

General aviation safety

- The following safety related material is a joint project between Samgöngustofa (ICETRA) and FMI (Icelandic Aeroclub).
- The purpose of the following material is to make us pilots more aware of how we can improve safety in general aviation.
- Every pilot is responsible for the safety of his aircraft and those on board.
- The privilege of taking safety related decisions on behalf of passengers comes with a high level of responsibility.





Airprox



An AIRPROX is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.

Unfortunately such incidents seem to be

[Cherokee - Microlight](#)



[C172 - Seminole](#)

Airprox

- It is extremely difficult for pilots on a collision course to see each other's aircraft as they will be stationary from each pilot's point of view until a few seconds before impact.
- Most near midair collisions (Airprox) and midair collisions happen close to airports at day time in good weather conditions, below 3000 feet.
- It is recommended to have landing lights on at least within 10 nm from an airport.
- It is recommended to report on the appropriate frequency not later than 10 nm When approaching an airport.



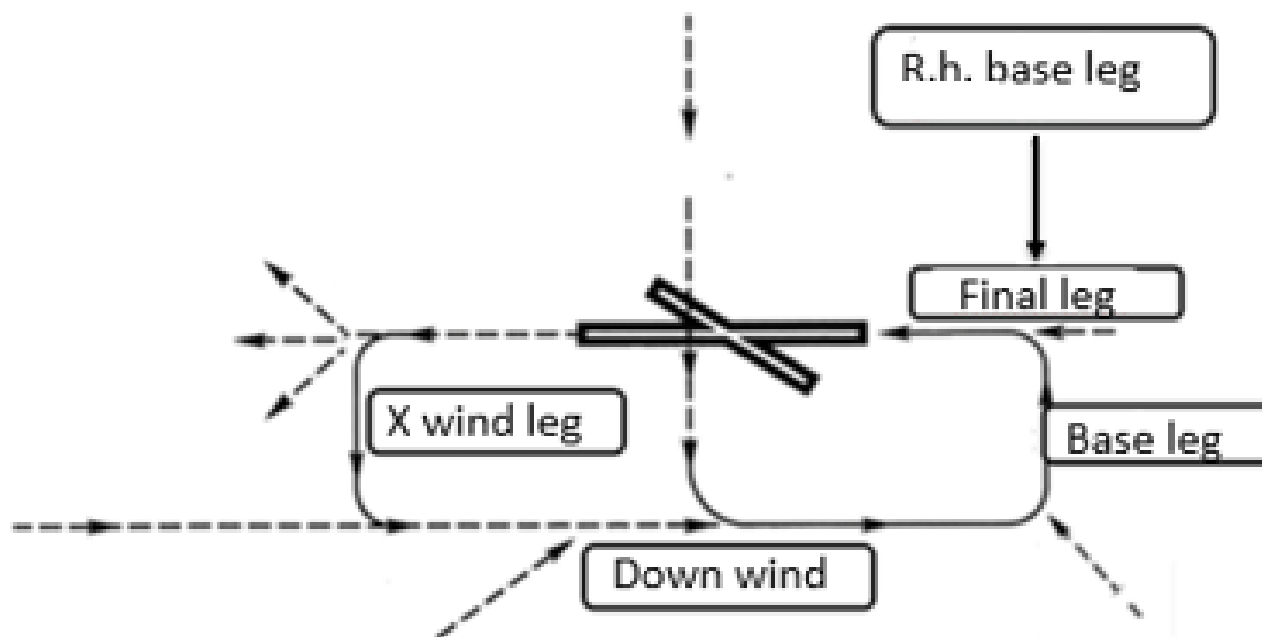
VFR procedures at Non-towered airports

- The traffic circuit:
- It is important to follow the general VFR rule to “see and avoid” other traffic.
- A faster aircraft following a slower one will normally fly a wider circuit to avoid overtaking or even flying inside the track of the slower one.
- Keep in mind that there is no requirement for aircraft in airspace class “E” and outside controlled airspace class “G” to be radio equipped.



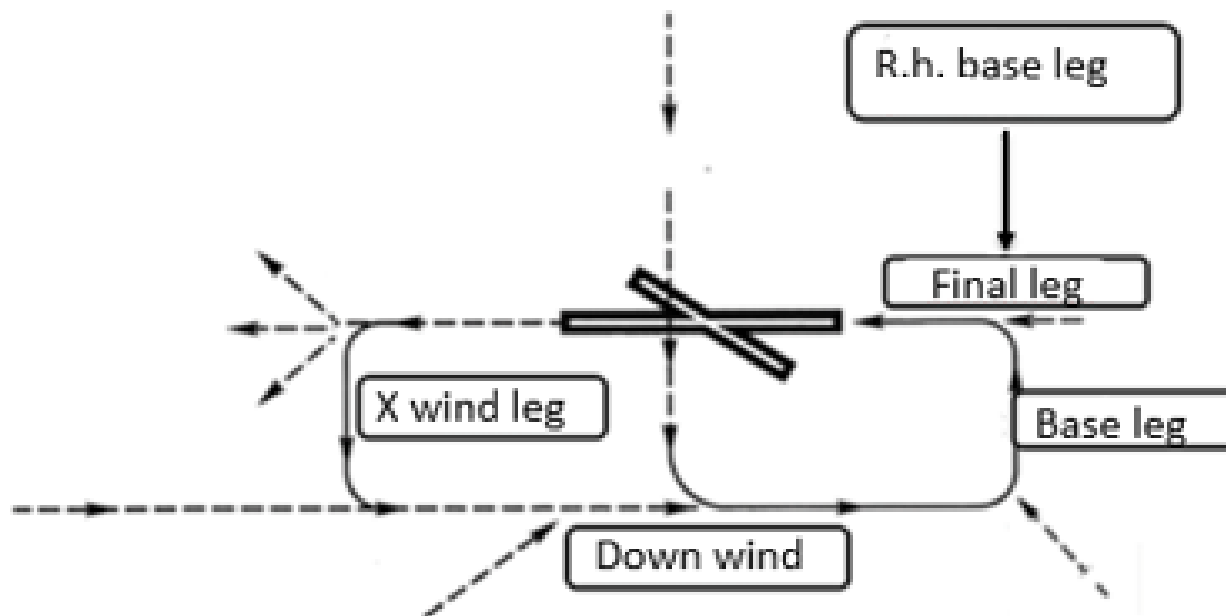
Standard traffic circuit

- Standard traffic circuit is a “left hand circuit” where the airport is on the left hand of the pilot and all turns are to the left.
- Right hand circuit is a mirror image of the “left hand” circuit.



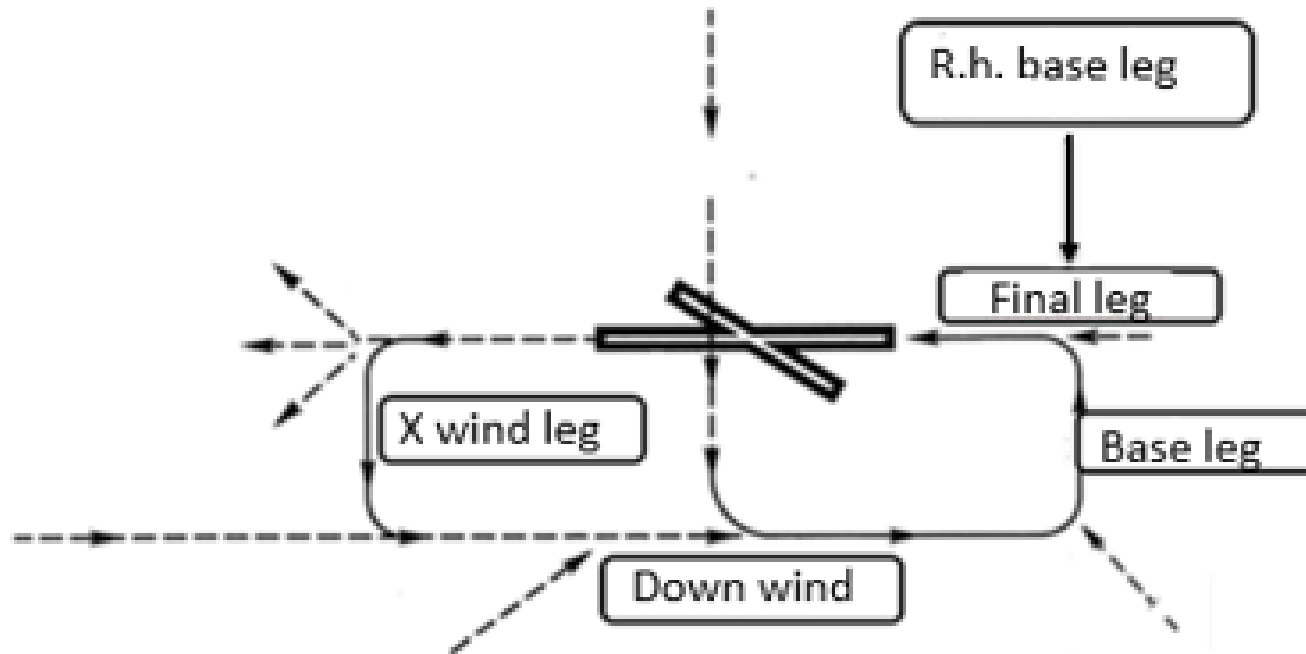
Standard traffic circuit

- Recommended is to enter and leave the traffic circuit with approximately 45 degrees course difference.
- General rule is to climb on runway heading to 500 feet above airport elevation before turning on to the crosswind leg.



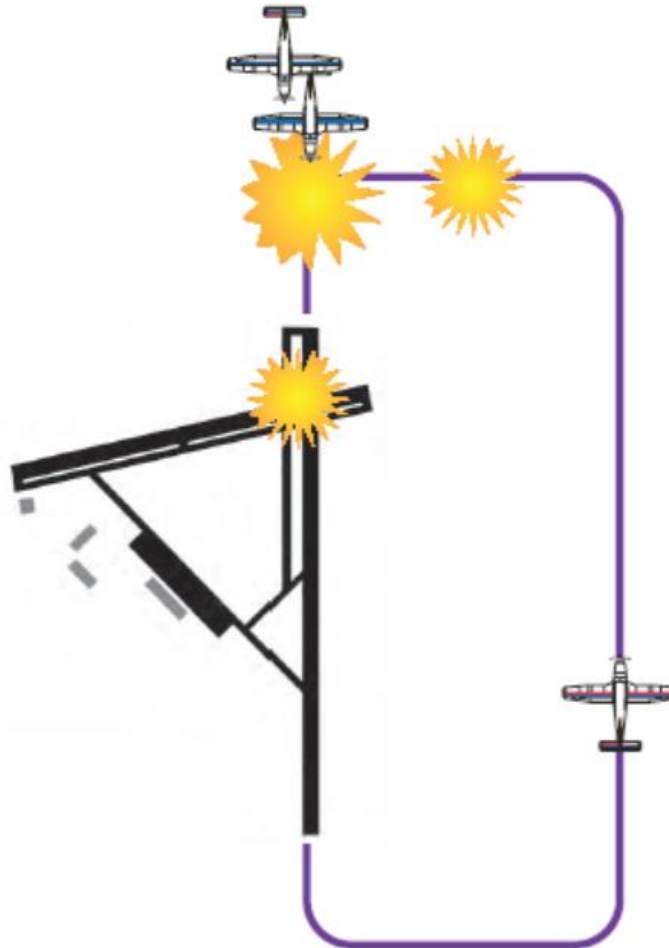
Standard traffic circuit

- Climb on crosswind leg to 800 feet or traffic circuit altitude, if lower, before turning on to the downwind leg.
- Report at least twice in the traffic circuit, on downwind leg and base leg and more often if required for traffic avoidance.



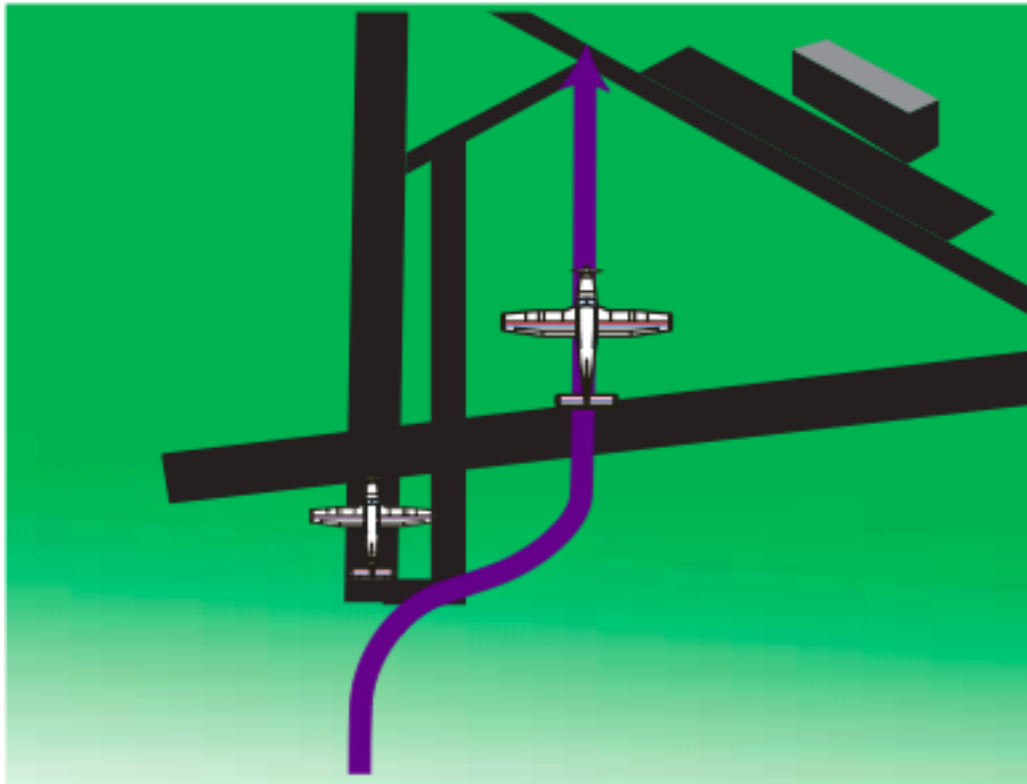
Standard traffic circuit

Collision risk is greatest on base leg, on final and at runway intersection at airports with crossing runways.



Standard traffic circuit

In case of a go-around due aircraft taking off it is common to climb parallel to the right hand side of the runway to keep the departing aircraft in sight.



Density altitude

- The majority of Icelandic airports are close to mean sea level and maybe for that reason density altitude has not gotten the attention it deserves.
- It is important to realize the effect density altitude has on aircraft performance. The affecting factors are pressure altitude, temperature and humidity.
- The elevation of BIHI, Hveravellir is 2019 feet. On a nice summer day, 20 degrees celsius and 980 hPa, the density altitude is over 4000 feet.
- In this case the aircraft will perform as at that elevation in standard conditions, ISA.
- The elevation of BIND, Nýidalur is 2690 feet. With the same conditions the density altitude will be around 5000 feet.



Density altitude

- The elevation of BIHE, Herðubreiðarlindir is 1592 feet. In 25 degrees Celsius and 980 hPa, density altitude will be around 4200 feet.
- Those conditions are not common in the highland but possible.
- Safest is to refer to aircraft POH or use a performance calculator to find density altitude. If not available, the easiest way to find approximate density altitude, when on board an aircraft, is to momentarily set the altimeter to 1013 hPa / 29.92 In and notice the pressure altitude, then adding 121 feet for every degree Celsius above ISA.
- In the above example at BIHI the pressure altitude will be just above 3000 feet. 20 degrees Celsius at BIHI is about 9 degrees above ISA. Approximate density altitude in this case will be $3000 + 1089 (9 \times 121) = 4089$ feet. Humidity has considerably less effect than pressure altitude and temperature but high humidity could add a few hundred feet to this altitude.



Density altitude

- To find pressure altitude, without an altimeter, we assume 30 feet for each hPa (0,01 In = 10 feet). In this case a QNH of 980 hPa is subtracted from 1013 and the outcome multiplied by 30. $1013 - 980 = 33 \times 30 = 990$ feet. Elevation $2019 + 990 = 3009$ which is approximately the pressure altitude.
- Highland airstrips are often soft which further reduces the performance of the aircraft.



Take off

- Do you visualize a point on the runway where you reject the take off if acceleration is not normal or there is an indication that continuing the take off may not be safe? (One rule of thumb is the 50/70 rule. By 50% of the runway 70% of takeoff speed should have been gained.
- Have you reviewed reaction to an engine failure during or shortly after take off? Land in a forward direction or return?
- What is your minimum altitude to return to the departure airfield in case of an engine failure?



VFR cruising altitudes/levels

- VFR cruising altitude when flying higher than 3000 feet over ground or water shall be flown based on magnetic track in accordance with ICAO Annex II.
- From 000° - 179° odd number + 500 feet. - 3500 feet – 5500 feet
- From 180° - 359° even number + 500 feet. - 4500 feet – 6500 feet.
- Above Transition Altitude TA, which is 7000 feet in Iceland, equivalent Flight levels shall be flown on 1013 hPa or 29.92 In.



VFR minimums

Hæðarbil / Altitude band	Flokkur loftrýmis / Airspace class	Flugskyggni / Flight visibility	Fjarlægð frá skýjum / Distance from cloud
Í og ofar FL 100 / At and above FL 100	A**B C D E F G	8 km	1.500 m lárétt 1.000 fet lóðrétt / 1 500 m horizontally 300 m vertically
Undir FL 100 og ofar en 3.000 fet AMSL, eða ofar en 1.000 fet yfir landi, hvort sem hærra er / Below FL100 and above 3 000 ft AMSL, or above 1 000 ft above terrain, whichever is the higher	A** B C D E F G	5 km	1.500 m lárétt 1.000 fet lóðrétt / 1 500 m horizontally 1 000 ft vertically
Í og undir 3.000 fetum AMSL, eða 1.000 fetum yfir landi, hvort sem hærra er / At and below 3 000 ft AMSL, or 1 000 ft above terrain, whichever is the higher	A**B C D E	5 km	1.500 m lárétt 1.000 fet lóðrétt / 1 500 m horizontally 1 000 ft vertically
	F G	5 km*	Laus við ský og sér til jarðar / Clear of cloud and with the surface in sight



VFR minimums

* Loffförum í A- og B-flokki er heimilt að degi til að fljúga við skyggni allt niður í 3 km ef flogið er á 140 kt IAS eða minna.

Þyrlum er heimilt að fljúga við 800 m flugskyggni í loftrými í flokki G að degi til, ef flogið er svo hægt, að nægur tími gefist til að fylgjast með annarri umferð eða hindrunum til að afstýra árekstri.

** VMC lágmarkið er sett í loftrými A til leiðbeiningar fyrir flugmenn og á ekki að gefa til kynna að VFR-flug sé samþykkt í loftrými A.

ENR 1.2.2 SÉRLEGT SJÓNFLUG SPECIAL VFR

Lofffar á sjónflugi má ekki lenda á né hefja flug frá stjórnúðum flugvelli, sem hefur flugstjórnarsvið, né heldur koma inn í umferðarhring hans án heimildar fyrir sérlegt sjónflug frá viðkomandi flugumferðarþjónustudeild þegar:

1. skýjahæð er lægri en 1 500 fet eða
2. vallarskyggni er minna en 5 km

* Aircraft in categories A and B may fly, during hours of daylight, when flight visibility is reduced to 3 km, at speeds of 140 kts IAS or less. Helicopters may operate in 800 m flight visibility in class G, if manoeuvred at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision

** The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

Except when a clearance for special VFR flight is obtained from an air traffic control unit, VFR flights shall not take-off or land, at controlled aerodromes within a control zone, or enter the aerodrome traffic circuit:

1. the ceiling is less than 1 500 ft (450 m); or
2. the ground visibility is less than 5 km



Controlled airspace in Iceland

- **Class A** IFR flights only are permitted, all flights are provided with air traffic control service and are separated from each other.
- **Class B.** Not applicable in Iceland
- **Class C.** IFR and VFR flights are permitted, all flights are provided with air traffic control service and IFR flights are separated from other IFR flights and from VFR flights. VFR flights are separated from IFR flights and receive traffic information in respect of other VFR flights.
- **Class D.** IFR and VFR flights are permitted and all flights are provided with air traffic control service, IFR flights are separated from other IFR flights and receive traffic information in respect of VFR flights, VFR flights receive traffic information in respect of all other flights.
- **Class E.** IFR and VFR flights are permitted, IFR flights are provided with air traffic control service and are separated from other IFR flights. All flights receive traffic information as far as is practical.



Outside controlled airspace

- **Class G.** IFR and VFR flights are permitted and receive flight information service if requested.

Terminal Areas, Control Zones, Aerodrome Traffic Zones

- Terminal Area (TMA) BIKF **Class A/C.**
- Terminal Area (TMA) BIRK **Class A/D.**
- Terminal Area (TMA) BIAR **Class D, Class E** outside ATC operating hours. (AIP AD 2.3 operating hours).
- **Class G** below TMA's, outside CTR's

- Control Zone (CTR) BIRK and BIKF **Class D.**
- Control Zone (CTR) BIAR **Class D.** Aerodrome Traffic Zone (ATZ) **Class G,** outside ATC operating hours. (AIP AD 2.3 operating hours).
- Aerodrome Traffic Zones(ATZ) **Class G.**



Class A above FL195 only IFR with clearance.

Icelandic airspace structure

FL245

Controlled airspace



Terminal Areas

FL195

Class A



Class E extends upwards from 3000 feet MSL or 1000 feet AGL, whichever is higher, up to Class A, around airspace classified as **C** or **D**. IFR flights need clearance to enter and are separated from other IFR flights. VFR flights do not need a clearance to enter.

Class C/D/E

Faxi TMA

Class E

Keflavik Approach Sector **Class A/C**

Reykjavík Approach Sector **Class A/D**

Upper limit FL245

Lower limit 3000/2000/1000 feet MSL or 1000 feet AGL whichever is higher (AIP ENR 2.1)

Below Faxi TMA, outside CTR's, **Class G**

Akureyri TMA **Class D/E**

Upper limit 7000 feet

Lower limit 3000 feet MSL or 1000 feet AGL, whichever is higher.



BIRD FIR (Class A outside domestic airspace above FL 55)

All flights need a clearance to enter airspace **C** and **D**. In Iceland clearance is considered to be given when Approach or Tower give airport information and route clearance. Remain clear of airspace **C** and **D** until cleared to enter by ATC.



G, 1000 feet AGL

CTR



KF/RK/AR
Class D

G, 3000/2000/1000 feet MSL

ATZ
Class G

Food for thought

- Superior pilots are those who use their superior judgement to avoid those situations where they might have to use their superior skills.
- RNSA completed investigations of 43 incidents and accidents involving airplanes, helicopters, microlights and a glider between 2004 and 2014. Six of them were due to technical issues, one due to carb ice and one due to wingtip vortex.
- That leaves 37 incidents and accidents caused by, for example, running out of fuel or fuel selector in the wrong position, cross wind take-offs and landings exceeding the pilots capability. Aircraft not performing according to the pilots expectations.
- Although accidents can not be prevented to happen the risk can be reduced with proper flight preparation, decision making and self discipline. Maintaining theoretical knowledge as well as practical proficiency is an important safety measure.



Food for thought

- Following are some safety tips and recommendations which every pilot should regularly review.
- Grass strips and soft gravel strips can considerably affect aircraft performance.
- Always have an alternate destination in mind in case landing at planned destination is not feasible.
- Keep yourself familiar with usable alternates along the route of flight.
- Flying on the right hand side of roads, rivers, powerlines etc. on VFR cross country flights at lower levels, weather permitting, is an important safety feature. Same applies when flying through valleys or mountain passes.



Food for thought

- Not to fly beyond „point of no return“ in valleys or mountain passes unless it is ascertained that weather conditions permit a safe continued flight.
- Flying approximately 45 degrees angle to a rising terrain.
- On VFR flights report as required on the appropriate frequency, position, altitude and direction of flight and intentions as applicable.
- Check winds aloft before a cross country flight. There can be a considerable difference between winds at ground level and planned flight altitude.



Food for thought

- Plan an alternate destination airfield in case weather conditions at planned destination are not within your limits for landing.
- Be familiar with usable airfields for landing along the planned route. Weather can deteriorate, fuel can be less than planned due to more head wind than planned or due to deviations around weather.
- Check before deciding to fly „on top“ that weather conditions at destination permits descent in VMC.
- Do not hesitate to ask ATS for assistance for whatever reasons that might endanger flight safety.
- Keep yourself familiar with your aircraft gliding performance in case of power loss. As a rule of thumb most single engine aircraft will glide at least 1 nm for every 1000 feet of altitude.



Food for thought

- Mentally brief yourself for approach, landing and a possible go-around. Do a mental safety check before landing. E.g. **GUMPS**
- **G** Gas – correct tank selected, fuel pump on if applicable
- **U** Undercarriage – gear down if applicable
- **M** Mixture – rich or correct for the atmospheric conditions
- **P** Prop – fine pitch if applicable
- **S** Switches – as applicable.
- Be prepared for a go-around if continuing the approach to a landing is not feasible.
- Have it absolutely clear when two pilots are flying together who is in control.



Food for thought

- The three golden rules in case of power loss:
 - Fly the aircraft,
 - Choose a landing place,
 - As time permits, perform emergency procedures according to the aircraft POH and declare emergency (Aviate, navigate, communicate).

- Never trust the fuel gauges or aircraft log book figures about fuel on board before a flight. Confirm that fuel is sufficient for the flight.



Flying in winter conditions

- There are cases where pilots on a cross country flight in winter have been dressed in light summer clothes.
- There are many things to consider when winter is approaching. History tells us that many incidents and accidents in winter operation could have been avoided with proper flight preparation and decision making in flight.
- Familiarize your self with your aircraft manual regarding winter operation. Check weather condition and forecast. Get information about the condition of planned landing fields. Have the proper survival equipment on board.



Flying in winter conditions

- Between 2002 and 2015 there were at least 11 aircraft incidents/accidents in Iceland where winter conditions were a contributing factor. Presumably most of them could have been avoided with proper flight preparation and decision making.
- Whiteout, ice/snow covered landing fields, soft spots in dirt runways due to frost lifting, snow showers, icing and more were contributing factors.
- Whiteout can occur in blowing snow, snowfall and when diffuse light casts no shadows and when a low cloud layer makes features of the landscape indistinguishable. Whiteout occurs without any warning.



Flying in winter conditions

- Condition of snow covered landing fields can only be checked on ground. It is impossible to safely judge that from an aircraft in flight.
- Frost lifting can occur in gravel/grass airstrips. There can be soft spots although the surface looks solid. Those runways can also get dangerously soft when temperature rises well above freezing.
- When flying local flights during snow showers it is advisable, conditions permitting, to fly upwind of the airport to prevent snow showers to get between the aircraft and the airport. There are some examples of surprise cross country flights when snow showers prevented flying back to the airport.



Flying in winter conditions

- Height over snow covered land as well as over water and dark sand is impossible to judge safely. Be careful about trusting your judgement. Familiarize your self with the land elevation and compare to your altitude.
- Special care is needed for flight preparation for aircraft that are parked outside in winter conditions. Ensure that there is no icing that can affect aircraft performance or instruments. In fuel tanks of aircraft parked outside, with half empty tanks, the possibility of condensation of water exists.
- On a cold winter day the temperature at altitude above inversion can be somewhat higher. In such condition the possibility of freezing rain can exist.
- It is advisable to file a flight plan with ATS for alerting service in accordance with AIP ENR 1.10.1, even if not required by regulation.



Situational awareness

- We perceive less than 80 % of our environment.
- We comprehend less than 20% of what we perceive.
- If we are looking for something in particular this percentage will become even less.
- Our brain will try to provide us with what we are looking for.
- This can possibly explain some VFR accidents in marginal weather.
- For those that like to test their perception
- [Color changing card game](#) (internet connection required).



Safety reporting

- It is important that pilots report to ICETRA if becoming aware of any issues endangering aviation safety.
- Same applies to any aviation related issues that pilots believe not to be in order.
- Reports can be made to <http://www.aviationreporting.eu/>
- or <http://www.aviationreporting.eu/AviationReporting/OLR.aspx?occsrc=1&countrycode=IS>
- Occurrence Reports are treated confidentially to maintain full and free reporting from the aviation community and to protect the identity of the individual in accordance with EU legislation.
- Received information can only be used for the purpose of maintaining or improving aviation safety.



END

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