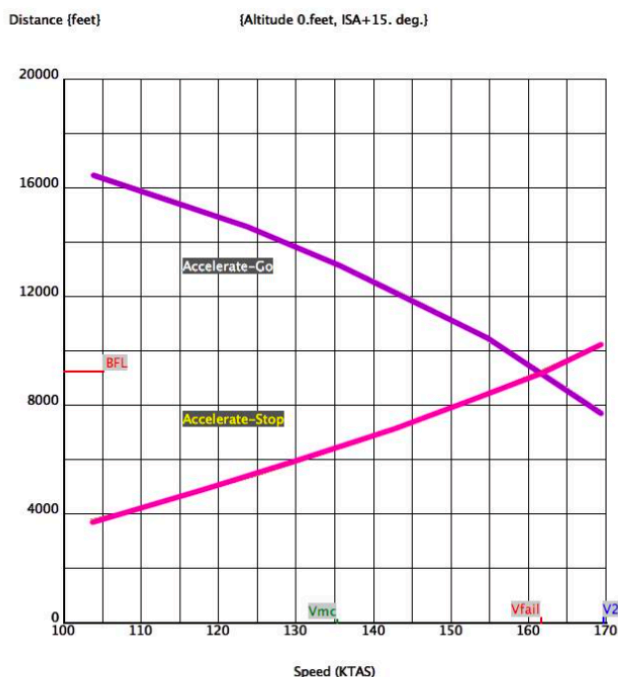
Props – 50ft TO and Land

What is a balanced field length?

If **TODR equals ASDR** it is known as a balanced field.

For a given takeoff weight any increase in V_1 leads to a decrease in TODR and an increase in ASDR.

A minimum distance is achieved in a particular V_1 speed, called 'balance V_1 ' and the corresponding distance is called 'balance field'.



Explain the fuel policy/fuel requirements for a 1h flight:

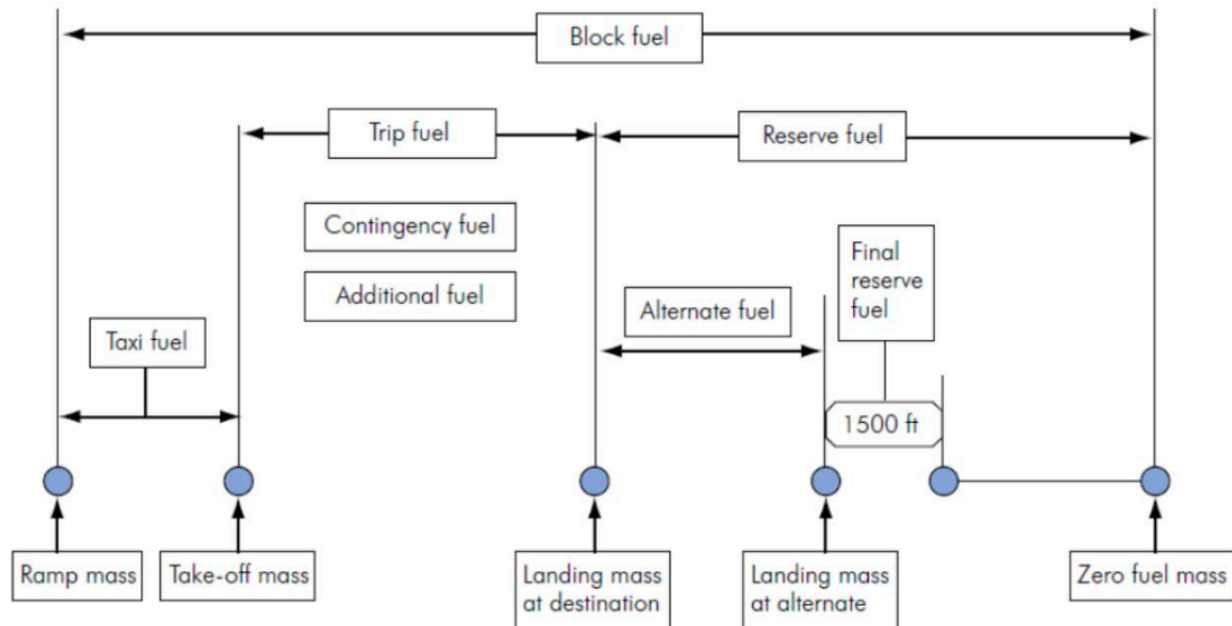
How can the final reserve be increased?

The final reserve (FRF) in EASA regulations can be increased by adding more fuel than the minimum required by law, which is typically 30 minutes for jets and 45 minutes for piston

aircraft. This can be done proactively through a company's fuel policy or the flight plan, and in cases where an operator can justify it with additional data or risk analysis.

30 minutes at 1500ft ARP elev. in ISA calculated with the estimated landing mass at the alternate (or destination if no alternate)

If no alternate is required we must carry 15 minutes(holding at 1500 ft in ISA) additional fuel.



RVSM

RVSM airspace in Europe the airspace between FL290 to FL410, inclusive is considered special qualification airspace. All Wizz Air airplanes are authorized to conduct RVSM operations.

FLIGHT PLANNING

For all flights planned through RVSM airspace a **Significant Weather Chart** shall be available.

SERVICEABLE EQUIPMENT

The following equipment shall be serviceable before entering RVSM airspace:

- o Two primary altimeter systems (agree within ± 200 feet);
- o One automatic altitude control system;
- o One altitude alerting system;
- o A transponder that can be connected to the altitude measurement system in use for maintaining altitude.

GPWS (first 5 modes):

Sink Rate, Terrain, Don't Sink, Too low Gear/Flaps/Terrain, Glideslope

The (Enhanced) Ground Warning Proximity System ((E)GPWS) is designed to alert pilots that the aircraft position in relation to the terrain is abnormal and, if not corrected, could result in a Controlled Flight Into Terrain (CFIT).
Cannot be deactivated.

Mode	Condition	Aural Alert	Aural Warning
1	Excessive descent rate	"SINKRATE"	"PULL UP"
2	Excessive terrain closure rate	"TERRAIN TERRAIN"	"PULL UP"
3	Excessive attitude loss after take off or go-around	"DON'T SINK"	(no warning)
4a	Unsafe terrain clearance while gear not locked down	"TOO LOW - GEAR"	"TOO LOW - TERRAIN"
4b	Unsafe terrain clearance while landing flap not selected	"TOO LOW - FLAP"	"TOO LOW - TERRAIN"
4c	Terrain rising faster than aircraft after take off	"TOO LOW - TERRAIN"	(no warning)
5	Excessive descent below ILS glideslope	"GLIDESLOPE"	"GLIDESLOPE"(1)
6	Advisory Callout of Radio Height	(for example) "ONE THOUSAND"	(no warning)
6	Advisory Callout of Bank Angle	"BANK ANGLE"	(no warning)
7	Windshear protection	"WINDSHEAR"	(no warning)
-	Terrain Proximity	"CAUTION TERRAIN"	"TERRAIN TERRAIN PULL UP"

What is TCAS and how does it work?

An aircraft collision avoidance system designed to reduce the incidence of mid-air collisions between aircrafts.

TCAS is based on secondary surveillance radar (SSR) transponder signals, and operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft.

o SSR C mode +ALT / only transmit

o SSR S mode +SPD +HDG / transmit + receive (TCAS required)

Procedures:

All engine:

WHITE rhombus „pussy” (NO action)

Traffic Advisory

TA YELLOW circle symbol ~40sec [?] „traffic-traffic”

PF should have prepare himself; callout: „I have control”

Resolution Advisory

RA RED square symbol ~25sec [?] „climb-climb” or „descent-descent” or „maintain/adjust vertical speed”

PF: AP- disengaged, CLB or DESC based on RA

TCAS will show the necessary vertical SPD on the VSI (red and green ARC)

PNF: „TCAS RA” on radio

When „Clear of conflict”

PNF: „Clear of conflict” to the radio and go back to the desired ALT

One engine INOP or emergency DESC:

Switch TA mode only: TCAS two way communication is remain, but NO resolution advisory for you, just the intruder.

What is the MEL and what are the different categories?

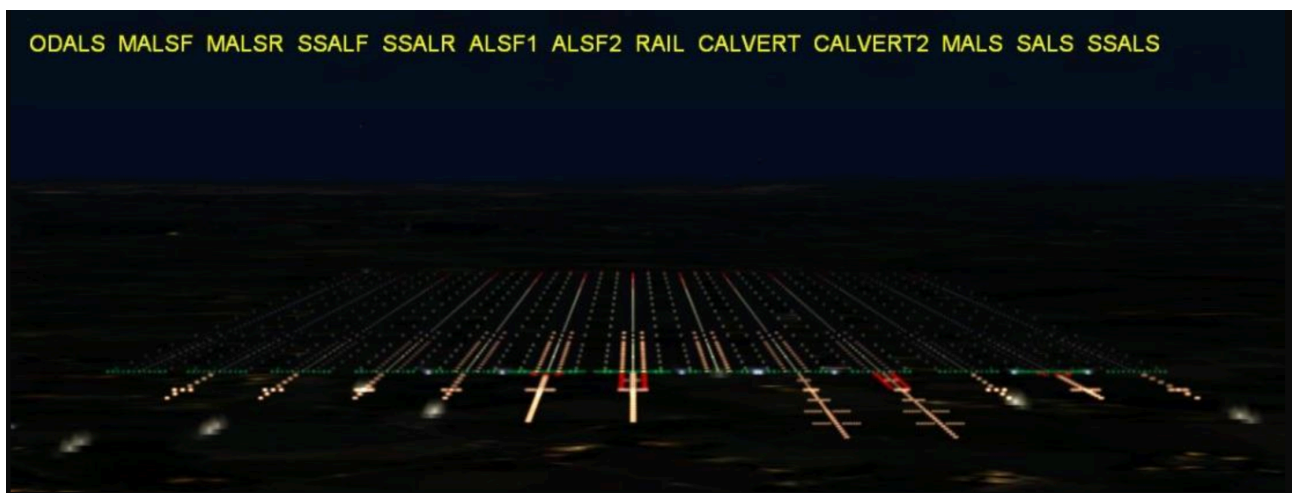
MEL lists all the equipment, systems and installations that must be serviceable before a particular flight is undertaken.

Items that may be unserviceable are indicated, together with any additional limitations that may apply to flights with such items inoperative. The MEL is based on, but may not be less restrictive than, the Master MEL which is given by the manufacturer.

What is the CDL and where do you find it?

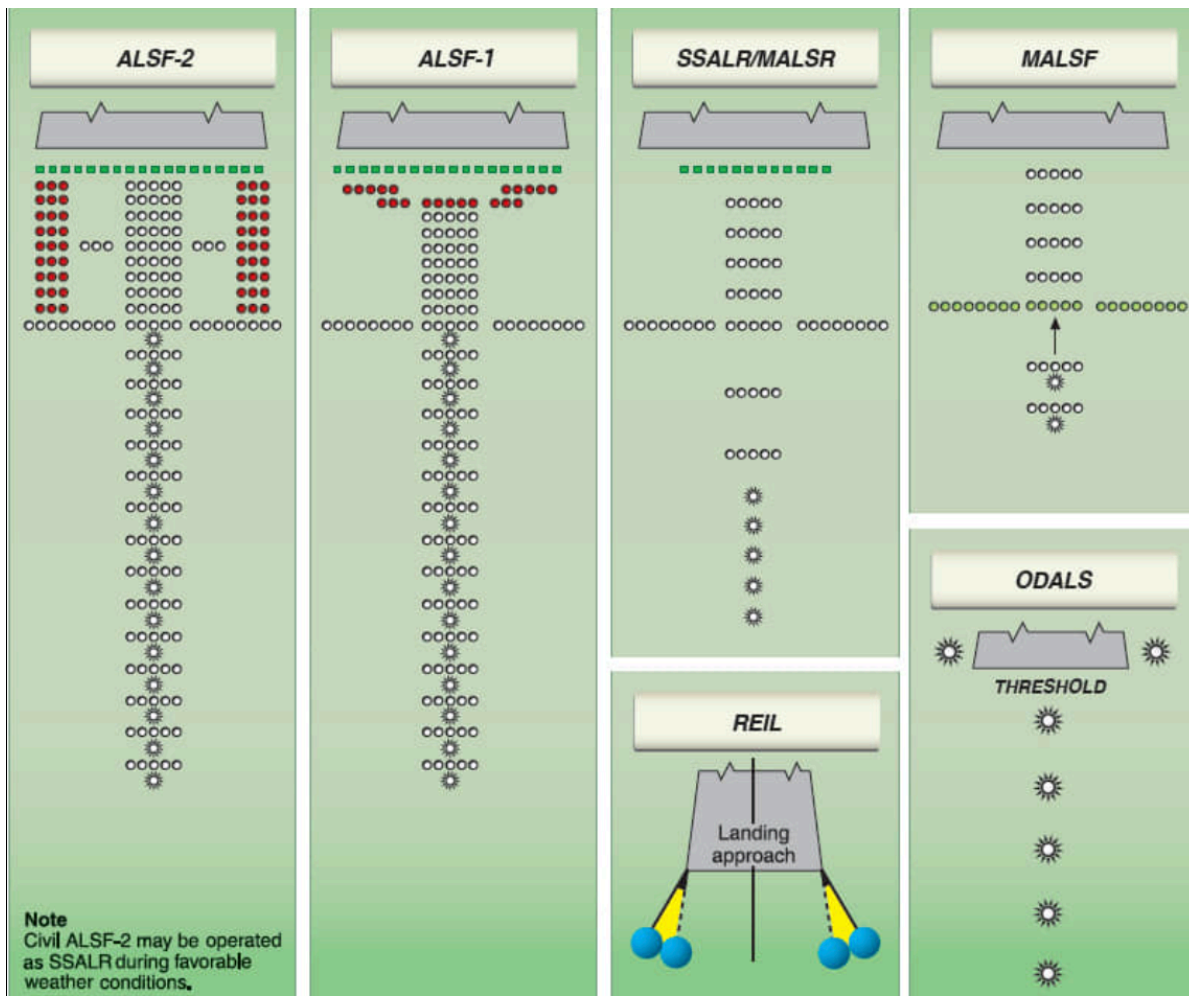
Lists the aeroplane panels and doors that may be missing for a particular operation and graphically indicates areas of damage to the aeroplane skin/structure that are considered acceptable for flight.

Explain the approach lighting system:



Approach Lighting System (ALS) is the tail end of the Air Navigation System, thus, it is important to affect the aircraft landing. ALS allows the pilot to see and identify the runway and align the aircraft to land on the runway. It is very important especially during night time, bad weather and poor visibility.

ALS are designed to allow the pilot to quickly and positively identify visibility distances under Instrument Flight Rules (IFR).



Legend Flashing light  Steady burning light  Omnidirectional flashing light 

ALSF—Approach light system with sequenced flashing lights

SSALR—Simplified short approach light system with runway alignment indicator lights

MALSAR—Medium intensity approach light system with runway alignment indicator lights

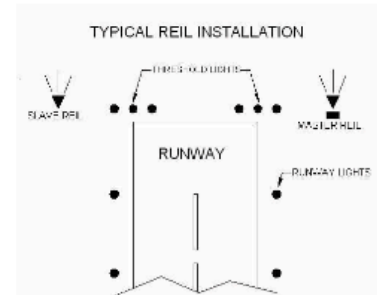
REIL—Runway end identification lights

MALSARF—Medium intensity approach light system with sequenced flashing lights (and runway alignment)

ODALS—Omnidirectional approach light system

Explain the runway lights:

- **Runway End Identification Lights (REIL)** – unidirectional (facing approach direction) or omnidirectional pair of synchronized flashing lights installed at the runway threshold, one on each side.
- **Runway end lights** – a pair of four lights on each side of the runway on precision instrument runways, these lights extend along the full width of the runway. These lights show **green** when viewed by approaching aircraft and **red** when seen from the runway.
- **Runway edge lights** – **white** elevated lights that run the length of the runway on either side. On precision instrument runways, the edge-lighting becomes **yellow** in the last 2,000 ft (610 m) of the runway, or last third of the runway, whichever is less.
- **Taxiways** are differentiated by being bordered by **blue** lights, or by having **green** center lights, depending on the width of the taxiway, and the complexity of the taxi pattern.
- **Runway Centerline Lighting System (RCLS)** – lights embedded into the surface of the runway at 50 ft (15 m) intervals along the runway centerline on some precision instrument runways. **White** except the last 900 m (3,000 ft): alternate **white** and **red** for next 600 m (1,969 ft) and **red** for last 300 m (984 ft).
- **Touchdown Zone Lights (TDZL)** – rows of **white** light bars (with three in each row) at 30 or 60 m (98 or 197 ft) intervals on either side of the centerline for 900 m (3,000 ft)
- **Taxiway Centerline Lead-Off Lights** – installed along lead-off markings, alternate **green** and **yellow** lights embedded into the runway pavement. It starts with **green** light at about the runway centerline to the position of first centerline light beyond the Hold-Short markings on the taxiway.
- **Taxiway Centerline Lead-On Lights** – installed the same way as taxiway centerline lead-off Lights, but directing airplane traffic in the opposite direction.
- **Land and Hold Short Lights** – a row of **white** pulsating lights installed across the runway to indicate hold short position on some runways that are facilitating land and hold short operations (LAHSO).



The aiming point:

The aiming point is the visual target on the runway (usually 300 m from threshold) that the pilot uses to control glide path and ensure landing in the touchdown zone.

Contamination on the runway:

A runway is considered contaminated when more than 25% (based on each 3rd of the runway) or more than a 3rd of the surface is covered with ice, slush, snow or standing water (>3mm) -> reduces the braking ability and causes a slower acceleration

What is anti-skid and how does it work, what happens when you apply maximum brakes?

The anti-skid system ensures that brakes do not lock during braking by modulating brake pressure when a skid is detected. During max braking, the anti-skid allows the tires to maintain traction with the runway-> helps to reduce stopping distances and maintain control (especially on slippery surfaces)

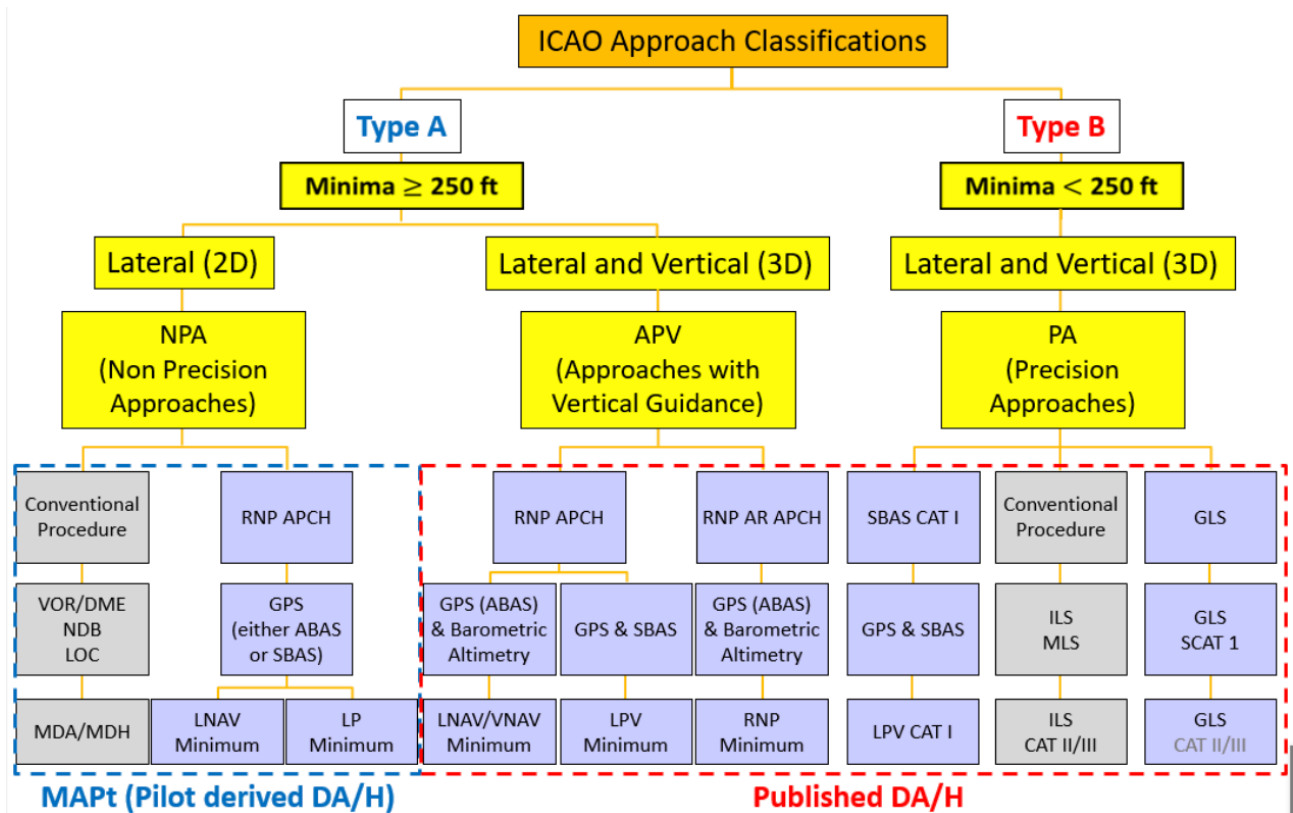
What is hydroplaning, what are the types, on what is this speed based and how do you manage this when it occurs?

It is a loss of tire to runway contact caused by a film of water -> 3 types: dynamic (water can't be displaced due to speed of the A/C), viscous (friction is reduced due to a film of water) and reverted rubber (rubber is heated and creates a layer of steam) -> the likelihood of hydroplaning depends on the speed, water depth, tire pressure and runway surface -> when hydroplaning occurs, braking should be avoided (reduce throttle to regain control) -> typically hydroplaning can start when an A/C exceeds a predefined speed, but once hydroplaning has started, it can also continue well below

Aquaplaning Speed $V_p = 9\sqrt{p}$ (V_p in kt, p in psi)

Approach Classification. What are type A/B approaches? Give an example

- Type A -> DH or MDH is 250ft or more, 2D or 3D, non-precision approach or APV – **VOR/NDB, LNAV, LPV**
- Type B -> DH is less than 250ft, 3D, Precision Approach - **CAT I, II or III**



CAT I/II/III minimums:

Category		DH (ft)	RVR (m)	Notes
Type A		≥ 250		
Type B	CAT I	200	550	(or 800m VIS)
	CAT II	100	300	
	CAT III	99-50	175	
		49-0	125	Fail Passive
		49-0	75	Fail Operational

RVR given if VIS/RVR < 1500 m

RVR given if VIS/RVR < 1500 m

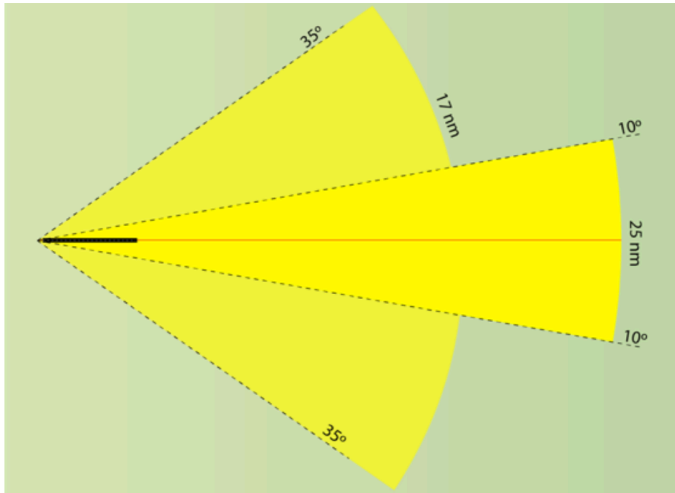
RVR Reporting	Coverage
CAT I	Touchdown Zone
CAT II	Touchdown + Mid zone
CAT III	All zones

STUDY THIS TOO : IFR Planning minimas

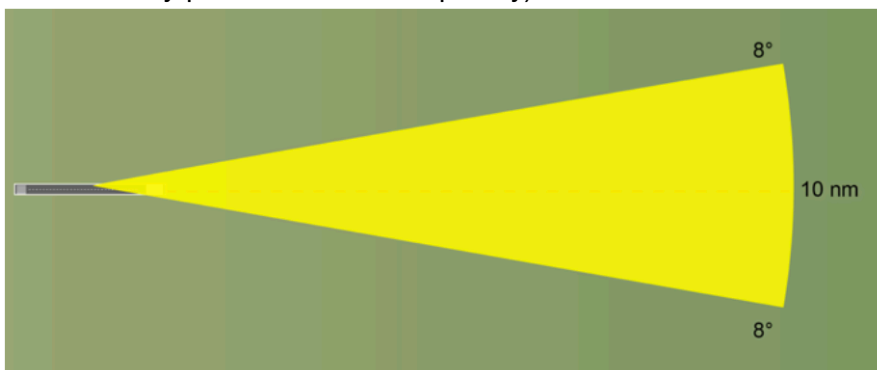
Explain the ILS system: (degrees of coverage and modulation)

- o Precision approach radio aid with 2 separate ground transmitters:

- The localizer -> protected 10° either side out to 25NM and 35° either side out to 17NM (up to 6000ft) -> transmit 2 radio signals at 2 different frequencies (90 and 150 kHz) -> used to determine position relative to the runway centreline (VHF 108-112MHz)



- The glideslope -> normally set at 3° -> coverage up to 8° either side out to 10NM -> transmit 2 radio signals at 2 different amplitude modulation frequencies (90 and 150 kHz) -> used to determine position relative to the glideslope (UHF 329,3-335MHz -> automatically paired with ILS frequency)



ASI errors when static is blocked:

The ASI measures dynamic pressure as the difference between the total pitot pressure measures in the instruments capsule and the static pressure measures in the case.

The dynamic pressure represents the indicated airspeed as knots per hour. The ASI is calibrated to ISA at MSL.

The ASI suffers from the following errors:

❑ Instrument, pressure, density, compressibility, maneuver, blocked pitot static system.

If the static probe becomes blocked:

- ❑ at constant altitude, the ASI will read correctly
- ❑ During descent, the ASI will over read
- ❑ During climb, the ASI will under read

If the static probe becomes blocked:

- ❑ at constant altitude, the ASI will not change
- ❑ During descent, the ASI will under read
- ❑ During climb, the ASI will over read

What is the VSI and how does it work?

The capsule is fed with static pressure and reacts immediately to any change in static pressure,

whereas the static pressure feed into the case is restricted or slowed by a metering unit, thus creating a differential static pressure between the capsule and the case. As long as the a/c continues to climb or descent the VSI will translate this as a rate of climb or descent measurement on the instrument dial face.

Errors:

❑ instrument time-lag, pressure, manoeuvre

If the static probe becomes blocked:

❑ The indication will slowly move back to 0 and not change.

Gyroscopic instruments and how they are powered:

The gyroscope measures the force experienced on its rotor body during a maneuver of an a/c. The rotor is usually suspended in a system of frames called gimbals, which are arranged at right angles to each other and are used as a conduit to transfer the force experienced on the rotor to displayed measurement on the instrument face.

The gyro's rigidity property allows it to remain stable in space while the a/c moves around it. Any force applied to the gyro as a result of the a/c changing direction or attitude around the gyro will press the gyro.

The turn coordinator:

The advanced version of the turn and slip indicator -> gives both information about the rate of turn and the coordination of the turn -> works on the principle of gyroscopic precession (90°) (both roll and yaw movement -> turn and slip indicator is only yaw movement)

What is the HSI?

Horizontal situation indicator -> provides information about the aircraft's navigation status -> course deviation, current heading -> it is an integration of multiple navigation functions into a single display (enhances SA)

One engine out condition: (asymmetric thrust, slipstream effect...)

- Asymmetric thrust -> causes yaw movement towards inoperative engine -> counteracted by rudder
- Slipstream effect -> spiral flow that wraps around the fuselage and hits the tail surface -> further continues the yawing motion -> propeller only
- P-factor (during high angles of attack) -> effect of the downward-moving propeller blade gives more thrust -> yaw movement -> propeller only
- Spiralling slipstream -> can also create a roll towards dead engine -> propeller only
- Drag increase because of windmilling propeller (propeller only) and performance loss (RoC decreases significantly)

What is a funnel cloud, why is it dangerous and what is the METAR code?

It is a rotating cloud which can develop into a tornado (rotation is caused by windshear) -> dangerous since it can cause severe damage and is associated with intense thunderstorms -> **FC in a METAR**

METARs/TAFs:

METAR

Compiled half-hourly or hourly.

CAVOK

Visibility is greater than 10km, no clouds below 5000ft or below highest MSA, no Cumulonimbus, no precipitation, thunderstorm, shallow fog or low drifting snow.

SKC

If any of the above conditions are not met but there is no cloud to report

TREND

When significant changes are forecasted in the **next 2 hours**. BECMG and TEMPO used.

FM - From, TL – Until, AT – at.

NOSIG

When no significant changes expected in the **next 2 hr** the trend is replaced by this.

Aerodrome Weather forecast – TAF

9 hour TAF

Issued and updated every 3 hours

12-24 hour TAF

Issued and updated every 6 hours

TEMPO

The TEMPO group is used for any conditions in wind, visibility, weather, or sky condition which are expected to last for generally **less than an hour** at a time (occasional), and are expected to occur during **less than half the time period**

- Write a METAR on outside's current weather (LHBP)

- State the correct order

- Read and decode it

Example -> METAR LHBP 171430Z 300/10 5000 -RA BKN020 12/10 1013

- LHBP -> airport

- 171430Z -> 17th at 14.30Z

- Wind 300° at 10kt

- Visibility 5000

- Slight rain

- Clouds broken 2000ft

- Temperature 12, Dew point 10

- QNH 1013

o Meaning of the following:

- TEMPO

Temporary weather conditions change that last in periods **between 30 mins and 1 hour**

Sum of duration is half the time of the TEMPO (ex. TEMPO 1500 to 2000 = max 2.5 hours)

- BECMG

Definite weather conditions change **gradually** on schedule time (Window normally 2 hours)

- FM

Immediate change from a previous state to a new one from the date, time and minute specified to the described one, **nullifying previous changes**

- PROB30/40

They show the likelihood of certain weather events occurring (30 or 40% chance) -> above 40% it is considered a TREND

- CAVOK

Visibility is at least 10 kilometres or more.

No clouds below 5,000 feet AGL or below the minimum sector altitude, whichever is higher.

No significant weather phenomena like rain, thunderstorms, or fog are reported within the vicinity.

No cumulonimbus or towering cumulus clouds are present.

- **NOSIG**

"No Significant Change" in weather conditions over the **next 2 hours**.

- **NSW**

"No significant weather"

SA = SURFACE ACTUAL

SA = METAR

FC = FORECAST COURT

FC = SHORT TAF

FT = FORECAST TEMPS

FT = LONG TAF

SA stands for surface observation. **FT** is for terminal forecast.

- **SA** (as the first two letters)

It means it's **semi-automated** -> automated stations report the weather, but might need some human intervention or verification

- **TX** - maximum temperature forecasted for the period of validity (Ex: TX27/0114Z)

- **TN** - minimum temperature forecasted for the period of validity

- **=** Means that the weather observation for this METAR Is concluded

What is a SIGWX chart and what info does it give?

- It provides critical information about significant weather phenomena affecting flight operations -> usable 3h before and after validity time

- Explain the symbol

Symbols for Significant Weather			
	Tropical Cyclone		Drizzle
	Severe Squall Line*		Rain
	Moderate Turbulence		Snow
	Severe Turbulence		Shower
	Mountain Waves		Hail
	Moderate Aircraft Icing		Widespread Blowing Snow
	Severe Aircraft Icing		Severe sand or Dust Haze
	Widespread Fog		Severe Sandstorm or Duststorm
	Radioactive Materials in the Atmosphere**		Widespread Haze
	Volcanic Eruption***		Widespread Mist
	Mountain Obscuration		Widespread Smoke
			Freezing Precipitation****

Atpl Questions

They give you a chart (approach plate):

- What chart is this
- What is this ... symbol
- What is the distance between these points

- Can you land with the current weather/what are the minima
- How long/wide is the runway and what is the slope
- Do you need an alternate
- What is the missed approach altitude
- What is the missed approach track
- What are the minima for category C aircraft (A320)
- What is ALS
- What is the MSA and what clearance provides it
- What is the big pink number, what does it represent, and in what occasion can we go below?

The MORA -> minimum off-route altitude -> provides a minimum altitude that guarantees obstacle clearance within a specified area -> we can go below when being on a published approach, being radar vectored, or during a visual descend

Clearance of 1000ft or 2000ft (if the elevation is above 5000ft)

Jet engine stages and how they work/provide thrust (be able to draw)

o Fan -> draws in additional air to provide most of the thrust -> significant portion of air that bypasses the engine core (compressor to turbine)

o Inlet -> direct incoming air into the engine -> slows the air and increases its pressure

o Compressor -> air is pressured, and temperature is increased (preparing it for combustion) - > rotor – stator:

- Rotor -> rotating blades that compresses incoming air by accelerating it

- Stator -> stationary blades slow the air again, converting it from kinetic energy to pressure and direct the airflow to the next stage for further compression

- The air continues through multiple stages of rotor/stator pairs in the compressor

o Combustor (combustion chamber) -> compressed air is mixed with fuel and ignited -> produces a large volume of hot gases at high pressure

o Turbine -> converts thermal energy of the hot gases into mechanical energy (pressure drop) -> stator – rotor:

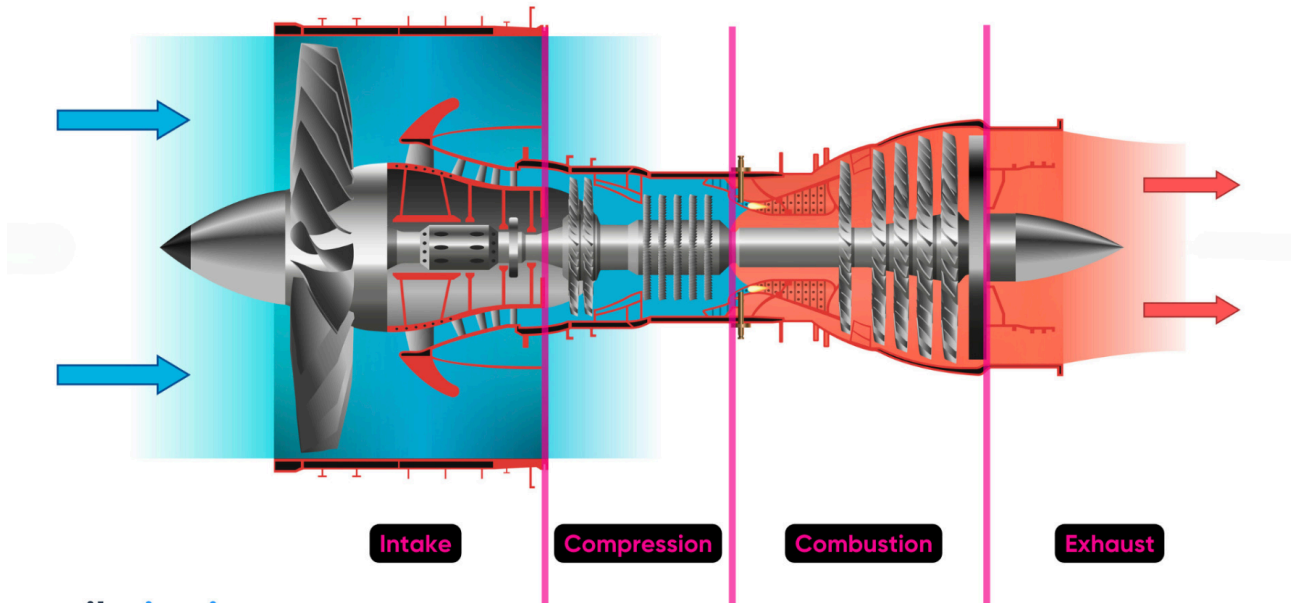
- Stator -> the stationary blades guide and direct the high energy airflow onto the turbine blades

- Rotor -> the rotating blades then extract energy from the airflow by spinning -> powers the compressor and other engine systems

- Drives the compressor and other engine components

o Nozzle -> accelerate the gases as they exit the engine (they expand/lower in pressure and accelerate) -> produces thrust according to Newton's third law

How Do Gas Turbines Work?



What is bypass ratio?

The mass of air that bypasses the engine core to the mass of air that goes through the core

How do magnetos work?

These are self-contained ignition systems that generate electrical sparks to ignite the fuel-air mixture in piston engines -> works through electromagnetic induction (rotating permanent magnets and coils producing high-voltage electricity)

What is fly-by-wire?

An advanced aircraft control technology that replaces manual flight controls with electronic systems -> no direct controls between the pilot's and the aircraft's controls -> enhances safety (flight envelope exceeding limits) and performance

What is just culture (might be specific for someone else)?

About creating a fair and open environment that fosters learning and safety in organizations -> balancing accountability with support and aims to improve the overall performance and reduce the likelihood of accidents and errors

Communication failure on an IFR flight in IMC, the pilot shall:

o In airspace where a **surveillance system** is used:

Maintain the last assigned speed and level for **7 minutes** following:

- The time the last assigned level or minimum flight altitude is reached; or

- The time the transponder was set to squawk 7600; or
- The aircraft's failure to report its position over a compulsory reporting point.

whichever is later. Thereafter adjust level and speed in accordance with your filed flight plan.

o In airspace where **procedural separation** is being applied (i.e. not radar separation):

Maintain the last assigned speed and level for **20 minutes** following your failure to report position over a compulsory reporting point. Thereafter adjust level and speed in accordance with your filed flight plan.

Begin descent from the fix at, or as close to, the expected approach time (EAT) last received and acknowledged. Without an EAT, descend as close as possible to the ETA resulting from the current flight plan. Complete a normal instrument approach procedure. Land, if possible, within 30 minutes after the ETA or the last.

Communication failure in VMC (IFR or VFR)

Continue the flight in VMC. Land at the nearest suitable aerodrome and report your arrival to the appropriate ATSU ASAP after landing.

Draw a 6-Pack



AIRSPEED INDICATOR



ATTITUDE INDICATOR



ALTIMETER



TURN COORDINATOR



HEADING INDICATOR



VERTICAL SPEED INDICATOR

What is the outbound hold time below 14000ft? Above 14000ft?

1min when below
1min 30sec above

Can we go to an airport if we don't know the weather at our ETA? What do we need?

Yes, we can, however we would need 2 alternates. (Weather below minima or no meteorological information available)

What are the O2 requirements?

Unpressurized Aircraft:

From 10000 to 13000ft oxygen must be provided to flight crew and 10% of pax. For flight durations over 30mins.

From 13000ft oxygen must be provided to all occupants.

Pressurized Aircraft:

Flight crew - from 10000ft > 30'
13000ft

Quick-donning oxygen masks > FL250

Cabin crew - from 10000ft > 30'
13000ft > 30'

PAX -10% above 10000ft > 30'

30% above 14000ft

All pax from 15000ft

Duration:

Flight crew – at least 2 hours (Certified FL250)

Quick-donning oxygen masks – 10 mins.

Pax – Time to emergency descent + 10 mins.

What is TAA?

Terminal Arrival Altitude (TAA) -> Similar concept as MSA but **for RNAV approaches**

Why do Airliners have swept wings?

Airliners have **swept wings** primarily to **delay the onset of shock waves** and **reduce drag at high subsonic speeds** (close to Mach 1).

- At high speeds, airflow over parts of the wing can locally reach Mach 1 even if the aircraft is flying below Mach 1.
- This causes wave drag — a large increase in drag due to shock formation.
- Sweeping the wing backward makes the airflow meet the wing at an angle, so the effective velocity component perpendicular to the leading edge is reduced.
- This means the critical Mach number (M_{crit}) increases — the aircraft can fly faster before hitting drag rise.

So, swept wings = higher cruise Mach number (≈ 0.78 – 0.85 for airliners).

How does a Swept Wing work?

The key principle is **velocity component reduction**:

- If the wing is swept back by an angle Λ ,
the airflow normal (perpendicular) to the leading edge is:

$$V_{\text{normal}} = V \cos \Lambda$$

- The lift and pressure distribution depend mainly on this normal component.
- Since V_{normal} is smaller, **compressibility effects** (and shock waves) appear at a higher true airspeed.

In other words, the wing "feels" like it's flying slower than it actually is, allowing higher true Mach numbers before shock formation.

What are the disadvantages of a swept wing?

A swept wing is favoured for high subsonic and supersonic speeds, and is found on almost all jet a/c. Compared with straight wings they have a "swept" wing root to wingtip direction angled beyond the span wise axis.

Advantages

☐ High Mach cruise speed: ☐ delays the airflow over the wing from going supersonic and allows the a/c to maximize the jet engine potential for higher Mach cruise. The swept wing is also designed with a minimal camber and thickness, thereby reducing profile drag, which further increases the wing ability for higher speed.

☐ Stability in turbulence: ☐ poor lift qualities, thereby it is more stable in turbulence compared with a straight-winged aircraft.

Disadvantages

☐ poor lift qualities, because the swept wing has the effect of reducing the lift capabilities of the wing

☐ speed instability at lower speeds and higher stall speeds because of the poor lift qualities

☐ wing tip stalling tendency which makes the aircraft longitudinally unstable, which is a major disadvantage.

Mcrit on Swept Wing?

- For a given airfoil with straight wings, the **critical Mach number (Mcrit)** is the speed where **some part of the airflow first reaches Mach 1**.
- For a **swept wing**, only the **normal component** of the airflow matters.

Mathematically:

$$M_{\text{crit(swept)}} = \frac{M_{\text{crit(straight)}}}{\cos \Lambda}$$

Example:

- If a straight wing has $M_{\text{crit}} = 0.70$
and the wing sweep is $\Lambda = 35^\circ$:

$$M_{\text{crit(swept)}} = \frac{0.70}{\cos 35^\circ} \approx 0.85$$

This is why airliners can cruise efficiently at Mach 0.80–0.85.

What is Dutch Roll?

Combination of rolling and yawing oscillations that normally occurs when the dihedral effect of an a/c are more powerful than the directional stability.

What are aircraft Winglets and how do they work?

- Reducing vortices: As an aircraft flies, there's a pressure difference between the top (low pressure) and bottom (high pressure) of the wings. At the wingtips, this air spills from the high-pressure side to the low-pressure side, creating powerful swirling vortices. Winglets act as a barrier, disrupting these vortices and breaking them down into smaller, less powerful eddies.
- Lowering induced drag: These wingtip vortices cause a type of drag known as induced drag. By reducing the strength and size of the vortices, winglets decrease induced drag, which makes the wings more aerodynamically efficient.
- Improving performance: A more efficient wing generates more lift for the same amount of drag, or requires less drag for the same amount of lift. This leads to several benefits:
 - Fuel savings: Reducing drag directly lowers the amount of fuel the aircraft needs to burn, saving fuel and reducing operating costs.
 - Increased range: With lower fuel consumption, the aircraft can fly longer distances.
 - Enhanced stability: Winglets can improve the aircraft's stability and help it maintain a smoother flight by controlling airflow at the tips.
 - Reduced noise: Less turbulence from smaller vortices can lead to less noise during take-off.

Why do Airliners change from climbing at constant IAS to constant Mach Number?

At very high altitudes, you come close to an aircraft's maximum altitude capability. At these heights, you have two limiting speeds:

- **Stall limit:** Even at cruise, an aircraft must maintain a minimum airspeed to produce enough lift for the thin air at altitude.

You will experience buffeting when you get close to the stall limit, although here the buffet comes from a high angle of attack.

- **Mach limit:** This is the high-speed Mcr we've discussed. Exceed it and you get shock waves, Mach buffet, Mach tuck, and control problems.

As you go higher, the space between these two speeds reduces. This is the coffin corner, named grimly because straying above or below that tiny speed window could be disastrous.

What happens if an aircraft in coffin corner hits turbulence?

If it jolts upward, momentarily increasing your angle of attack, you might hit the stall buffet.

Or if it jolts downward or gains speed, you might overshoot the Mach limit.

This is why high-altitude operations need great care from the pilots.

[LEARN ABOUT MACH HERE](#)

Can you tell me what you understand CRM is?

It is the effective use of all available resources for flight crew personnel to assure a safe and efficient operation, reducing error, avoiding stress and increasing efficiency.

CRM encompasses a wide range of knowledge, skills and attitudes including

- communications,
- loss of situational awareness,
- problem solving,
- decision making, and
- teamwork;

Together with all the attendant sub-disciplines which each of these areas entails.

The elements which comprise CRM are not new but have been recognised in one form or another since aviation began, usually under more general headings such as 'Airmanship', 'Captaincy', 'Crew Co-operation', etc.

CRM can also be defined as a management system which makes optimum use of all available resources - equipment, procedures and people - to promote safety and enhance the efficiency of flight operations.

CRM is concerned not so much with the technical knowledge and skills required to fly and operate an aircraft but rather with the cognitive and interpersonal skills needed to manage the flight within an organised aviation system.

In this context, cognitive skills are defined as the mental processes used for gaining and maintaining situational awareness, for solving problems and for taking decisions. Interpersonal skills are regarded as communications and a range of behavioural activities associated with teamwork.

In aviation, as in other walks of life, these skill areas often overlap with each other, and they also overlap with the required technical skills.

What is windshear?

Windshear is a sudden change in wind speed and/or direction over a short distance, occurring either horizontally or vertically. It is a significant weather phenomenon, especially for aviation, because it can cause abrupt changes in an aircraft's airspeed and altitude, potentially leading to loss of lift or control. It can be caused by factors like thunderstorms, microbursts, and temperature inversions.

What are the three stages of thunderstorms?

Thunderstorms require three ingredients for them to exist. There must be moisture in the air, an unstable atmosphere, and a lifting force. Once all these are present, then the excitement begins...

The Cumulus (developing) Stage

The Cumulus stage is the first stage. Pilots will experience updrafts when in the vicinity of these clouds. Depending on the severity of the updrafts these clouds can reach an altitude of more than 60,000 feet (rare, but possible). Clouds with extensive vertical development are referred to as towering cumulus. Because of continuous updrafts, there is no precipitation. Once these updrafts give, we move to the next stage.

The Mature Stage

An example of a Mature Thunderstorm and its dangers.

In the Mature Stage, there are both updrafts and downdrafts present. The beginning of rainfall signals the beginning of the mature stage. This is the most dangerous stage of a thunderstorm because it's where most of the excitement happens. Pilots can experience lightning, severe turbulence, wind gusts, and even hail. Hail has been observed to travel more than 20 nautical miles from a storm.

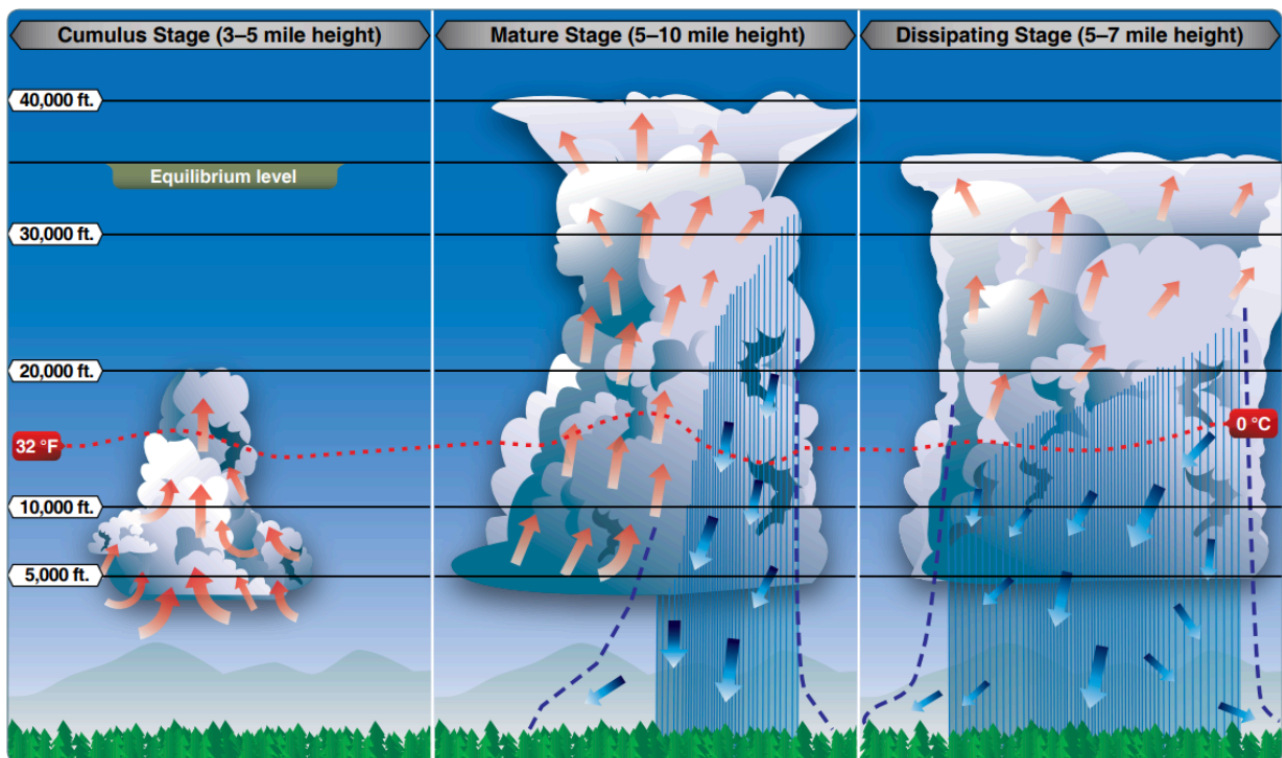
There are many signs that pilots can observe during the day to forecast the dangers of a storm, but common practice is to circumnavigate the storm by at least 20 nm on the upwind side. A very dangerous phenomenon called microbursts can occur at this stage. Microbursts have downed airliners in the past like [Delta Flight 191](#), a Lockheed L-1011 which experienced a microburst during an instrument approach that they couldn't fly away from. Small general aviation airplanes should not be getting anywhere near these storms.

An easy way to determine the movement of a storm is by observing the direction of the cloud anvil as it always appears on the downwind side.

The Dissipating Stage

This is the end of a thunderstorm, at this point, due to a lack of warm rising air, moisture is gone and the storm mostly consists of downdrafts. These downdrafts are signs that the storm is dying out. Light rain and light winds can still be present. This light rain rarely is a danger to light aircraft but can still affect visibility.

Identifying which stage a thunderstorm is in can be tricky; remember always check the weather radar of your flight path area, monitor the Automatic Terminal Information Service (ATIS) of local airports, and when in doubt, keep a distance of 20 nm on the upwind side of any potential storms. Following these simple steps could save you from a lot of trouble.



What is V_{mcg}, V₁, V_{mcg}?

Symbol	Name	Condition	Description
V _{mcg}	Minimum control speed (ground)	On ground	Maintain directional control after engine failure during takeoff roll
V ₁	Takeoff decision speed	Ground roll	Decide to abort or continue takeoff
V _{mcg}	Minimum control speed (air)	In air	Maintain directional control after engine failure in flight

V_{mcg} — Minimum Control Speed on the Ground

Definition:

The *minimum speed* on the ground, during the takeoff roll, at which directional control can be maintained using only aerodynamic controls (rudder) after the critical engine suddenly fails, while the other engine(s) are producing takeoff power.

Key points:

- Below V_{mcg}, if an engine fails, you cannot maintain directional control using rudder alone.
- Determined with:
 - Takeoff power set on the operating engine(s),
 - Flaps in takeoff position,
 - Max rudder deflection,
 - No nosewheel steering,
 - Standard atmosphere and sea level.
- If engine fails below V_{mcg} → reject the takeoff.

V₁ — Takeoff Decision Speed

Definition:

The maximum speed during takeoff at which a pilot must decide whether to abort or continue the takeoff after an engine failure or another critical event.

Key points:

- At or below V₁ → you must abort (enough runway to stop).
- After V₁ → you must continue (not enough runway to stop safely).
- It's the *go/no-go* speed.
- Determined considering aircraft weight, runway length, elevation, temperature, and performance data.

Vmca — Minimum Control Speed in the Air

Definition:

The *minimum speed* in flight at which directional control can be maintained with one engine inoperative and the other(s) at takeoff power, with maximum rudder deflection and no more than 5° of bank toward the operating engine.

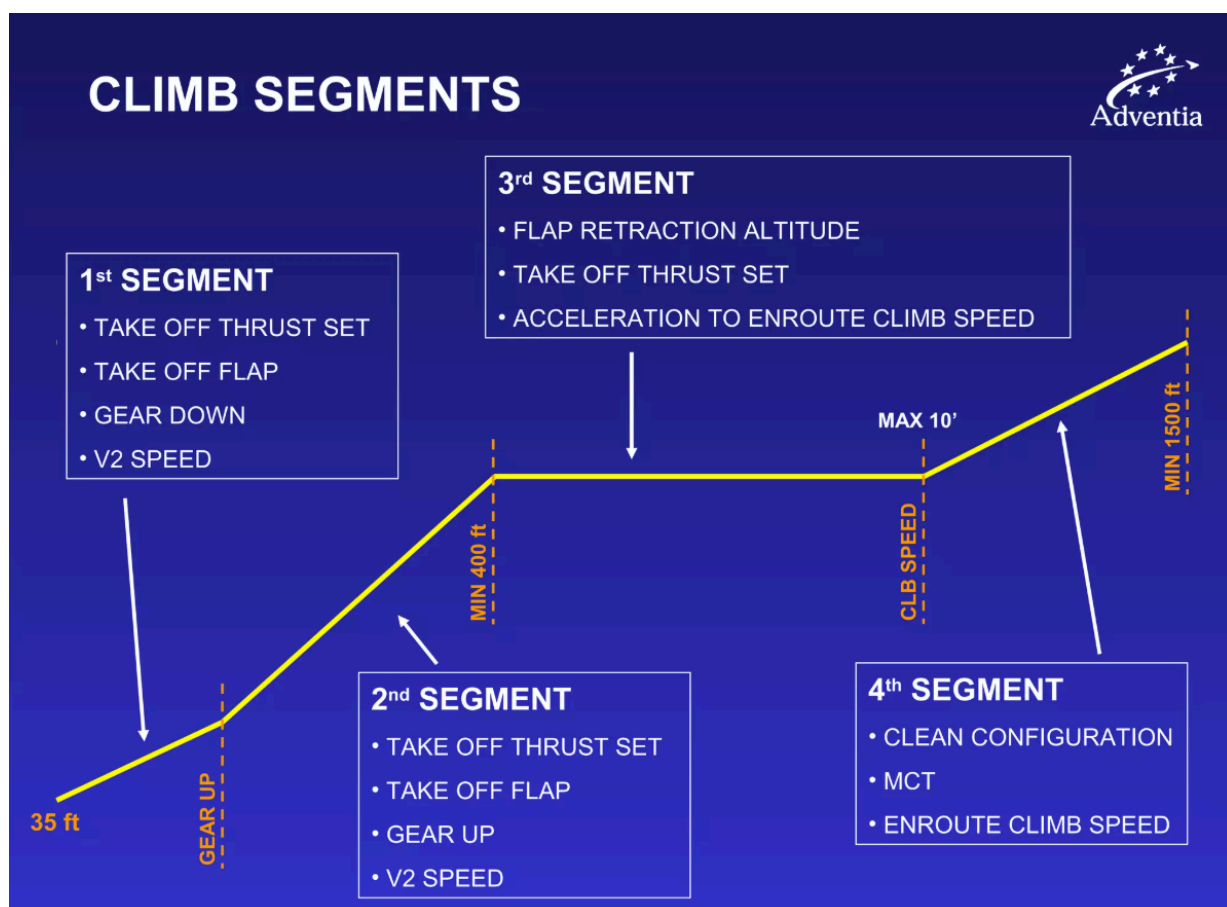
Key points:

- Below Vmca, the rudder cannot overcome asymmetric thrust → aircraft will yaw/roll uncontrollably.
- Published as a red radial line on the airspeed indicator.
- Always ensure takeoff safety speed (V2) is above Vmca.

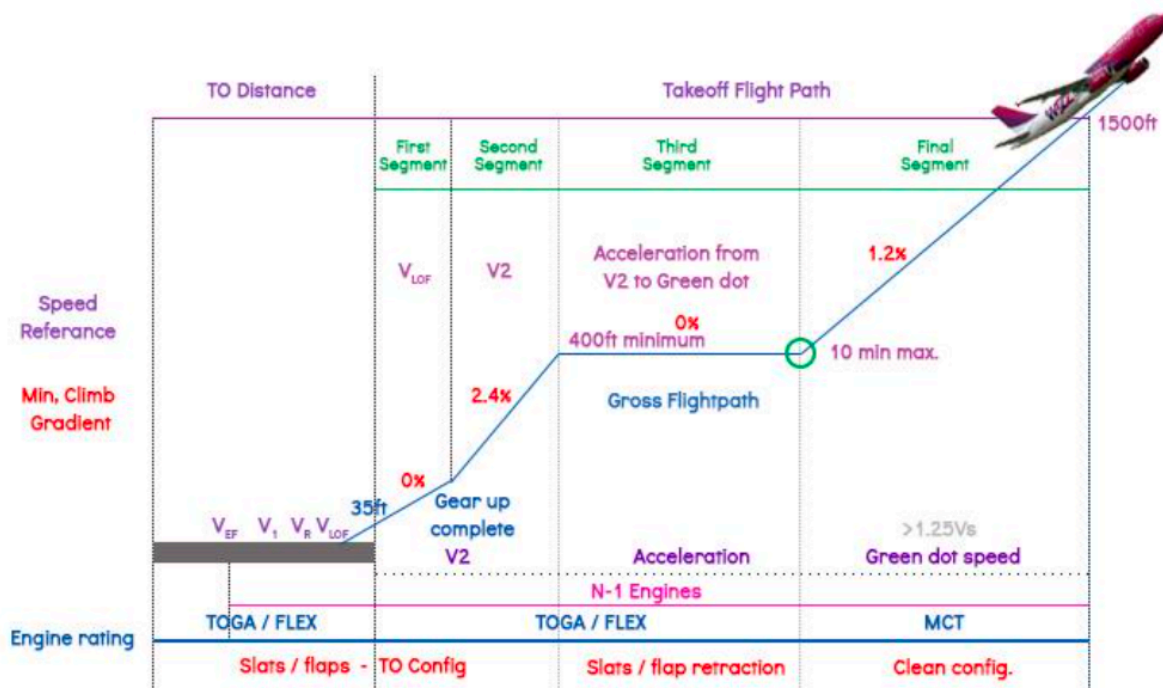
What is the difference between TORA and TODA?

TORA (Takeoff Run Available) is the length of the runway for the aircraft's ground roll during takeoff, while TODA (Takeoff Distance Available) is the length of the TORA plus any available clearway beyond the end of the runway. TORA is the physical runway available for the take-off run, whereas TODA accounts for the extended distance, including the clearway, which is a paved or grassy area free of obstacles.

How many climb segments are there? What are they?



Segment (one engine INOP) +0,8% all engine	Gear	S/Flaps	Speed	CLB gradient	Thrust
1 st : from 35 ft point until landing gear is retracted	down	T/O	V ₂	positive	T/O
2 nd : from gear up point until acceleration ALT 400ft is reached	up	T/O	V ₂	2.4%	T/O
3 rd : a.) distance covered before flap retraction, accelerating to green dot speed b.) after flap retraction accelerating to final T/O climb speed	up	acc. → retract.	acc. V ₂ → green dot O	0%	T/O MCT
4 th : from 400 FT to 1500 ft is reached	up	up	green dot	1.2%	MCT



What is a RVSM airspace? What are the limits? What do you need to fly in it? Do you need an autopilot? Do you need a TCAS? Do you need a significant weather chart?

RVSM = Reduced Vertical Separation Minimum

It's a portion of controlled airspace where the vertical separation between aircraft flying between certain flight levels has been reduced from 2,000 ft to 1,000 ft.

Limits

RVSM airspace extends from:

- **FL290** (29,000 ft) up to **FL410** (41,000 ft) inclusive.

What You Need to Fly in RVSM Airspace

Your aircraft and operator must be RVSM approved by the aviation authority.

Requirements include:

1. Two independent altitude measurement systems (altimeters) $\leq \pm 200$ ft discrepancy.
2. One automatic altitude control system (autopilot) capable of holding altitude within ± 65 ft.
3. One altitude alerting system to warn if you deviate more than ± 200 ft.
4. Mode C/S transponder that reports pressure altitude.
5. Crew training in RVSM procedures (contingencies, monitoring, etc.).
6. Maintenance program ensuring the accuracy of altimetry systems.

Do you need an Autopilot?



Yes.

An autopilot capable of maintaining assigned altitude precisely is required for RVSM operations.

Do you need a TCAS?



Not specifically required for RVSM, but:

- TCAS II is required for most turbine-powered transport aircraft by ICAO/FAA/EASA, regardless of RVSM.
- So in practice — yes, you will have one, but it's not a direct RVSM requirement.

Do you need a Significant Weather Chart?



Not specifically for RVSM, but:

- Pilots must review upper air and significant weather charts before flight to anticipate turbulence, mountain wave, or convective activity, since such phenomena can cause altitude deviations and RVSM errors.
- So it's good airmanship, not a regulatory requirement.

What is RNAV?

RNAV, or Area Navigation, is a method of aircraft navigation that allows a plane to fly any desired flight path between two waypoints, rather than being limited to fixed routes based on ground-based navigation beacons. It uses on-board systems that integrate data from sources like GPS, inertial navigation systems (IRS), and VOR/DME to allow for more direct and efficient routes, saving time and fuel.

What are the components of flight plan fuel?

What is minimum reserve fuel?

What is contingency fuel?

CAT.OP.MPA.181 Fuel/energy scheme – fuel/energy planning and in-flight re-planning policy – aeroplanes

Regulation (EU) 2021/1296

The operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes:

- (1) **taxi fuel**/energy that shall not be less than the amount expected to be used prior to take-off;
- (2) **trip fuel**/energy that shall be the amount of fuel/energy that is required to enable the aeroplane to fly from take-off, or from the point of in-flight re-planning, to landing at the destination aerodrome;
- (3) **contingency fuel**/energy that shall be the amount of fuel/energy required to compensate for unforeseen factors;
- (4) **destination alternate** fuel/energy:
 - (i) when a flight is operated with at least one destination alternate aerodrome, it shall be the amount of fuel/energy required to fly from the destination aerodrome to the destination alternate aerodrome; or
 - (ii) when a flight is operated with no destination alternate aerodrome, it shall be the amount of fuel/energy required to hold at the destination aerodrome, while enabling the aeroplane to perform a safe landing, and to allow for deviations from the planned operation; as a minimum, this amount shall be 15-minute fuel/energy at holding speed at 1 500ft (450 m) above the aerodrome elevation in standard conditions, calculated according to the estimated aeroplane mass on arrival at the destination aerodrome;
- (5) **final reserve** fuel/energy that shall be the amount of fuel/energy that is calculated at holding speed at 1 500ft (450 m) above the aerodrome elevation in standard conditions according to the aeroplane estimated mass on arrival at the destination alternate aerodrome, or destination aerodrome when no destination alternate aerodrome is required, and shall not be less than:
 - (i) for aeroplanes with reciprocating engines, the fuel/energy to fly for **45 minutes**; or
 - (ii) for turbine-engined aeroplanes, the fuel/energy to fly for **30 minutes**;
- (6) **additional fuel**/energy, if required by the type of operation; it shall be the amount of fuel/energy to enable the aeroplane to land at a fuel/energy en route alternate aerodrome (fuel/energy ERA aerodrome critical scenario) in the event of an aircraft failure that significantly increases the fuel/energy consumption at the most critical point along the route; this additional fuel/energy is required only if the minimum amount of fuel/energy that is calculated according to points (c)(2) to (c)(5) is not sufficient for such an event;
- (7) **extra fuel**/energy to take into account anticipated delays or specific operational constraints; and
- (8) **discretionary fuel**/energy, if required by the commander.

BASIC FUEL SCHEME — PRE-FLIGHT CALCULATION OF USABLE FUEL FOR PERFORMANCE CLASS A AEROPLANES

For the pre-flight calculation of the usable fuel, the operator should:

- (a) for **taxi fuel**, take into account the local conditions at the departure aerodrome

and the **APU consumption**;

(b) for **trip fuel**, include:

- (1) fuel for take-off and climb from the aerodrome elevation to the initial cruising level/altitude, taking into account the expected departure routing;
- (2) fuel from the top of climb to the top of descent, including any step climb/descent;
- (3) fuel from the top of descent to the point where the approach procedure is initiated, taking into account the expected arrival routing; and
- (4) fuel for making an approach and landing at the destination aerodrome;

(c) for **contingency fuel**, calculate for unforeseen factors either:

- (1) 5 % of the planned trip fuel or, in the event of in-flight re-planning, 5 % of the trip fuel for the remainder of the flight; or
- (2) an amount to fly for 5 minutes at holding speed at 1 500 ft (450 m) above the destination aerodrome in standard conditions,
whichever is the higher;

(d) for **destination alternate** fuel, include:

- (1) when the aircraft is operated with one destination alternate aerodrome:
 - (i) fuel for a missed approach from the applicable DA/H or MDA/H at the destination aerodrome to the missed-approach altitude, taking into account the complete missed-approach procedure;
 - (ii) fuel for climb from the missed-approach altitude to the cruising level/altitude, taking into account the expected departure routing;
 - (iii) fuel for cruising from the top of climb to the top of descent, taking into account the expected routing;
 - (iv) fuel for descent from the top of descent to the point where the approach is initiated, taking into account the expected arrival routing; and
 - (v) fuel for making an approach and landing at the destination alternate aerodrome; and
- (2) when the aircraft is operated with two destination alternate aerodromes, the amount of fuel that is calculated in accordance with point (d)(1), based on the destination alternate aerodrome that requires the greater amount of fuel;

(e) for **FRF**, comply with point [CAT.OP.MPA.181\(c\)](#);

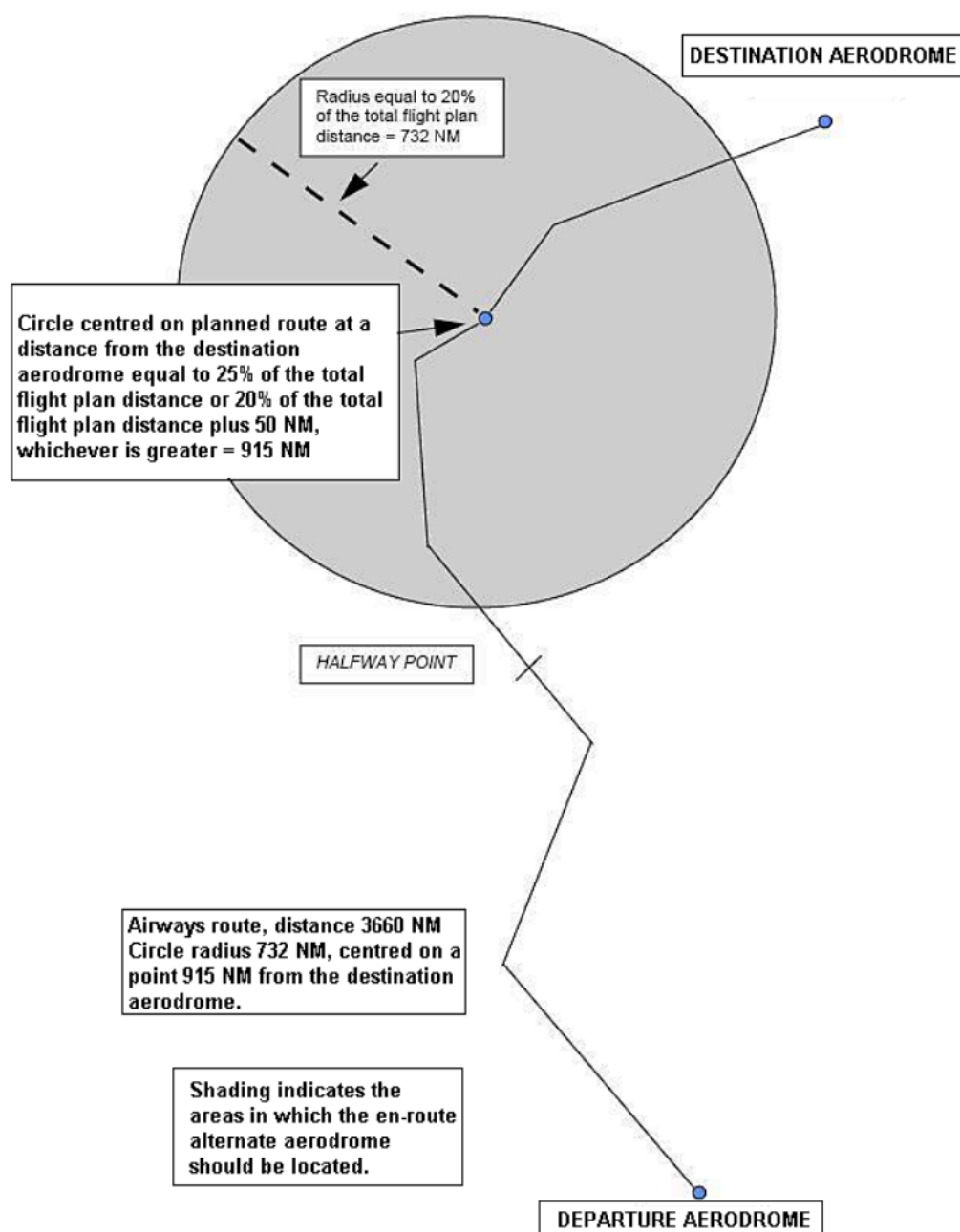
(f) for **additional fuel**, include an amount of fuel that allows the aeroplane to proceed, in the event of an engine failure or loss of pressurisation, from the most critical point along the route to a fuel en route alternate (fuel ERA) aerodrome in the relevant aircraft configuration, hold there for 15 minutes at 1 500 ft (450 m) above the aerodrome elevation in standard conditions, make an approach, and land;

- (g) for **extra fuel**, include anticipated delays or specific operational constraints that can be predicted; and
- (h) for **discretionary fuel**, include a quantity at the sole discretion of the commander.

BASIC FUEL SCHEME WITH VARIATIONS — LOCATION OF THE FUEL EN ROUTE ALTERNATE AERODROME TO REDUCE CONTINGENCY FUEL TO 3 %

The fuel en route alternate (fuel ERA) aerodrome should be located within a circle with a radius equal to 20 % of the total flight plan distance; the centre of this circle lies on the planned route at a distance from the destination aerodrome equal to 25 % of the total flight plan distance, or at least 20 % of the total flight plan distance plus 50 NM, whichever is greater. All distances should be calculated in still-air conditions (see Figure 1). The fuel ERA aerodrome should be nominated in the operational flight plan.

Figure 1 — Location of the fuel ERA aerodrome to reduce contingency fuel to 3 %



Is a destination alternate always required?

No, can be missed if:

NO DESTINATION ALTERNATE AERODROME

(c) The operator may operate with no destination alternate aerodrome when the destination aerodrome is an isolated aerodrome or when the following two conditions are met:

- (1) the duration of the planned flight from take-off to landing does **not exceed 6 hours** or, in the event of in-flight re-planning, in accordance with point [CAT.OP.MPA.181\(d\)](#), the remaining flying time to destination does not exceed 4 hours; and
- (2) two separate runways are usable at the destination aerodrome and the appropriate weather reports and/or weather forecasts indicate that for the period from 1 hour before to 1 hour after the expected time of arrival, the ceiling is at least **2 000 ft (600 m) or the circling height + 500 ft (150 m)**, whichever is greater, and ground visibility is at least **5 km**.

Is an en-route alternate always required?

An en-route alternate aerodrome is only required for ETOPS/EDTO or if using 3% contingency operations by aeroplanes with two turbine engines. If it is so required, it must be specified in the operational and ATS flight plans.

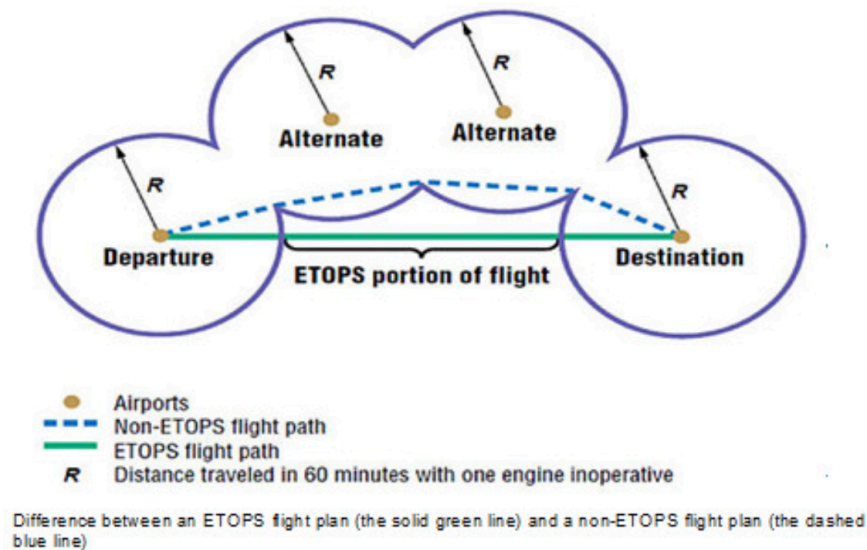
ETOPS, now often called EDTO (Extended Diversion Time Operations), refers to regulations for long-distance flights by twin-engine aircraft. EASA (European Union Aviation Safety Agency) uses ETOPS and oversees these regulations for twin-engine aircraft operating over routes that take them more than 60 minutes away from an emergency airport. The "eng" in the query likely refers to "engine," and EASA enforces specific reliability standards for engines to get ETOPS approval.

ETOPS/EDTO

- What it is: ETOPS is a set of standards that allows twin-engine aircraft to fly routes that extend beyond 60 minutes from a suitable diversion airport.
- The change: The term EDTO has been introduced as a more general term for extended-range operations by the International Civil Aviation Organization (ICAO) (ICAO), but ETOPS is still widely used and allowed. EDTO is the formal term used by ICAO, while ETOPS is still commonly used by organizations like EASA.
- Purpose: It enables twin-engine aircraft to operate on longer routes, like transatlantic and transpacific flights, that were previously limited to multi-engine aircraft.

EASA and ETOPS

- Role: EASA is the European authority that sets and enforces the regulations for ETOPS (or EDTO) within its jurisdiction.
- Requirements: EASA requires that operators meet specific reliability standards for their engines to be approved for ETOPS flights.
- Example: EASA certified the Airbus A350-900 for up to 370 minutes of ETOPS, meaning it can fly that far from a diversion airport, according to [EASA](#).



What is cost index?

The cost index (CI) is a ratio of an airline's time-related costs (like crew pay, maintenance, and depreciation) to its fuel costs. Airlines use this value in their flight management computers to calculate the most cost-effective speed for a flight, which helps balance fuel savings against the cost of flying faster to save time.

The formula: $CI = \frac{\text{Time-related costs}}{\text{Fuel costs}}$.

What is your understanding of an LVO approach?

GM1 SPA.LVO.100(a) Low-visibility operations and operations with operational credits

ED Decision 2022/012/R

CLASSIFICATION OF LVTO OPERATIONS

Take-off operations are classified as 'normal take-off operations' with an RVR at or above 550 m and 'LVTO operations' with an RVR below 550 m. Only LVTO operations in an RVR of less than 400 m require a specific approval.

- (74) 'low-visibility operations (LVOs)' means approach or take-off operations on a runway with a runway visual range less than 550 m or with a decision height less than 200 ft;
- (75) 'low-visibility take-off (LVTO)' means a take-off with an RVR less than 550 m;

GM2 SPA.LVO.100 Low-visibility operations and operations with operational credits

ED Decision 2023/007/R

ILS AND GLS CLASSIFICATION

- (a) The ILS and GLS/GBAS classification systems are specified in ICAO Annex 10 and [GM2 SPA.LVO.110](#).

LOW-VISIBILITY CONDITIONS

- (b) Low visibility conditions means meteorological conditions with a runway visual range (RVR) less than 550 m.

SPA.LVO.100 Low-visibility operations and operations with operational credits

Regulation (EU) 2024/1111

The operator shall conduct the following operations only if they are approved by the competent authority:

- (a) take-off operations with visibility conditions of less than 400 m RVR;
- (b) instrument approach operations in low-visibility conditions; and
- (c) operations with operational credits, except for EFVS 200 operations, which shall not be subject to a specific approval.

[applicable until 30 April 2025 — Regulation (EU) 2021/2237]

An operator of aeroplanes or helicopters shall conduct the following operations only if they are approved by the competent authority:

- (a) take-off operations with visibility conditions of less than 400 m RVR;
- (b) instrument approach operations in low-visibility conditions; and
- (c) operations with operational credits, except for EFVS 200 operations, which shall not be subject to a specific approval.

[applicable from 1 May 2025 — Regulation (EU) 2024/1111]

SPA.LVO.105 Specific approval criteria

Regulation (EU) 2021/2237

To obtain a specific approval as required by [SPA.LVO.100](#), the operator shall demonstrate that:

- (a) for low-visibility approach operations, LVTO operations in an RVR less than 125 m, and operations with operational credits, the aircraft has been certified for the intended operations;
- (b) the flight crew members are competent to conduct the intended operation and a training and checking programme for the flight crew members and relevant personnel involved in the flight preparation has been established, in accordance with [SPA.LVO.120](#);
- (c) operating procedures for the intended operations have been established;
- (d) any relevant changes to the minimum equipment list (MEL) have been made;
- (e) any relevant changes to the maintenance programme have been made;
- (f) procedures have been established to ensure the suitability of aerodromes, including instrument flight procedures, for the intended operations, in accordance with [SPA.LVO.110](#); and
- (g) for the intended operations, a safety assessment has been carried out, and performance indicators have been established to monitor the level of safety.

What direction is a standard holding pattern?

To the right

How many cabin crew are onboard? Why this number?

Aircraft Type	Seats Installed	Minimum Cabin Crew (EASA)
A320 (≈180 seats)	180	4 cabin crew
A321 (≈230 seats)	230	5 cabin crew

A319 (≈156 seats)	156	4 cabin crew
Small aircraft (e.g. 30 seats)	30	1 cabin crew

ORO.CC.100 Number and composition of cabin crew

Regulation (EU) 2019/1384

- (a) For the operation of aircraft with an MOPSC of more than 19, at least one cabin crew member shall be assigned when carrying one or more passenger(s).
- (b) For the purpose of complying with point (a), the minimum number of cabin crew members shall be the greatest number amongst the following:
 - (1) the number of cabin crew members established during the aircraft certification process in accordance with the applicable certification specifications, for the aircraft cabin configuration used by the operator;
 - (2) if the number under point (1) has not been established, the number of cabin crew members established during the aircraft certification process for the maximum certified passenger seating configuration reduced by 1 for every whole multiple of 50 passenger seats of the aircraft cabin configuration used by the operator falling below the maximum certified seating capacity;
 - (3) one cabin crew member for every 50, or fraction of 50, passenger seats installed on the same deck of the aircraft to be operated.
- (c) For operations with more than one cabin crew member, the operator shall nominate one cabin crew member accountable to the pilot-in-command or the commander.
- (d) By way of derogation from point (a), non-commercial operations with aircraft with an MOPSC of more than 19 may be performed without an operating cabin crew member, subject to the prior approval by the competent authority. To obtain the approval, the operator shall ensure that all of the following conditions are fulfilled:
 - (1) there are maximum 19 passengers on board;
 - (2) the operator has developed procedures for that operation.

So for **WizzAir A320-family aircraft**, you'll normally have:

- **A320 → 4 cabin crew**
- **A321 → 5 cabin crew**

 Why this number?

Because according to EASA CS-25 (Certification Specifications), the aircraft must be capable of evacuation in 90 seconds with half the exits blocked — and the required number of cabin crew is set to meet that safety standard.

The “1 per 50” ratio was determined by safety studies and evacuation tests.

What navigation systems do our aircraft have?

Our Airbus A320/A321 are equipped with a dual integrated navigation system, which includes:

- IRS (Inertial Reference System) – provides attitude, position, and acceleration data.

- GNSS (GPS) – provides satellite-based position updating.
- DME/DME – ground-based distance measurement updating.
- VOR and ILS – for en-route and approach navigation.
- ADF – for NDB navigation (mainly backup).
- FMGS (Flight Management and Guidance System) integrates all of these for RNAV and RNP operations.



Expanded Explanation (if they ask you to elaborate):

1. IRS (Inertial Reference System)

- Three independent ADIRUs (Air Data Inertial Reference Units) provide position, speed, attitude, and heading.
- Can navigate standalone for limited time (drift ~1 NM per hour).

2. GNSS (GPS)

- Dual GPS receivers provide satellite position updates directly to the FMGC.
- Used for RNAV (Area Navigation) and RNP (Required Navigation Performance) operations.

3. DME/DME Updating

- When GPS unavailable, position can be updated via DME/DME triangulation.

4. VOR / ILS / ADF

- Classic radio navigation systems.
- ILS used for precision approaches (CAT I/II/III).
- VOR and ADF for conventional procedures or backup.

5. FMGS

- Integrates all inputs to manage flight path (lateral and vertical), performance, and navigation accuracy.
- Provides LNAV/VNAV and RNP capabilities.

What is the stall speed of the A320?

The stall speed varies with weight and configuration — typically around **110** knots clean and about **95** knots landing configuration.

In Normal Law, the aircraft is protected from stalling by the alpha-protection system.

How many hydraulic systems on the A320?

The A320 has **three independent hydraulic systems — Green, Blue, and Yellow.**

What is Green Dot speed?

Green Dot is the best lift-to-drag ratio speed — it represents the engine-out drift-down speed and the maximum glide distance in clean configuration.

It varies with weight and is shown as a **green circle** on the PFD.

How does fly-by-wire work? What are the advantages/disadvantages?

Fly-by-wire replaces mechanical linkages with electrical signaling.

The pilot's sidestick input goes through flight control computers, which interpret it according to control laws and move the control surfaces hydraulically.

The system gives full flight envelope protection, reduces weight and workload, and improves efficiency

—

but it's complex, dependent on electrical power, and provides no tactile feedback between pilots.

When does the sideslip indicator turn blue?

The sideslip indicator turns blue when the aircraft is in alternate or direct law.

This shows actual sideslip, not Beta Target, meaning automatic yaw compensation is lost and the pilot must manually coordinate with rudder.

What is groundspeed mini?

Groundspeed Mini is an FMGS function that keeps a nearly constant groundspeed on final approach by automatically adjusting VAPP for wind changes.

It protects against airspeed loss if the headwind decreases, ensuring stable energy and safer approaches.

What are the Airbus memory items?

FLIGHT PHASE (Time Permitting)	REVISION ITEM
Before Taxi	Loss of Braking
During Taxi	Unreliable Speed
Before Takeoff	Abnormal Slats / Flaps
Before Takeoff (If anticipated)	Windshear Warning
	EGPWS Warning
Climb	TCAS Warning
	Engine Failure
Cruise	Emergency Descent
	EGPWS Cautions
	Stall Warning & Recovery

VFR Limitations?

VFR Minima

Airspace Class	A	B	C	D	E	F	G
At and Above 10 000 ft		Visibility 8 km, 1500 m horizontally and 1000 ft vertically clear of cloud					
Below 10 000 ft but above 3000 ft amsl or 1000 ft agl		Visibility 5km, 1500 m horizontally and 1000 ft vertically clear of cloud					
Below 3000 ft amsl or 1000 ft agl		Visibility 5km, 1500 m horizontally and 1000 ft vertically clear of cloud				Visibility 5 km. Clear of cloud and in sight of the surface	

What's the important things you must watch out during planning?

Pre-flight preparation

- Weather and meteorological assessment: Gather and analyze comprehensive weather information for the entire route, including departure, destination, and alternate airports. Look for turbulence, icing, wind direction and speed, visibility issues, and potential storms.
- NOTAMs (Notices to Airmen): Review all relevant NOTAMs for potential hazards or changes affecting the flight, such as temporary flight restrictions, runway closures, or navigational aid outages.
- Minimum Equipment List (MEL): Consult the MEL to determine if any inoperative equipment affects the aircraft's airworthiness and ability to proceed with the flight.

Aircraft and route considerations

- Aircraft performance and loading: Calculate the aircraft's weight and balance to ensure it remains within safe operating limits throughout the flight.
- Fuel requirements: Plan for sufficient fuel, including contingency and reserve fuel, to cover the planned route, potential diversions, holding, and unforeseen circumstances.
- Route and airspace analysis: Plot the optimal route while considering winds, weather, and airspace restrictions. Be aware of controlled or restricted airspace and communicate with Air Traffic Control (ATC) as needed.

Risk management and human factors

- Risk assessment: Systematically identify and evaluate risks associated with the flight, such as potential hazards from weather, equipment, or human factors. Assess the likelihood and severity of risks and develop mitigation strategies.

- Contingency planning: Prepare for the unexpected by identifying suitable alternate airports and planning for possible diversions or other emergencies.
- Human factors: Evaluate your own fitness to fly, including potential stressors, fatigue, or other factors that could impair your judgment or performance.

Continuous monitoring

- In-flight vigilance: Understand that planning is a continuous process. Once airborne, continuously monitor conditions and compare reality with your plan. Be prepared to adapt if your plan and reality differ, and adjust your plan accordingly.
- Team communication: Coordinate effectively with your crew and ATC throughout all phases of the flight to maintain situational awareness and ensure smooth operations.

Take-off Minima?

Table 1

Take-off — aeroplanes (without LVTO approval)

RVR or VIS

Minimum RVR* or VIS*	Facilities
500 m (day)	Nil**
400 m (day)	Centre line markings or Runway edge lights or Runway centre line lights
400 m (night)	Runway end lights*** and Runway edge lights or runway centreline lights

- * The reported RVR or VIS value representative of the initial part of the take-off run can be replaced by pilot assessment.
- ** The pilot is able to continuously identify the take-off surface and maintain directional control.
- *** Runway end lights may be substituted by colour-coded runway edge lights or colour-coded runway centre line lights.

Table 16

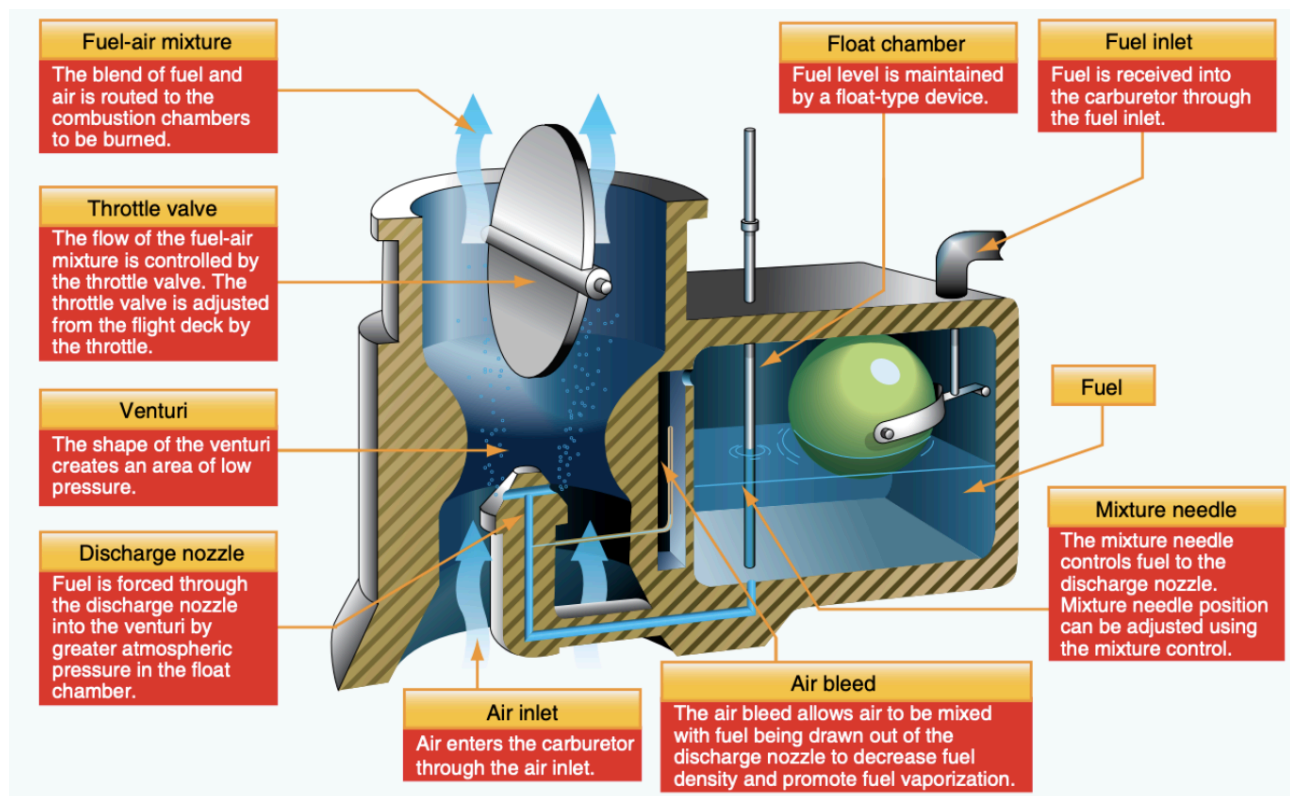
Conversion of reported VIS to RVR/CMV

Light elements in operation	RVR/CMV = reported VIS x	
	Day	Night
HI approach and runway lights	1.5	2.0
Any type of light installation other than above	1.0	1.5
No lights	1.0	not applicable

How does a carburettor work? Draw it.

A carburettor mixes fuel and air by using the venturi effect: air forced through a narrow passage speeds up, which lowers its pressure. This low pressure creates a vacuum that draws fuel from a reservoir (the float chamber) through a nozzle and into the airstream, where it is atomised into

a fine mist. A throttle valve controlled by the pilot regulates the amount of air—and thus the amount of fuel mixture—entering the engine, controlling engine power.



What are the minima you need at the alternate?

As a rule, we will have to make sure that the weather conditions outlined at the table below will be satisfied from **1 hour prior to 1 hour after our ETA**.

Table 2 — Basic fuel scheme — planning minima — aeroplanes
Destination alternate aerodrome, fuel ERA aerodrome, isolated destination aerodrome

Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
Type B instrument approach operations	DA/H + 200 ft	RVR/VIS + 800 m
Type A instrument approach operations	DA/H or MDA/H + 400 ft	RVR/VIS + 1 500 m
Circling approach operations	MDA/H + 400 ft	VIS + 1 500 m

Crosswind planning minima: see Table 1 of [AMC3 CAT.OP.MPA.182](#)

Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).

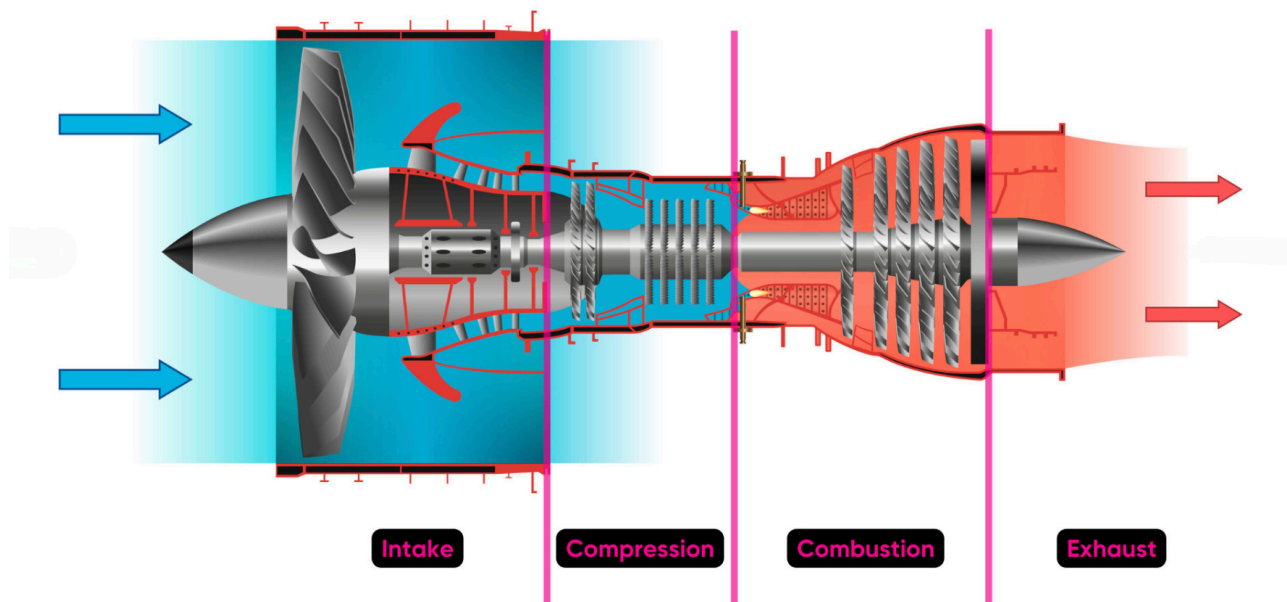
Planning minima?

Check IFR PLANNING/OPERATIONAL MINIMA file

How a turbofan engine works?

A turbofan engine works by using a large front fan to pull in and accelerate a large volume of air, which generates most of the thrust. A small portion of this air goes into the engine's core to be compressed, mixed with fuel, and ignited in a combustion chamber. The resulting hot gas spins a turbine, which powers the fan and compressor, while the remaining air bypasses the core and exits through a separate nozzle, producing the majority of the engine's thrust efficiently.

How Do Gas Turbines Work?



More here: [Turbofan article](#)

What is freezing fog?

Freezing fog is a type of fog that consists of **supercooled water droplets** which freeze instantly **on contact with surfaces** when the temperature is at or below 0 degrees C. In aviation, this poses a significant hazard because it can cause dangerous ice accumulation, or [rime ice](#), on an aircraft's wings, propellers, and engines, impairing visibility and increasing drag. This can inhibit takeoff and requires careful deicing operations, leading to delays or cancellations.

What is Anti Icing and De-icing?

Anti-icing prevents ice from forming, while de-icing removes ice that has already accumulated. Anti-icing systems use methods like heating or chemicals to stop ice from forming in the first place, while de-icing systems use methods like heating, chemicals, or mechanical systems to remove existing ice.

What is the RWY midpoint RVR requirement for the approach?

The RVR midpoint requirement for an approach is generally 125 meters (or the touchdown zone RVR, if lower), but it can be 75 meters for aircraft equipped with a rollout guidance system. The exact requirement depends on the operational category (e.g., CAT II, CAT III) and whether the RVR is controlling for a specific phase of flight.

That is a very good and specific question. Under EASA regulations, your initial assumption is incorrect: for a Category I (CAT I) approach, you do not use the lower of the touchdown zone (TDZ) and midpoint RVR. The touchdown zone RVR is always the controlling value.

For CAT I approaches, any additional RVR information, such as the midpoint and stop-end RVR, is considered advisory.

Category		DH (ft)	RVR (m)	Notes
Type A		≥ 250		
Type B	CAT I	200	550	(or 800m VIS)
	CAT II	100	300	
	CAT III	99-50	175	
		49-0	125	Fail Passive
		49-0	75	Fail Operational

RVR Reporting	Coverage
CAT I	Touchdown Zone
CAT II	Touchdown + Mid zone
CAT III	All zones

RVR given if VIS/RVR < 1500m

What is HOT?

‘Hold-over time (HoT)’ means the estimated time the anti-icing fluid will prevent the formation of ice and frost and the accumulation of snow on the protected (treated) surfaces of an aeroplane.

When and where does the « HOT time window » starts and end?

The HOT time window begins when the final application of de-icing/anti-icing fluid starts on the aircraft.

What is the precipitation that will affect HOT the more?

Precipitation that is a mixture of rain and freezing temperatures (**freezing rain or freezing drizzle**) will affect HOT the most because it **can wash away or dilute the anti-icing fluid**, reducing its effectiveness.

What is a contaminated runway?

‘Contaminated runway’ means a runway of which **more than 25%** of the runway surface area within the required length and width being used is covered by the following:

- (a) surface water more than **3 mm** (0.125 in) deep, or by slush, or loose snow, equivalent to more than 3 mm (0.125 in) of water;
- (b) snow which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow); or
- (c) ice, including wet ice

What is standing water?

STANDING WATER. Running water of depth **greater than 3 mm** is reported as 'standing water' by convention.

What is the difference between wet and damp?

The difference is the amount of moisture and its reflectivity. A damp runway has moisture that changes the surface color but doesn't create a reflective, shiny appearance and has no standing

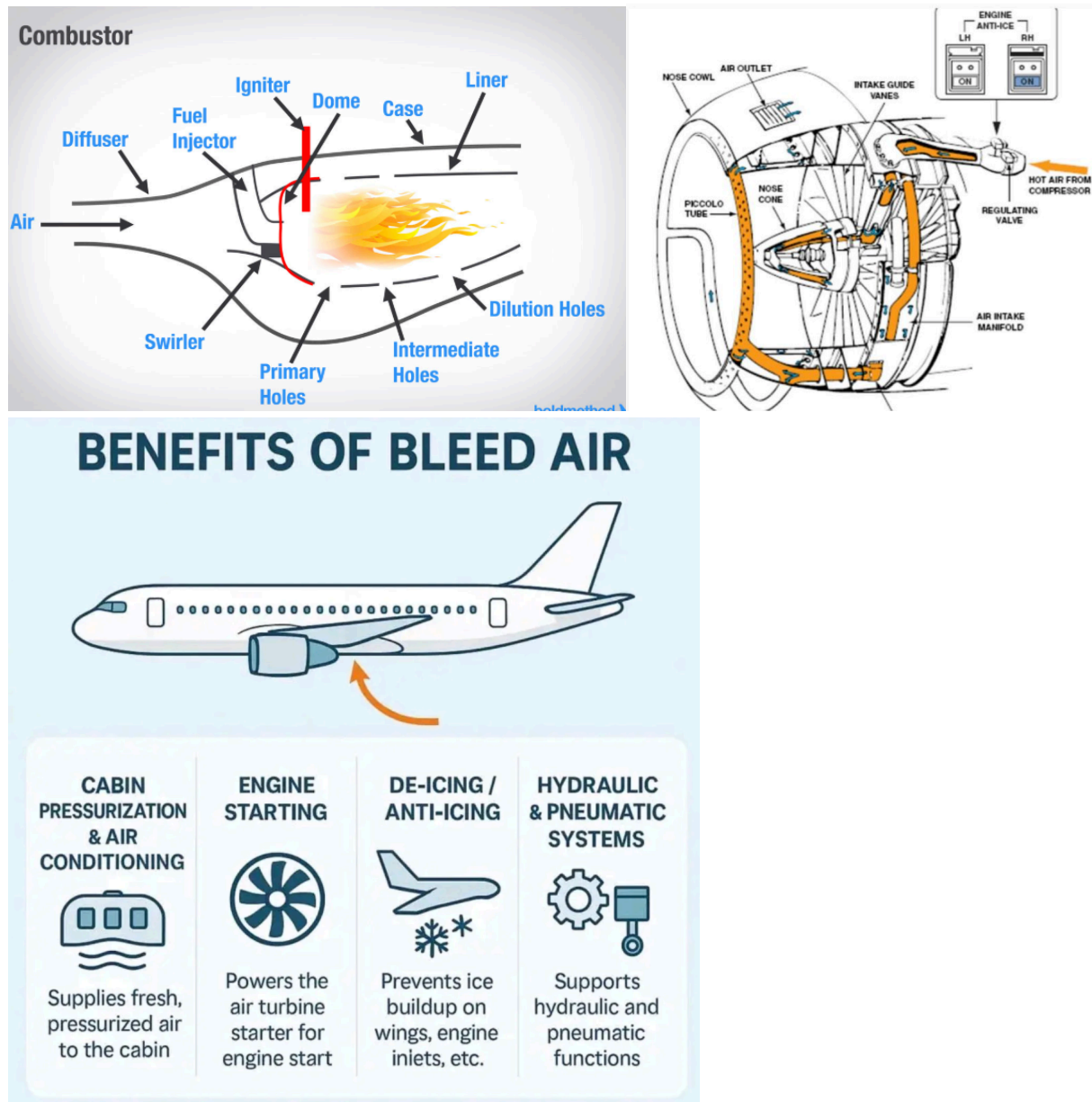
water. A wet runway is more soaked, with a reflective surface, but still has no significant standing water (generally less than 3 mm deep).

Imagine you're flying from Budapest to Portugal, what would be the minimum flight level for you to be in RVSM airspace? (semicircular Rule)

FL300

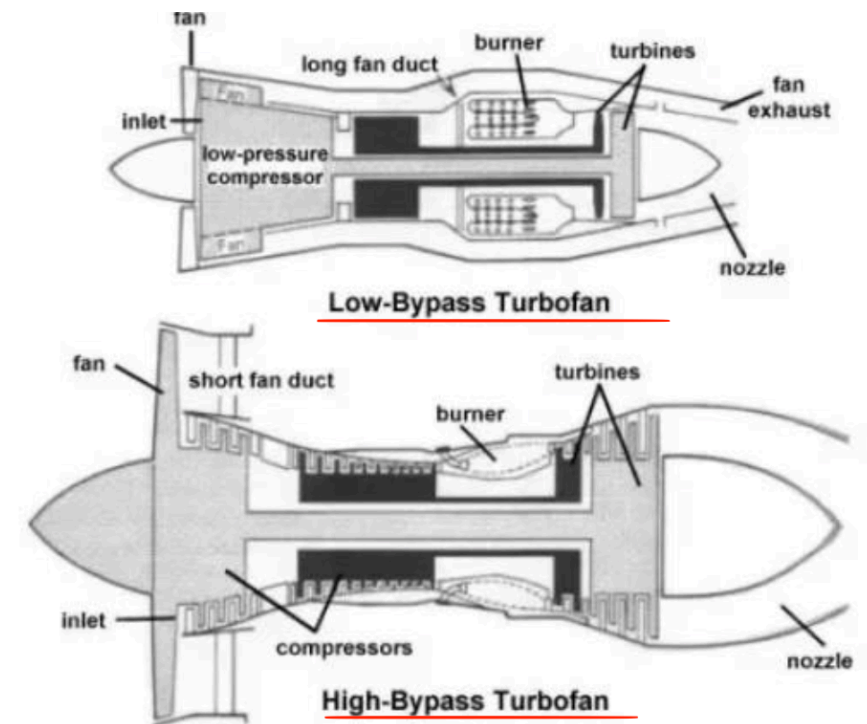
Draw and describe jet engine function and associated systems (icing/ injection engine/bleed air).

The basic components of a jet engine and what are N1 and N2?



The basic components of a jet engine are the intake, compressor, combustor, turbine, and exhaust nozzle. **N1** refers to the rotational speed of the **low-pressure spool** (fan and low-pressure compressor), while **N2** is the rotational speed of the **high-pressure spool** (high-pressure compressor and high-pressure turbine). Both spools are connected by independent shafts, allowing them to rotate at their own optimal speeds.

Draw a high bypass ratio jet engine and explain how it works, why is it called "high bypass"?



What does it mean 12:1 ratio?

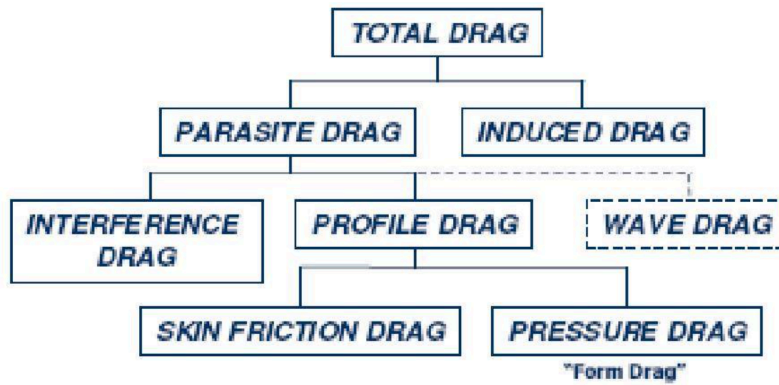
A 12:1 ratio in a jet engine typically refers to the bypass ratio (BPR), which is the ratio of the air that bypasses the engine's core to the air that flows through it. High-bypass turbofan engines, which are most common in commercial airliners, can have a BPR of 12:1 or higher. In this case, a 12:1 ratio means that for every one part of air that goes through the engine's core (where it is mixed with fuel, ignited, and expelled), 12 parts of air are pushed by the large fan at the front of the engine, bypassing the core.

Write the drag equation and explain it

$$D = C_D * 0.5 * \rho * V^2 * S$$

- D is the drag **force**, which is by definition the force component in the direction of the flow velocity,
- ρ is the **mass density** of the fluid,^[1]
- V is the **flow velocity** relative to the object,
- S is the reference **area**, and
- C_D is the **drag coefficient** – a **dimensionless coefficient** related to the object's geometry and taking into account both **skin friction** and **form drag**.

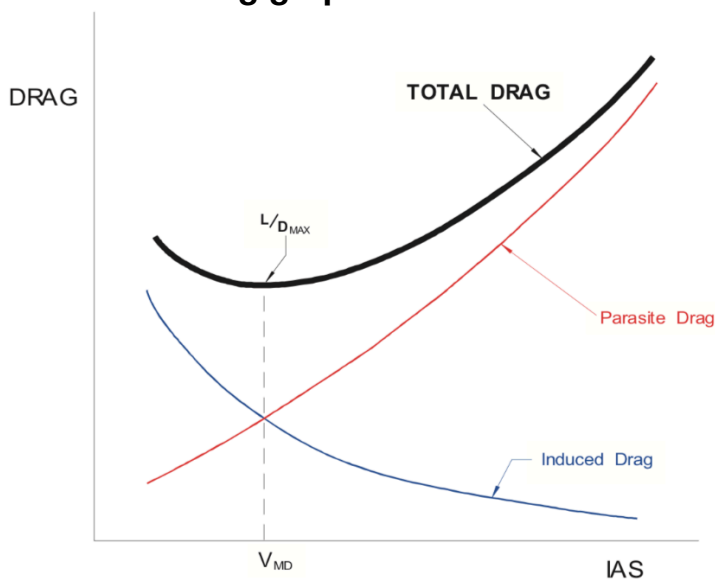
What type of drags forms total drag?



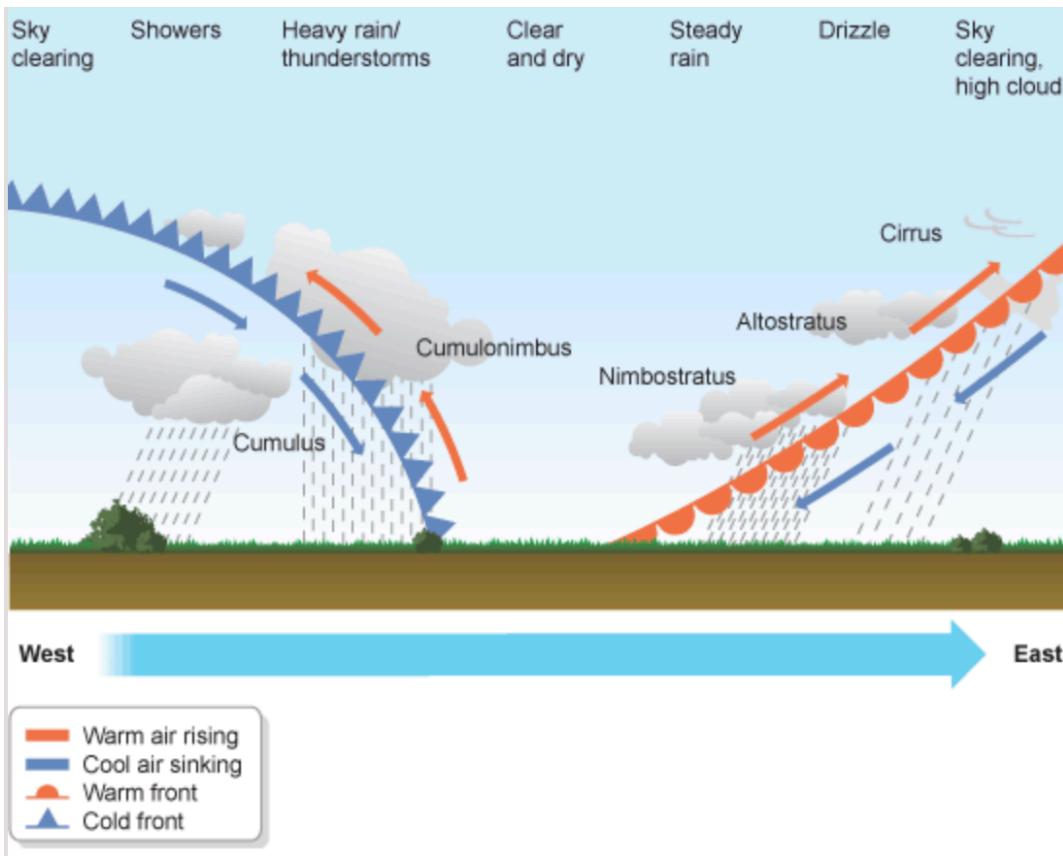
Draw parasite drag graph

Draw induced drag graph

Draw total drag graph



Draw a warm front and a cold front. Which type of clouds can you find?



How does the pressure change when the front is moving?

Cold fronts

A cold front occurs when a mass of cold, dense air pushes into and replaces a warmer air mass.

- Before the front: As the front approaches, the warm air ahead of it is forced upward, causing the atmospheric pressure to drop gradually.
- During the front: The pressure reaches a minimum just as the front passes.
- After the front: Once the colder, denser air mass arrives, the pressure increases sharply and the air becomes cooler and drier.

Warm fronts

A warm front forms when a warm air mass advances and glides over a cooler, denser air mass.

- Before the front: As the warm front approaches, the warm air rising over the cooler air causes the atmospheric pressure to decrease gradually.
- During the front: The pressure continues to fall, though not as sharply as with a cold front.
- After the front: After the warm air mass passes over, the pressure levels off or rises slightly.

Occluded fronts

An occluded front is a more complex frontal system that occurs when a faster-moving cold front overtakes a slower-moving warm front.

- Pressure change: This process pushes the warm air upward, creating a low-pressure area at the surface. A low-pressure trough and minimum pressure typically coincide with the front's passage.

Stationary fronts

A stationary front forms when a cold air mass and a warm air mass meet, but neither is strong enough to push the other out of the way.

- Pressure change: In this case, the pressure remains relatively stable, as there is little movement or displacement of the air masses.

Which are the highlights of a take-off run?

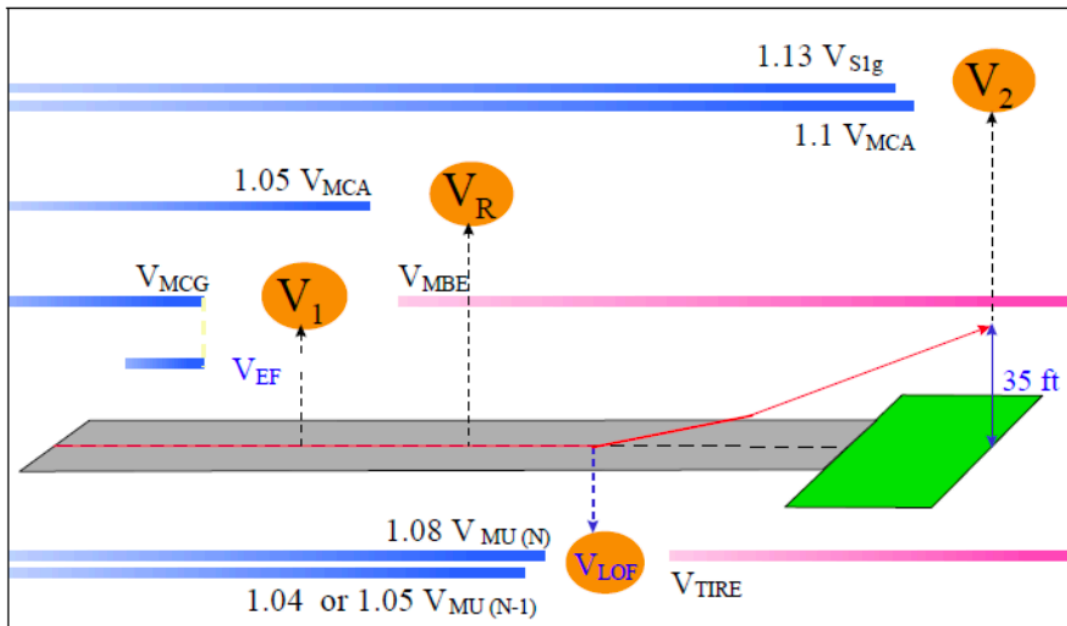


Figure C4: Takeoff Speed Summary and Limitations related to V_1 , V_R , V_{LOF} and V_2

Decision Speed (V_1): Maximum speed during takeoff at which a pilot can safely stop the aircraft without leaving the runway. This is also the minimum speed that allows the pilot to safely continue to V_2 takeoff even if a critical engine failure occurs between V_1 and V_2 . V_1 cannot be less than V_{MCG} and cannot be greater than V_R .

Engine Failure Speed (V_{EF}): The CAS at which the critical engine is assumed to fail.

Rotation Speed (V_R): The speed at which the pilot starts to rotate the aeroplane for take-off to achieve V_2 at the screen height. $V_2 \geq V_1$. It is a function of aeroplane weight and flap setting but can also vary with pressure altitude and temperature.

Takeoff Safety Speed (V_2), achieved by the screen height 35ft and maintained to 400ft AGL in the event of an engine failure. $V_2 \geq 1.2 \times V_S$

Lift-off Speed (V_{LOF}): The speed at which the aeroplane first becomes airborne.

Stall Speed (V_S): V_S is the speed at which the airflow over the wings will stall. It varies with weight and configuration. The stall speed is the reference speed for the other performance speed i.e. V_2 , V_{ref}

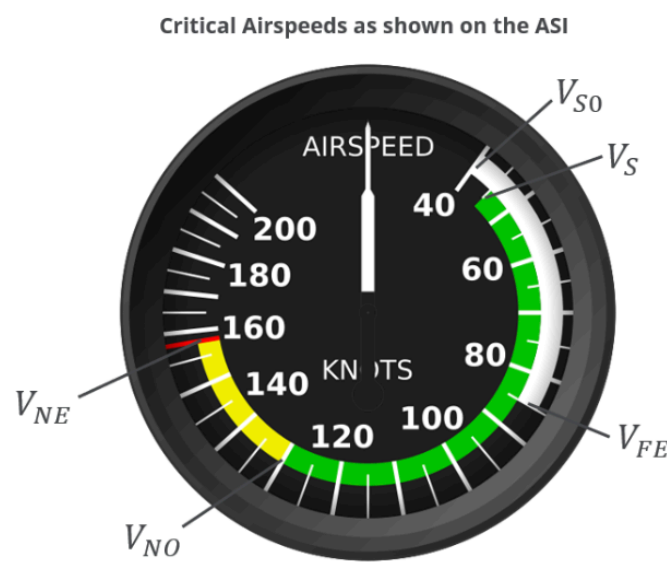
Minimum Control Speed on the Ground (V_{MCG}): The minimum speed on or near the ground at which the take-off can be continued safely when the critical engine becomes inoperative, with the remaining engines at take-off thrust.

Minimum Control Speed in the Air (V_{MCA}): The minimum speed at which the aeroplane is controllable in flight with a maximum 5 degrees of bank, when the critical engine becomes inoperative, with the remaining engines at take-off thrust.

What happens in that 2nd stage? (Jet engine)

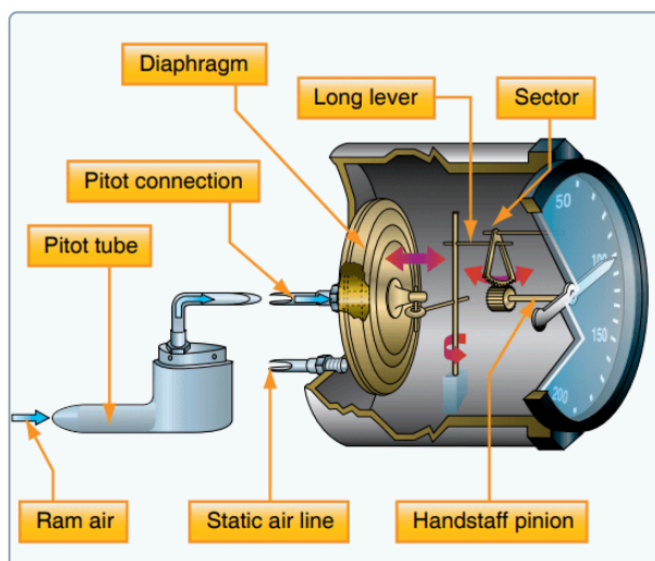
In a typical turbojet engine, the second stage refers to the compressor stage, where the air is compressed to increase its pressure and temperature. This is a critical step in the jet engine's cycle, as the high-pressure, hot air is then mixed with fuel and ignited in the combustion chamber.

Draw an Airspeed Indicator.

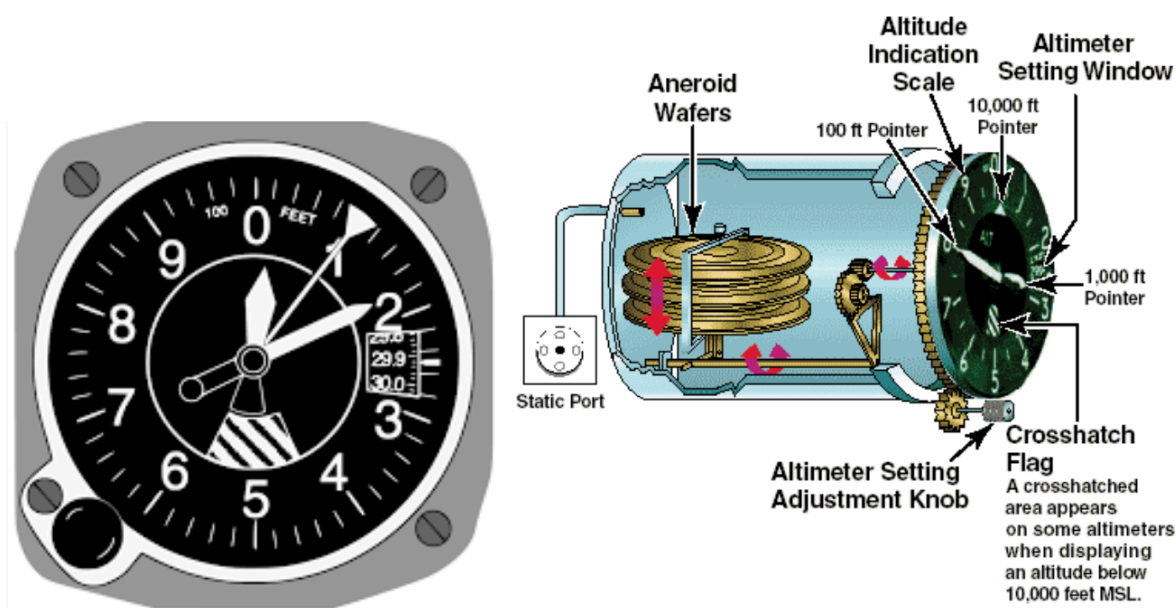


How does the capsules move the needle?

The capsule (diaphragm) moves the needle in an airspeed indicator by using mechanical linkages to translate pressure differences into physical movement. Total pressure from the pitot tube flexes the diaphragm, while static pressure fills the instrument case outside the diaphragm. The greater the pressure difference, the more the diaphragm expands, pushing a series of rods and gears that move the needle on the display.



Draw an Altimeter.

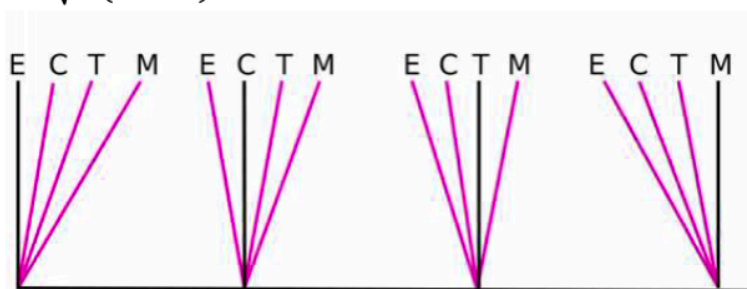


How does the capsules move the needle?

The aneroid capsule in an altimeter moves the needle by expanding and contracting with changes in static air pressure, which is mechanically linked to a series of gears and levers. As the aircraft climbs, outside air pressure decreases, causing the capsule to expand and the needle to move to a higher altitude reading. When descending, pressure increases, compressing the capsule and moving the needle to a lower altitude.

Type of Airspeed and how you obtain them?

$$\text{LSS Formula: } 38.94 * \sqrt{T \text{ (Kelvin)}} \quad 0^\circ\text{C} = 273^\circ\text{K}$$



IAS – INDICATED AIRSPEED

IAS is the speed shown on our airspeed indicator (AIS). It is not actually a real speed but an indication of dynamic pressure. This is because lift depends on dynamic pressure. Increasing dynamic pressure results in reducing static pressure and producing lift.

CAS – CALIBRATED AIRSPEED

CAS is IAS corrected for position and instrument errors. It is a slightly more accurate IAS. Larger modern aircraft have air data computers that remove the instrument and position error, the display

of speed on these aeroplanes is CAS. Almost all the V speeds used in performance (such as V_1 and V_R) are CAS.

EAS - EQUIVALENT AIRSPEED

EAS is CAS corrected for compressibility, and is the most accurate of the indicated airspeed family; however IAS, CAS, and EAS are all measures of dynamic pressure. V_{MO} , which is the maximum operating speed of a large aeroplane, is a very fast speed and the air is compressing and it is an EAS.

TAS – TRUE AIRSPEED

TAS is the actual speed of the aircraft relative to the air mass in which it is flying. It is a real speed, not a dynamic pressure. TAS is the true value of a/c performance in cruise, thus listed in aircraft specs, manuals, performance comparisons, pilot reports, etc., it is the speed also normally listed on the flight plan.

M - MACH NUMBER

Mach number is not a speed but a ratio of TAS to the local speed of sound (LSS). Mach number = TAS/LSS . The local speed of sound varies with air temperature. As altitude increases, the air temperature normally decreases and the speed of sound decreases. This means that if an aeroplane climbs at constant Mach number, its TAS decreases.

Mach number and why we use it at Cruising Altitude?

Mach number is a ratio of an aircraft's speed to the local speed of sound, and pilots use it at cruising altitude because the speed of sound decreases with altitude, making indicated airspeed less meaningful. Flying at a constant Mach number helps maintain a stable speed relative to the changing atmospheric conditions, optimizes fuel efficiency, and ensures the aircraft stays within structural and aerodynamic limits, like preventing Mach tuck or buffeting.

Why should an MDA(H)/DA(H) be raised compared to basic system Minima?

An MDA(H)/DA(H) is raised above basic system minimums to account **for the performance of the specific aircraft** and ensure that the pilot can **safely initiate a missed approach** from the specified altitude **without descending below the obstacle-protected airspace**. The added height ensures there is **enough margin for a go-around maneuver** to be completed successfully without compromising obstacle clearance, as initiating a go-around at the minimum altitude could be hazardous due to the risk of descending too low.

Missed Approach Climb Gradient and on which A/C configuration is based?

AMC2 CAT.POL.A.225 Landing – destination and alternate aerodromes

ED Decision 2014/015/R

MISSED APPROACH

- (a) For instrument approaches with a missed approach climb gradient greater than 2.5 %, the operator should verify that the expected landing mass of the aeroplane allows for a missed approach with a climb gradient equal to or greater than the applicable missed approach gradient in the OEI missed approach configuration and at the associated speed.
- (b) For instrument approaches with DH below 200 ft, the operator should verify that the expected landing mass of the aeroplane allows a missed approach gradient of climb, with the critical engine failed and with the speed and configuration used for a missed approach of at least 2.5 %, or the published gradient, whichever is greater.

What is Dew Point?

The dew point is the temperature at which a parcel of air, at constant barometric pressure, must be cooled to become saturated with water vapor. At this point, the relative humidity reaches 100%, and any further cooling will cause the water vapor to condense into liquid water, such as dew, fog, or clouds.

Is the RVR minima for whole runway or part of it?

How RVR minima are applied

The pilot must ensure that the reported RVR values for all the required segments meet or exceed the minima specified on the approach plate for the particular type of operation.

- For a Category I approach, only the touchdown zone RVR may be required.
- For a Category II approach, both touchdown zone and midpoint RVRs are controlling.
- For a Category III approach, the touchdown zone, midpoint, and stop-end RVRs are all controlling and must be reported.

That is a very good and specific question. Under EASA regulations, your initial assumption is incorrect: for a Category I (CAT I) approach, you do not use the lower of the touchdown zone (TDZ) and midpoint RVR. The touchdown zone RVR is always the controlling value. For CAT I approaches, any additional RVR information, such as the midpoint and stop-end RVR, is considered advisory.

140. What is type b/a approach?

A is w DH=>250' B is <250'

Tell me a few precision approaches you know?

ILS GLS MLS

What is CRM? When and why was it introduced?

Crew Resource Management (CRM) is a training framework for improving safety and efficiency in high-risk, high-stakes environments, such as aviation. CRM focuses on the non-technical skills of crew members, such as communication, teamwork, decision-making, and situational awareness.

The core idea is to make optimal use of all available resources—people, equipment, and procedures—to promote safety and enhance the efficiency of operations.

Fail passive and fail operational systems

Under [EASA](#) regulations, the terms "fail-passive" and "fail-operational" refer to the redundancy and reliability of critical aircraft systems, most notably the automatic landing system (autoland) used for low-visibility operations. The classification dictates the minimum weather conditions (specifically RVR) in which a landing can be conducted.

Fail-passive system

A system is fail-passive if, in the event of a single system failure, there is:

- No significant deviation from the intended flight path or attitude.
- The automatic landing cannot be completed automatically.
- The flight crew must take immediate manual control of the aircraft.

In practice:

- A typical fail-passive system involves a redundant design, such as **two autopilots** working together.
- If one component fails, the other component detects the failure and brings the system to a safe, neutral state. The pilots receive an alert and must take over manually.
- This kind of system is typically certified for lower visibility operations, such as Category II and Category IIIA, which still have a decision height (DH). If a failure occurs below the alert height, the pilots must perform a missed approach unless they have sufficient visual reference to land.

Fail-operational system

A system is fail-operational if, in the event of a single system failure, the approach, flare, and landing can still be completed automatically by the remaining part of the system.

In practice:

- This requires a higher level of redundancy, such as a **three-autopilot system**.
- If one autopilot fails, the system automatically uses the remaining two to complete the landing. The system is still fail-operational after the first failure.
- If a second, subsequent failure occurs, the system will then become fail-passive.
- A fail-operational system is required for the lowest visibility operations, specifically Category IIIB and IIIC, which involve a very low or no decision height.

Fail-operational hybrid system

EASA also defines a fail-operational hybrid landing system, which is a combination of the two types:

- It features a primary fail-passive automatic system.
- It has a secondary, independent guidance system, often a Head-Up Display (HUD).
- In the event of a failure of the primary system, the secondary system enables the pilot to complete the landing manually without needing to go around.

At 5NM from an airport with 500ft elevation, what should your altitude be on a 3° glideslope?

At 5 nautical miles (NM) from the airport on a standard 3° glideslope, your altitude should be 2,000 ft.

A standard **rule of thumb** for a 3° glideslope is that for every nautical mile (NM) from the runway, you should be at approximately 300 feet of altitude above the airport elevation.

GPWS

The Ground Proximity Warning System (GPWS) is a safety system designed to prevent Controlled Flight Into Terrain (CFIT) accidents. It alerts the flight crew with audible and visual warnings when the aircraft is in immediate danger of unintentionally flying into the ground or an obstacle.

- Mode 1 (Excessive Descent Rate): An alert, such as "SINK RATE," sounds if the aircraft is descending too rapidly.

- Mode 2 (Excessive Terrain Closure Rate): A warning like "TERRAIN" or "PULL UP" is given when the aircraft is rapidly approaching rising terrain.
- Mode 3 (Altitude Loss After Takeoff): It detects significant altitude loss shortly after takeoff, which could be dangerous.
- Mode 4 (Unsafe Terrain Clearance): This mode warns if the aircraft is too close to the ground with the landing gear or flaps not in the correct position for landing.
- Mode 5 (Excessive Glide Slope Deviation): A warning sounds if the aircraft deviates significantly below the glideslope during an ILS approach.

The evolution to Enhanced GPWS (EGPWS)

To address these limitations, the Enhanced Ground Proximity Warning System (EGPWS), or Terrain Awareness and Warning System (TAWS), was developed.

Key improvements of EGPWS include:

- Terrain and Obstacle Database: It uses an internal, worldwide terrain and obstacle database.
- GPS Position: EGPWS incorporates GPS data to precisely locate the aircraft relative to the database.
- Predictive Function: This "look-ahead" capability allows EGPWS to anticipate potential conflicts with terrain and issue warnings much earlier than the basic GPWS.
- Cockpit Display: A color-coded terrain display is shown on the navigation screen, providing the flight crew with a visual representation of the surrounding terrain.

PA vs NPA

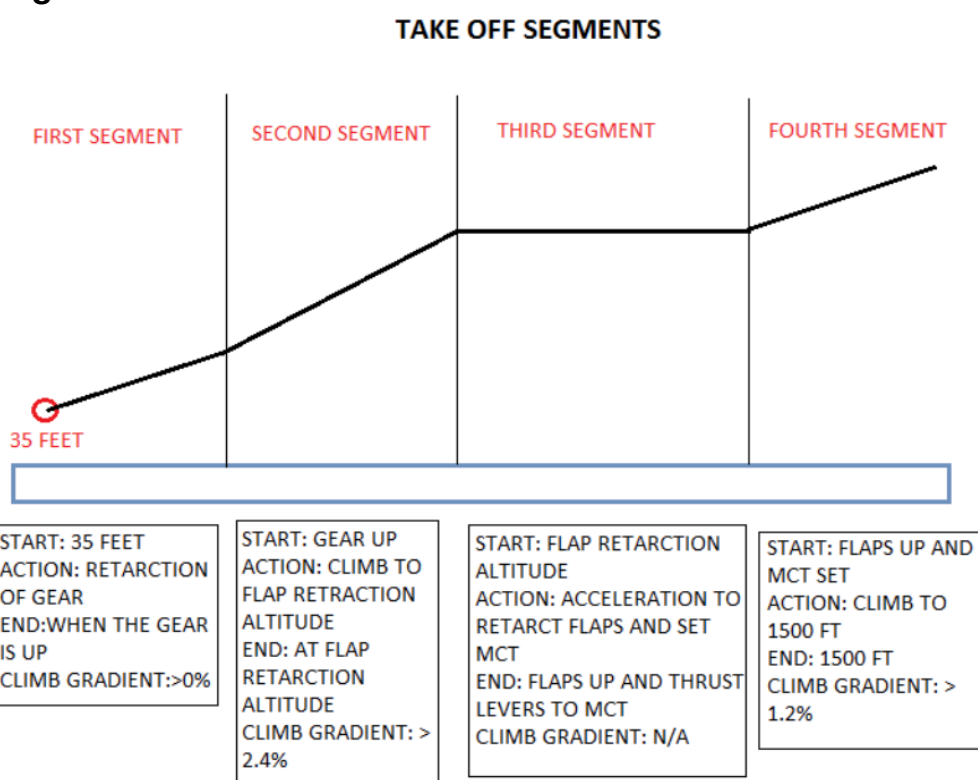
Feature	Precision Approach (PA)	Non-Precision Approach (NPA)
Vertical Guidance	Yes (Glidepath)	No (Lateral only)
Vertical Minimum	Decision Altitude (DA) or Decision Height (DH)	Minimum Descent Altitude (MDA) or Minimum Descent Height (MDH)
Associated Equipment	ILS, GLS, PAR, etc.	VOR, NDB, RNAV (LNAV), Localiser, etc.
Descent Profile	Continuous, stable descent to DA/H, following a fixed glideslope.	A continuous descent (CDA) to MDA/H is required by EASA.
Action at Minimum	At the DH, decide to land or go around. It's permissible to briefly dip below the DH during the manoeuvre.	Must not descend below the MDA until the required visual references are established. (that's why safety factor of 30')

Weather Minima	Associated with lower weather minima (CAT I, II, III), depending on the equipment and crew qualification.	Associated with higher weather minima compared to PAs.
Risk Factors	Lower risk of Controlled Flight Into Terrain (CFIT) due to precise vertical guidance.	Historically, higher risk of CFIT due to lack of vertical guidance, but this is mitigated by the CDFA technique.

ADF + VOR: Identify your position on a diagram

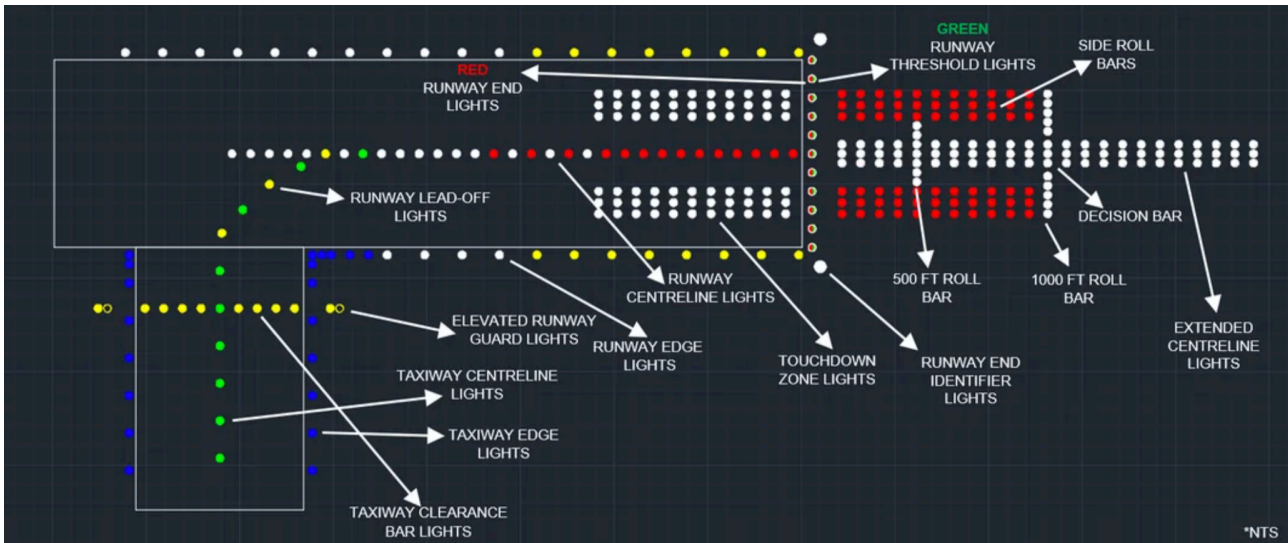
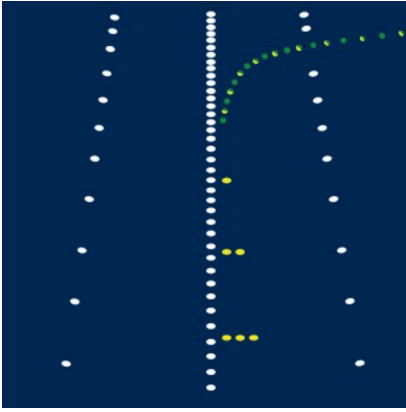
To identify your position on a diagram using an Automatic Direction Finder (ADF) and a Very High Frequency Omnidirectional Range (VOR), you plot a line of position (LOP) from each navigation aid. Your location is the point where the two lines intersect.

TO segments



Rapid Exit Taxiway Indicator Lights (RETL)

RETLs are a crucial supplementary lighting system that helps pilots make timely and efficient exits from the runway, especially during low visibility procedures.



How to calculate cloud base from the temperature and dewpoint?

$T - T_d \times 400\text{ft}$

$$\text{Cloud Base (feet)} = \frac{(\text{Temperature } (^{\circ}\text{C}) - \text{Dew Point } (^{\circ}\text{C}))}{2.5} \times 1000$$

How close should a CB be to the aerodrome to change the CAVOK in the METAR.

5000' and less than 5NM

What is NOSIG?

In aviation, NOSIG stands for "No Significant Change" and indicates that the weather forecast for the **next two hours** is expected to remain stable, without any major changes to wind, visibility, weather, or cloud cover. It is a trend forecast used in weather reports like METAR and TAF to show a stable forecast period, replacing other indicators like BECMG (becoming) or TEMPO (temporarily) when they are not needed.

Difference between Boeing and Airbus?

The main difference is that **Airbus prioritizes automation** with **fly-by-wire controls** and a side-

stick, while **Boeing focuses on more traditional manual control** with a control column. This leads to different design philosophies, with Airbus using computers to manage flight controls for greater safety and automation, and Boeing allowing pilots more direct manual input.

What is meant by the term “Fading”?

Fading is the interference between the ground wave and the sky wave.

If ADR1 fails, what action should be taken?

Set the AIR DATA knob on the switching panel to CAPT3 so the captain receives air data from an alternative source.

V1 and TODR

Lowering V1 increases Take-off Distance Required (TODR) because **a lower V1 means an engine failure is assumed to occur earlier**, requiring the aircraft to accelerate for a longer distance on a single engine to reach Vr and V2. While it is not a direct, one-to-one relationship where a lower V1 automatically means a longer TODR, they are inversely related, especially when TODR is the limiting factor for the runway length. [🔗](#)

PERFORMANCE resume CLICK!

How does the formation of shock waves on the wing affect the center of pressure?

At transonic speeds, shock waves form, especially on the upper surface. This causes the centre of pressure to move rearward, producing Mach tuck (nose-down tendency).

Return to departure airfield after 16 minutes at 100 kt TAS with 20 kt tailwind. Rate-one 180° turn. Arrival time?

Outbound GS 120 kt → 32 NM

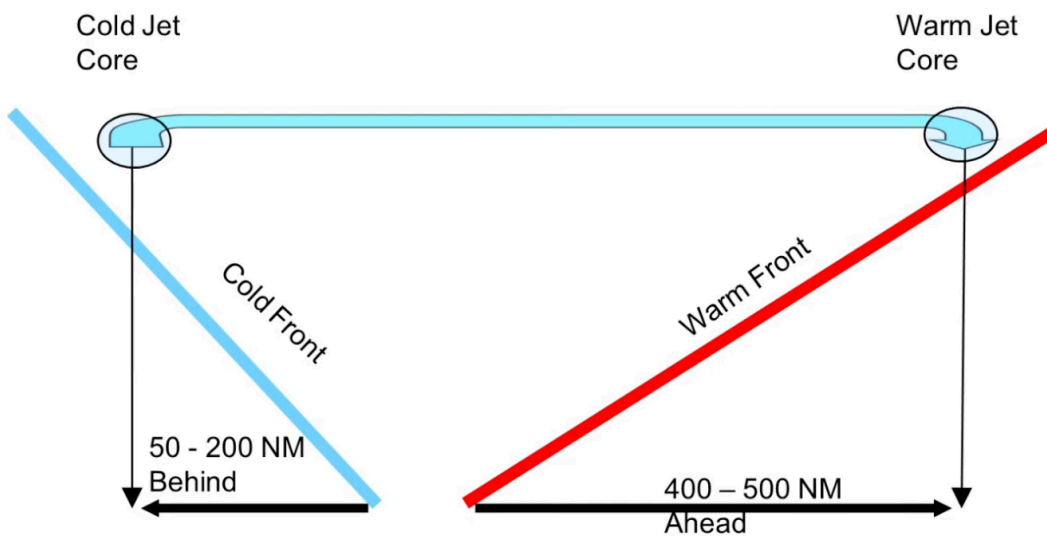
Return GS 80 kt → 24 min

Turn time 1 min

Total: 25 minutes

Where is CAT strongest in a jet stream?

Jet core surface projections

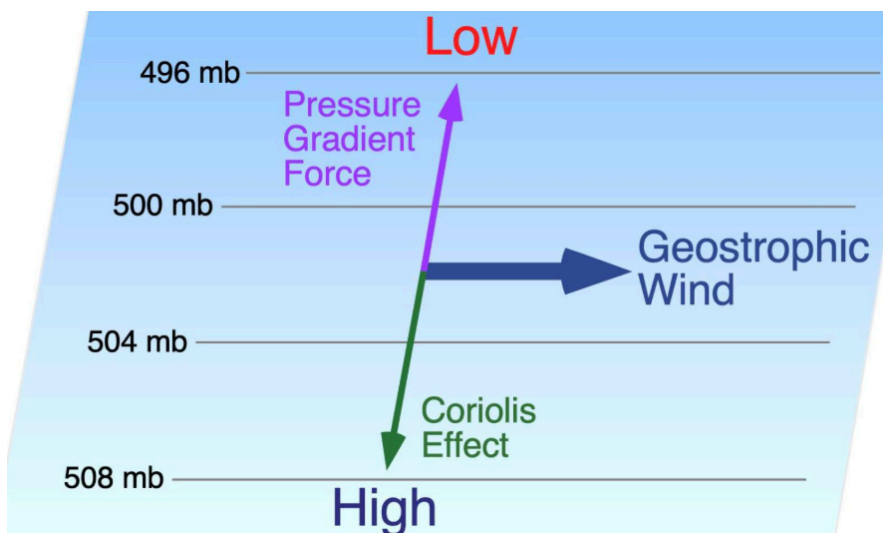


On the cold side, left of the jet axis when looking downstream, just below the tropopause.

Geostrophic vs gradient wind

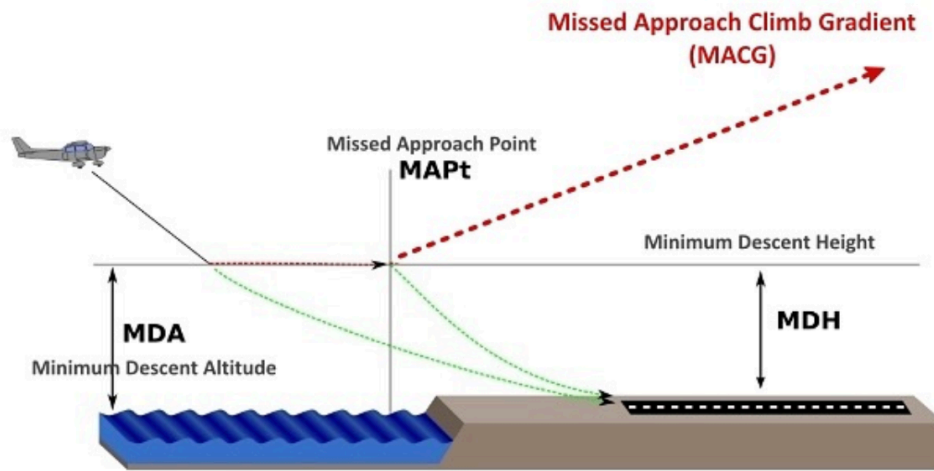
Geostrophic wind is a steady wind that blows parallel to straight isobars due to balance between Coriolis force and pressure gradient force.

Gradient wind is a wind that blows around curved isobars, influencing wind around pressure systems.



Missed Approach Climb Gradient (MACG)

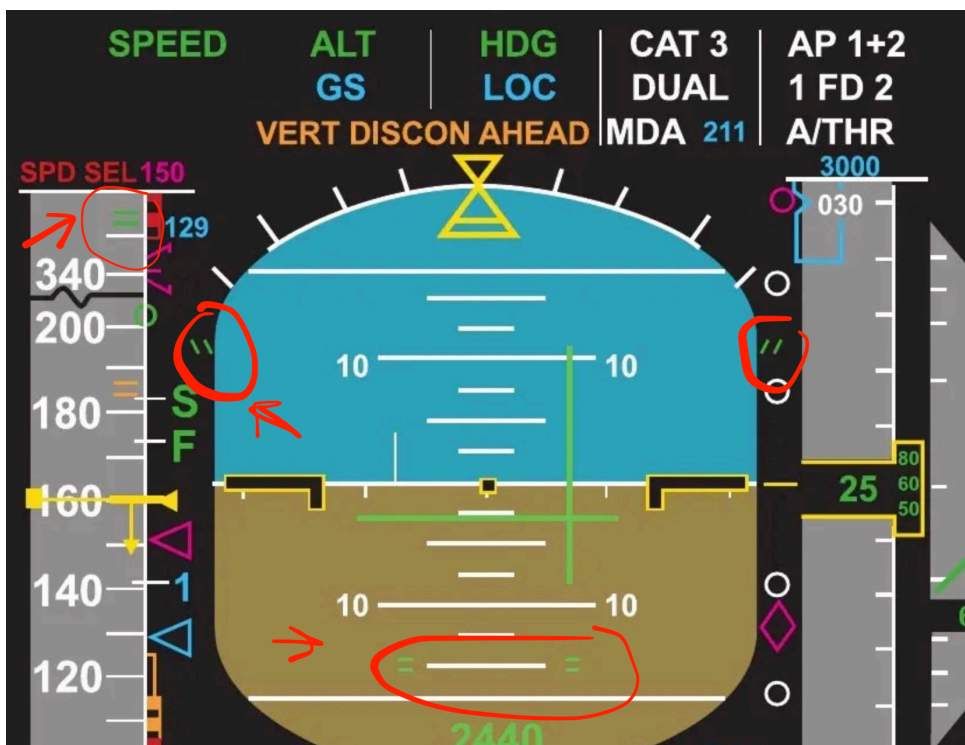
Missed Approach Climb Gradient (MACG) is the minimum net climb gradient an aircraft must achieve in the missed approach segment to ensure required obstacle clearance



The standard Missed Approach Climb Gradient (net gradient) is 2.5% (152 ft per nautical mile) unless a higher value is published on the approach chart. (ICAO)

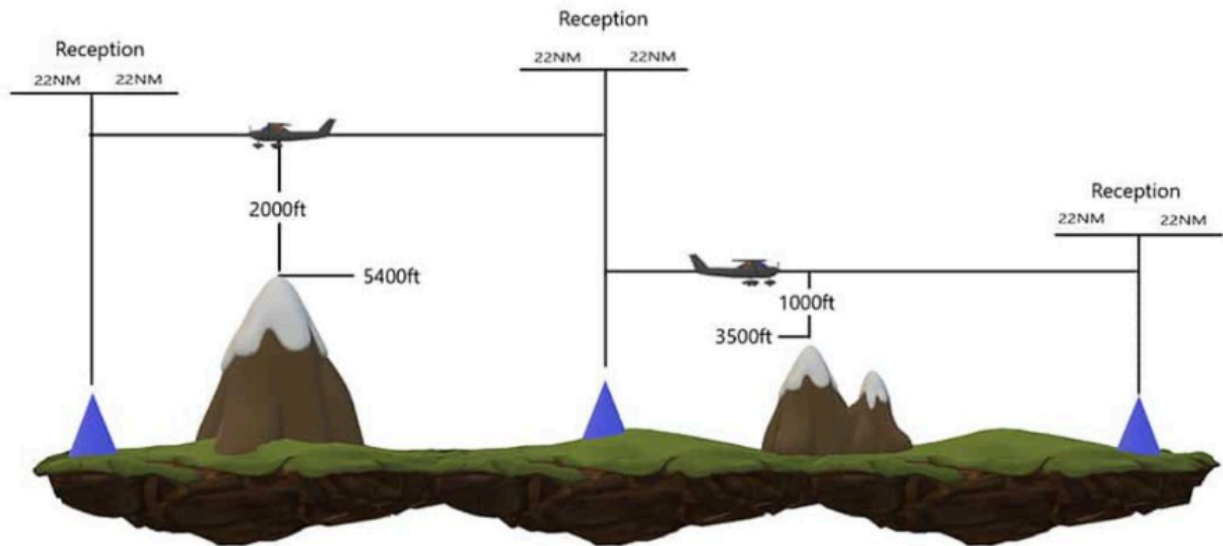
Normal law pitch and roll limits on PFD

Displayed as green “=” symbols.



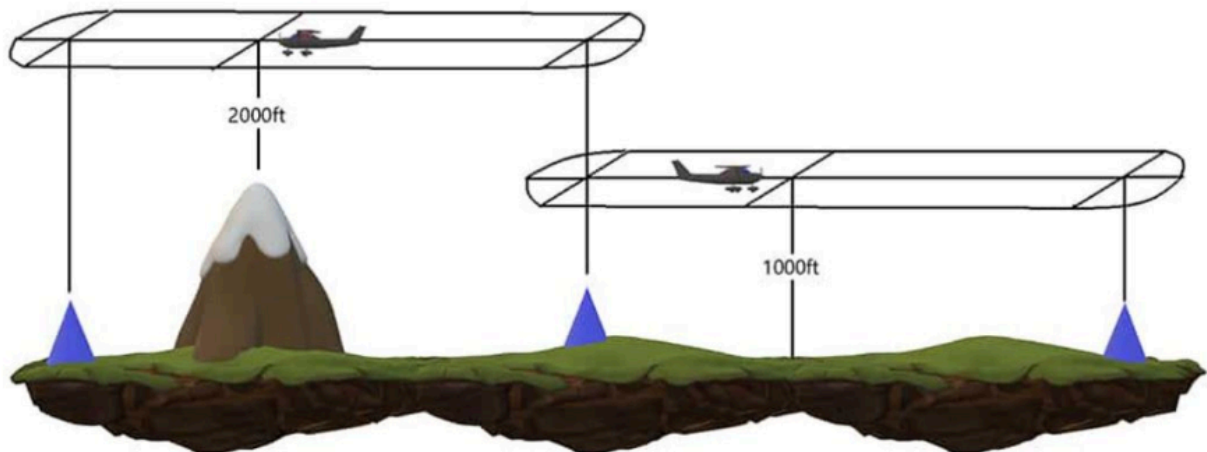
MOCA (Minimum Obstacle Clearance Altitude)

MOCA will give you a minimum altitude above terrain and guarantee VOR reception within 22 NM from the beacon. MOCA will give you 1 000 ft separation from terrain when terrain is less than 5 001 ft and 2 000 ft separation when terrain is more than 5 000 ft.



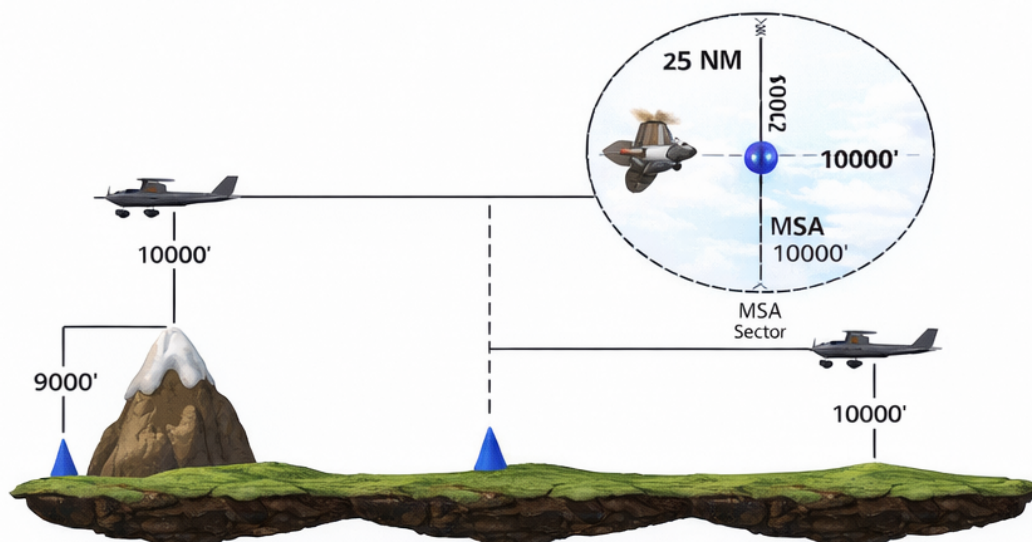
MORA (Minimum Off-Route Altitude)

MORA will give you separation from terrain up to 10 NM off the route centre line and 10 NM radius around the ends of the route. MORA will give you 1000 ft separation from terrain in non mountainous areas and 2000 ft separation in mountainous areas.



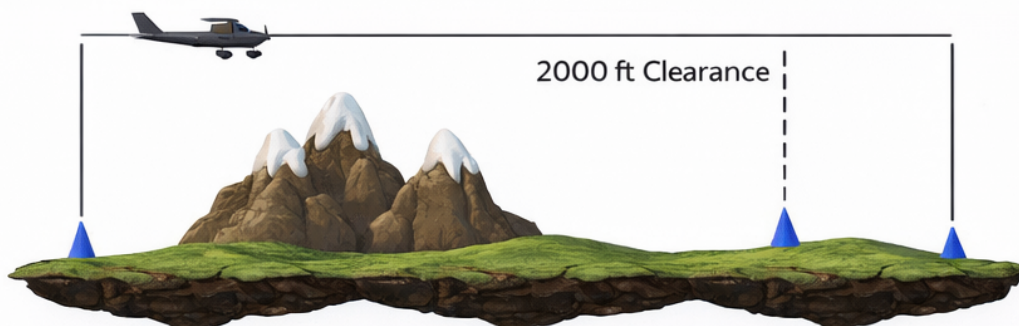
MSA (Minimum Sector Altitude)

MSA is the minimum safe altitude within a 25 NM radius of a navigational aid. MSA will give you 1,000 ft separation from the highest terrain within that sector.

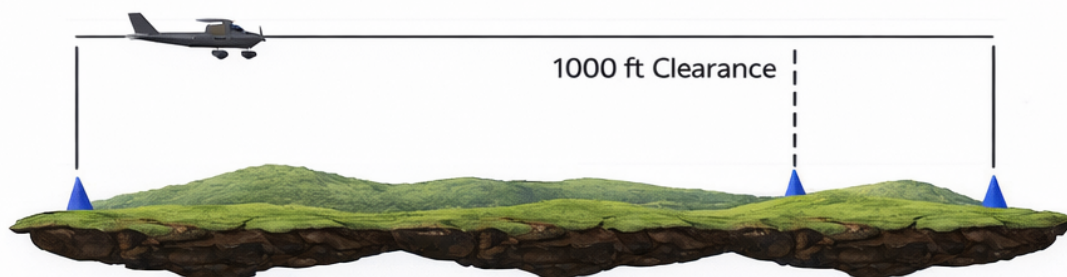


MEA (Minimum En-Route Altitude)

MEA is the minimum altitude that will guarantee signal of navigation aids along the route, give you two way communication with ATC and provide obstacle clearance. MEA will give you 1,000 ft separation from terrain in non mountainous areas and 2,000 ft separation from terrain in mountainous areas.



MEA (Minimum En-Route Altitude)



BRNAV equivalent RNP

BRNAV (Basic Area Navigation) is equivalent to RNP 5, meaning aircraft must maintain a navigation accuracy of within 5 nautical miles for 95% of the flight time.

Green-collared circuit breakers

Green-collared circuit breakers are monitored by the Electronic Centralized Aircraft Monitoring (ECAM) system. These breakers are crucial for identifying system faults and ensuring proper aircraft operation.

While descending through 800 feet, ATC informs you that the standby power of the ILS is unserviceable. How should you proceed?

If standby power for the ILS becomes unserviceable below 1,000 feet, the commander may continue the approach at their discretion. It is not expected that the Pilot in Command (PIC) will consult the Failed or Downgraded Equipment Table in OM-A at this altitude.

During a Category III approach with a Decision Height (DH) of 27 feet, what is the minimum required visual reference to continue landing?

During a CAT III approach with a DH of 27 feet, **at least one light** from the runway lighting system must be visible to continue the landing. This ensures sufficient visual reference in low-visibility conditions.

What is Dutch Roll, and how is it prevented in modern aircraft?

Dutch Roll is an aerodynamic instability that occurs in swept-wing aircraft, characterized by a coupled rolling and yawing motion.

- It happens due to asymmetric lift and yaw responses.
- When one wing drops, the aircraft yaws in the opposite direction, causing a wobbling motion.
- This is more pronounced in high-speed, high-altitude flight.

Causes of Dutch Roll:

- Swept Wings: Increase lateral stability but reduce directional stability.
- High Aspect Ratio Wings: Amplify rolling tendencies.
- Adverse Yaw: Causes a delayed yaw response when banking.

Countermeasures:

- Yaw Dampers: Most modern jets have an automatic yaw damper to suppress Dutch Roll.

- Pilot Input: In aircraft without yaw dampers, pilots may need rudder inputs to control it.

Autothrottle provides protection for what?

Autothrottle provides protection against overspeed, stall, and speed-related envelope limits.

Protections include:

- Overspeed protection
- Stall protection
- Configuration speed protection
- Approach speed management

What happens during a coordinated turn with the blood pressure?

During a coordinated turn, the pilot experiences an increase in apparent weight (centrifugal force), which increases the hydrostatic pressure in the circulatory system, especially in the lower body, potentially increasing systolic and diastolic blood pressure.

Effect on Blood Pressure

- G-forces compress the body along the spine, pushing blood toward the lower extremities.
- Systolic and diastolic pressures increase, especially in the legs and lower torso, to maintain cerebral perfusion.
- In extreme bank angles or high-g turns:
 - Blood may pool in lower body → decreased cerebral blood flow → potential grey-out, tunnel vision, or blackout if not mitigated by anti-G straining maneuvers (AGSM) or G-suits.
- In normal coordinated turns at low g, the change is modest but measurable:
 - Slight increase in systolic and diastolic BP
 - Heart rate may rise to maintain cardiac output

What is the vertical extent of a CB (cumulonimbus) cloud?

Cumulonimbus (CB) clouds typically have a vertical extent of 20,000–60,000 feet (6,000–18,000 meters), reaching from low levels near the surface up to the tropopause.

What is a Cumulonimbus Cloud?

- Cumulonimbus (CB) clouds are large, towering clouds associated with thunderstorms, heavy precipitation, turbulence, and lightning.

- They can extend through much of the troposphere, often from low-level bases (around 1,000–5,000 ft) to high-level tops near the tropopause.

Vertical Extent

- Typical CB base: 1,000–5,000 ft AGL
- Typical CB top: 30,000–60,000 ft
 - Tropics: 50,000–60,000 ft
 - Mid-latitudes: 30,000–45,000 ft
- Average vertical extent: roughly 20,000–50,000 ft

Aviation Significance

- Hazards associated with CB clouds:
 - Severe turbulence
 - Icing and hail
 - Lightning
 - Heavy precipitation and wind shear
- Aircraft should avoid penetrating CB clouds.

Find the QDM if the heading is 045° and bearing is 110°.

- Heading (HDG): 045°
- Relative Bearing (RB): 110°

$$\text{QDM} = \text{HDG} + \text{RB}$$

$$\text{QDM} = 045^\circ + 110^\circ = 155^\circ$$

$$\text{QDM to the station} = 155^\circ$$

$$\text{QDR} = 335^\circ$$

How close should a CB be to the aerodrome to change the CAVOK in the METAR?

If a CB is within 5 NM of the aerodrome, CAVOK is no longer reported.

It is 13:20 and you have a delay of 30 minutes. How will ATC announce this?

Estimated approach time: one three five zero

What is the average vertical extent of radiation fog?

500 ft

What is the aerodynamic center?

Approximately 25% of the chord from the leading edge, where pitching moment remains constant.

Carburettor icing most likely?

Worst icing happens between about -1°C and $+15^{\circ}\text{C}$

Name the different winds in Europe

Several regional winds influence Europe's weather. These winds are named based on their origin and effect on climate:

Bora:

- A strong cold, dry wind from Eastern Europe that affects northeastern Italy, Slovenia, and Croatia.
- Caused by cold air rushing down mountain slopes toward the Adriatic Sea.
- Can reach speeds above 100 knots, creating dangerous conditions for aviation and shipping.

Scirocco:

- A warm, humid wind from North Africa moving toward Southern Europe.
- Carries dust from the Sahara and leads to hot, dry conditions in summer or humid, rainy weather in winter.

Föhn:

- A warm, dry wind on the leeward side of the Alps (common in Switzerland, Austria, and northern Italy).
- Occurs when moist air rises over mountains, loses moisture as precipitation, and descends as dry air.
- Can cause rapid temperature increases, affecting aviation and snowmelt.

Mistral:

- A cold, strong wind from central France and the Alps toward the Mediterranean.
- Can reach speeds of 60 knots and significantly reduce visibility.
- Commonly affects southern France, including Marseille.

What are warm front characteristics?

A warm front forms when warm air advances over colder air, creating a gradual slope.

Characteristics:

- Layered clouds (cirrus, altostratus, nimbostratus) before the front arrives.
- Steady, prolonged precipitation (rain, drizzle, or snow).
- Fog formation due to warm, moist air condensing near the surface.
- Visibility reduction in precipitation and fog.
- Gradual temperature increase after the front passes.
- Pressure falls before the front and stabilizes afterward.

What is the optimum altitude?

The optimum altitude is the altitude where an aircraft achieves maximum fuel efficiency and range, determined by:

- Engine performance
- Aircraft weight (decreasing as fuel burns)
- Air density and temperature

What should be the indication on the magnetic compass when you roll into a standard rate turn to the left from a south heading in the Northern Hemisphere?

The compass initially shows a left turn at a faster rate than the actual turn.

This is due to compass lag and acceleration errors.

The deviation is more pronounced near North/South headings due to the damping effect of the compass.

What are cold front characteristics?

A cold front occurs when cold, dense air displaces warm air, forcing it to rise rapidly.

Characteristics:

- Unstable atmosphere → promotes convective cloud development.
- Cumuliform clouds (e.g., cumulonimbus), leading to turbulence and thunderstorms.
- Short, intense showers followed by clear skies after passage.
- Wind shift → Often veers clockwise.
- Rapid temperature drop due to the replacement of warm air with cooler air.
- Pressure increases after the front passes.

You are flying on 290 radial inbound to the beacon, inbound track is 070 non-standard hold, what is the entry?

Direct entry because the aircraft is already aligned within the holding pattern entry sector.

Which Audio Control Panel (ACP) transmission key will illuminate when the flight attendants call the cockpit?

When flight attendants call the cockpit, the CAB (Cabin) transmission key on the Audio Control Panel (ACP) will illuminate.

This allows the flight crew to identify and respond to cabin crew communications.

When is the drag minimum? and when is the drag maximum?

Minimum: when the parasite drag and induced drag are equal.

Maximum: At V_{mo}/M_{mo} (Maximum Operating Speed).

What is the function of the APU GEN pushbutton on the overhead electrical panel?

When selected OFF, the APU GEN is de-energized and the line contactor opens, resetting the fault circuit. Normally, the pushbutton remains in the lights-out position.

What is the definition of washout in aerodynamics?

Washout refers to the decrease in the angle of incidence from the root to the tip of an aircraft wing.

Washout improves stall characteristics and overall aerodynamic efficiency.

Once the thrust reduction altitude (THR RED ALT) is reached during normal operations, in which detent should the thrust levers be positioned?

Once the thrust reduction altitude (THR RED ALT) is reached, the thrust levers should be positioned in the CLB (Climb) detent.

This allows the autothrust system to manage engine power efficiently during climb.

Explain Max Range Cruise vs Long Range Cruise (LRC)

Max Range Cruise:

Definition:

The Max Range Cruise speed is the airspeed that gives the greatest distance per unit of fuel. This is the most fuel-efficient speed in terms of nautical miles per pound or kilogram of fuel.

Purpose:

Used when maximizing distance is critical — for example, ferry flights or long overwater flights with fuel constraints.

Characteristics:

Typically occurs just above the speed for minimum drag (L/D max).

It is slower than LRC and results in a longer flight time.

Fuel Flow vs. TAS: It is found where the ratio of TAS to fuel flow (nm per kg) is at its maximum.

Not used operationally often because it provides minimal fuel savings at the cost of significant time.

Long Range Cruise (LRC):

Definition:

LRC is defined as the speed that gives 95% of the maximum range but with a higher cruise speed.

Purpose:

Used in normal airline operations because it balances fuel efficiency with reduced flight time.

Characteristics:

Slightly higher than Max Range Cruise speed (approximately 3–5% higher).

Provides nearly the same range with faster arrival time.

Airlines prefer this because fuel savings at Max Range Cruise often do not justify the longer operating hours (crew, maintenance, etc.).

In a LIDO Operational Flight Plan (OFP), what fuel amount should be entered in the "Final Block Fuel" field?

In the LIDO Operational Flight Plan (OFP), the "Final Block Fuel" field should contain the fuel on board after refueling.

When an engine fire is detected, under what condition will the ENG FIRE pushbutton light extinguish?

The ENG FIRE pushbutton light will extinguish only when the fire warning no longer exists.

This indicates that the fire has been successfully extinguished, and there is no longer an active fire condition in the engine.

If a single Display Management Computer (DMC) fails, how can the crew recover the failed display units?

If a single Display Management Computer (DMC) fails, the crew can recover the failed display units by rotating the EIS DMC switch on the switching panel to DMC #3.

For takeoff performance calculations, how should a damp runway be classified?

For takeoff performance calculations, a damp runway is classified as dry.

A damp runway has moisture present but is not sufficiently wet to be considered "wet" for performance calculations.

What is the wind direction around a low pressure area in the Southern hemisphere?

In the Southern Hemisphere, wind circulates clockwise and towards the center of a low-pressure system due to the Coriolis effect.

What is an RMI and what does each needle represent?

RMI = Radio Magnetic Indicator

It is a navigation display instrument that combines:

- A magnetic compass card (automatically aligned to magnetic north)
- One or two pointers that indicate direction to NAVAIDs

Braking coefficient of 0.4 and above is considered?

GOOD braking action

Explanation:

Friction Coefficient Scale:

- 0.40 and above: GOOD
- 0.36–0.39: MEDIUM to GOOD
- 0.30–0.35: MEDIUM
- 0.26–0.29: MEDIUM to POOR
- 0.25 and below: POOR

Taxiway centerline markings between runway holding position and centerline – type and color?

Continuous green centerline lights

Explanation:

Lighting Configuration:

- Color: **Green**
- Type: Continuous centerline lighting from runway holding point to runway centerline

Markings vs. Lights:

- Markings (painted lines): **Yellow**
- Lights (inset): **Green** centerline

Which systems are heated and how?

Bleed Air Heated Components:

- Wing leading edge (outboard slats)
- Engine intakes

Electrically Heated Components:

- Windshields and side windows
- Pitot tubes
- Static ports
- Angle of Attack sensors
- Total Air Temperature probes

In the ATS flight plan, for a non-scheduled flight, what letter goes in item 8?

N

Item 8 – Type of Flight:

- S – Scheduled Air Service
- N – Non-scheduled Air Transport
- G – General Aviation
- M – Military
- X – Other

You are approaching an ATS reporting point. The controller has instructed you to make routine meteorological reports. You experience turbulence which makes occupants feel strain against the seat belts. As required by SERA, you should?

Make a SPECIAL AIREP

Explanation:

SPECIAL AIREP is required when significant or unexpected meteorological phenomena are encountered, such as moderate or severe turbulence.

What is the max operating altitude of the A320?

FL390 - 39000 ft

Explain fly-by-wire

Fly-by-wire is a flight control system where electronic signals transmit pilot inputs to control surfaces instead of mechanical linkages.

Key points:

- Uses flight control computers
- Provides flight envelope protection
- Reduces pilot workload
- Central to Airbus design philosophy

Control forces are generally reduced by...?

Aerodynamic balance and powered control systems

Methods include:

- Aerodynamic balancing
- Servo tabs
- Powered (hydraulic/electric) controls
- Artificial feel systems

According to TEM model: one threat category is environmental, what is the other?

Organizational threats

Explanation:

Environmental threats come from outside the organization, while organizational threats originate from company policies, procedures, training, or scheduling.

RNP APCH to LNAV/VNAV – vertical guidance is based on?

Barometric Vertical Navigation (Baro-VNAV)

How are MF radio waves propagated?

Ground wave propagation during day and also as skywave during the night

What is the relation between lift declive and gust load factor?

More declive → more gust load factor

Detailed Explanation:

The term declive of lift curve refers to the slope of the lift coefficient curve (C_L vs angle of attack).

A gust introduces a sudden change in angle of attack.
If the lift curve slope is steep, even a small AoA change causes a large change in lift.
This results in a higher instantaneous load factor (gust load factor).

Summary:

- More declive = more gust load factor
- Important for aircraft structural design and certification

What are FANS?

FANS stands for Future Air Navigation System.

It is a communications and surveillance technology suite that improves aircraft capability in limited radar coverage areas, especially oceanic and remote airspace.

- CPDLC (Controller–Pilot Data Link Communications)
- ADS-C (Automatic Dependent Surveillance – Contract)

Main Purpose:

- Replaces voice-based HF communications over oceans
- Improves reliability and airspace capacity

Summary:

FANS = digital communication and surveillance for remote/oceanic airspace.

What is the difference between additional fuel and extra fuel?

Additional Fuel:

- **Required by regulation**
- Used when no suitable alternate exists or weather is marginal
- Covers diversion, holding, and final reserve

Extra Fuel:

- **Not required by regulation**
- Carried at Captain's discretion
- Declared as “extra” in the flight plan

Summary:

- Additional fuel = mandatory
- Extra fuel = optional flexibility

What frequency band does weather radar operate in?

SHF (Super High Frequency)

It's 25°C at surface. If -2°C per 1000 ft, what's the temperature at FL350?

-45°C

What is the difference between DH, MDH, DA, and MDA?

- DA/DH: Precision approaches, continuous descent
- MDA/MDH: Non-precision approaches, level-off

Altitude vs Height:

- Altitude = AMSL (DA / MDA)
- Height = AGL (DH / MDH)

In case of DH/DA you can decide at this altitude but for MDH/MDA you need a safety factor of 30 ft (for decision time taken to execute a GO AROUND for example) for example as you're not allowed to descend. So precision approaches has a safety factor in them and you can dip below while deciding to go or not while in non precision you don't.

How to prevent vertigo?

Looking to the horizon

Why is it important for the captain to know the altitude of the tropopause?

- Most weather occurs below the tropopause
- Important for turbulence, jet streams, CB tops, cruise planning

How are generators on a multi-engine aircraft connected?

Parallel for more power

What gives less maneuverability? CG aft, retracting flaps, Increasing IAS, Decreasing IAS

Increasing IAS

What is the planning LDA for a Cat A jet aircraft?

For a Category A jet aircraft, planning LDA must be at least 60% of the actual landing distance required under dry conditions.

Additional factors apply for wet or contaminated runways.

What is traffic load?

Traffic load is the total mass of passengers, baggage, and cargo carried on a flight.

After one engine failure, what airspeed must you maintain?

Vy_{se}, the blue line speed.

Best rate of climb with one engine inoperative.

V_r for transport category aircraft must be at least?

$$V_r \geq 1.05 \times V_{mca}$$

Close-in obstacle during second segment, what action?

Increase V₂ climb speed while maintaining takeoff weight to achieve higher climb gradient.

What is rate of climb and how is it calculated?

$$\text{RoC} = \text{Gradient} \times \text{TAS}$$

What is angle of climb?

The inclination of the flight path relative to the ground.

Minimum crew oxygen pressure at Wizz Air and where read?

550 PSI

Read on ECAM DOOR/OXY page.

Electrical configuration after avionics smoke, GEN1 OFF, GEN2 OFF, RAT deployed?

Emergency Electrical Configuration (EMER ELEC).

A/SKID & NWS ON, braking failure detected. What happens?

Automatic transition to alternate braking system.

Which manual contains PRM(persons with disability) limits?

OM-A.

Cockpit lighting available in EMER ELEC?

Right side dome lights

Left main panel flood lights

Standby compass lights

What is V₂?

Takeoff safety speed allowing safe climb with one engine inoperative.

How is thrust distributed between the bypass flow and the engine core in a turbofan engine, and what are the advantages and disadvantages of increasing engine size?

A turbofan engine generates thrust from two primary sources:

Bypass Flow (Cold Air):

Air accelerated by the fan that bypasses the combustion core.

Core Flow (Hot Air):

Air that passes through the engine core, is compressed, mixed with fuel, combusted, and expanded through turbines.

Typical Thrust Percentage Distribution:

High-bypass turbofan (modern commercial jet engines):

Bypass flow: approximately 80–85% of total thrust

Core flow: approximately 15–20% of total thrust

Example: Boeing 787 GENx engine

Low-bypass turbofan (older and military jets):

Bypass flow: approximately 40–50%

Core flow: approximately 50–60%

Example: fighter jet engines

Higher bypass ratio improves efficiency and reduces noise.

Advantages of increasing engine size:

Higher fuel efficiency

Quieter operation

Higher thrust capability for larger aircraft

Disadvantages of increasing engine size:

Increased weight

Higher aerodynamic drag

Ground clearance issues

Higher manufacturing and maintenance costs

Conclusion:

Modern turbofan engines generate most thrust from bypass flow. *Larger engines improve efficiency and noise performance due to less spin speed needed* but introduce structural, aerodynamic, and cost penalties.

What is specific ground range?

How does it affect fuel efficiency and aircraft performance during cruise?

Specific Ground Range (SGR) is the distance traveled over the ground per unit of fuel burned.

$$\text{SGR} = \text{Ground Speed} / \text{Fuel Flow}$$

What is running load?

In what ways does running load impact aircraft structural integrity and fatigue life?

Running load refers to continuous or repetitive loads acting on the aircraft structure during flight, including aerodynamic forces, bending loads, and vibrations.

Effects:

- Fatigue accumulation from cyclic loading
- Stress concentration at joints and wing roots
- Material degradation over time

Aircraft are designed with fatigue limits, fail-safe structures, and load alleviation systems. Maintenance programs and operational techniques aim to reduce running-load damage.

Why is there no applicable separation minima for a medium aircraft following a light aircraft on approach in non-radar conditions?

Wake turbulence separation focuses on heavier aircraft affecting lighter ones.

A medium aircraft is not significantly affected by the wake of a light aircraft, so no specific separation minimum is required in non-radar conditions.

ATC may still apply extra spacing if conditions warrant it.

Under what flight conditions can an aircraft experience a negative load factor, and how does this affect structural stress?

Negative load factor occurs during negative G conditions where occupants feel lifted from their seats.

Occurs during:

- Push-over maneuvers
- Sudden descents
- Severe turbulence or wind shear

Effects:

- Structural bending in wings and fuselage
- Increased stress on airframe
- Fuel and system disturbances
- Physiological effects on occupants

Commercial aircraft are designed for limited negative G and avoid prolonged exposure.

What types of cargo are typically stored in the bulk cargo compartment?

Loose, irregular, or small cargo items such as:

- Passenger baggage
- Live animals

Perishable goods
Crew baggage and aircraft spares

How do RNP approach requirements differ from RNP en-route airspace classification, such as RNP 2?

RNP approach operations require much higher navigation accuracy than RNP en-route airspace.

RNP approach:
Accuracy down to 0.3 NM or less
Used for instrument approaches
Allows curved and terrain-sensitive paths

RNP 2:
Accuracy within 2 NM
Used for en-route navigation
Common in oceanic or remote airspace

Aircraft certified for RNP approach can operate in RNP 2, but not necessarily the reverse.

What visual indications and signage alert pilots to ILS-sensitive areas, and why is protection of these areas critical?

ILS-sensitive areas are marked by:

Red ILS HOLD or ILS CRITICAL AREA signs
Yellow ILS hold lines painted on taxiways

Protection is critical to prevent signal distortion, ensure accurate localizer and glide slope guidance, and support CAT II and III operations.

Pilots must strictly comply with ATC instructions regarding ILS hold points.



How does tire wear, runway texture, and contamination contribute to the likelihood of viscous hydroplaning?

Viscous hydroplaning occurs when a thin film of water prevents tire-runway contact.

Contributing factors:

Worn tire grooves
Smooth or polished runway surfaces
Runway contamination such as oil, dirt, or rubber

It can occur at lower speeds than dynamic hydroplaning and significantly reduces braking effectiveness.

What does an IFR ETA typically reference, and why is this distinction important for flight planning and ATC coordination?

An IFR Estimated Time of Arrival (ETA) is generally referenced to the Initial Approach Fix (IAF), Intermediate Fix (IF), or Final Approach Fix (FAF), depending on operational context. It does not necessarily indicate the exact landing time.

Detailed Explanation:

Different Reference Points for IFR ETA:

Initial Approach Fix (IAF):

Used in procedural approach sequencing.

Provides ATC with an estimate of when an aircraft will enter the approach phase.

Intermediate Fix (IF):

Occasionally used in more direct arrival procedures.

Final Approach Fix (FAF):

Commonly used in non-precision approaches as a final reference before landing.

Why the Distinction Matters:

Air Traffic Coordination:

ATC sequences aircraft based on ETA to key fixes, not landing time.

Fuel and Holding Calculations:

Pilots use ETA to plan fuel reserves in case of delays.

Approach Transition Planning:

Helps in determining descent profiles and missed approach contingencies.

Operational Considerations:

Flight plans must specify the ETA based on ATC procedures.

Modern FMS automatically calculate ETA to approach fixes, ensuring accurate planning.

What is cold drop, and how does it impact aviation?

A cold drop, also called a cut-off low, is an isolated cold-core low-pressure system that forms when a cold air mass detaches from the main jet stream. It creates unstable weather with *heavy rainfall, thunderstorms, and turbulence*.

Detailed Explanation:

Formation Process:

A cold drop forms when a trough in the upper atmosphere becomes cut off from the main westerly flow.

This leaves a pocket of cold air trapped at high altitudes, leading to significant atmospheric instability.

Commonly occurs over Europe, the Mediterranean, and North Africa.

Impact on Weather and Aviation:

Thunderstorms and Heavy Rain:

Due to unstable atmospheric conditions, a cold drop generates heavy convective storms.

Severe Turbulence:

Sudden updrafts and downdrafts cause moderate to severe turbulence.

Wind Shear and Microbursts:

Localized severe winds pose a risk during takeoff and landing.

Icing Hazards:

Moist air and freezing temperatures create severe icing risks.

How do frontal depressions over Europe typically evolve, and what weather patterns do they generate?

A frontal depression is a low-pressure system associated with weather fronts, often forming over the Atlantic Ocean before moving toward Europe. These systems bring strong winds, precipitation, and changing weather conditions.

Detailed Explanation:

Formation and Development:

Originate over the North Atlantic where warm and cold air masses meet.

Intensify while moving eastward due to baroclinic instability.

The jet stream guides these systems and influences intensity.

Structure:

Warm Front:

Produces steady widespread precipitation.

Cold Front:

Forces warm air upward, creating heavy showers, thunderstorms, or squalls.

Occluded Front:

Occurs when the cold front overtakes the warm front, producing mixed precipitation and gusty winds.

Effects on Aviation:

Severe turbulence, icing hazards, reduced visibility, and wind shear.

How does compass error in the Northern Hemisphere manifest when turning north, and what role does the liquid swirl effect play? Additionally, how does acceleration and deceleration affect compass indications?

In the Northern Hemisphere, when turning north, the compass lags due to magnetic dip. When turning south, it leads. Acceleration causes a false indication toward north, and deceleration toward south.

Fluid motion causes temporary oscillations, especially during turbulence or abrupt maneuvers.

What are the primary environmental stressors in the cockpit, and how do they impact pilot performance and decision-making?

Environmental stressors include temperature extremes, noise, vibration, oxygen levels, fatigue, and workload. These factors degrade concentration, reaction time, and decision quality.

How do radar separation minima differ between heavy and light aircraft?

Heavier aircraft generate stronger wake turbulence, requiring greater separation.

Typical separations:

Heavy behind heavy: 4 NM

Medium behind heavy: 5 NM

Light behind heavy: 6 NM

How is true north defined in aviation?

True north is the direction toward the geographic North Pole where all meridians converge. It is constant and used for charts, GPS, and great-circle navigation.

Magnetic north varies over time.

The difference is magnetic variation, corrected during flight planning.

Taxiway exit lighting: what does yellow exit lights beside the centerline mean?

Yellow exit lights beside the centerline indicate a high-speed exit taxiway, helping pilots clear the runway quickly, especially in low visibility conditions.

What is the Bergeron–Findeisen process?

It explains precipitation formation in cold clouds where ice crystals and supercooled water coexist. Water vapor deposits onto ice crystals, causing them to grow and fall as precipitation.

Why is it necessary to wait before dispatching an aircraft after a quick turnaround to prevent thermal plug activation?

A thermal plug (or fusible plug) is a safety device installed in aircraft wheels, specifically in the brake assembly, to prevent tire explosion due to excessive heat. It melts at a predetermined temperature, allowing controlled tire deflation instead of a burst.

Why must we wait after a quick turnaround? During a quick turnaround, the aircraft lands, unloads and reloads passengers, refuels, and prepares for the next flight in a short time. The brakes remain extremely hot from landing and taxiing. Waiting prevents thermal plug activation and reduces risks of tire failure and operational disruptions.

What is the wet runway friction coefficient, and how does it impact aircraft landing performance?

The wet runway friction coefficient measures the runway's ability to provide traction under wet conditions. It directly affects braking, directional control, and landing distance.

Factors affecting friction:

Water depth:

Thin water layers slightly reduce friction.

Deeper water increases hydroplaning risk.

Runway surface and grooving:

Grooved surfaces improve drainage and friction.

Smooth surfaces reduce traction.

Rubber deposits:

Rubber buildup reduces wet friction.

Maintenance restores friction.

Aircraft speed and tire pressure:

Higher speeds increase hydroplaning risk.

Proper tire pressure improves contact.

Impact on landing performance:

Increased landing distance.

Reduced braking effectiveness.

Directional control difficulties, especially in crosswinds.

Conclusion:

Wet runway friction strongly affects stopping distance, control, and safety margins.

Which gas is commonly used for emergency landing gear extension in aircraft, and why is it preferred?

Emergency landing gear extension systems use compressed gas when hydraulics fail.

Most common gas:

Nitrogen (N_2)

Reasons:

Inert and non-flammable.

Chemically stable.

Compressible at high pressure.

Operates across wide temperature ranges.

Is having the runway in sight a requirement to initiate a visual approach at Wizz Air?

No, having the runway in sight is not a requirement to initiate a visual approach at Wizz Air.

What speed will you maintain if there is an engine failure just after take off and you want to maintain positive control with full controls deflection?

The required speed to maintain control with full control deflection after an engine failure just after takeoff is V_{mc} (Minimum Control Speed Airborne).

Vmca is the lowest speed at which the aircraft can maintain directional control after an engine failure using full rudder deflection and maximum bank angle (usually 5° toward the operating engine).

Factors affecting Vmca:

Engine thrust settings

Aircraft configuration (flaps, landing gear)

Center of gravity location

Density altitude

If the aircraft speed drops below Vmca, directional control may be lost.

Does a derated takeoff result in higher trip fuel consumption?

Yes, a derated takeoff results in higher trip fuel consumption because it uses a lower thrust setting, leading to a longer takeoff roll and reduced climb rate. This means the aircraft spends more time at lower, less fuel-efficient altitudes before reaching cruise.

Derated takeoff extends engine life and reduces maintenance costs, so it is a trade-off.

What is a wet start?

A wet start occurs when fuel is introduced into the combustion chamber before ignition, leading to excess fuel accumulation inside the engine.

Consequences:

Possible engine fire

Compressor stalls or flameout

Causes:

Incorrect starting sequence

Igniters not functioning correctly

Fuel control unit malfunction

What is a hung start?

A hung start occurs when the engine starts but fails to accelerate to idle RPM.

Causes:

Insufficient airflow

Poor combustion

Low battery or APU power

Risks:

Engine overheating

Potential engine damage if not aborted

In which direction is the airflow on the upper side of the wing on a straight wing?

The airflow moves in the root direction due to spanwise pressure differences.

You are taking off on the Airbus A320 in Dubai, suddenly the aircraft has a reduced rate of climb. What could be a possible (weather related) reason?

A possible weather-related reason for the reduced rate of climb is a strong inversion layer.

An inversion layer occurs when temperature increases with altitude instead of decreasing. This creates a stable layer of air that prevents vertical mixing and can trap pollutants, dust, and moisture.

In regions like Dubai, strong temperature inversions can occur due to high surface temperatures and rapid cooling at night.

Effects on Aircraft Performance:

Reduced rate of climb:

Warm air is less dense, meaning less lift and reduced engine thrust efficiency.

Performance degradation:

The aircraft requires more runway and has a lower climb gradient.

Possible wind shear:

A strong temperature inversion can cause sudden changes in wind direction and speed, affecting climb performance.

On which ECAM page(s) can aft cargo indications be found?

Aft cargo indications are displayed on the ECAM Cruise and COND pages.

If the landing gear was extended using the gravity extension procedure and green hydraulic pressure is still available, can normal gear operation be restored?

If the landing gear was extended using the gravity extension procedure, normal operation may be restored provided there is no landing gear system damage.

If the extension was not caused by a mechanical failure, restoring hydraulic pressure may allow normal operation.

What is the correct ATC callout when executing a TCAS climb maneuver?

“TCAS RA”

What is the maximum taxi speed permitted at Wizz Air when making a standard turn on a taxiway?

15 kt

Where can the exact procedure for Landing Performance Calculation (LPC) landing distance be found at Wizz Air?

The exact procedure for LPC landing distance is described in the EFM.

How can you confirm that the cockpit sliding window is properly closed and locked?

The red ring below the release button must be visible.
This confirms the locking mechanism is engaged.

Under what conditions can the Auto-Thrust (A/THR) system be armed automatically?

Auto-Thrust arms automatically during takeoff or go-around.

Where can precise information about MOTNE decoding be found at Wizz Air?

Detailed information on decoding MOTNE can be found in the LIDO ERM, which provides operational meteorological data for pilots.

During an LNAV RNP approach, if visual references are insufficient, would the message "GPS PRIMARY LOST" require a mandatory go-around?

Yes. If visual references are insufficient and GPS PRIMARY LOST appears, a go-around is required because GPS accuracy is essential for RNP performance.

When the arrival aerodrome temperature is below 0°C, is it necessary to apply a temperature correction to the go-around altitude?

Yes. A temperature correction must always be applied when the temperature is below 0°C to ensure obstacle clearance.

When the thrust levers are advanced to the takeoff position, how does the FMGC update the aircraft's position?

The FMGC updates the aircraft position based on the navigation database and the takeoff runway entered in the MCDU.

Wizz Air's RNP approaches were approved by the CAA starting from January 1st. Can pilots immediately perform RNP approaches?

No. Both pilots must first complete initial RNP training before RNP approaches are permitted.

Why is it possible for an operator to be RNAV terminal area approved but not RNP approach approved?

RNAV approval covers general area navigation, while RNP approaches require stricter accuracy, onboard performance monitoring, and specific operational approval, which not all operators have.

What does the phrase "stop-end RVR must be taken into account if relevant" mean?

Stop-end RVR is only considered if the aircraft's expected speed in that runway section exceeds 60 knots.

What is the major equipment loss if the Green hydraulic system fails?

The major equipment loss is the autobrakes.

How does weight affect the glide range of an aircraft?

Glide range depends on the lift-to-drag ratio, which does not change with weight. Therefore, glide range does not vary with weight.

How is V1 speed determined and entered?

V1 speed is entered manually by the pilot, based on takeoff performance calculations.

Can an IDG (Integrated Drive Generator) be reconnected in flight?

No. An IDG cannot be reconnected in flight. Once disconnected, it remains unavailable until maintenance on the ground.

Can a pilot legally fly to an airport not listed in OM-C – Airports, and under what conditions at Wizz Air?

Yes, but only if the airport is listed as an alternate on the OFP.

Given that Peter weighs more than Michael, Nina weighs more than John, John weighs less than Ben, and Michael and Ben weigh the same, which statement must be true?

Peter weighs more than John.

If you are cleared for an ILS approach, which button should you press for the FMGC to capture and navigate via the localizer (LOC) and glide slope (GS)?

Press the APPR push button.

If both ELACs fail, which system will take control of the elevator and stabilizer?

Control is transferred to the SECS (Spoiler Elevator Computers).

Under what conditions does the APU provide automatic fire extinguishing?

On the ground only. In flight, fire extinguishing is manual.

When using Type 1 anti-icing fluid, and there is a discrepancy between the fluid-specific HOT table and the generic HOT table, which one should be used at Wizz Air?

The generic hold-over time table must be used.

When should the RAM AIR switch be selected ON?

During dual pack failure or for smoke removal.

What hydraulic pump can be used to re-pressurize the brake accumulator?

The yellow electric hydraulic pump.

You are moving the centre of pressure in front of the CG. What will be the tendency?

A nose-up pitching tendency.

What are the effects of excessive aircraft weight?

Higher stall speed.

Reduced climb performance.

Longer takeoff and landing distances.

Reduced range and endurance.

Increased structural and landing gear loads.

What is the angle of incidence?

The fixed angle between the wing chord line and the aircraft longitudinal axis.

Why must the seat position be adjusted precisely before the approach?

To ensure correct eye reference, proper instrument scan, accurate flight director tracking, and correct runway visual alignment.

If an approach is based on two NDBs and is not included in the FMGS database, how should a non-CDFA approach be flown in IMC?

It must not be flown in IMC; without FMGS guidance it is only permitted in VMC.

What effects do slats have?

They re-energize the boundary layer, increase the critical angle of attack, and reduce stall speed with a relatively small drag increase.

Where can the date of issue of the Minimum Equipment List (MEL) be found at Wizz Air?

In the MEL PDF document in the onboard database.

If no weather forecast is available for your destination at the expected time of landing, are you legally allowed to depart?

Yes, provided two alternates are planned and both meet planning minima, with sufficient fuel for the most demanding alternate.

What is the standard weight assigned to an infant, including their carry-on baggage allowance at Wizz Air?

0 kg.

What is the amount of gases in the atmosphere on FL410?

The same composition as sea level, but with lower partial pressures.

What is the wake turbulence separation when a medium aircraft departs after a heavy aircraft?

Two minutes from the same runway point.

Three minutes from an intermediate runway point.

Table 2 – Arriving Aircraft		
Leading Aircraft	Following Aircraft	Minimum Time
Heavy	Heavy	2 minutes
	Medium	2 minutes
	Light	3 minutes
Medium	Light	3 minutes

Table 1 - Cruise		
Leading Aircraft	Following Aircraft / Crossing Behind	Minimum Separation Distance
Heavy	Heavy	4 NM
	Medium	5 NM
	Light	6 NM
Medium	Light	5 NM

Table 3 – Departing Aircraft			
Leading Aircraft	Following Aircraft	Minimum Spacing at Time Aircraft are Airborne	
		Departing From	
		Same Take-Off Position	Intermediate Take-Off Position
Heavy	Heavy	2 minutes	3 minutes
	Medium		
	Light		
Medium	Light	2 minutes	3 minutes

What is the time of useful consciousness at FL400?

<i>Conscious. Time</i>	<i>FL 430</i>	<i>10s</i>
	<i>FL400</i>	<i>15 - 30 s</i>
	<i>FL350</i>	<i>30 - 60 s</i>
	<i>FL300</i>	<i>1-3 min</i>
	<i>FL250</i>	<i>3-5 min</i>
	<i>FL220</i>	<i>5-10 min</i>
	<i>FL 180</i>	<i>20-30 min</i>

If the landing gear is extended manually using the gravity extension hand crank, how must the landing gear position be verified?

By checking ECAM landing gear indications and the landing gear indicator lights.

Can Alpha Floor protection be manually canceled?

Yes, by disconnecting autothrust using the A/THR pushbutton or instinctive disconnect.

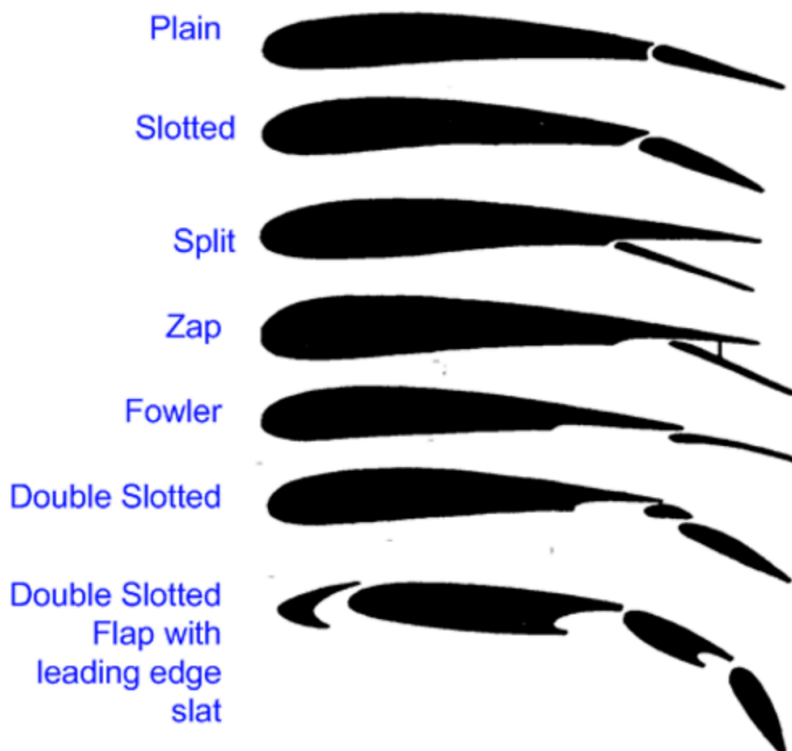
Is the following statement true or false: The transition level must be read back to ATS?

True.

If the BUS TIE pushbutton is set to OFF during a normal flight, what effect will this have?

No effect.

What type of flaps are shown in the picture?



You have landed at an airport without maintenance support and cannot contact MCC. Can you release the aircraft if it has a fault requiring maintenance action?

No.

What happens to the PTU if the green hydraulic system experiences an overheat, low pressure, or low fluid level condition?

If the green hydraulic system experiences an overheat, low pressure, or low fluid level condition, the PTU (Power Transfer Unit) fault light will stay illuminated as long as the problem exists. The PTU should be manually selected off to prevent further issues.

What configuration is selected when FLAPS 1 is deployed during flight?

Selecting FLAPS 1 during flight extends the slats to position 1 while keeping the flaps retracted at position 0.

Which types of navigational aids (navaids) can be automatically tuned by the aircraft system?

The aircraft's systems can automatically tune ILS, VOR, and DME navigation aids. This feature ensures navigation and approach capabilities without manual frequency input.

Which section of the operations manual contains information regarding passenger handling at Wizz Air?

Passenger handling information can be found in OM-A-8-2 of the Operations Manual A, which provides guidelines on passenger-related procedures.

How is the Accelerate-Stop Distance Available (ASDA) calculated?

TORA + stopway if available

After the departure of a Boeing 757, what is the minimum required separation time for an A320?

2 min

How can the source of power for aircraft electrical buses be determined?

The power source for aircraft electrical buses can be determined by pressing the ECAM ELEC push button, which displays the electrical schematic on the ECAM screen, providing real-time information on power distribution.

If the landing gear is extended using the gravity extension hand crank, which system will become inoperative?

If the landing gear is extended using the gravity extension hand crank, nose wheel steering will be inoperative, as hydraulic power is required for its operation.

What happens if a BLEED leak is detected while both engine and wing anti-ice systems are active?

If a BLEED leak is detected while both the engine and wing anti-ice systems are in use, the wing anti-ice system on the affected side will continue operating.

What is the minimum RVR requirement for the midpoint and stop end (if applicable) on a CAT I approach?

For a CAT I approach, the minimum required RVR at the midpoint is 250m, and if Runway Centerline Lighting (RCLL) is available, the stop end requirement is reduced to 125m.

AMC1 CAT.OP.MPA.305(a) Commencement and continuation of approach

ED Decision 2022/012/R

MINIMUM RVR FOR CONTINUATION OF APPROACH — AEROPLANES

- (a) The touchdown RVR should be the controlling RVR.
- (b) If the touchdown RVR is not reported, then the midpoint RVR should be the controlling RVR.
- (c) Where the RVR is not available, CMV should be used except for the purpose of continuation of an approach in LVO in accordance with [AMC10 CAT.OP.MPA.110](#).

How would a runway with a matte surface appear after rainfall (dry, damp or wet)?

After rainfall, a runway with a matte surface is classified as **damp**, indicating that it has a thin layer of moisture but is not considered wet or contaminated.

What does a flashing amber IR FAULT light indicate?

A flashing amber IR FAULT light means that while the respective Inertial Reference System (IRS) has a fault, attitude and heading information may still be recovered in ATT mode.

What does an amber boxed line on the MCDU screen indicate?

An amber boxed line on the MCDU (Multipurpose Control and Display Unit) indicates a **mandatory data entry**, meaning the system requires input before proceeding.

How many trim air valves are there in the aircraft's air conditioning system?

There are three trim air valves in the aircraft's air conditioning system:

- One for the cockpit zone
- One for the forward cabin zone
- One for the aft cabin zone

When flying at cruise altitude, does the aircraft use only radio navigation aids?

Aircraft do not rely solely on radio navigation aids at cruise altitude. Instead, they use a combination of radio aids, inertial navigation, and GPS to maintain accurate positioning.

If the FADEC automatically aborts an abnormal engine start to provide engine limit protection, will it also automatically dry crank the engine?

If an abnormal start occurs, the FADEC (Full Authority Digital Engine Control) will automatically abort the start to protect the engine from exceeding limits. It will also automatically dry crank the engine as long as the ENG MASTER switch remains in the ON position.

If the BSCU detects a brake system malfunction in flight with the A/SKID & NWS switch in the ON position, how is the crew notified?

If the BSCU (Brake and Steering Control Unit) detects a brake system malfunction in flight while the A/SKID & NWS switch is ON, the crew will be notified with an ECAM message.

What is the difference between an engine anti-ice fault light and a wing anti-ice fault light?

Both engine and wing anti-ice fault lights indicate a valve in transit or a disagreement between the valve position and the selected position. However, the wing anti-ice fault light may also indicate low pressure.

What happens when one ADR push button is set to OFF?

Placing one ADR (Air Data Reference) push button to OFF will cause the OFF light to illuminate, and the air data output will disconnect.

Under what conditions is fuel transfer between tanks possible?

Fuel transfer between tanks is only possible while the aircraft is on the ground. In flight, the system is designed to maintain proper balance and does not allow direct transfer between tanks.

What is the minimum runway width required for a 180-degree turn in Wizz Air operations for the A320 and A321?

The minimum runway width required for a 180-degree turn during Wizz Air operations is:

- 30 meters (99 feet) for the A320
- 32 meters (105 feet) for the A321

After an APU fire is detected, how long will the chime continue to sound?

In the event of an APU fire detection, the chime will continue sounding until the crew pushes the red MASTER WARN push button and until the crew pushes and releases the guarded red APU FIRE push button.

Are approaches with vertical guidance (Baro VNAV approaches) classified as precision approaches?

Baro VNAV approaches, identified on charts by the VNAV – DA minima line, are not classified as precision approaches because they offer vertical guidance with lower performance than what is required for a precision approach.

What does the autobrake DECEL light indicate?

The autobrake DECEL light indicates that the airplane is decelerating at 80% of the selected rate.

Is a pilot allowed to climb above the recommended maximum flight level displayed on the FMGS PROG page at Wizz Air?

Yes, a pilot is allowed to climb above the recommended maximum flight level shown on the FMGS PROG page, but this is not advised as the aircraft may not have sufficient performance margins for safe operation at higher altitudes.

Where can the procedure for unpressurized flight be found?

The procedure for unpressurized flight is described in the FCOM.

Immediately after liftoff, you receive a stall warning with no other ECAM message. What actions should the Pilot Flying (PF) take?

If a stall warning occurs immediately after liftoff, the PF should set TOGA thrust, pitch the aircraft to 15°, and level the wings.

If the EMER EXIT LT selector is in the ARM position, what will activate the emergency lights and exit signs?

With the EMER EXIT LT selector in the ARM position, the emergency lights and exit signs will activate if the DC ESS SHED BUS loses power.

What information does the Inertial Reference (IR) system provide on the Primary Flight Display (PFD)?

The Inertial Reference (IR) system provides essential flight data to the PFD, including heading, attitude, and vertical speed.

When both engines are running, under what condition will the ENG BLEED PB fault light illuminate?

The ENG BLEED PB fault light illuminates when the valve position differs from that commanded by the push button while both engines are running.

How many Spoiler Elevator Computers (SEC) are installed, and what is their function?

There are three Spoiler Elevator Computers (SEC) responsible for spoiler control, standby elevator control, and THS (Trimmable Horizontal Stabilizer) control.

What will happen if the flaps are not manually retracted after takeoff?

If the flaps are not retracted manually after takeoff, they will automatically retract when the aircraft reaches 210 knots.

This prevents overspeed and excessive drag during climb.

What happens when the APU GEN PB is selected OFF?

When the APU GEN push button is switched OFF, the APU generator is de-energized.

Why might the fuel calculation for an alternate airport in the LIDO OFP display a negative value?

A negative fuel value in the LIDO OFP alternate airport summary indicates that the airport is unsuitable for diversion. This can occur due to operational restrictions, poor runway conditions, NOTAMs, or performance limitations.

While approaching LHBP with RWY 13R in use and dry conditions, the reported wind is 220/10G25, BKN014, VIS 6000m. At 500 feet on the navigation display (ND), the wind shows 220/36. Can the approach be continued?

During the approach to LHBP, the pilot should consider the officially reported wind conditions (220/10G25) rather than the wind value displayed on the navigation display at 500 feet, so the approach can be continued. - **also maybe because at surface the wind is as published**

What system does the aircraft use for detecting a fire in the APU?

The aircraft's APU fire detection system operates using two parallel detection loops. Both loops must sense excessive heat for a fire warning to trigger, providing redundancy and reducing the chances of false alarms.

On which ECAM page(s) can pressurization indications be monitored?

Pressurization system indications can be viewed on both the in-flight ECAM cruise page and the dedicated PRESS page, allowing pilots to monitor cabin pressure conditions during flight.

Which hydraulic system(s) provide pressure to the landing gear system?

The landing gear system is powered by the Green hydraulic system.

How is a runway classified when it is covered by 3mm of water?

A runway covered by 3mm of water is classified as wet.

What is the normal state of the wing fuel transfer valves when they are not transferring fuel?

The wing fuel transfer valves remain electrically held closed when not transferring fuel. In the event of electrical failure, the valves fail open to allow gravity transfer.

What is the correct phrase to be announced over the PA system at the start of an emergency descent at Wizz Air?

"CABIN CREW, EMERGENCY DESCENT" stated twice.

Where can information about the necessary equipment for flying in German airspace be found?

The required equipment for operating in German airspace is listed in the LIDO ERM CRAR documentation.

What is the maximum number of infants allowed on board a Wizz Air A320?

A maximum of 18 infants, corresponding to 10% of the total number of passenger seats.

A flight passed over Paris at 04:45 and later over Amsterdam at 06:15, covering a distance of 450 miles. What was the average speed of the flight?

450 miles divided by 1.5 hours equals an average speed of 300 mph.

Once wing tip brakes are activated, how can they be reset?

Wing tip brakes can only be reset on the ground by maintenance personnel.

If the aircraft has no APU or external power, is refueling with one engine running possible, and where is this procedure documented in Wizz Air?

Refueling with one engine running is possible when no APU or external power is available. The procedure is documented in FCOM / PRO / SUP and includes safety and coordination requirements.

What data displayed on the Primary Flight Display (PFD) is supplied by the Air Data Reference (ADR) system?

Airspeed, altitude, and backup vertical speed.

At what point does the blue hydraulic system pump start functioning under normal conditions?

During the first engine start.

What are the input sources for the pressurization controllers?

LGCIU, ADIRU, FMGS, and EIU.

In what order are electrical power sources prioritized in the aircraft?

Engine generators first, then external power if selected, and finally the APU.

You fly at night and see a green light at 45 degrees to your left, its position doesn't change.

Is there a collision risk?

Yes, there is a collision risk.

Aircraft navigation lights:

- Green: right wing
- Red: left wing

- White: tail

Flying immediately after scuba diving involves the risk of getting?

Decompression sickness due to nitrogen bubbles forming in the blood.
This can cause joint pain, dizziness, paralysis, or death.

What are the values of ISA (International Standard Atmosphere)?

ISA standard conditions at sea level:

- Pressure: 1013.25 hPa (29.92 inHg)
- Temperature: +15°C
- Density: 1.225 kg/m³
- Speed of sound: 661 knots (340.3 m/s)
- Temperature lapse rate: 1.98°C per 1,000 ft
- Pressure decrease: approximately 27 ft per hPa
- Tropopause: 36,089 ft (FL360) with temperature –56.5°C

What is the manoeuvring area?

The manoeuvring area includes all airside surfaces **except the apron**, where aircraft can take off, land, and taxi.

At the airport QNH is 1003, one aircraft is flying at 5000 ft and the other one is at FL50.

Which one will be higher?

The aircraft flying at 5000 ft on QNH will be higher than the aircraft at FL50.
FL50 is based on standard pressure (1013 hPa). Since QNH is lower (1003 hPa), FL50 corresponds to a lower true altitude.

What is an en-route alternate?

An enroute alternate is an airport available for diversion during the cruise phase.
It must be reachable within 1 hour at one-engine-inoperative cruise speed.

At FL180 with a temperature of –21°C, what is the deviation from ISA?

ISA temperature at FL180 is –21°C.
The deviation from ISA is 0°C.

What is the movement area?

The movement area includes all surfaces used for aircraft movement, including runways, taxiways, and aprons.

What is a takeoff alternate?

A takeoff alternate is an airport used if an aircraft must divert shortly after takeoff when returning to the departure airport is unsafe or impossible.

It must be within 1 hour flying time at one-engine-inoperative cruise speed.

When flying to an IFR point, where can you find the lowest altitude you can fly?

The lowest safe altitude is found in the Grid Minimum Off-Route Altitude (Grid MORA), which provides terrain clearance of 1,000 ft or 2,000 ft in mountainous areas.

What is a contaminated runway?

A runway is contaminated when 25% or more of its surface is covered by standing water greater than 3 mm, compact snow, or ice.

What is a Fail Passive Flight Control System?

A fail-passive system allows an autoland approach, but in case of a failure the aircraft remains stable and the pilot must complete the landing manually.

Example: single autopilot failure during a dual-autopilot approach.

How many degrees Celsius is 273 Kelvin?

273 Kelvin = 0°C

Formula: $273\text{ K} - 273 = 0^{\circ}\text{C}$

What is a Fail Operational Flight Control System?

A Fail-Operational system allows an autoland to continue automatically even after an autopilot failure.

Example: If one autopilot fails in a dual-autopilot approach, the second autopilot continues the autoland.

What does the abbreviation SLOP stand for?

SLOP stands for Strategic Lateral Offset Procedure.

Strategic lateral offset procedures are approved procedures in oceanic and remote continental airspace that allow aircraft to fly on a parallel track to the right of the centre line relative to the direction of flight.

What is the absolute ceiling?

The absolute ceiling is the altitude where:

Rate of Climb (ROC) = 0 ft/min

At this altitude, the aircraft cannot climb further due to insufficient excess power.

What is the isolated aerodrome fuel procedure?

For an isolated aerodrome, fuel must include:

- Normal fuel quantities
- Plus 2 hours of cruise fuel after arrival overhead destination
- Including Final reserve fuel

Why should brake applications be minimised as much as possible?

Brake applications should be minimised because brake wear during taxi is proportional to the number of applications. Excessive braking increases wear, maintenance costs, and the risk of brake overheating.

Which statement best describes mechanically backed-up control surfaces?

Mechanically backed-up control surfaces require hydraulic power for actuation.

Although mechanical linkages exist as a backup, hydraulic systems are still required for normal operation.

Which section of which document at Wizz Air provides information on the passenger number threshold for switching the pack flow rotary selector to LO?

The relevant information is found in the FCOM-PRO section. It specifies the passenger number below which the pack flow selector should be set to LO to optimize air conditioning efficiency.

What is the primary function of the ram air valve?

The ram air valve is primarily used for emergency smoke removal and ventilation in case of dual pack failure.

Your aircraft is hijacked before engine start, with hijackers controlling the cabin and two in the cockpit. Where can you find the company policy?

The company policy is outlined in the CAM manual, which provides guidance on handling hijacking situations and coordination with authorities.

If you have a 2500 kg fuel imbalance between wing tanks on the ground, can you transfer fuel and where is the procedure found?

Fuel transfer on the ground is possible. The procedure is described in the FCOM-PRO-SUP document.

If the cost index is 50 kg/min, what does this mean?

A cost index of 50 kg/min means that one minute of flight time costs the same as burning 50 kg of fuel.

Cost Index basics:

- Cost Index = Time Cost / Fuel Cost
- Higher CI: faster speed, more fuel burn, shorter time
- Lower CI: slower speed, less fuel burn, longer time

Flying is not recommended after deep diving for how many hours?

For snorkeling, no time interval required;

When swimming with **compressed air**, a minimum preflight surface interval of 12 hours is suggested;

For a single no-decompression dive (**up to 10 m/30 ft**), a minimum preflight surface interval of **12 hours** is suggested;

For multiple dives per day or multiple days of diving, a minimum preflight surface interval of 18 hours is suggested;

For dives requiring decompression stops (**depth over 10 m/30 ft**), a minimum preflight surface interval of **24 hours** is suggested.

If the LIDO ERM database on board is not current, which document contains the contingency procedure at Wizz Air?

If the LIDO ERM database is not current, the contingency procedure can be found in the WIZZ EFM.

What parts of the Airbus are de-iced by hot air from the bleed system?

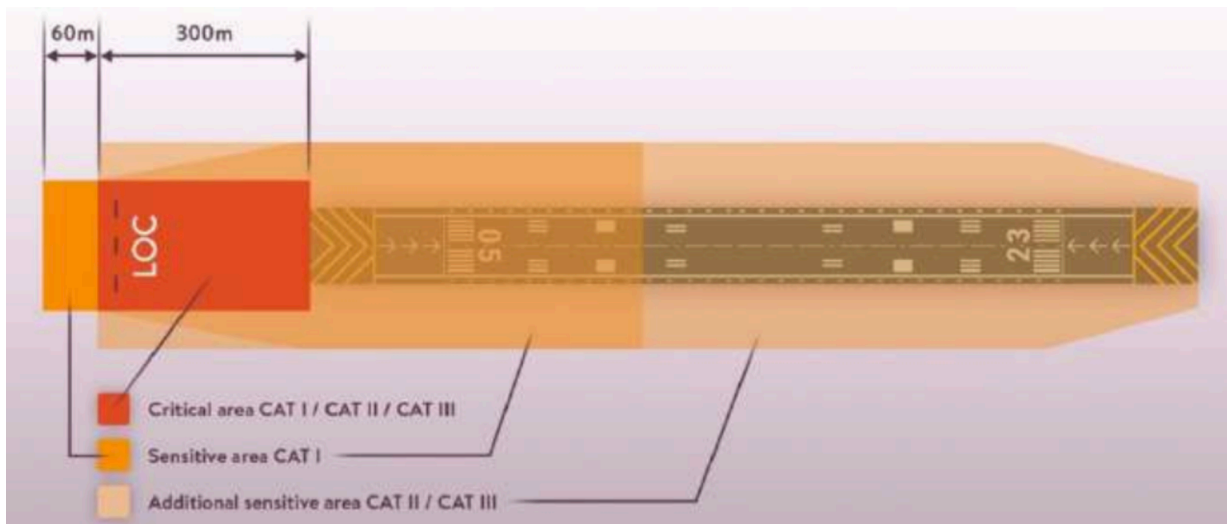
The engine nacelles and the three outboard leading-edge slats.

What is the maximum speed with the cockpit window open?

The maximum speed with the cockpit window open is 200 knots.

What is the obstacle-free zone (OFZ) around a runway?

The obstacle-free zone (OFZ) is a 60-meter area on either side of the runway.



What are the standard holding altitudes and speeds?

Right-hand holding. Standard holding speeds and altitudes are defined in the published holding speed tables.

Std Holding Altitudes & Speeds	FL	Speed	Outbound Timing
	340	M 0.83	1,5 min
	200	265	
	FL 140	240	
	5000 ft	230	1 min
	0	220	

What are approach categories for aircraft based on?

They are based on aircraft grouping determined by $V_{at} = 1.3 \times V_s$, where V_{at} is the indicated airspeed at the runway threshold in landing configuration at maximum landing mass.

App. Categ.	A	$\leq 90 \text{ kts}$
	B	91 - 120
	C	121 - 140
	D	141 - 165
	E	$\geq 166 \text{ kts}$

How do ground equipment failures affect CAT II and CAT III approaches?

The localizer and glide slope must be operational. Runway lights must be serviceable.

Approach lights may be unserviceable, since at CAT II/III minima the aircraft is already over the runway.

What is the Localizer Sensitive Area (LSA)?

The Localizer Sensitive Area extends 137 meters.

When can an approach be commenced and continued according to CAT.OP.MPA.305?

An approach may be **commenced regardless of reported RVR or visibility**.

An approach may be continued unless the reported RVR/VIS falls below applicable minima before 1,000 ft above aerodrome elevation or before entering the final approach segment.

If RVR/VIS deteriorates after passing 1,000 ft or in the final segment, the approach may still be continued provided the required visual references are established at DA/H or MDA/H.

What are the FTL (Flight Time Limitations) for duty and flight hours?

Duty limits:

- 60 hours in 7 days
- 110 hours in 14 days
- 190 hours in 28 days

Flight limits:

- 100 hours in 28 days
- 900 hours in a calendar year
- 1000 hours in the last 12 months

What is the FAF (Final Approach Fix)?

The FAF marks the start of the final approach segment for non-precision approaches.

It must be crossed at or above the published altitude before initiating final descent.

What does the red AUTO LAND warning mean on the Airbus A320, and why does it happen?

At **200 feet RA**, the red AUTO LAND warning illuminates if:

- Both autopilots disengage
- Localizer or glide slope deviation exceeds limits

- Localizer or glide slope signal is lost
- Radar altimeter discrepancy exceeds 15 feet

What are the Aerodrome Reference Codes in relation to maximum aircraft dimensions?

Aerodrome Reference Codes classify airports based on the maximum aircraft wingspan and the outer main gear wheel span they can accommodate.

Aerodr. Ref. Code	Code N.	Reference Field Length	Code Letter	Wingspan	Outer MLG Span
	1	Less than 800 m	A	< 15 m	< 4.5
	2	800-1199	B	15-24 m	4.5 - 6
	3	1200 - 1799	C	24 - 36	6 - 9
	4	> - 1800	D	36 - 52	9 - 14
			E	52 - 65	
			F	65 - 80	14 - 16

What is the FRRS (Fire and Rescue Rating) for different aircraft and can they be downgraded?

A320: Category 6

A321: Category 7

A330: Category 8

All can be downgraded by 1 category if the highest-category aircraft has fewer than 700 movements in 3 months, and by 2 categories if the downgrade is temporary.

What are the biggest differences between the Airbus A320 and A321?

- The A321 is approximately 23 feet longer than the A320
- The A321 has about 50 more seats
- The A321 has roughly 600 NM greater range
- The A321NEO leads in capacity and efficiency
- Crew configuration and loading distribution differ

How can the aileron droop be best confirmed during aircraft checks?

By checking the lower ECAM F/CTL page.

What is the managed climb speed above 10,000 feet?

ECON climb speed.

What is the minimum response time for airport firefighting services?

2 minutes on the runway.
3 minutes on any other part of the movement area.

When does the ON BAT light on the ADIRS panel illuminate amber?

When one or more IRs are operating on aircraft battery power, and for a few seconds at the beginning of the alignment process.

Which speed does the FMGS use during an Expedite climb?

Green dot speed.

What speed does SRS mode command during takeoff?

V2 + 10 knots with both engines operating.
V2 or current speed, whichever is higher, after an engine failure.

How many minutes is the minimum longitudinal time separation at the same flight level?

5 minutes. 10 min for NAT HLA

Do pilots always need to follow a GPWS “Terrain, Terrain, Pull Up, Terrain” warning?

No.
It may be disregarded in VMC if the warning is clearly false.

What is hypoxia?

A condition where the body lacks sufficient oxygen.

What are icing conditions and what effect may they have?

Icing conditions exist when the outside air temperature is below 10°C and visible moisture is present, such as clouds, fog, rain, or standing water, ice, or snow.

Effects of ice on aircraft:

- Increased weight
- Reduced lift due to disturbed airflow
- Increased stall speed
- Decreased thrust
- Possible instrument malfunction, for example blocked pitot tubes
- Reduced controllability due to ice on control surfaces

Anti-icing and de-icing systems must be used to reduce these risks.

Hoar frost forms directly on the aircraft surface as a result of?

Hoar frost forms when water vapor in the air changes directly into ice on a cold aircraft surface.

Commonly occurs on aircraft parked overnight in freezing conditions or flying through cold, humid air.

What is Mach tuck?

A nose-down pitching tendency at transonic speeds caused by the rearward movement of the center of pressure.

It can lead to loss of control or exceeding the critical Mach number.

Bonding is used to protect the aircraft against fire by?

Bonding ensures all aircraft components are at the same electrical potential.

This prevents static electrical discharge that could ignite fuel vapors, especially during refueling.

Linear acceleration causing somatogravic illusion gives a false impression of?

A false sensation of climb.

What is EPR?

Engine Pressure Ratio.

It is the ratio of exhaust pressure to inlet pressure and is used as a power indication for jet engines.

What do the Q codes represent?

QDM: Magnetic bearing to the station

QDR: Magnetic bearing from the station

QTE: True bearing from the station

QUJ: True bearing to the station

QNE: Altitude referenced to standard pressure 1013 hPa

QFU: Magnetic runway direction in use

What equipment prevents Mach tuck?

Mach Trim System.

Automatically adjusts elevator trim to compensate for Mach tuck effects.

You are planning a flight to LHBP, which has two separate runways with independent instrument approaches. The active runway 31R is forecast to be dry. Flight time is 2 hours, crosswind 20G45, BKN014. How many alternate airports are required during planning?

One alternate airport is required.

Crosswind 20G45 is spicy but irrelevant for alternate planning. Dry runway also irrelevant for the question.

You are flying from high pressure to low pressure in the Northern Hemisphere. What is your drift?

Right drift.

Due to Coriolis effect when moving from high to low pressure.

If the aircraft enters a continuous nose-down pitch rate above VLS that cannot be stopped with backward sidestick inputs, what action should the pilot take?

Keep one ADR ON, switch two ADRs OFF, and manually control the aircraft.

When selecting Flaps 3 in flight, what configuration will be set?

Slats 2, Flaps 3.

What is an anabatic wind?

A warm upslope wind that flows up hills during the day due to solar heating.
Opposite of katabatic wind.

What functions do the Flight Augmentation Computers (FACs) provide?

Rudder and yaw damping.
Flight envelope and speed computations.
Windshear protection.

At what runway visual range is specific training required for low visibility takeoff at Wizz Air?

At or below 150 meters RVR.

What are the effects of swept wings?

Higher critical Mach number.
Higher cruise speed.
More stability in turbulence.
Tip stall tendency.
Lower lift efficiency requiring higher takeoff and landing speeds.

Under radar advisory service in the UK, is the pilot responsible for terrain avoidance?

Yes.

The pilot is always responsible for terrain avoidance.

What is the purpose of the continuous monitoring program at Wizz Air?

To monitor aircraft landing capability.

To demonstrate that at least 95 percent of autolands meet regulatory requirements.

After a 4-hour flight, IRS 1 has drifted by 8 NM. Where can you find whether this is within serviceable limits at Wizz Air?

In the FCOM PRO NOR SOP.

You are holding at the takeoff runway in an A320 and receive a 20-minute delay. How much fuel should you expect to burn?

Approximately 300 kg of fuel.

What is a katabatic wind?

A cold downslope wind flowing from mountains into valleys, typically at night.

What are the effects of flaps?

Reduced stall speed.

Increased lift.

Increased drag.

Increased maximum coefficient of lift.

Shorter takeoff and landing distances.

Reduced climb performance.

What is the maximum allowable fuel LMC on the loadsheet if 400 kg of passengers and baggage have already been adjusted at Wizz Air?

0 kg.

How is a runway called with special holes or grooves on its surface?

Grooved runway.

Where do you find the strongest CAT associated with a jet stream?

The strongest Clear Air Turbulence is found on the **cold (low-pressure) side of the jet stream but in the warm sector.**

In the Northern Hemisphere this is the **north side**, in the Southern Hemisphere the **south side**.

It is strongest **near and below the jet core**, especially where **wind shear and temperature gradients** are greatest.

If IR2 is lost, what action should be taken?

Set the **ATT HDG selector to F/O 3** to use IR3 as the reference.

You are flying from high pressure to low pressure. What happens to your true altitude?

Your **true altitude decreases**.

The altimeter overreads, meaning you are **lower than indicated**.

At 500 ft pilot incapacitation occurs. You are alone, CAT III weather, CAT I certified, trained for autoland. What is your decision?

Declare **MAYDAY**, take control, and **perform an autoland** using available automation.

This is the safest option despite CAT I authorization, due to pilot incapacitation.

You are flying from low pressure to high pressure. What happens to your true altitude?

Your **true altitude increases**.

The altimeter underreads, meaning you are **higher than indicated**.

What do you do during engine failure after V1?

Continue the takeoff.

Maintain control, climb at V2, gear up, no actions below 400 ft AGL, handle the failure afterward and return or divert.

What altitude and pitch will you maintain after an engine failure?

Maintain **Vyse (blue line)** for best single-engine climb and climb to **MSA or a safe altitude** ensuring obstacle clearance.

What types of jet fuel are there?

Jet A

Freezing point: -40°C

Mainly used in North America

Jet A-1

Freezing point: -47°C

International standard, preferred for long-haul

Jet B

Freezing point: -60°C

Used in very cold environments

What is the difference between MEA and MORA?

MEA (Minimum Enroute Altitude):

The lowest published altitude along an airway that ensures both obstacle clearance and navigational signal coverage.

Provides at least 1000 ft obstacle clearance in non-mountainous areas and 2000 ft in mountainous areas.

MORA (Minimum Off-Route Altitude):

The lowest altitude that provides obstacle clearance within 10 NM of an airway centerline or within a 10 NM radius of a reference point.

Provides obstacle clearance only and does not guarantee navigation signal coverage.

MEA applies to published airways and includes navigation assurance.

MORA applies to wider areas and focuses only on terrain clearance.

You have a bird strike causing an engine fire. What is your decision and what altitude do you fly?

Maintain aircraft control.

Execute the engine fire procedure immediately.

Set thrust idle on the affected engine.

Pull the fire handle and discharge extinguishing agent as required.

Declare MAYDAY.

Climb to at least MSA if performance allows.

Land at the nearest suitable airfield.

In the event of a single ELAC failure, what happens to its functions?

The remaining ELAC automatically takes over the failed ELAC's functions, maintaining normal flight control operation through system redundancy.

What would be the most difficult aspect when flying an Airbus?

Staying ahead of the aircraft due to high automation and computer-managed flight controls, requiring strong systems understanding and mode awareness.

Describe the different types of hydroplaning.

Dynamic hydroplaning:

Occurs when tire speed is high and water depth exceeds tread depth, lifting the tire onto a water layer.

Viscous hydroplaning:

Occurs on smooth or contaminated runways with a thin water film, even at low speeds.

Reverted rubber (steam) hydroplaning:

Occurs when wheels lock and heat turns water into steam, lifting the tire off the runway.

What is the maximum amount of frost allowed on the fuselage without deicing?

No deicing is required if the fuselage markings or paint remain clearly visible.

Given FEW005 SCT015 BKN026 OVC030, what is the ceiling?

2600 ft.

The ceiling is the lowest broken or overcast layer.

What is a drift down procedure?

A controlled single-engine descent after an engine failure at cruise altitude when level flight cannot be maintained.

The aircraft descends at an optimal speed and thrust setting until reaching the single-engine ceiling while ensuring terrain clearance and navigation toward a suitable diversion airport.

When the landing gear is extended using gravity, is nose wheel steering available?

No.

What happens if the instinctive disconnect pushbuttons are held for more than 15 seconds?

Auto-thrust, including Alpha Floor protection, is disengaged for the remainder of the flight until reset on the ground.

In NAT HLA airspace, must a 1 or 2 NM offset to the left be reported to ATC?

Yes.

Offsets to the left must be reported.

Offsets to the right do not require reporting.

Where is the thrust reduction altitude found, and can it be modified?

It is found on the MCDU takeoff performance page and can be modified to meet departure or noise abatement requirements.

In EMER ELEC configuration, which RMPs(Radio Management Panels) and ACPs(Audio Control Panels) remain operative?

RMP 1 and ACP 1 and 2 remain operative.

How do you calculate dynamic hydroplaning speed?

Dynamic hydroplaning speed (knots) $\approx 9 \times \sqrt{\text{tire pressure (psi)}}$.

What is the bypass ratio of a turbofan engine?

The bypass ratio is the ratio of the mass of air that bypasses the engine core to the mass of air that flows through the core.

Example:

A bypass ratio of 10:1 means 10 kg of air bypasses the core for every 1 kg entering it.

High bypass engines are quieter and more fuel efficient.

What is tire creep?

Tire creep is the slight movement of a tire around the wheel rim during takeoff or landing.

What is an inversion layer?

An inversion layer is a region of the atmosphere where temperature increases with altitude.

Effects:

Stable air

Limited vertical mixing

Traps pollution and smog

Reduces visibility

Suppresses convective cloud formation

Types:

Radiation inversion

Frontal inversion

Subsidence inversion

What is wheel shimmy?

Wheel shimmy is a rapid oscillation of the nose wheel, usually at high speed.

Causes:

Flexible tire sidewalls

Worn or loose landing gear components

Wheel imbalance

Incorrect alignment

Aerodynamic forces

Effects:

Severe vibration

Accelerated wear

Potential landing gear damage

Prevention:

Shimmy damper

Correct tire inflation

Regular maintenance

What is FADEC?

FADEC stands for Full Authority Digital Engine Control.

It uses an electronic engine control unit with sensors and actuators to manage engine operation.

FADEC controls fuel flow, ignition, and engine performance automatically. It optimizes efficiency, reduces pilot workload, and monitors engine health. Used in piston and turbine engines.

Describe a radio altimeter

Purpose:

Provides accurate height above ground, typically below 2500 ft AGL.

Use:

Precision approaches

Decision heights below 200 ft

Feeds GPWS and autoland systems

Operation:

Transmits **radio waves** toward the ground

Measures the time or frequency difference of the return signal

Calculates height above terrain directly

When do you have to file a flight plan?

A flight plan must be filed when operating:

In controlled airspace

In an Upper Information Region

Across FIR boundaries

On an ILS, when can you descend on the glide path?

You may descend on the ILS glide path when:

- You are cleared for the approach by ATC
- You have intercepted the localizer

Descent begins only when both localizer and glide slope signals are properly established.

What are the limits of the green scale of an airspeed indicator?

The **green arc** represents the normal operating range.

Lower limit: VS1 (stall speed in clean configuration)

Upper limit: VNO (maximum structural cruising speed)

Above VNO, turbulence may cause structural damage.

What is the minimum speed for a wind to be classified as a jet stream?

60 knots.

How can the pressurization controller be changed during flight?

By cycling the CABIN PRESS MODE selector from MAN to AUTO, switching control to the alternate automatic system.

How is flight crew oxygen supplied?

From a single central oxygen bottle supplying the flight crew in emergencies.

What is the maximum taxi speed allowed on a straight taxiway within an apron area at Wizz Air?

20 knots.

What is SALR, DALR, and ELR?

SALR (Saturated Adiabatic Lapse Rate):

Cooling rate of saturated air, about 1.8°C per 1000 ft. Cooling is reduced due to latent heat release.

DALR (Dry Adiabatic Lapse Rate):

Cooling rate of dry air, about 3.0°C per 1000 ft.

ELR (Environmental Lapse Rate):

Actual temperature change with altitude in the atmosphere.

If $ELR > DALR$: unstable air

If $ELR < SALR$: stable air

In NAT HLA airspace, must a 1 or 2 NM offset to the right be reported to ATC?

No.

Offsets to the right do not need to be reported.

Offsets to the left must be reported.

What could cause a Display Unit to go blank?

Internal failure or loss of power.

What is the correct sequence of events during the initial takeoff roll at Wizz Air?

Clearance received

Confirmed

Ready?

Ready!

Set N1 50% and stabilize

Takeoff

Set thrust to FLX/MCT or TOGA

Can the flight compartment sliding windows be used as emergency exits?

Yes.

Escape ropes are installed above each window behind an access panel.

What is the total fuel capacity of the Wizz Air A320 fleet (rounded)?

Approximately 18,800 kg.

Code Number	Aeroplane Reference Field Length	Code Letter	Wingspan	Outer Main Gear Wheel Span
1	Less than 800m	A	Up to but not including 15m	Up to but not including 4.5m
2	800m up to but not including 1 200m	B	15m up to but not including 24m	4.5m up to but not including 6m
3	1 200m up to but not including 1 800m	C	24m up to but not including 36m	6m up to but not including 9m
4		D	36m up to but not including 52m	9m up to but not including 14m
		E	52m up to but not including 65m	9m up to but not including 14m
		F	65m up to but not including 80m	14m up to but not including 16m

On which ECAM page can the oxygen cylinder pressure be checked?

The DOORS ECAM page.

During a CAT III B approach with NO DH, if no lights are visible at alert height, can you continue the landing?

Yes.

With NO DH, landing may continue using autopilot guidance without visual reference.

Name and describe the different air masses

Polar Maritime: cold, moist, unstable

Polar Continental: cold, dry

Tropical Maritime: warm, moist

Tropical Continental: hot, dry

Arctic: very cold and dry

What is the minimum rate of climb required in UK airspace?

The minimum rate of climb required in UK airspace is 500 feet per minute.

What is pressure altitude, density altitude, and air pressure?

Pressure Altitude:

The altitude displayed when 1013.25 hPa (29.92 inHg) is set on the altimeter.

Used for standardized performance calculations and flight levels.

Density Altitude:

The altitude at which the air density equals that of the standard atmosphere.

Affected by temperature, humidity, and pressure.

Used for takeoff performance and engine efficiency calculations.

Air Pressure:

The weight of a column of air exerting force in all directions.

Decreases with altitude and varies due to weather systems.

Which of the following values does a 4F airport have?

Aeroplane Reference Field Length: more than 1,800 meters

Wingspan: less than 80 meters

Outer Main Gear Wheel Span: less than 16 meters

A 4F airport can accommodate large aircraft such as the Boeing 747-8 and Airbus A380.

What is the crew composition on the A320 at Wizz Air?

A320:

2 pilots + 4 cabin crew (2/4)

13. What is the crew composition on the A321 at Wizz Air?

A321:

2 pilots + 5 cabin crew (2/5)

What is the operating pressure of the A320 hydraulic system?

The A320 hydraulic system operates at 3000 psi in all three systems (green, yellow, and blue).

The line voltage of a typical aircraft constant-frequency paralleled AC system is how many volts?

200 volts

Most modern commercial aircraft use a 115V / 200V AC, 400 Hz, three-phase electrical system.

Line voltage = Phase voltage $\times \sqrt{3}$

$115 \times 1.73 \approx 200 \text{ V}$

Dispatch to LHBP, runway 31R, dry, CAT IIIA available.

Forecast: 220/20G45, scattered 1,400 ft, visibility 150 m.

Minimum number of alternates?

A minimum of **two alternates** is required.

Visibility and ceiling are below no/one alternate planning minima.

What is the difference between “-FD2” and “2FD-” on the FMA?

- -FD2: Flight Director 1 OFF, Flight Director 2 engaged
- 2FD-: Flight Director 2 engaged, Flight Director 1 INOP

This indicates different system availability states.

True or false:

During an ILS autoland, at 1500 ft the localizer controls roll, offline channels engage automatically, and flare mode is armed.

True

At what cabin altitude must a pilot use supplemental oxygen?

When cabin altitude exceeds 10,000 feet.

Can the wing anti-ice system be tested on the ground?

Yes.

The valves will only remain open for 30 seconds.

If no weather forecast is available for the destination at ETA, can departure be conducted legally?

Yes.

Departure is legal if two alternates are selected, both meet planning minima, and sufficient fuel is carried to the most demanding alternate.

What is the recommended maximum thrust for taxiing at Wizz Air?

40% N1

Higher thrust may cause excessive acceleration and brake wear.

What happens when the avionics ventilation system is placed in SMOKE configuration?

The blower fan is de-energized, the extract fan runs, and the air conditioning extract valves open.

Dispatch to LHBP, runway 13R, dry.

Forecast: 020G45 kt, CAVOK.

Minimum number of alternates?

No alternates required.

CAVOK conditions and independent runways allow no-alternate dispatch.

What is VLE?

VLE (Maximum Landing Gear Extended Speed)

The highest speed permitted with landing gear extended.

Are there external warnings for an APU fire?

Yes.

An external fire warning horn sounds and the APU fire light illuminates to alert ground personnel.

How do you calculate rate of descent for a 3-degree glide slope?

Approximation formula:

Rate of descent (FPM) = Groundspeed $\times$ 5

Example:

120 kt $\times$ 5 = 600 FPM

Regarding Low Fuel State Emergency, when must the flight crew report a PAN PAN and when must the flight crew report a MAYDAY?

Fuel emergencies are classified based on remaining fuel and estimated fuel at landing.

PAN PAN (Low Fuel State Alert):

Declared when the flight crew determines the aircraft may land with less than Final Reserve Fuel.

Final Reserve Fuel is the minimum fuel required to fly 30 minutes at 1500 ft AGL at the alternate airport.

The situation is becoming critical, but the aircraft is not yet in immediate danger.

ATC provides priority handling but not full emergency treatment.

MAYDAY (Fuel Emergency):

Declared when the flight crew determines the aircraft will land with less than Final Reserve Fuel.

No further fuel-saving options are available and the aircraft must land as soon as possible.

ATC treats this as a full emergency with absolute priority.

How many seats does Wizz Air offer in the Airbus A320, A321 and A321neo?

Airbus A320: 180 seats

Airbus A321: 230 seats

Airbus A321neo: 239 seats

Is the following statement true or false?

Concerning the three entries to the hold, the entry has to be flown on heading.

True

Holding entries are flown on heading rather than tracking a course initially.

Holding entry types:

- Parallel entry
- Offset (teardrop) entry
- Direct entry

Flying on heading ensures correct alignment with the holding pattern.

What engines are fitted to the Airbus A320 and Airbus A321?

Both aircraft are fitted with IAE V2500 series engines.

Thrust ratings vary by variant, typically between 22,000 and 33,000 lbs.
Bypass ratio is approximately 4.8:1.

What engines are fitted to the Airbus A321neo?

The A321neo is fitted with **Pratt & Whitney PW1100G Geared Turbofan engines.**

Fuel consumption is reduced by approximately 16–20%.
High bypass ratio improves efficiency and reduces noise.

Why are flight level intervals increased to 2000 ft in non-RVSM airspace?

Above FL290, air density is lower and altimeter accuracy decreases.
To reduce collision risk, vertical separation is increased to 2000 ft.
In RVSM airspace, improved altimetry allows 1000 ft separation.

What does the Variable Load (VL) include?

Variable Load includes:

- Flight crew and their baggage
- Catering and removable service equipment
- Food and beverages
- Potable water
- Lavatory chemicals
- Special operational equipment

It is not revenue-generating but affects weight and balance.

What is the definition of VEF (Engine Failure Speed)?

VEF is the **calibrated airspeed at which the critical engine is assumed to fail during takeoff.**

It is used in determining **V1**.

Under which weather conditions would you not take off, and why?

Freezing rain:

No holdover time exists. Ice accumulates rapidly and can freeze control surfaces.

Heavy snow:

Runway contamination reduces braking.

Snow or ice on wings increases stall speed and reduces lift.

Asymmetric shedding can cause roll instability.

Can you explain the IFR and RVSM flight levels?

IFR flight levels:

Tracks 360°–179° use odd flight levels.

Tracks 180°–359° use even flight levels.

Non-RVSM airspace:

1000 ft separation up to FL290

2000 ft separation above FL290

RVSM airspace:

1000 ft separation between FL290 and FL410

What does the Traffic Load (TL) include?

Traffic Load includes:

- Passengers
- Checked baggage
- Cargo

Used in weight and balance and fuel planning.

Receiver Failure Phraseology (Wizz Air):

Say: “WIZZ AIR... transmitting blind due to receiver failure.”

Close Isobars on Surface Chart:

Indicates strong winds due to a steep pressure gradient.

COM/NAV in EMER ELEC with EMER GEN:

Operational: ACP 1 & 2, VHF1, HF (if equipped), RMP1, VOR1, ILS1.

Dew Point:

Can only be equal to or lower than air temperature.

DU with black screen & white diagonal line:

Indicates DMC (Display Management Computer) failure.

“Omission”:

Means excluding someone or something.

ETOPS & Categories:

ETOPS allows twin-engine aircraft to fly routes >60 min from an alternate airport.
Categories:

- ETOPS-60 → 60 min
- ETOPS-120 → 120 min
- ETOPS-180 → 180 min

DC power from AC system

- DC comes from a TRU (Transformer Rectifier Unit), which steps down AC voltage and rectifies it to DC for essential systems like avionics and battery charging.

Ice types & frost

- Clear ice: large droplets freeze slowly, smooth and transparent, very dangerous.
- Blade ice: forms on fan blades during cold/humid conditions, risky at engine start.
- Rime ice: small droplets freeze instantly, rough and opaque, disrupts airflow.
- Frost: forms on parked aircraft in sub-zero conditions, thin but disrupts lift.

Holdover Time (HOT)

- HOT = estimated time anti-icing fluid prevents ice/frost accumulation.
- Starts at final application of fluid (Type II/III/IV; Type I has minimal HOT).
- Duration depends on fluid type, weather, surface temperature.

Navigation position integrity

- RAIM (Receiver Autonomous Integrity Monitoring) and
- AIME (Autonomous Integrity Monitored Extrapolation) ensure GPS/FMS navigation accuracy.

What is one-step de/anti-icing?

- One-step de/anti-icing is a process where a single application of fluid is used to both remove existing ice, frost, or snow from the aircraft and provide short-term protection against further accumulation (anti-ice).

Critical surfaces for de-icing

- Surfaces that must be ice/frost/snow-free before takeoff:
 1. Wings (including flaps, slats, ailerons) – for lift and control.
 2. Horizontal and vertical stabilizers – for stability and pitch/yaw control.

3. Control surfaces (elevators, rudders, ailerons, spoilers, etc.) – must move freely.
4. Propellers/rotor blades – ice affects thrust and balance.
5. Engine inlets and fan blades – prevent ice ingestion, maintain efficiency.
6. Pitot tubes and static ports – critical for correct airspeed and altitude readings.
7. Fuselage – significant accumulation affects aerodynamics and weight.

Two-step de/anti-icing

- Two-step process uses two separate fluid applications:
- Step 1 – De-icing: Heated Type I fluid removes existing ice, snow, or frost. Low viscosity, little anti-icing protection.
- Step 2 – Anti-icing: Type II, III, IV fluids applied to protect from further ice formation. Higher viscosity, creates protective layer for extended holdover.
- Used when extended HOT is needed, especially in active precipitation, to prevent re-icing before departure.

RNP values and applicable routes

- RNP (Required Navigation Performance): Maximum lateral deviation allowed from flight path for 95% of flight time.
 - RNP-0.3: Approaches and helicopter operations – high precision required.
 - RNP-1: Terminal and departure procedures – stay within 1 NM of track.
 - RNP-5: En-route navigation in continental airspace – stay within 5 NM.
 - RNP-10: Oceanic/remote airspace – stay within 10 NM.

GPWS Mode 2 operating altitudes

- 50 ft to 2450 ft AGL
- Mode 2 detects excessive descent rates toward terrain to prevent CFIT.
 - Monitors radio altitude and closure rate.
 - Soft alert: “Terrain Terrain” if terrain approaches.
 - Hard alert: “Pull Up” if closure rate dangerous.
- Critical in mountainous or rapidly changing terrain areas. Immediate corrective action required.

RNP-5 definition

- Aircraft must remain **within 5 NM of intended flight path $\geq 95\%$ of flight time.**
- Applied for **en-route navigation in controlled airspace.**

JAR CPL validity

- 5 years

IRS strapdown alignment purpose

- establish trihedron relative to Earth.

Where is EGT measured?

- Measured after the combustion chamber at the high-pressure (HP) turbine outlet.
- Thermocouples monitor this to ensure engine health; too high EGT risks turbine damage.

When should PACK FLOW be set to HI?

- Smoke removal or hot/humid conditions. Increases airflow for comfort and safety.

HYD PUMP FAULT light indicates:

- Reservoir low level
- Reservoir overheat
- Low air pressure
- Pump low pressure
- Signals possible hydraulic system malfunction requiring crew attention.

Normal brake check timing:

- As soon as possible on all flights to ensure brakes are functional.

VFR ATC contact in Class E:

- Not required for continuous contact. Class E is controlled for IFR; VFR can operate without continuous ATC unless otherwise instructed.

Normal IR alignment duration:

- Approximately 10 minutes. Ensures accurate navigation data before flight.

Anti-ice and de-icing protection:

- Engine nacelles

- Three outboard slats

Air-driven artificial horizon during takeoff run:

- Nose-up attitude due to pendulous vanes
- Forward acceleration affects pendulous vanes, causing a temporary false nose-up indication.

Climbing at constant Mach below tropopause through an inversion:

- CAS decreases, TAS increases
- CAS affected by lower density; TAS rises due to higher local speed of sound.

IVSI reduced ... error by use of ...:

- timelag; dashpots
- Dashpots reduce VSI lag for more immediate vertical speed readings.

Fuel check frequency:

Every hour, or at least once if flight <1 hour

Ensures monitoring of consumption and remaining fuel for safety.

Describe the definitions of light, moderate and severe turbulence

Turbulence is the irregular movement of air resulting in sudden, unpredictable changes in an aircraft's altitude and attitude. It is caused by atmospheric phenomena such as jet streams, mountain waves, thunderstorms, or wake turbulence from other aircraft.

Light Turbulence

Characteristics:

- Slight and irregular changes in altitude, attitude, or vertical speed
- Aircraft remains fully controllable
- Passengers feel slight strain against seatbelts
- Unsecured objects may shift slightly

Operational impact:

- Cabin crew can continue service
- Minor pilot corrections required

Moderate Turbulence

Characteristics:

- More frequent and stronger altitude and attitude changes

- Aircraft remains controllable but requires larger corrections
- Passengers feel noticeable strain against seatbelts
- Unsecured objects may move, cabin movement becomes difficult

Operational impact:

- Seatbelt sign on
- Cabin crew should secure themselves
- Service may be suspended

Severe Turbulence

Characteristics:

- Large, abrupt, violent changes in altitude, attitude, and airspeed
- Aircraft may be briefly difficult to control
- Passengers may be thrown against seatbelts
- Loose objects become airborne

Operational impact:

Immediate pilot action required

All occupants must remain seated

Possible altitude or route change required

Which firefighting category needs to be applicable at an airport for the Airbus A320?

The Airbus A320 falls under Category 6 according to ICAO airport rescue and firefighting standards.

The category is based on aircraft length of approximately 38 meters and fuselage width.

Special considerations:

For infrequent A320 operations (not more than 8 movements per day), Category 4 may be permitted

If operating to a Category 4 airport, the alternate airport must be at least Category 6

Explain the following abbreviations regarding approach lighting systems

Approach Lighting Systems help pilots transition from instrument flight to visual flight during landing, especially in low visibility.

HIRL

High-Intensity Runway Lights

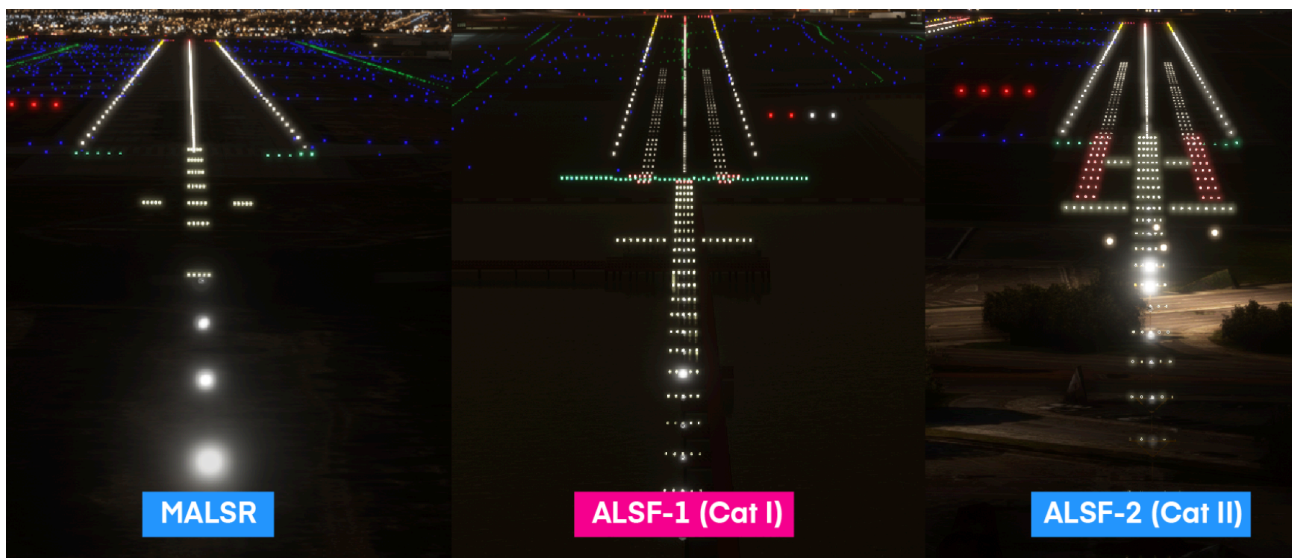
Bright adjustable runway edge lights for night and low visibility operations



MALSR

Medium-Intensity Approach Light System with Runway Alignment Indicator Lights

Combination of steady and sequenced flashing lights extending up to 2,400 ft before the threshold

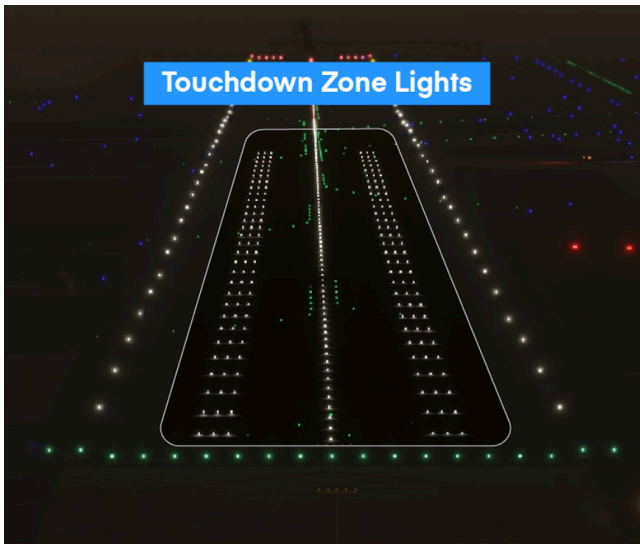


TDZ/CL

Touchdown Zone and Centerline Lighting

TDZ: White lights in first 3,000 ft of runway

CL: Embedded centerline lights spaced every 50 ft



ALSF-1

Approach Light System with Sequenced Flashing Lights (Category I ILS)
Extends 2,400–3,000 ft with steady-burning and sequenced flashing lights

ALSF-2

Approach Light System with Red Side Row Lights (Category II/III ILS)
Same as ALSF-1 with additional red side row lights in the last 1,000 ft

SALS / SALSF

Short Approach Lighting System
Shortened ALS, typically at shorter runways

SSALF

Simplified Short Approach Lighting System with Sequenced Flashing Lights
Reduced number of lights, cost-effective system

MALD / MASLF

Medium-Intensity Approach Lighting with Sequenced Flashing Lights
Extends up to 1,400 ft before the threshold

ODALS

Omni-Directional Approach Lighting System
Flashing lights arranged in a circle, used for non-precision approaches

RAIL

Runway Alignment Indicator Lights
Sequenced flashing white lights aiding runway alignment

Study page RWY LIGHTS

What is a MEL?

A Minimum Equipment List (MEL) is an authority-approved document listing which aircraft systems may be inoperative while allowing safe and legal dispatch.

Key features:

- Aircraft-type specific
- Derived from the MMEL
- Cannot be less restrictive than the MMEL
- Includes operational and procedural limitations
- May require maintenance actions or performance penalties

MEL categories:

Category A

Repair within time specified in MEL

Category B

Repair within 3 calendar days

Category C

Repair within 10 calendar days

Category D

Repair within 120 calendar days

Importance:

Maintains safety

Minimizes operational disruptions

What are the frequency ranges for:

NAV

COM

ILS

VOR

NAV (Navigation):

108.000 – 117.975 MHz

Used for VOR and ILS navigation aids.

COM (Communication):

118.000 – 136.975 MHz

Used for air-to-ground and air-to-air communication with ATC.

ILS (Instrument Landing System):

108.000 – 111.975 MHz

Used for localizer guidance during precision approaches.

VOR (VHF Omnidirectional Range):

108.000 – 117.975 MHz

Used for en-route navigation and approaches.

Which protections are fully active in normal law?

In normal law, the aircraft benefits from full flight envelope protection, including:

- Load factor protection
- Pitch attitude protection
- High angle of attack protection
- Alpha floor
- Bank angle protection
- High-speed protection (VMO/MMO)

How would you define airmanship?

Airmanship is the consistent use of good judgment and well-developed skills to accomplish flight objectives safely and efficiently. It is based on uncompromising flight discipline and developed through systematic skill acquisition and proficiency. A high level of situational awareness completes airmanship and is obtained through knowledge of oneself, the aircraft, the environment, the team, and risk.

Key elements of airmanship include:

- Situational awareness
- Flight discipline
- Knowledge and proficiency
- Risk management
- Crew resource management
- Automation management
- Professionalism and responsibility

Airmanship enhances safety, reduces errors, and supports effective decision-making in complex situations.

Regarding the turn and slip indicator, how would you define turn, slip, and skid?

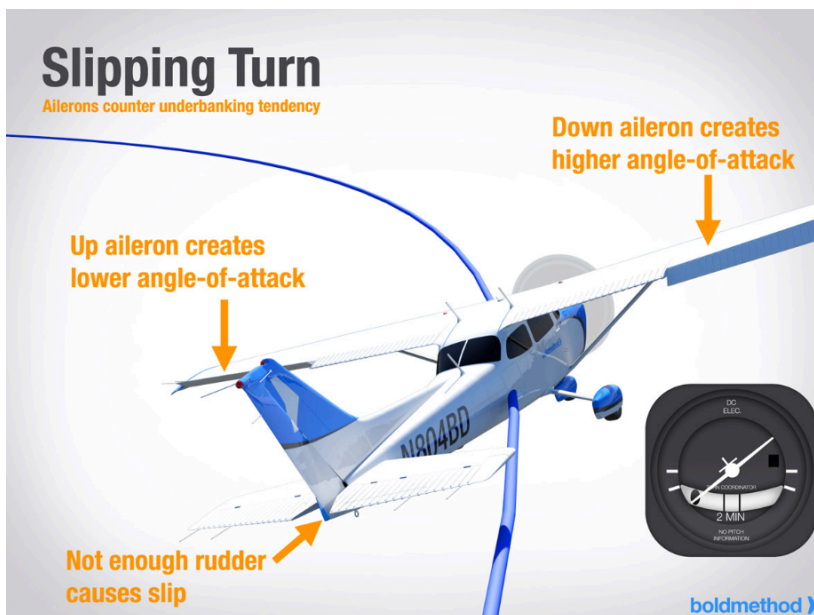
The Turn and Slip Indicator provides information on rate of turn and coordination.

Turn:

Movement about the yaw axis that changes the aircraft's direction. In a coordinated turn, the ball remains centered.

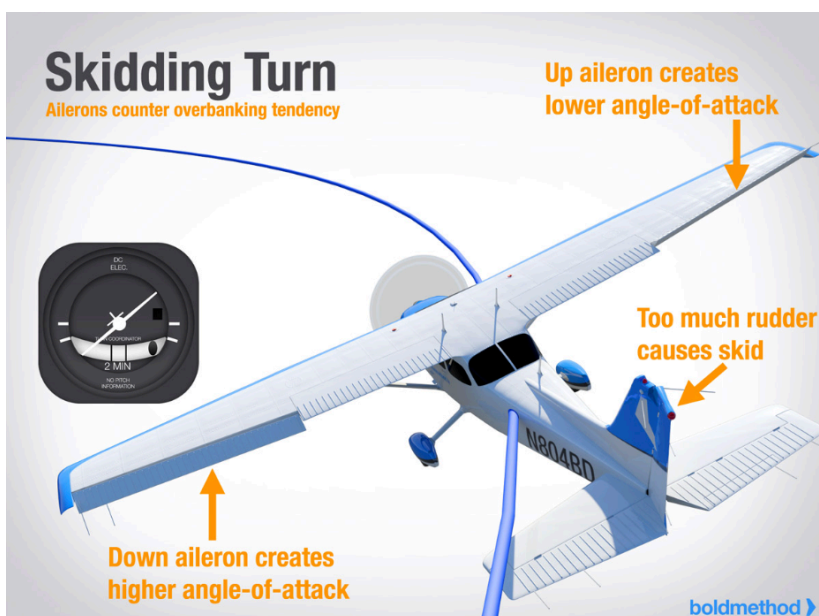
Slip:

The aircraft is not turning fast enough for the bank angle. The ball moves toward the inside of the turn (lower wing).



Skid:

The aircraft is turning too fast for the bank angle due to excessive rudder. The ball moves toward the outside of the turn (higher wing).



At what point does normal cabin pressurization occur?

Normal cabin pressurization begins during the takeoff roll when takeoff power is applied. This ensures a smooth and gradual change in cabin pressure and prevents passenger discomfort.

What happens to the engine anti-ice valves if electrical power is lost?

If electrical power is lost, the engine anti-ice valves fail to the open position. This ensures continued ice protection and prevents engine icing during an electrical failure.

Are the brake system pressure and the brake accumulator pressure displayed on the ECAM WHEEL page?

No.

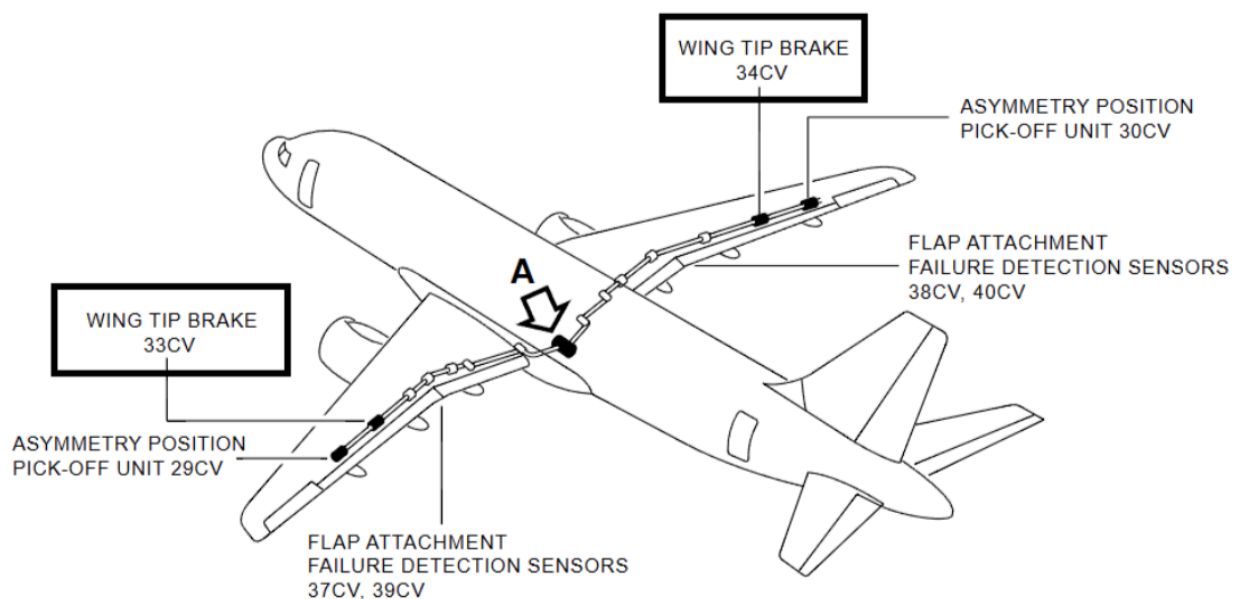
Neither brake system pressure nor brake accumulator pressure is displayed on the ECAM WHEEL page. These values are shown on the ECAM HYD page.

Under what conditions do the wingtip brakes engage?

Wingtip brakes engage automatically in case of:

- Slat or flap overspeed
- Slat or flap asymmetry
- Symmetrical runaway

They prevent further movement of the slats and flaps to protect the aircraft structure.



If a master warning is triggered below 1000 feet, what action should the crew take at Wizz Air?

If a master warning is triggered below 1000 feet, the decision to continue or abort the approach remains at the discretion of the flight crew. If an autoland is engaged, it also remains the crew's decision whether to proceed or disengage it. The situation must be assessed based on available time, altitude, and severity of the warning.

What is the definition of a wet runway?

A wet runway is a runway surface that is shiny or reflective due to moisture but has no significant areas of standing water.

It is not dry and not contaminated.

If the runway only appears darkened but not shiny, it is considered damp, not wet.

An aircraft climbs at a constant TAS through an inversion. What happens to RAS and Mach number?

Mach number decreases because the speed of sound increases in warmer air.

Rectified airspeed decreases due to decreasing air density with altitude.

The airplane outside air temperature probe measures what?

The probe measures total air temperature(TAT) and compensates for kinetic heating to determine static air temperature.

It removes the effect of ram air heating caused by aircraft motion.

What happens to EAS when descending at a constant CAS?

EAS increases.

As the aircraft descends into denser air, the same CAS represents a higher dynamic pressure, resulting in increased EAS.

What components make up the avionics smoke detection system?

- Smoke detector
- Smoke detection control unit

The detector senses smoke, and the control unit processes the signal and triggers cockpit warnings.

What is the definition of QFE?

QFE is the actual atmospheric pressure measured at an airport or airfield, without adjustment to sea level.

When QFE is set on the altimeter, it reads zero when the aircraft is on the runway.

It gives height above that specific airfield and is mainly used locally, often in military aviation.

What is a shuttle valve?

It allows a component (like an actuator for landing gear or flight controls) to be operated by two separate sources—usually the primary hydraulic system and an emergency/backup system—while keeping the two systems isolated from each other.

In the Southern hemisphere, during deceleration following a landing in an easterly direction, the magnetic compass will indicate an apparent turn to the...

North.

This is due to compass dip and inertia error.

In the Southern Hemisphere, the rule is SAND: South when accelerating, North when decelerating.

What phrase does the Pilot Monitoring call out after takeoff clearance has been issued while on the runway at Wizz Air?

“Confirmed”.

Name a source where you can find the exact descriptions of marshalling signals.

LIDO Emergency Response Manual (ERM).

What is the maximum allowable last-minute change for passengers and baggage when no crew LMC is made?

600 kg.

What is the RFFS category for an A320 in normal operations?

Category 6.

A trough of low pressure is generally associated with?

Rising air, cloud formation, precipitation, turbulence, and potentially thunderstorms. It is typically linked to unstable weather conditions.

How does an INS or IRS determine true north?

By using gyroscopes to detect the Earth's rotation during alignment. This allows the system to reference true north rather than magnetic north.

Once the EVAC alert has been activated, how can it be canceled from the cockpit?

By using the EVAC command switch.

What is the effect of flap extension on V_x and V_y ?

V_x decreases.

V_y decreases.

Flap extension increases lift but also increases drag, reducing climb performance.

From which flight level do the regulations require a quick donning type oxygen mask for the flight crew in a pressurized aircraft?

FL250 (25,000 feet).

On a pressurized aeroplane, supplemental oxygen is used to?

Provide passengers and crew with oxygen during cabin depressurization.

At high altitudes, oxygen levels are insufficient for human survival.

In the event of depressurization, oxygen masks prevent hypoxia.

This is required by aviation regulations.

The Bourdon tube is used to measure?

Pressure.

How it works:

A curved flexible tube expands or contracts with pressure changes.

The movement is converted into a mechanical gauge reading.

Used in hydraulic, pneumatic, fuel, and oil pressure systems.

Seasons are due to the?

Inclination of the Earth's polar axis with the ecliptic plane.

Earth is tilted approximately 23.5 degrees relative to its orbital plane.

As Earth orbits the Sun, different areas receive varying solar radiation.

Summer occurs when a hemisphere is tilted toward the Sun.

Winter occurs when tilted away.

What do vortex generators do?

Vortex generators improve airflow over aircraft surfaces.

They transfer energy into the boundary layer.

They delay airflow separation.

They improve lift and control effectiveness at high angles of attack.

Will a jet-powered aircraft flying above the optimum altitude have a larger or reduced range?

Reduced range.

Reasons:

Lower air density reduces engine efficiency.

Higher angle of attack is required, increasing induced drag.

Specific fuel consumption increases.

Which conditions will most likely cause the greatest increase in take-off distance?

Tailwind
Up-slope runway
High temperature

Complete the sentence:

Compressibility error is caused by a false increase of dynamic pressure, requiring a negative correction to the CAS to obtain EAS.

At high speeds, air compression increases measured dynamic pressure.
This causes CAS to overread.
A negative correction is needed to determine EAS.

GPWS mode 5 provides both visual and audible warnings to the pilot if the aircraft is under which conditions?

When the aircraft is significantly below the ILS glideslope.

Conditions:
Below 1000 feet radio altitude.
More than approximately 1.3 dots below the glideslope.

Warnings:
“GLIDESLOPE, GLIDESLOPE” audio warning.
Flashing visual warning on the PFD.

Key takeaway:
GPWS Mode 5 warns when flying dangerously low on the ILS glideslope.

**A public transport aircraft is intended to operate at FL390.
The total number of oxygen masks in the cabin must be at least the same as the total number of?**

Seats plus an additional 10 percent.

Reason:
Covers infants and non-seat occupants.
Allows for mask failures.
Meets regulatory requirements.

Key takeaway:
Oxygen masks must equal number of seats plus 10 percent.

What abnormal conditions would cause the FADEC to automatically abort an engine start?

The FADEC (Full Authority Digital Engine Control) system will automatically abort an engine start in case of hot start, overtemperature, stalled start, or no light-up. These conditions indicate abnormal engine behavior that could cause damage if the start sequence were to continue.

An aircraft having undergone an anti-icing procedure must be anti-icing fluid free at the latest when?

At rotation (so before takeoff).

What is the weather minima required for selecting a takeoff alternate at Wizz Air?

The weather minima required for a takeoff alternate is the applicable landing minima, provided it is at least CAT 3A.

Station numbers (Stn) and water lines (WL) are?

A means of locating airframe structure and components.

Understanding Station Numbers and Water Lines:

Station Numbers measure distances fore and aft along the fuselage.

Water Lines measure distances vertically from the aircraft's reference plane.

Used in aircraft design, maintenance, and repairs.

LRBS 1212 09012KT 1200 BKN003 PROB40 SHRA BECMG 2122 14015KT 4800 BKN006 OVC020 PROB40 1600 -RA BECMG 0203 2400 -RA OVC008 TEMPO 0312 0800.

For landing at Bucharest Băneasa (LRBS) at 2130 UTC the wind vector and weather could be?

Wind 140 degrees at 15 knots, light rain.

Decoding the forecast:

Time of landing: 2130 UTC.

BECMG 2122 means between 2100–2200 UTC, wind changes to 140 degrees at 15 knots.

PROB40 1600 -RA indicates a 40 percent chance of 1600 m visibility with light rain.

Which word can "smart" be synonymous with?

Intelligent.

What should you do if you receive a TCAS RA “climb climb” during an emergency descent, and why?

You must follow the TCAS RA.

TCAS is designed to prevent mid-air collisions and must be followed even during emergency descents. Ignoring it could result in a collision.

For approximately how many minutes does a PBE (Protective Breathing Equipment) provide a breathable atmosphere?

Approximately 15 minutes.

This allows crew members to perform emergency duties while protected from smoke or toxic fumes.

The red LED indicator light on an emergency torch is flashing at a 4-second interval. What does this indicate?

The battery charge is low.

Pre-flight checks for emergency torches:

Flashes every 5–10 seconds indicate normal charge.

Flashes every 4 seconds indicate low battery.

Torch must be secure and easily accessible.

What is the standard mass of a female passenger on a scheduled flight?

70 kg.

Does the FADEC provide EGT limit protection at all times?

EGT limit protection is only available during ground auto starts.

What type of autoland system would be required for the landing to continue following a single failure below alert height?

Fail-operational (fail-active).

Below alert height, the autoland system must be capable of continuing the landing without pilot intervention after a single failure.

Fail-passive systems require a go-around after failure.

Fail-operational systems continue the landing using redundancy.

Key Takeaway:

A fail-operational autoland system allows continuation below alert height after a failure.

Map scale on a Lambert conformal chart is?

Constant along a parallel of latitude (the standard parallel).

The scale varies slightly away from the standard parallel, increasing toward the equator and the poles. Lambert conformal charts preserve angles and shapes well, which is why they are widely used for aeronautical navigation and flight planning.

The Decision Point Procedure is a procedure to reduce the amount of fuel carried on a flight by?

Reducing the contingency fuel required for the entire flight by calculating it only from the decision point to the destination.

Explanation:

A decision point is selected along the route where the aircraft has enough fuel to either

continue to destination or divert. This reduces fuel weight, improves performance, and lowers operating costs, especially on long-haul flights.

What will be the effect on the reading of an altimeter of an aircraft parked on the ground as an active cold front is passing?

The altimeter indication will first increase, then decrease.

Explanation:

As a cold front approaches, surface pressure falls, causing the altimeter to indicate a higher altitude. At frontal passage, pressure is lowest and the over-reading is greatest. After the front passes, pressure rises sharply and the indicated altitude decreases back toward the true field elevation if QNH is not updated.

What is the most common specific cause of pilot induced accidents?

Poor pre-flight planning.

This includes inadequate fuel planning, insufficient weather assessment, incorrect weight and balance calculations, navigation errors, and failure to consider aircraft limitations.

An aircraft is descending at constant RAS. What will happen to Mach number and TAS?

Both Mach number and true airspeed decrease.

As the aircraft descends, air density increases, reducing TAS for the same RAS. At the same time, temperature increases, raising the speed of sound and reducing Mach number.

What are the lowest conditions forecast for 1900 UTC at Katowice (EPKT)?

**EPKT 0624 21010KT CAVOK BECMG 0810 9999 SCT025 SCT040 PROB30
TEMPO 1218 7000 -RADZ BKN012 BECMG 1620 7000 BKN020 TEMPO 1824
4000 RADZ BKN005**

Broken clouds at 500 feet and visibility of 4000 meters.

Explanation:

At 1900 UTC, the TEMPO 1824 period applies. The lowest forecast conditions are broken cloud at 500 feet (BKN005) with visibility temporarily reduced to 4000 meters due to rain drizzle.

Which of the following is a prohibited combination in aircraft registration letters? LLL TTT YYY RTB

TTT.

This combination is prohibited because it is associated with emergency or distress signaling conventions and could cause confusion in communications.

The modern anti-skid processes are based on the use of a computer whose input data is?

Modern anti-skid systems use a computer that processes:

- Idle wheel speed
- Braked wheel speed
- Desired wheel slip rate

The system compares wheel speeds and modulates brake pressure to prevent skidding and maximize braking efficiency, especially on wet or contaminated runways.

Up to what altitude will generally healthy people be able to stay without showing any signs of suffering from hypoxia?

Generally healthy individuals can remain up to 10,000–12,000 feet without noticeable hypoxia symptoms.

Above this altitude, cognitive performance and night vision begin to degrade, and oxygen is increasingly required.

What can you tell about FAIL-SAFE designed structural parts?

Fail-safe design ensures that if one structural component fails, another load path carries the load.

Key features include redundancy, parallel load paths, and damage tolerance.

This prevents sudden catastrophic failure and allows safe continued operation until repair.

After extending the RAT, how can its position and status be checked?

The RAT position and status are checked on the **HYD page**, which shows hydraulic pressure and RAT operation.

In contrast to brief showers, prolonged precipitation preceding a front is most likely related to which clouds?

Prolonged precipitation is associated with **stratiform clouds**, especially **nimbostratus**, typically ahead of a warm front.

These produce steady rain or drizzle over wide areas.

What is the correct procedure regarding the push button and handset for making a PA announcement?

- Press and hold the PA transmission push button
- Use the pedestal-mounted handset

A flight carried out below optimum altitude would result in less/more time and less/more fuel usage?

It results in more time and more fuel usage.
Higher air density increases drag, engines operate less efficiently, and overall cruise performance is reduced.

How can you verify that the A/THR (Autothrust) system is active?

By checking **column five of the Flight Mode Annunciator (FMA)**, which shows autothrust status.

What is the default managed climb speed below 10,000 feet?

250 knots.

Going from the equator to the north pole, the altitude and temperature of the tropopause will?

- Tropopause altitude decreases
- Tropopause temperature increases

The tropopause is highest and coldest near the equator and lowest and warmer near the poles.

When deployed automatically, how many ground spoilers deploy?

All ten ground spoiler panels deploy automatically to maximize lift dump and braking effectiveness.

An aircraft is flying at a constant indicated altitude over a warm airmass. The altimeter reading will be?

The altimeter will indicate **less than the real altitude**.
In warm air, the aircraft is actually higher than indicated.

What happens when APU bleed air is selected regarding priority to engine bleed air?

APU bleed air has **priority over engine bleed air**.

Under what conditions will the RAT deploy in case of a hydraulic system malfunction?

The RAT deploys when the crew selects the **guarded RAT MAN ON push button**.

What are the indications that the PBE oxygen supply has been depleted?

- The hood collapses and touches the face
- A flashing red light appears (in addition to the green light)

These indicate oxygen supply exhaustion.

What is the relationship between VMCG and V1?

VMCG must be equal to or less than V1 to ensure directional control can be maintained during an engine failure on takeoff.

**If you are at 33,000 feet and the OAT is -45°C , what is the ISA deviation?
ISA $+6^{\circ}\text{C}$.**

The air is 6°C warmer than standard at that altitude.

Complete the following sentence:

When selecting an alternate aerodrome, the runway of this facility must be sufficiently long to allow a full stop landing from 50 ft above the threshold (jet type aircraft, dry runway) within ...% of the landing distance available.

60 percent of the Landing Distance Available (LDA).

For jet aircraft under commercial air transport rules, the required landing distance must not exceed 60 percent of the available runway length. This provides an adequate safety margin for operational uncertainties.

Characteristic weather associated with a polar maritime air mass moving over northwest Europe in winter would include?

Widespread cumulus and cumulonimbus activity over land.

A polar maritime air mass originates in cold polar regions and travels over the relatively warm North Atlantic. This makes it unstable and moist, resulting in convective cloud formation, frequent showers, gusty winds, turbulence, and occasionally snow or hail over land in winter.

With respect to a modern jetliner's pressurisation system, the normal maximum negative differential pressure is?

The pressure at which the duct relief valve is set to operate.

Negative differential pressure occurs when outside pressure exceeds cabin pressure. Aircraft structures are not designed to tolerate large negative differentials, so relief valves open automatically to prevent structural damage, typically at around -0.3 to -0.5 psi.

With a gas turbine engine, the Engine Anti-Ice system should be selected ON when?

When the outside air temperature is $+10^{\circ}\text{C}$ or below and visible moisture is present.

Engine anti-ice prevents ice accumulation on engine inlets and compressor components. Visible moisture includes cloud, fog, rain, snow, sleet, or ice crystals. Ice can form above 0°C due to airflow cooling and pressure changes, so the $+10^{\circ}\text{C}$ threshold is used.

Vr for transport category aircraft must be at least ... $\times$ Vmca

1.05 × V_{mca}.

Rotation speed must be sufficiently above the minimum control speed in the air to ensure directional control during rotation if an engine fails, in accordance with certification standards.

Variable inlet guide vanes are fitted to gas turbine engines to?

Prevent a compressor stall at low engine speed.

Variable inlet guide vanes regulate airflow into the compressor. At low engine speeds, they restrict airflow to maintain stable compressor operation. At high speeds, they open to allow maximum airflow, improving efficiency and thrust.

How will the recovery from a stall be affected when the centre of gravity moves aft?

An aft centre of gravity makes stall recovery more difficult.

When the centre of gravity moves aft, longitudinal stability is reduced. The aircraft becomes more sensitive in pitch and has less natural nose-down tendency after a stall. This makes stall recovery slower and requires greater forward control input. In some aircraft, especially T-tail designs, an aft CG increases the risk of a deep stall.

Aeroplanes certified to JAR-25 must not operate across areas where search and rescue would be especially difficult without survival equipment if it flies to a distance corresponding to greater than?

90 minutes at cruising speed from an area suitable for making an emergency landing.

JAR-25 (now CS-25) requires survival equipment when operating beyond 90 minutes from suitable landing areas, such as over oceans, polar regions, deserts, or remote terrain.

An electrical resonant circuit is constructed from?

An inductor and a capacitor, connected either in series or in parallel.

A resonant circuit stores energy alternately in magnetic and electric fields and resonates at a specific frequency. These circuits are used in radios, filters, and oscillators.

Calculate the approximate rate of descent, given:

- ILS glide path angle: 3.5 degrees
- Groundspeed: 150 kt

Approximately 900 feet per minute.

$$150 \times 5 = 750 \times (3.5/3) = 870$$

If a fuel sample appears cloudy or hazy, the most probable cause is?

Water contamination.

Suspended water droplets give fuel a cloudy or milky appearance. Water in fuel can lead to engine flameout, corrosion, and microbial growth and must be removed before flight.

Which front most frequently gives freezing rain over Central and Eastern Europe?

A warm front.

Freezing rain commonly occurs when warm air overruns cold air at the surface, creating supercooled liquid precipitation that freezes on contact. This setup is most often associated with warm fronts.

Is the following statement true or false?

Emergency exits, like those found on the Airbus A320 must be outlined externally by a 2 inch band of contrasting colour.

True

Regulatory Requirement for Emergency Exit Markings

The requirement for emergency exits to be outlined in a contrasting color is specified in international aviation regulations, including EASA CS-25, FAA FAR 25, and ICAO Annex 8. The purpose of the contrasting 2-inch band is to enhance visibility for both ground rescue crews and passengers in case of an emergency evacuation.

Why is This Required?

Identification in Low Visibility Conditions

During smoke, fire, or poor lighting, emergency exits must be easily recognizable from outside.

The contrasting color ensures visibility in day and night operations.

Evacuation and Rescue Operations

In an accident, emergency responders must quickly locate and access exits to assist passengers.

A contrasting color helps differentiate exit doors from the aircraft fuselage.

Passenger Awareness

Passengers must be able to recognize emergency exits quickly.

This is particularly important for overwing exits, which are often used during evacuations.

Example: Airbus A320

The overwing exits on an A320 are clearly marked with red or bright yellow bands to distinguish them from the fuselage color.

Main cabin doors also feature a contrasting border to comply with regulatory standards.

What is a SPECI?

Definition of a SPECI

A SPECI (Special Weather Report) is an unscheduled meteorological report issued when significant weather changes occur at an aerodrome.

It provides updates between regular METAR reports.

When is a SPECI Issued?

A SPECI is issued when any of the following occurs:

Visibility drops below operational limits (e.g., less than 1,500 m).

Thunderstorms begin or end.

Wind speed or direction changes significantly.

Ceiling (lowest cloud base) decreases below a critical level (e.g., below 500 ft).

Heavy precipitation or snowfall begins.

Example of a SPECI Report

SPECI EDDL 081130Z 31015G30KT 0800 +SN OVC003 M01/M03 Q0995

Issued at 1130Z for Düsseldorf Airport (EDDL).

Wind 310 degrees at 15 knots, gusting to 30 knots.

Visibility 800 m.

Heavy snow with overcast clouds at 300 feet.

Temperature -1°C, Dewpoint -3°C.

Pressure 995 hPa.

What braking capability remains if the accumulator on the alternate braking system is the only pressure source?

If the accumulator on the alternate braking system is the only pressure source, it allows seven applications of the brake pedals before pressure is depleted.

An operator must ensure that the lowest MDH for a non-precision approach procedure which is based upon the use of a VOR is not lower than?

The lowest MDH for a VOR-based non-precision approach is 300 feet. An operator must not authorize approaches below this limit.

Explanation:

Minimum Descent Height (MDH) in Non-Precision Approaches

MDH is the lowest altitude to which an aircraft can descend during a non-precision approach before a missed approach must be initiated if the runway is not in sight.

A non-precision approach is one where vertical guidance is not provided.

Regulatory Minimum for a VOR-Based NPA

According to EASA and ICAO PANS-OPS, the lowest permissible MDH for a VOR-only approach is 300 feet AGL.

Factors Affecting MDH Calculation

Obstacle clearance

Approach lighting and visibility

Aircraft category and performance

Example

A VOR approach chart typically shows MDH values between 300 and 600 feet AGL.

300 feet is the absolute regulatory minimum.

Given the statements:

**Some kings are queens
All queens are beautiful**

Both conclusions are incorrect.

What happens to the speed range between high- and low-speed buffet during a descent?

The speed range between the high-speed and low-speed buffet increases at a constant indicated airspeed.

During descent:

Air density increases

Stall speed decreases

Critical Mach number increases

As a result, the margin between low-speed buffet and high-speed buffet becomes larger, giving a wider safe speed range.

What happens to the cockpit door in the event of an electrical power failure?

Correct answer shown:

The cockpit door automatically unlocks.

Where can the procedures for a deactivated main wheel brake be found?

Minimum Equipment List (MEL)

If something is inoperative and you're still flying, MEL is king.

A flight crew licence holder has completed a two-day hospital stay. What must be done before flying?

Consult an Aviation Medical Examiner (AME).

Because people want a shortcut answer like "self-assess" or "only if serious".

Regulatory reality:

- Any hospital admission is a medical event.
- The pilot must not self-clear.
- AME decides fitness. Period.

Does a reduced power climb result in higher trip fuel consumption?

Yes.

Why:

- Reduced power = longer time at low altitude.

- Lower altitude = higher drag + worse SFC.
- Net result = more fuel burned overall, despite “saving” thrust initially.

What triggers the flow of passenger oxygen masks?

Pulling the mask starts oxygen flow.

Explain Max Altitude vs Optimum Altitude

Max Altitude:

- Structural, aerodynamic, pressurization, buffet-limited.
- You *can* be there, barely.

Optimum Altitude:

- Best fuel efficiency for current weight.
- Moves higher as fuel burns.
- Airlines chase it with step climbs.

How many Display Management Computers (DMCs) are installed?

Three.

Function of the CREW SUPPLY pushbutton

Allows low-pressure oxygen flow to the crew mask.

What are the errors of a Mach meter?

Correct categories:

- Instrument error
- Pressure / position error
- Shockwave effects at high Mach

The normal brake system uses which hydraulic pressure, and which hydraulic system does the alternate brake system use, backed up by the hydraulic brake accumulator?

The normal brake system operates using Green hydraulic pressure, while the alternate brake system uses Yellow hydraulic pressure, with backup from the hydraulic brake accumulator.

What is the aviation definition of height?

In aviation, height is defined as the measured distance above the ground.

What types of fires should a HALON fire extinguisher be used on?

A HALON fire extinguisher should be used on electrical and flammable liquid fires, as it effectively suppresses these types of fires.

After rain, a runway with a shiny surface but no visible water patches is classified as:

A runway that appears shiny after rain but has no visible water patches is classified as wet, as it still retains a thin moisture film that can affect braking performance.

How does the APU fuel system obtain fuel?

The APU fuel system obtains fuel from the left manifold via the left-side fuel pumps. If required, it can also use the APU fuel pump.

What are the different Aeronautical Information Circular (AIC) colors?

AICs provide non-time-critical aviation information.

- **White: Administrative matters**
- **Yellow: Operational matters including ATS facilities and requirements**
- **Pink: Safety-related topics**
- **Mauve: UK airspace restrictions**

A/P	GEN	General	Light blue
	ENR	Enroute	Green
	AD	Aerodromes	Yellow

A/C	Administration	White
	Operational and ATS	Yellow
	Safety	Pink
	Airspace Restrictions	Mauve
	Maps and Charts	Green

- **Green: Maps and charts**

Which index color of the Aeronautical Information Circular (AIC) contains information about ATS facilities?

Yellow

Yellow AICs cover Air Traffic Services facilities and operational requirements.

Which of the following combinations provides the best visual landmarks for a VFR flight?

1) Large water reservoir

2) Fruit land farm

3) Excessively high mast

4) Roads of a large city

5) High tension power

Best visual landmarks:

- Large water reservoir
- Excessively high mast
- High tension power line

These are large, distinctive, easily recognizable, and consistently visible from the air.

What are ribs for in wings?

Ribs increase the strength of an aircraft wing structure.

They define the aerodynamic shape, distribute loads to the spars, and prevent deformation.

What is the purpose of an air traffic control ATC clearance?

An ATC clearance is an authorization issued to prevent collisions between known aircraft, allowing an aircraft to proceed under specified conditions within controlled airspace. It ensures safe separation, efficient traffic flow, and coordinated operations.

What does the registration mark consist of and by who is it assigned?

A registration mark consists of a country prefix and a unique alphanumeric code. It is assigned by the Civil Aviation Authority of the state of registration or A Common mark authority.

What is the purpose of baffle check valves?

They ensure one-way fuel flow toward the pumps, prevent fuel from moving away during maneuvers, and help maintain balanced fuel distribution.

What is a conditional ATC clearance?

A clearance issued with a specific condition that must be met before proceeding.

Order: identification, condition, clearance, reiteration of condition.

Example: "WIZZ AIR 9UD, BEHIND BOEING 737 ON SHORT FINAL, LINE UP BEHIND."

What braking action do you expect with braking coefficient 0.25?

Poor

Measured coefficient	Estimated braking action	Code
0.40 and above	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 and below	Poor	1

What happens to the pack valves when the bleed air system loses pressure?

The pack valves automatically close to prevent unregulated airflow and system damage.

What are the definitions of ASDA and TODA?

ASDA: The length of the takeoff run plus the length of the stopway, where provided.

TODA: The length of the takeoff run available (TORA) plus the length of the clearway, where provided.

If the autothrust (A/THR) is active and the pilot selects a speed lower than Alpha protection speed, what speed will the aircraft maintain?

Vls (Lowest Selectable Speed) is the minimum speed the aircraft will maintain when autothrust (A/THR) is engaged and the pilot selects a speed below Alpha Protection.

Alpha Protection is an automatic function that prevents the aircraft from stalling by increasing thrust and limiting the angle of attack.

The system will not allow speed to drop below Vls in managed or selected speed mode.

How are MMO and VMO limits displayed on the PFD in Normal Law?

In Normal Law, MMO (maximum Mach operating speed) and VMO (maximum operating speed) are displayed on the PFD with red and white striped barber pole indications.

During a crosswind takeoff, which engine is considered critical on a multi-engine jet aircraft? What happens on the three axes of the plane?

In jet aircraft, a “critical engine” is not defined in the same way as in piston twins. Jet engines produce symmetric thrust aligned with the longitudinal axis, so both engines are equally critical by design.

However, during strong crosswind operations, the upwind engine can become effectively critical due to environmental effects.

If the upwind engine fails:

- Asymmetric thrust combines with weathervaning.
- Directional control becomes more difficult.
- More rudder and corrective control is required.

Yaw axis (vertical axis):

Asymmetric thrust causes yaw toward the failed engine.

Crosswind causes weathervaning effects.

The combined effect can significantly increase yaw demand, especially at low speed.

Roll axis (longitudinal axis):

Asymmetric thrust creates roll toward the inoperative engine.

Crosswind can reinforce this roll, increasing wingtip clearance risk during rotation.

Aileron input and a small bank toward the live engine help counteract this.

Pitch axis (lateral axis):

Engine failure has little direct pitch effect.

Secondary effects include slight pitch changes due to thrust loss or drag asymmetry.

Crosswind has minimal direct influence on pitch.

Pilot response includes maintaining V₂, using rudder and aileron as required, and avoiding over-rotation.

How many automatic pressurization controllers are installed in the Airbus A320?

The Airbus A320 has two Cabin Pressure Controllers (CPC 1 and CPC 2).

One operates actively while the other remains in standby, providing redundancy.

Where can you find the names of the designated postholders in an airline organization?

In the **OMM (Operations Management Manual)**.

This document lists responsible personnel and organizational authority roles.

What is produced by the coalescence process in the mid-latitudes?

In the mid-latitudes, the coalescence process produces **only drizzle or very light rain**.

This is because precipitation there is usually dominated by the Bergeron-Findeisen process.

Pure coalescence occurs mainly in warm clouds and does not typically generate heavy rain.

How does an APU fire test differ when using battery power compared to full electrical power?

When using battery power, fewer indications illuminate.
Only the red **APU FIRE** and **AGENT/DISC** pushbuttons light up.
Other indications require AC electrical power.

What is the maximum permitted distance between the departure airport and the designated takeoff alternate for an A320?

250 nautical miles.

At what cabin altitude must passengers use supplemental oxygen?

When cabin altitude exceeds 14,000 feet.
Passenger oxygen masks deploy automatically to prevent hypoxia.

What is the correction factor for landing on a wet runway?

When landing on a wet runway, the Landing Distance Available (LDA) must be at least 115% of the LDR

What is the requirement for refueling during boarding?

During refueling while boarding, at least one pilot must remain on the flight deck. This is a crucial safety measure to ensure that a qualified crew member is available to manage any potential emergencies, such as a fuel spill or an evacuation scenario. The pilot on the flight deck monitors aircraft systems, maintains communication with ground personnel, and ensures compliance with safety procedures. This requirement is part of standard operating procedures to enhance passenger and crew safety during the refueling process.

Full Length Take Off

What is the minimum time separation for a departing LIGHT or MEDIUM aircraft taking off behind a HEAVY aircraft which are using:

- **The same runway or**
- **Parallel runways separated by less than 760 m (2 500 ft) or**
- **Crossing runways if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below or**

- **Parallel runways separated by 760 m (2 500 ft) or more, if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below.**

A minimum time separation of 2 minutes is required to allow wake turbulence to dissipate and ensure safety. Wake turbulence consists of vortices generated by the wingtips of large aircraft, which can be dangerous to smaller aircraft.

How can the whiteout effect be defined?

A whiteout is a weather phenomenon that causes disorientation and low visibility in conditions such as snow, overcast clouds, or fog.

It is defined as a condition of diffuse light where no shadows are cast, as a result of a continuous white cloud layer merging with a white snow-covered surface. In this situation:

- No surface irregularities are visible.
- A dark object may still be visible.
- The horizon is indistinct or invisible.

Whiteout conditions can cause pilots to lose reference to the ground, increasing the risk of spatial disorientation.

With regard to the Centre of Gravity limits of an aircraft:

Can the aircraft operator's CG limitations be less or more restrictive than the manufacturer's CG limitations?

Yes, an aircraft operator can impose more restrictive CG limits than the manufacturer.

Operators may tighten CG limitations for safety, operational efficiency, or specific performance considerations, but they cannot exceed the manufacturer's certified limits.

Intermediate Take Off After a Full Length Take Off

What is the minimum time separation for a departing LIGHT or MEDIUM aircraft when taking off behind a HEAVY aircraft which are using:

- **An intermediate part of the same runway; or**
- **An intermediate part of a parallel runway separated by less than 760 m (2 500 ft).**

A minimum time separation of 3 minutes is required.

This increased separation compared to full-length takeoffs (2 minutes) is due to the fact that the intermediate takeoff position places the smaller aircraft closer to residual wake turbulence from the preceding heavy aircraft, increasing the potential risk.

How is TAT calculated in regards to SAT and what is Ram Rise?

Total Air Temperature (TAT) is calculated as:

$TAT = \text{Static Air Temperature (SAT)} + \text{Ram Rise}$

SAT is the ambient temperature in undisturbed airflow.

Ram Rise accounts for compression heating and frictional effects as the aircraft moves through the air at high speeds.

TAT is used in performance calculations for aircraft engines and aerodynamics.

In straight flight, as speed is increased, whilst trimming to keep the stick force zero, in which direction (downwards or upwards) are the elevator and trim tab deflected?

As an aircraft's speed increases in straight and level flight, and the pilot trims to maintain zero stick force:

- The elevator deflects downwards to counteract the increased lift and maintain level flight.
- The trim tab deflects upwards to hold the elevator in position without pilot input.

This setup prevents excessive nose-up pitching as speed increases.

Why are high latitude flights in Polar regions subject to specific problems with the use of a gyro magnetic compass?

In Polar Regions, the gyro magnetic compass experiences:

1. Magnetic anomalies near the North Magnetic Pole, making magnetic variation impossible to quantify.
2. Rapidly changing magnetic variation, causing great circle track deviations as longitude changes.

These factors make magnetic navigation unreliable at high latitudes.

At night an aircraft observes a luminous signal requesting help.

To indicate that he has received these ground signals, the pilot must do which action?

If an aircraft observes a luminous distress signal from the ground at night, it must acknowledge receipt by:

- Switching its landing lights on and off twice, or
- If not equipped with landing lights, switching its navigation lights on and off twice.

This action confirms to the sender that the distress signal has been seen and will be acted upon.

A large cargo aircraft is fully loaded, ready for departure and with the trim set.

The PIC is informed that extra cargo is being loaded onto the aircraft, forward of CG.

The PIC amends the load sheet and attains a revised trim setting.

What would the trim adjustment be, forward or aft?

If additional cargo is loaded forward of the aircraft's center of gravity, the CG shifts forward. This requires a trim adjustment aft (nose-up).

A forward CG increases longitudinal stability but reduces elevator authority, making the aircraft harder to rotate at takeoff.

What is the purpose of Hydraulic Thermal Relief Valves?

Hydraulic thermal relief valves are designed to relieve excess pressure in hydraulic systems caused by temperature increases.

As hydraulic fluid heats up, thermal expansion can cause excessive pressure buildup in the system. The relief valve prevents damage to hydraulic components by allowing excess fluid to escape, maintaining system integrity.

An aeronautical station that wishes to put out a general call to all aircraft in its area should address the call including which content?

When an aeronautical station wants to make a general call to all aircraft in its area, it begins the call with:

“ALL STATIONS ...”

This phrase indicates that the message is not directed at a specific aircraft, but to all aircraft operating within range.

Mountain effect, occurring for instance with NDBs, is caused by what physical phenomenon?

The mountain effect impacting Non-Directional Beacons (NDBs) is caused by radio wave reflection off mountain surfaces.

Reflections can distort or delay signals, leading to inaccurate direction-finding by an aircraft's Automatic Direction Finder (ADF).

What is induced drag?

Induced drag is a byproduct of lift and occurs due to the wing's movement through the air.

It is greatest at low speeds or high angles of attack, such as during takeoff and landing. It is caused by wingtip vortices, which disrupt smooth airflow and create resistance.

The phenomenon of a change in direction of a radio wave due to a change in its speed is called?

This phenomenon is called refraction.

Refraction occurs when a radio wave passes through different air densities or temperature layers, altering its speed and bending its path.

What is the standard mass used to calculate the weight of a flight crew member?

The standard mass for a flight crew member at Wizz Air is 85 kg.

Visibility is 350 meters, and the minimum required for takeoff is 200 meters. Can you depart?

Low-Visibility Operations procedures must be in force for departures in conditions with visibility lower than standard minimums. In this case, the visibility is 350 meters, which is above the minimum of 200 meters, so the answer is yes, but it still requires LVO procedures to ensure safety, such as the use of enhanced guidance systems, specific aircraft equipment, and crew training.

How does an INS/IRS system determine magnetic North?

The Inertial Navigation System or Inertial Reference System uses gyroscopes to calculate the aircraft's position and movement based on true North.

The system then applies a stored magnetic variation, the difference between true and magnetic North, to calculate magnetic North for navigation and heading calculations.

Gyrocompassing (Finding True North): Upon startup, the system rests while its laser gyros detect the Earth's rotation rate, which is about 15°/hour. By sensing this rotation, the system identifies the North-South axis and establishes True North.

Magnetic Variation: To obtain a magnetic heading, the system uses its current position (latitude/longitude) to look up the local magnetic variation (the difference between magnetic and true north) from a database.

What is the minimum rate of descent in UK airspace when no specific restriction is given?

In UK airspace, unless specified otherwise, the minimum rate of descent is 500 feet per minute. This ensures a safe and controlled descent while adhering to air traffic control instructions.

An aeroplane scheduled to fly an oceanic sector departs from a high-altitude airport in the tropics at 14:00 local time. The runway is exceptionally long.

What would most likely be the most limiting factor(s) in determining the take-off mass?

The primary limiting factors are:

- High altitude, which reduces air density and affects engine performance and lift
- High temperature, which further reduces air density

Despite a long runway, thin air reduces takeoff performance and limits allowable mass.

In which modes is VOR, ILS, and NDB raw data information displayed on the ND?

VOR, ILS, and NDB raw data information can be displayed on the ND in multiple modes. ARC and ROSE NAV modes display various navigation aids, including VOR, RMI, and NDB. ROSE VOR and ROSE ILS modes are used to display specific information related to VOR and ILS navigation systems.

How should you inform ATC if it becomes clear that the flight will land with less fuel than the final reserve at a suitable airport?

PAN PAN PAN ? MAYDAY MAYDAY MAYDAY, WIZAIR..., FUEL EMERGENCY

If an aircraft is facing an emergency involving insufficient fuel, the correct action is to declare a MAYDAY. Repeating MAYDAY three times indicates distress and gives the call priority.

What happens when either engine anti-ice system is open?

When engine anti-ice is open, engine load increases. To maintain stability and prevent flameout, the system limits maximum N1, activates continuous ignition, and increases minimum idle RPM.

What are the two types of flight guidance?

The two types of flight guidance are managed and selected.

Managed guidance follows the flight plan stored in the system.

Selected guidance allows the pilot to manually set parameters such as speed or altitude.

What is the main factor which contributes to the formation of very low clouds ahead of a warm front?

Very low clouds ahead of a warm front form due to saturation of cold air by rain evaporating into it.

As rain falls into cooler air ahead of the front, evaporation increases moisture content, leading to cloud formation at low levels.

What kind of weather can you expect in a low pressure area and what kind of weather in a high pressure area?

Low-pressure area:

Low cloud base, precipitation, mild temperatures

Good visibility outside precipitation

Associated with unstable air, leading to stormy weather

High-pressure area:

Clear skies, hazy conditions, poor visibility

Inversions may trap pollutants and fog

Typically stable air, leading to calm weather

An aircraft which experiences a headwind of 40 kt while making its way towards the centre of a microburst may expect, when crossing the microburst, to face a windshear of how many knots?

An aircraft experiencing a 40-knot headwind while flying toward the center of a microburst will encounter a sudden wind shift when crossing it. In a microburst, headwinds transition to downdrafts and then strong tailwinds.

This results in a total wind shear of 80 knots (40 knots headwind plus 40 knots tailwind change).

Microbursts are highly dangerous, particularly during takeoff and landing.

How does GBAS work?

GBAS is an advanced satellite-based navigation system that enhances the accuracy and reliability of GPS signals for aircraft during approach and landing. It provides precision approach guidance down to Category III operations.

The system consists of the following key components:

Ground stations installed at airports receive raw GPS signals.

Correction algorithms calculate GPS errors caused by ionospheric delays, satellite clock errors, and atmospheric conditions.

Corrected GPS information is sent to aircraft via a VHF data broadcast.

Aircraft avionics receive the corrected signals, improving navigation accuracy and allowing precise approaches.

GBAS replaces older Instrument Landing Systems by offering more flexibility, multiple approach paths, and reduced signal interference.

What are the phases of a reciprocating engine?

The four phases of a reciprocating engine cycle are:

Induction – Air-fuel mixture enters the cylinder.

Compression – The mixture is compressed.

Combustion – The mixture is ignited, creating power.

Exhaust – Burned gases are expelled.

This process is intermittent and occurs at constant volume.

What processes take place in the carburettor?

A carburetor is responsible for mixing fuel and air before combustion.

Air flows through a venturi, creating a pressure drop.

Fuel is drawn into the airstream and mixes with air in the correct ratio.

The mixture is delivered to the engine cylinders for combustion.

What is the weather minima for commencing a visual approach?

The weather minima for commencing a visual approach is a visibility of 5000 meters and a ceiling of 1000 feet.

Additionally, the runway must be in sight for the pilot to continue the approach visually.

These minima ensure the aircraft can be safely navigated and aligned with the runway before landing.

How does thrust reverse work on a jet engine?

Thrust reversal changes the direction of the bypass airflow to redirect thrust forward, slowing the aircraft.

Jet engines generate thrust primarily using fan bypass flow.

Thrust reversers redirect this airflow forward, creating a braking force.

Thrust reversers are mainly used after landing to assist in deceleration.

How do you call the change of water vapour directly to ice? And the change of ice directly to water vapour?

deposition, sublimation

What is a microburst? And what is windshear?

Microburst: A localized, intense downdraft from a cumulonimbus cloud, about 4 km in diameter, causing dangerous wind shifts.

Windshear: A sudden change in wind speed or direction, occurring vertically or horizontally over a short distance.

Both pose significant risks during takeoff and landing.

10 minutes on a meridian is equal to?

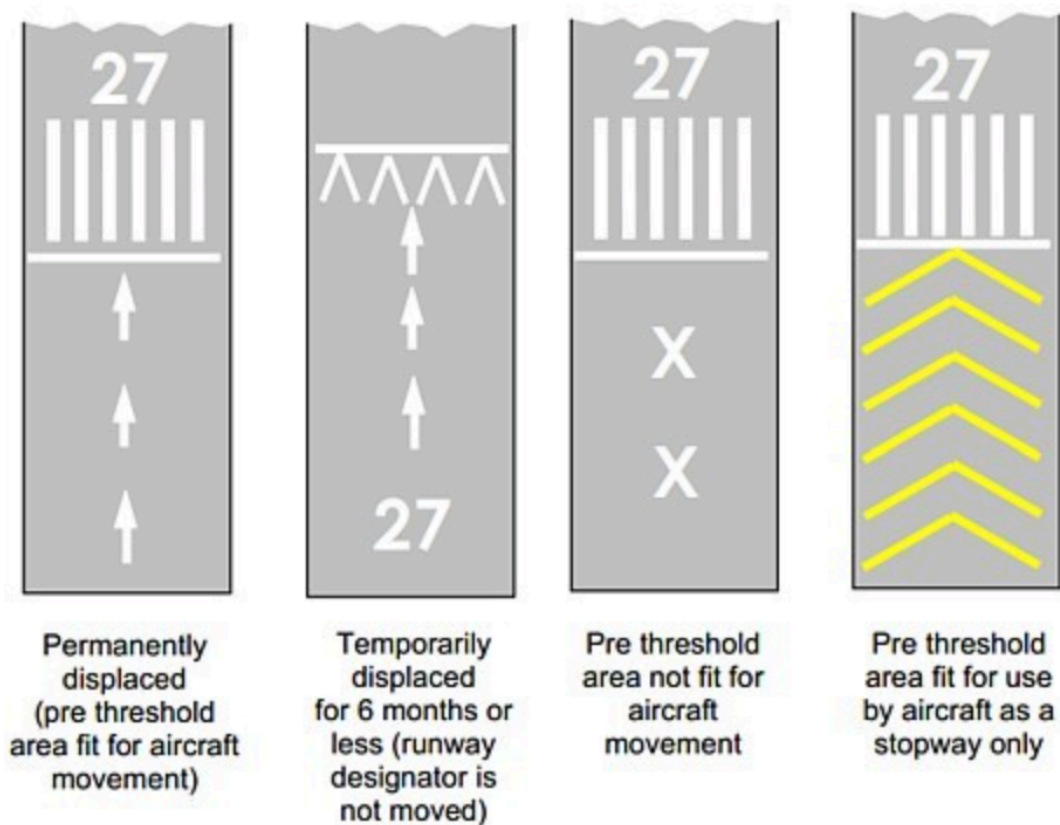
10 minutes on a meridian equals 10 nautical miles.

1 degree of latitude equals 60 nautical miles.

1 minute of latitude equals 1 nautical mile.

10 minutes of latitude equals 10 nautical miles.

Explain the following runway or threshold markings:



Where would you find the Runway Condition Assessment Matrix?

The Runway Condition Assessment Matrix (RCAM) can be found in the Quick Reference Handbook (QRH).

This matrix helps pilots assess runway contamination such as snow, ice, or water and determine aircraft performance and landing capability.

What is the call during a prepared emergency landing made during the descent through 1500 ft?

At Wizz Air, during a prepared emergency landing at 1500 ft, the correct call is: "Emergency stations! Emergency stations!"

This command instructs the cabin crew to take their assigned emergency positions and prepare for impact.

Where does the weight act when an aircraft is parked on the ground?

When an aircraft is on the ground, weight acts through the center of gravity (CG).

The CG represents the point where total mass is balanced.

The weight is transmitted through the landing gear struts to the ground.

During a routine flight, which of the following would result after the loss of GEN 2 and the subsequent start of the APU?

If GEN 2 fails and the APU is started, GEN 1 will supply AC 1 and its downstream systems, while the APU supplies AC 2 and its downstream systems.

This configuration maintains a stable electrical supply for critical systems.

**In an upper weather chart, the wind is in relation to true or magnetic north?
And the wind speed is indicated in which unit?**

Wind direction is referenced to true north.

Wind speed is given in knots.

Following a departure of an A380, how long is the minimum separation?

The minimum required separation following an A380 departure is 3 minutes.

This is due to the strong wake turbulence generated by the aircraft.

Normally, how should you call a flight attendant?

Flight attendants are normally called using the overhead forward or aft call pushbutton.

This ensures clear and direct communication.

British Airways departed last. KLM departed before SAS. SAS departed after United. United departed before KLM. American departed after SAS. Which airline departed first?

United departed first.

SAS departed after United and before KLM.

KLM departed before SAS.

American departed after SAS.

Therefore, United must have departed first.

In which stage of cumulonimbus clouds can you expect the anvil?

The anvil forms during the mature stage of a cumulonimbus cloud.

During this stage, strong updrafts push air to the tropopause, where it spreads laterally, forming the anvil shape.

This stage is associated with heavy precipitation, lightning, strong winds, and turbulence.

What is the purpose of the Sharklet on the wing of the aircraft?

Sharklets (blended wingtips) are designed to:

- Reduce induced drag
- Improve fuel efficiency
- Increase range and climb performance

They prevent wingtip vortices from forming, enhancing aerodynamics.

When is fog reported?

Explain the different types of fog

Fog is reported when visibility falls below 1000 meters.

Types of fog:

- Radiation fog – Forms during clear, calm winter nights when the ground cools rapidly, cooling the air above.
- Evaporation fog (Arctic smoke) – Occurs when cold air moves over a warmer, moist surface, causing moisture to evaporate and condense.
- Advection fog – Forms when mild, moist air flows over colder ground (e.g. snow-covered ground) with wind speeds below 10 knots.
- Frontal fog – Forms ahead of a warm front, where continuous rain saturates the air, reducing visibility.

You have landed on a runway in bad weather conditions, alternating red and white centreline lights are visible, how much runway will you have left?

If alternating red and white centerline lights are visible, you have not more than 900 meters of runway left.

What lights can be seen on a taxiway?

Green – Taxiway centerline lights

Blue – Taxiway edge lights

A runway is 2000 m long, you can see only amber edge lights. How much runway will you have left?

Amber edge lights indicate the last 600 meters or one third of the runway length, whichever is less.

On a 2000 m runway, at least 600 meters remain.

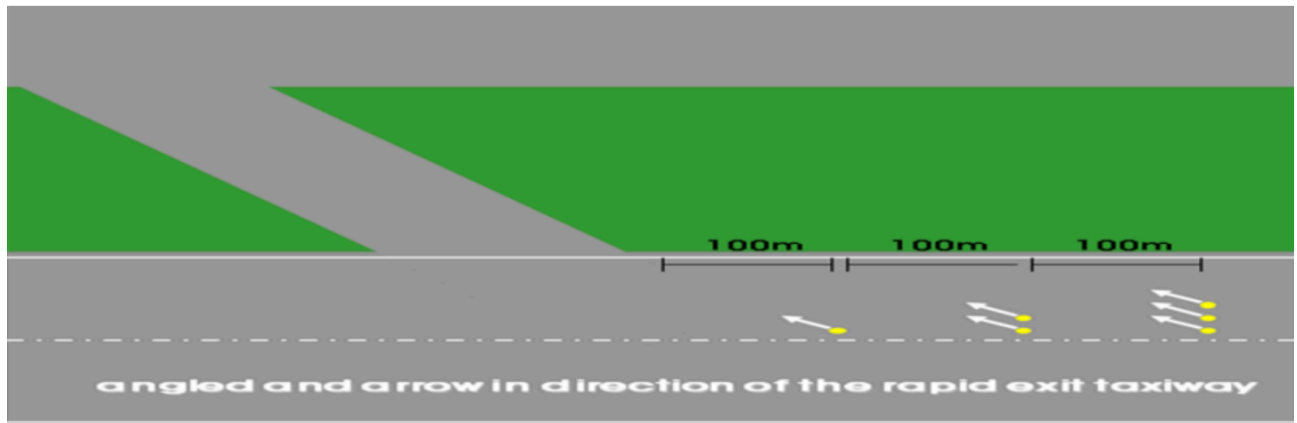
You see yellow lights near the centreline. What does this indicate?

They indicate a rapid exit taxiway.

The lights appear in a countdown sequence:

- Three lights – 300 m before exit
- Two lights – 200 m before exit

- One light – 100 m before exit



An air mass is considered unstable when?

An air mass is unstable when a rising air parcel continues to ascend due to lower surrounding air density, leading to:

- Cloud formation
- Convective activity
- Thunderstorms

If you have net performance, you are clear of an obstacle by how many feet?

If using net performance, the aircraft clears obstacles by at least **35 feet**.

When should mass and balance, and the center of gravity (CG) check be performed?

A mass and balance check should be performed:

1. Before each flight, especially when loading passengers, cargo, or fuel.
2. When there are changes in the aircraft's configuration, such as adding or removing seats, altering cargo distribution, or using auxiliary fuel tanks.
3. If the aircraft is close to maximum takeoff weight or landing weight.

What kind of line does centreline marking and taxiway markings have?

The runway centerline is marked with dashed white lines.
Taxiways have continuous yellow lines.

What is the screen height?

The takeoff part of the flight is the distance from the brake release point to the point at which the aircraft reaches a defined height.

This defined height is termed the “screen height”.

Varies by aircraft type and conditions:

- 35 feet – Class A aircraft
- 50 feet – Class B aircraft
- 15 feet – On wet runways

You have landed on a runway in bad weather conditions, only a red centreline is visible, how much runway will you have left?

If only red centerline lights are visible, you have not more than 300 meters (1000 feet) of runway remaining.

When the selected navigation database has expired, when must it be changed?

When the selected navigation database has expired, it must be changed prior to entering the preflight data.

An outdated database could contain incorrect or missing information, potentially affecting navigation and safety.

What lights are controlled by the three-position EMERGENCY EXIT Light switch on the cockpit overhead panel?

The three-position EMERGENCY EXIT Light switch controls exit signs, emergency lights, and escape path lighting.

These lights provide visibility and guidance during an evacuation.

If a military jet intercepts your aircraft and then lowers its landing gear while displaying steady landing lights over an aerodrome, what does this indicate?

It is a signal instructing you to land at that aerodrome.

This is an internationally recognized military interception procedure.

What are Krueger flaps, and what is their function?

Krueger flaps are leading-edge wing flaps designed to increase the wing's camber, thereby improving lift coefficient and enhancing aerodynamic performance during takeoff and landing.

After refueling, the fuel on board is 100 kg more than planned. What is the proper Last Minute Change (LMC) procedure in this situation?

When the fuel on board after refueling exceeds the planned amount by 100 kg, no Last Minute Change is required.

Standard procedures allow for small fuel discrepancies within a certain threshold without the need for a new load sheet.

Complete the following sentence:

The master minimum equipment list (MMEL) is established by ... and accepted by ...

The Master Minimum Equipment List is established by the aircraft manufacturer and accepted by the aviation authority (e.g. EASA, FAA).

The MMEL defines which equipment can be inoperative while maintaining airworthiness.

In the event of a hijacking where the cabin is under the control of multiple hijackers, including two in the cockpit, where can you find company policy guidelines on compliance and response?

Company hijacking compliance policy and procedures are found in the CAM.

This document outlines the appropriate response, including communication strategies and safety protocols.

If a grooved runway is reported as wet, how should it be classified for performance calculations?

A grooved runway reported as wet should still be considered wet for performance calculations.

Grooves help drain water but do not change the runway condition classification.

Cabin air for large aeroplanes is usually taken from the ...

- ☒ HP compressor.
- ☐ second fan stage.
- ☐ LP compressor.
- ☐ HP compressor and from the LP compressor if necessary.

One assessor drew an aircraft at 2700 ft and a runway with elevation 500 ft. Question: At what distance should you be if the glide slope is 3°?

➡ Step 1: Determine altitude to lose

The aircraft is at an altitude of 2,700 ft and the runway is at 500 ft. The total height to descend (h) is the difference between these two values:

$$h = 2700 \text{ ft} - 500 \text{ ft} = 2200 \text{ ft}$$

➡ Step 2: Apply the 3:1 rule of thumb

In aviation, a standard rule of thumb for a 3° glide slope is the **3:1 rule**, which states that you should allow 3 nautical miles (nm) of travel for every 1,000 ft of descent.

$$\text{Distance (nm)} \approx \frac{h}{1000} \times 3$$

$$\text{Distance (nm)} \approx \frac{2200}{1000} \times 3 = 6.6 \text{ nm}$$

Next question: same altitudes, but temperature -5°C .

How would the temperature affect your altitude, and what would you do?

I explained that we'd need to correct the DH/A because of cold-temperature error, meaning we'd effectively be lower than indicated and would need to fly higher. They wanted to know by how much — I guessed around 200 ft, actual correction was 167 ft.

$$\Delta\text{ISA} = \text{ISA} - \text{OAT}$$

$$4 \times H(\text{nmbr of flight levels, our case 2.2}) \times \Delta\text{ISA}$$

$$4 \times 2.2 \times -15 (\text{ISA deviation}) = -132$$

VHF and UHF frequency bands

Frequency name	Frequency	Application
Very Low Frequency (VLF)	3 - 30 kHz	Nil
Low Frequency (LF)	30 - 300 kHz	NDB/ADF
Medium Frequency (MF)	300 - 3000 kHz	NDB/ADF, long range communications
High Frequency (HF)	3 - 30 MHz	Long range communications
Very High Frequency (VHF)	30 - 300 MHz	Short range communication, VDF, VOR, ILS Localizer, marker beacons
Ultra High Frequency (UHF)	300 - 3000 MHz	ILS Glide Path, DME, SSR, Satellite communications, GNSS, Long range radars
Super High Frequency (SHF)	3 - 30 GHz	RADALT, AWR, MLS, Short range radars
Extremely High Frequency (EHF)	30 - 300 GHz	Nil

Turboprop landing distance factors? When is it added ? Grass or paved or both , wet or dry

70% (turboprop)

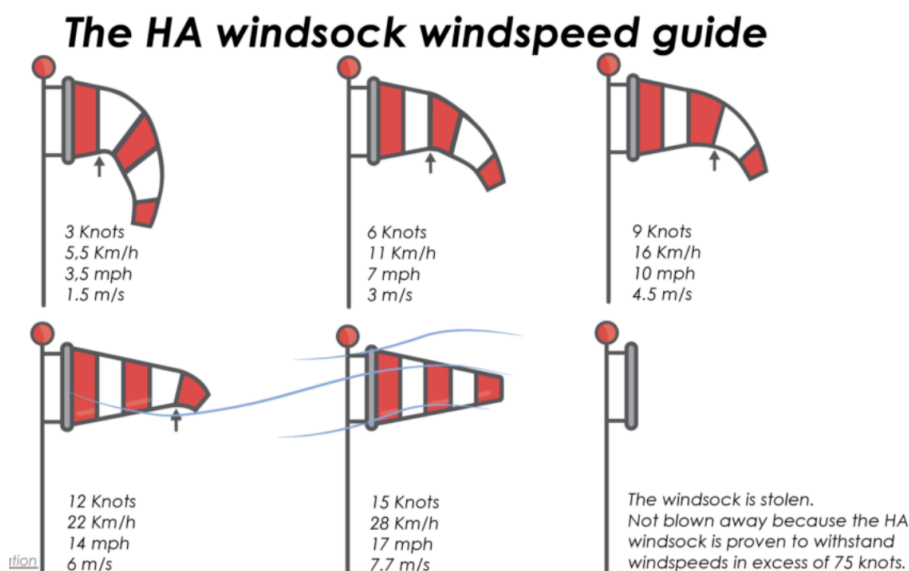
What is the latitude of the 'Tropic of Cancer'?

23.5N

Mark the correct statement concerning lightning discharge...

While flying through air that is electrically charged the aircraft is likely to become a charge carrier itself and can initiate a lightning discharge.

An image with a windsock, what is the experienced wind?



METAR and TAF decode. What is SA? TX? TN?

- **SA (Sand):** In the weather phenomena group, **SA** stands for Sand. It is used to describe sand obscuring visibility, often seen as SA (sand), SS (sandstorm), or PO (dust/sand whirls).
- **TX (Maximum Temperature Forecast):** Found in TAFs, **TX** is the indicator for the maximum expected temperature during the forecast period. It is followed by a temperature value in Celsius, and often the time (e.g., TX22/1718Z means maximum temperature is 22°C, expected on the 17th day at 1800Z).
- **TN (Minimum Temperature Forecast):** Found in TAFs, **TN** is the indicator for the minimum expected temperature during the forecast period. Similar to TX, it is followed by the temperature in Celsius (e.g., TN11/1810Z means minimum temperature is 11°C, expected on the 18th day at 1000Z).

Sign Present and Forecast Weather				
Qualifier		Weather Phenomena		
Intensity of Proximity 1	Descriptor 2	Precipitation 3	Obscuration 4	Other 5
- = Light Moderate (no qualifier) + = Heavy VC = Vicinity	MI = Shallow BC = Patches PR = Partial (Covering part of the aerodrome) DR = Low Drifting BL = Blowing SH = Shower(s) > TS = Thunderstorm FZ = Freezing (super cooled)	DZ = Drizzle RA = Rain SN = Snow SG = Snow Grains IC = Ice crystals (diamond dust) PE = Pellets GR = Hail GS = Small hail and/or snow pellets	BR = Mist FG = Fog FU = Smoke VA = Volcanic Ash DU = Widespread Dust SA = Sand HZ = Haze	PO = Dust/sand whirls SQ = Squalls FC = Funnel Clouds (tornado or waterspout) SS = Sandstorm DS = Dust storm

Then he draw RWY with elevation of 1000 ft, 3 degrees GS, I'm 10 NM from the RW. What should be my alt? Then he asked me when do we need to apply corrections? So he gave me temp and calculator and I found it

$3300(10/3 \text{ FLs}) + 1000 \text{ ft} = 4400 \text{ ft}$ roughly

A multi-engined performance class B aeroplane has a wingspan of less than 60 metres. What is the semi-width of the obstacle accountability area at a distance of D from the end of the TODA? A semi-width...

- ☒ of at least 1/2 wingspan plus 60 m, plus $0.125 \times D$
- ☐ of at least 2 x wingspan plus 90 m, plus $0.125 \times D$
- ☐ of at least 1/2 wingspan plus 90 m, plus $0.125 \times D$
- ☐ at the discretion of the pilot to ensure obstacle avoidance

How can I find V_2 if I have V_{mc}

- $1.1 \times V_{mca}$ (110% of the Minimum Control Speed)
- $1.2 \times V_s$ (120% of the Stall Speed) [🔗](#)

What is the best action after an abortive take-off?

After an abortive take-off (rejected takeoff), the best actions are: apply maximum braking and deceleration, deploy spoilers and reverse thrust if available, maintain directional

control, and stop the aircraft safely on the runway. Once stopped, assess the situation before vacating or taxiing.

Definition of Abortive Take-off:

An abortive take-off (rejected takeoff, RTO) occurs when the pilot decides to stop the aircraft on the runway instead of continuing the takeoff.

The decision is usually made at or below V1 speed.

The phenomenon when a wave bends when it passes around an impenetrable obstacle is called?

Diffraction

Explain how a cantilever wing is designed to handle external aerodynamic forces during flight.

Cantilever Wing Definition:

A cantilever wing has no external bracing or struts.

All loads are carried internally by spars, ribs, and skin.

External Forces:

Lift, weight, drag, fuel load, turbulence, and gusts.

Load Handling:

- Internal spars carry bending loads
- Ribs maintain shape and distribute loads
- Wing skin resists torsion and shear
- Wing root transmits forces to the fuselage

Advantages:

- Less drag due to no external struts
- Higher aerodynamic efficiency
- Space for fuel storage

What does NOSIG mean in a METAR/TAF?

NOSIG means No Significant Change expected.

In METAR:

Weather conditions are expected to remain unchanged for the **next two hours**.

In TAF:

No significant short-term changes from forecast conditions.

Where can you find the hottest surface?

Options:

1. **Water**
2. **Grass**
3. **Sand**
4. **Rocks**

Over rocks

Load factor is increased by?

Load factor increases due to:

- Upward gusts increasing angle of attack
- Abrupt pitch-up maneuvers
- Steep banked turns
- Turbulence combined with control inputs

Example:

A 60-degree banked turn produces a load factor of 2G.

If cargo is added in the aft section but not updated in the loadsheet, what happens with V1 and takeoff performance?

Adding cargo aft without updating the loadsheet shifts the CG rearward, which may increase V1 and reduce longitudinal stability. Takeoff performance calculations become invalid.

Effect on Center of Gravity:

- Aft cargo moves the CG rearward.
- Rearward CG reduces pitch stability.
- Increases risk of tail strike.
- Reduces elevator authority margin.

Effect on Takeoff Performance:

- V1 may change, but more importantly becomes invalid because calculations assume correct weight and CG.
- VR and V2 may no longer be appropriate.
- Rotation may be more aggressive than expected.
- Safety margins are reduced.

Loadsheet implications:

- Incorrect loadsheet means incorrect performance data.
- Aircraft may be operated outside CG limits unknowingly.
- Increased risk of stall, tail strike, or loss of control.

Why can High Frequency (HF) radio waves be used for long-distance communication, and what role does the ionosphere play?

HF radio waves can travel long distances because the ionosphere reflects or refracts them back toward the Earth, allowing communication beyond line of sight.

Explanation:

- The ionosphere is a region of the upper atmosphere (approximately 60–400 km).
- It contains ionized gases created by solar radiation.
- HF waves (3–30 MHz) are reflected or refracted back to Earth.
- Signals can “bounce” between the ionosphere and the Earth’s surface.
- This enables communication over thousands of kilometers.
- The effect depends on frequency, time of day, and solar activity.

What flight level should you fly for VFR on a track of 200° magnetic?

Even thousand feet plus 500 ft (for example: 4500 ft, 6500 ft, 8500 ft, or FL045, FL065, etc.).

Explanation:

- VFR cruising levels above 3000 ft AGL are based on magnetic track.
- Track 200° falls in the 180°–359° range (westbound).
- Westbound VFR uses even thousands plus 500 ft.
- This ensures vertical separation from opposite-direction traffic.

Given 145°W and 165°E, what is the difference in longitude?

50° longitude difference.

Explanation:

- $145^{\circ}\text{W} = -145^{\circ}$
- $165^{\circ}\text{E} = +165^{\circ}$

- Difference = 310°
- The shortest distance around the globe is used:
 $360^\circ - 310^\circ = 50^\circ$

What is meant by the term “Vertex”?

The vertex is the highest latitude point reached by a great circle track.

Explanation:

- A great circle is the shortest path between two points on Earth.
- Except for equatorial or meridian routes, it curves toward a pole.
- The point of maximum latitude is called the vertex.

A turbojet aeroplane has swept-back wings, a central fuel tank, and inner and outer wing tanks. Central tank fuel is fully consumed by landing. How does the landing CG compare to top of climb?

The landing CG will be further aft compared to the CG at top of climb.

Explanation:

- Central tank fuel is usually located near the aircraft's CG.
- At TOC, all tanks are full, keeping CG more forward.
- Fuel is typically burned first from the central tank.
- Removing mass near the CG shifts CG aft toward the wing tanks.
- Aft CG reduces longitudinal stability and must remain within limits.

Explain the concept of critical Mach number (Mcrit) and its relationship with angle of attack (AOA).

Critical Mach Number:

- The lowest Mach number at which airflow somewhere on the aircraft reaches Mach 1.
- Localized supersonic flow occurs before the aircraft itself is supersonic.
- Beyond Mcrit, shock waves, buffet, and rapid drag increase appear.

Angle of Attack relationship:

- Increasing AOA increases local airflow speed over the wing.
- Higher AOA causes Mcrit to be reached at a lower aircraft Mach number.

- Lower AOA allows higher Mach before compressibility effects occur.

Summary:

Higher AOA → lower Mcrit

Lower AOA → higher Mcrit

Positive G will cause the blood to the brain to...?

Flow away from the brain toward the lower extremities, reducing cerebral blood flow.

Explanation:

- Positive G occurs during pull-ups or tight turns.
- Forces act from head to feet.
- Blood is pulled downward.
- Reduced oxygen to the brain can cause grey-out or blackout.

Explain the meaning of the different colors displayed on an Airborne Weather Radar (AWR) and how a pilot should interpret them during flight.

Airborne Weather Radar (AWR) provides real-time information on precipitation intensity and potential weather hazards ahead of the aircraft. The radar displays different colors to indicate the strength of the returned signal, which correlates with rain, snow, hail, or turbulence.

Color Coding and Interpretation:

- Green: Light precipitation, usually safe
- Yellow: Moderate precipitation, caution advised
- Red: Heavy precipitation, significant hazard, deviation recommended
- Magenta or White: Extreme precipitation or hail, avoid entirely

Important Points:

1. Color intensity does not equal exact precipitation rate. Radar reflectivity depends on droplet size, shape, and density.
2. Attenuation effect: Heavy precipitation can absorb radar energy, making weather beyond appear weaker or invisible.
3. Tilt angle adjustment is essential to avoid ground clutter and to correctly detect weather ahead.
4. Decision-making should always prioritize avoidance of red and magenta returns.

If the Runway Condition Code (RWYCC) is reported as 0 or 1, should you take off? Explain your reasoning.

RWYCC is a numeric code from 0 to 6 indicating runway braking capability.

- RWYCC 0: Very poor braking action, runway effectively unusable.
- RWYCC 1: Poor braking action, extremely slippery.

Takeoff considerations:

- Aircraft performance data assumes a minimum runway friction level.
- With RWYCC 0 or 1, accelerate-stop distance and takeoff distance increase dramatically.
- Risk of runway excursion or inability to safely reject a takeoff is high.
- Crosswind limitations become critical on contaminated runways.

Operational decision:

Do not take off unless approved contaminated-runway performance data exists and crosswinds are within operator limits. Otherwise, delay, wait for runway improvement, or divert.

A frontal depression is reported over Western Europe. Where and when did it form?

A frontal depression over Western Europe typically forms over the North Atlantic Ocean, west of the British Isles, and then moves eastward.

Explanation:

- A frontal depression is a low-pressure system forming along a boundary between warm and cold air masses.
- Common formation areas include regions south of Iceland and west of Ireland.
- These areas have strong temperature gradients and active jet streams.
- Frontal depressions can form at any time but are more frequent in autumn and winter.

A hospital is located close to the airport on the extended centerline. What should the pilot do to avoid noise?

Take off using $V_2 + 10$ kt until 3,000 ft, then accelerate and retract slats and flaps.

Explanation:

- Maintain $V_2 + 10$ kt to achieve a strong climb gradient while limiting engine noise.
- Keep takeoff configuration until reaching the noise-abatement altitude.
- At or above 3,000 ft, accelerate and clean up the aircraft.

- Gaining altitude early is the most effective way to reduce noise impact on the ground.

Safety always takes priority over noise abatement.

Explain the significance of taxiway lights inside the ILS sensitive area and why an aircraft must not stop there.

The ILS sensitive area protects the localizer and glideslope signals from interference.

Key points:

- Aircraft or vehicles within the sensitive area can cause signal reflections and distortions.
- Taxiway lights indicate permitted crossing paths, but stopping is prohibited.
- A stationary aircraft can cause localizer or glideslope deviations for approaching aircraft.
- This can lead to unsafe approach guidance and increased CFIT risk.

Pilots must cross the area only when cleared and without stopping.

What do you understand by “Geoid”?

The geoid is the irregular shape of the Earth that represents mean sea level, influenced only by gravity and Earth’s rotation. It is the reference surface for altitude measurements above mean sea level.

At what distance from threshold you are in relation to cat DH?

You are **always ~50 ft above threshold** because of **TCH**. So you **subtract it**.

On a **3° glide path**:

- Vertical per NM ≈ 318 ft
- **Effective height to lose = DH – 50 ft**

Formula you actually use:

Distance from threshold (NM) $\approx (DH - 50) / 318$

Examples they expect you to nail:

CAT I

- DH = 200 ft
- Height to lose = 150 ft
- Distance $\approx 150 / 318 \approx 0.47$ NM (~870 m)

CAT II

- DH = 100 ft
- Height to lose = 50 ft
- Distance $\approx 50 / 318 \approx \mathbf{0.16 \text{ NM}}$ (~300 m)

CAT III

- DH = 50 ft
- Height to lose = 0
- Distance $\approx$ **at threshold**

ICAO Annex 13 (ACCIDENT, INCIDENT)

Chapter 1. Definitions

Accident. An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

a) a person is fatally or seriously injured as a result of:

- being in the aircraft, or
 - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
 - direct exposure to jet blast,except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and
 - would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

Incident. An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Serious incident. An incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft

with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Note 1. — The difference between an accident and a serious incident lies only in the result.

ATTACHMENT C. LIST OF EXAMPLES OF SERIOUS INCIDENTS

Serious incident. An incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

2. The incidents listed are typical examples of incidents that are likely to be serious incidents. The list is not exhaustive and only serves as guidance to the definition of serious incident.

"Aircraft structural failures or engine disintegrations, including uncontained turbine engine failures, not classified as an accident."

A fill in the blank question that asked what happened to a plane's Mach crit, angle of attack and center of pressure if we were to increase the mass of the plane

Mach Crit (M_{crit}): Decreases (or lowers). A heavier aircraft requires a higher angle of attack to maintain level flight, which increases the pressure differential over the wing and causes the airflow to reach sonic speed (Mach 1.0) at a lower free-stream speed.

Angle of Attack (α): Increases. To maintain level flight at a given airspeed, a heavier airplane must produce more lift ($L = W$), which requires a higher angle of attack.

Center of Pressure (C_p): Moves Forward. In subsonic flight, as the angle of attack increases due to higher weight, the center of pressure typically moves toward the leading edge. 

What does "LO" stand for in a NOTAM

In a NOTAM, the code "LO" stands for Locator, Outer (ILS), referring to the low/medium frequency radio beacon that acts as the outer marker in an Instrument Landing System (ILS). It is often part of the IX code combination, signaling the status of this specific navigational aid.

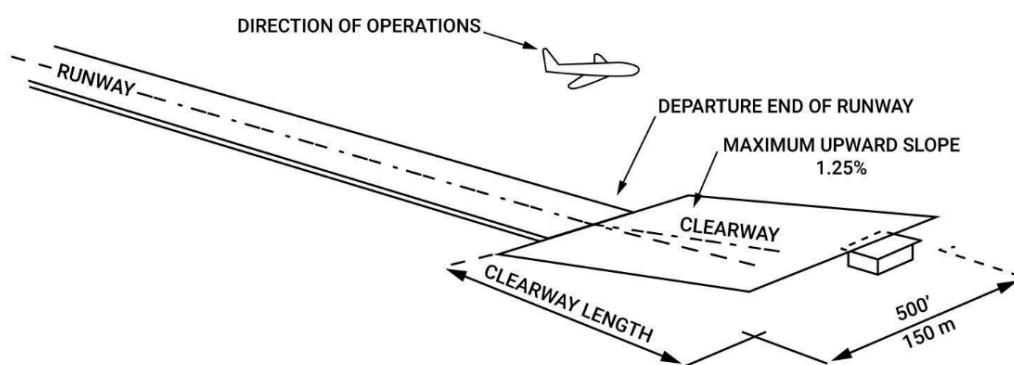
- **Definition:** Locator outer marker (LOM) is a NAVAID used for final approach, combining a beacon with a marker signal.

- **Context:** It is used within the International NOTAM (Q) Code structure.
- **Location:** Found in the SUBJECT or CONDITION section of a NOTAM, often related to ILS component status.

Clearway dimensions (how many meters wide and long)

CLEARWAY

A defined area prepared for an airplane so that it may make a portion of its initial climb to a specified height



Details Regarding OCNL on SIGWX Charts

- **Definition:** OCNL denotes a 25-50% coverage of specific weather, falling between ISOL (Isolated, 1-25%) and FRQ (Frequent, >50%).



Quick Reference Approach Climb Gradient (CS-25)

Phase	Engine Condition	Configuration	Min Gradient
Approach (Go-Around)	One engine inoperative	Gear up, flaps approach	2.1% (2-eng), 2.4% (3-eng), 2.7% (4-eng)
Landing Climb	All engines operating	Gear down, landing flaps	≥ 3.2%

EASA CS-25 Go-Around **Climb Gradient Requirements**

• APPROACH (OEI) •

1 Engine Out



2.1% Twin-Engine

2.4% Three-Engine

2.7% Four-Engine

Gear Up / Flaps Approach

• LANDING CLIMB (All Engines)



≥ 3.2%

Gear Down / Landing Flaps

Quick Reference

One Engine Inop:

2.1% / 2.4% / 2.7%

All Engines Operating:

≥ 3.2%

Higher Charts?
Plan Accordingly!

→ **MINIMUM REQUIRED CLIMB GRADIENTS!**

NAVIGATION **FORMULAS**



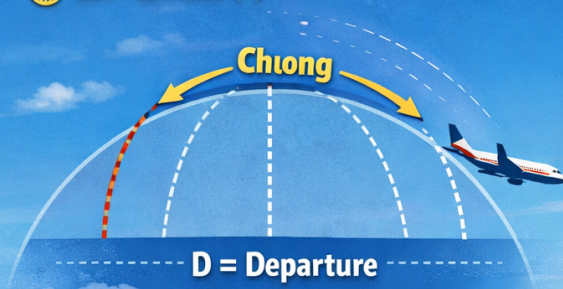
DEPARTURE

$$D = (\text{Chlong}) \times \text{Cos} (\text{Lat})$$

✓ D = Departure (NM)

↑↑ Chlong = Change in Longitude (°)

🌐 Lat = Latitude (°)



CONVERGENCY

$$C = \text{Chlong} \times \text{Sin} (\text{Lat})$$

✓ C = Convergency (°)

↑↑ Chlong = Change in Longitude (°)

🌐 Lat = Latitude (°)



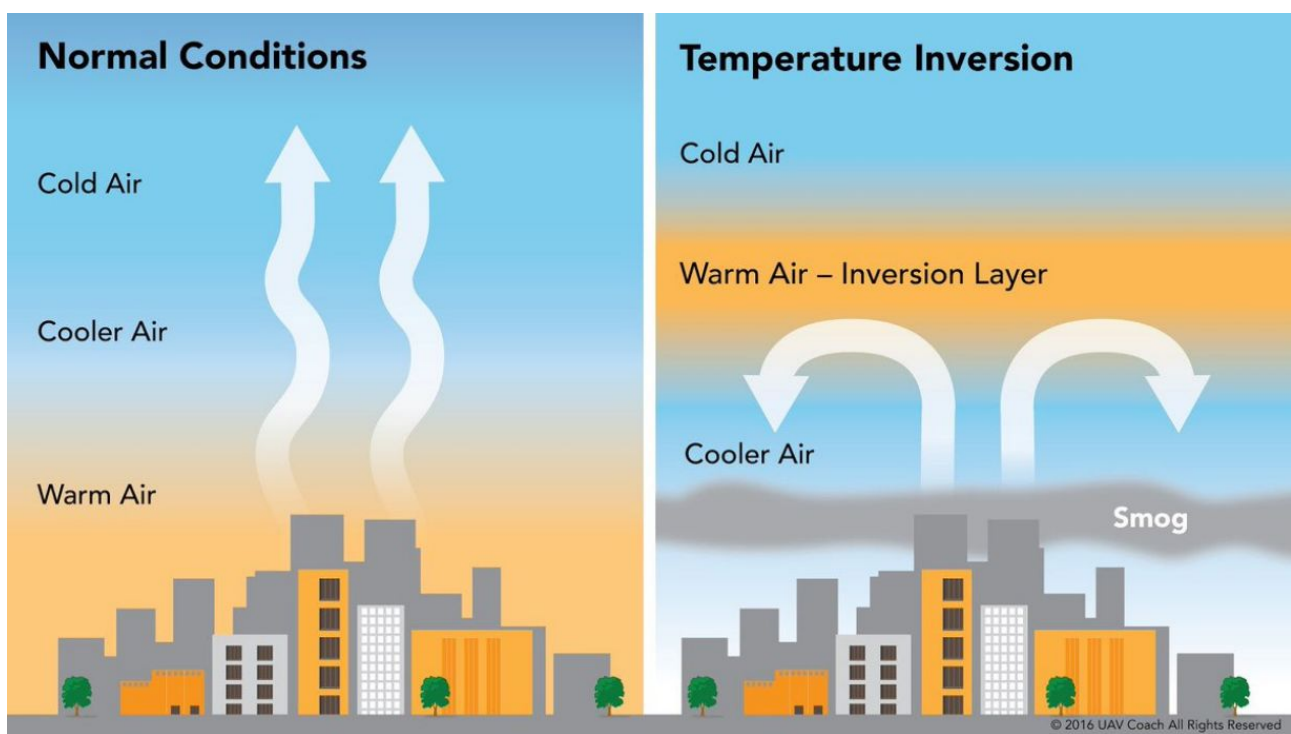
COLD AIR POOL

Cold air pools often form in topographic depressions, such as valleys or basins, filled with cold air.

The cold air is heavy and settles to the bottom of the depression. This air can remain stagnant, trapped by the surrounding higher terrain, resulting in long periods of poor air quality and fog, depending on the sources of pollution and amount of moisture in the air, respectively.

Where the temperature increases with an increase in height, then we have what is called an inversion: vertical mixing is inhibited and below an inversion the wind speed will be light with a significantly different direction to the much stronger wind above the inversion. Hence windshear will occur at the inversion. An aircraft climbing or descending through the inversion will experience a rapid change in speed and direction giving, possibly, moderate to severe turbulence.

Note: Cold Air Pool is not the same as "Cold Pool/Cold Air Drop".



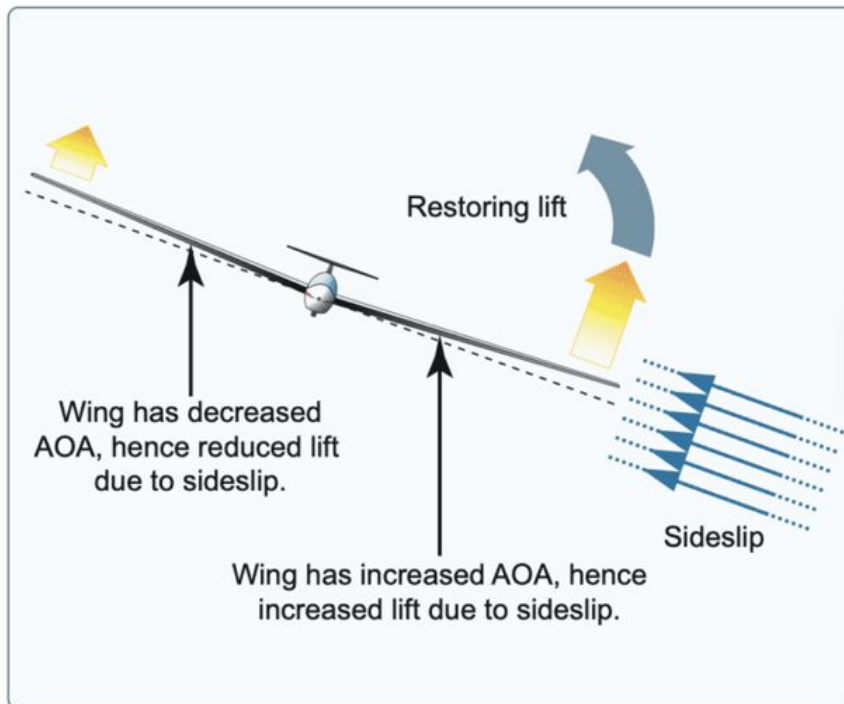
DIHEDRAL

If not corrected, an unstable aeroplane will side slip down when rolled to one side. This effect is not desirable, so how can we reduce it?

By tilting the wingtips upwards, the aeroplane becomes naturally more stable in the lateral plane. This is called dihedral.

Lift acts perpendicular to the relative airflow. If the aeroplane rolls to the side when disturbed by a gust of wind, the lift vector leans to the side with the aeroplane. This creates a resultant sideways facing force that makes the aeroplane side slip in the same direction. As a result of this side slip, the aeroplane is subjected to a sideways component of the relative airflow. Due to dihedral, the lower wing (into the wind) meets the upcoming airflow at a greater angle of attack than the upper wing. Consequently, **the lower wing produces more lift and helps the aeroplane roll back to its original position.** This is how dihedral

improves lateral stability.



In a **high-pressure system**, air sinks, a process known as subsidence. As the air descends, it is compressed by increasing atmospheric pressure, causing its temperature to rise. Since this air originates from the colder, drier regions near the tropopause, it contains little moisture. As a result, cloud formation is inhibited, as both cooling and moisture are required for condensation. The warming of the descending air creates a temperature inversion, which acts as a lid, capping any vertical development of clouds.

