ROYAUME DE BELGIQUE

MINISTERE DES COMMUNICATIONS ET DE L'INFRASTRUCTURE

Administration de l'Aéronautique

CIRCULAIRE

CIR/OPS-12 Date **01/89**

Edition : **2**

Objet :

Circulaire d'information concernant la préparation et la gestion des vols IFR.

Annexe :

IFR guidelines.

Réf. :

- A.R du 14 mai 1973 "Règles de l'air" – art. 4 et art. 7.
- A.M. du 13 février 1970 "Transport aérien commercial" (aéronefs d'une masse égale ou supérieure à 5700 kg) - § 7.2.
- A.M. du 2 mai 1972 "Transport aérien commercial" (aéronefs d'une masse inférieure à 5700 kg) - § 7.2.

L'édition 2 comprend

Le Directeur Général,

W. VANDERPERREN

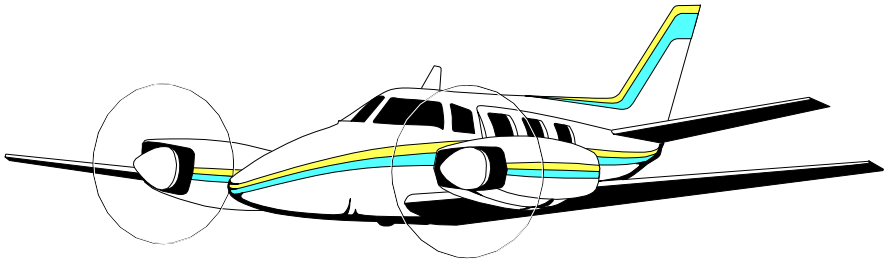
22 pages datées : **01/89**

Préparation et gestion des vols IFR

Tout vol IFR doit être préparé et exécuté de façon adéquate afin de garantir le meilleur niveau de sécurité.

A cet effet, cette circulaire présente, en annexe, une méthode acceptable de préparation et de gestion des vols IFR.

CIVIL AVIATION ADMINISTRATION, BELGIUM
a member of the
JOINT AVIATION AUTHORITIES



IFR FLIGHT

PREPARATION

FOLLOW - UP

IFR-FLIGHT
Preparation/Follow-up
CIR/OPS-12

IFR GUIDELINES

FLIGHT PREPARATION AND FLIGHT FOLLOW-UP

CONTENTS

IFR-FLIGHT
Preparation/Follow-up
CIR/OPS-12

0. INTRODUCTION

The purpose of this bulletin is to provide a method to pilots for systematic IFR flight preparation as well as in flight follow-up.

It will be a base to develop the own way of thinking, and cockpit flight organisation of the pilot.

It is not a read and do checklist.

This guide does NOT consider :

- instrument flying technique;
- specific aircraft operating procedures;
- use of de-ice and anti-ice equipment;
- use of weather radar;
- company or school policy;
- traffic rights and over flying permits;
- routing and custom procedures.

A good flight preparation cannot be performed without thorough knowledge and correct use of :

- air law and ATC regulations;
- meteorology and use of weather maps and messages;
- aircraft and its manuals;
- the navigation maps, departure and approach charts;
- R/T phraseology.

ALSO

it is mandatory to be mentally and physically available for the task.

CONCLUSION :

> Before entering the chapter "flight preparation", be sure to be acquainted with all the theoretical knowledge needed.

IFR-FLIGHT
Preparation/Follow-up
CIR/OPS-12

1. GENERALITIES

1.1. Personal equipment.

Check availability and validity of :

- licence and qualifications;
- passport and visas;
- international certificate of vaccination;
- identity badge (security documents);
- computer or calculator;
- protractor;
- earphones;
- corrective glasses if required + spare set;
- flash light;
- clip board and sunglasses.

1.2. Aircraft documents.

Before each flight, check for the availability and validity on board of your aircraft of following documents :

the legal aircraft documents :

- registration certificate;
- airworthiness certificate;
- operations manual (if required);
- radio equipment certificate;
- aircraft logbook;
- insurance documents (if required);
- POH - pilots operating handbook;
- trouble report (if required);
- MEL (minimum equipment list) (if required);
- codes for search and rescue (if required);

documents of current use (if required) :

- check lists normal & emergency;
- a complete and updated set of maps and charts;
- the company flight operating manual;
- reserve navigation logs;
- reserve load & trimsheets;
- weight books.

2. PREFLIGHT PREPARATION

GOOD PREFLIGHT PREPARATION IS THE FOUNDATION OF SAFE FLYING

2.1. Optional routing.

Choose the initial routing to destination and alternate.
Taking into account :
- preferential routings;
- topographical details (safety altitudes);
- minimum en route altitudes;
- maximum en route altitudes;
- high and/or low level charts to be used.

Compare routing and airports with your aircraft performances (all engines operational and engine failure).

2.2. Notam.

Obtain & study NOTAM :
- departure airport;
- en route (navigation aids & special procedures);
- destination airport;
- alternate airports (T/O - en route - destination).

2.3. Weather.

Obtain & study weather information :

en route : - eather maps
- altitude wind maps;

airport TAF & METAR :
- departure airport
- destination airport
- alternate airports (T/O - en route - destination);

special weather condition :
- SNOWTAM
- SIGMET
- runway conditions.

Compare weather conditions with your personal minima.

2.4. Foreign Destination.

Check for :

- entry requirements;
- airport directory : - customs & immigration facilities;
  - opening hours;
  - fuel disponibility;
- special airlaw & regulations;
- emergency data : radio com failure.

2.5. Planned routing.

If necessary alter your optional routing according to the details obtained under : § 2.2., § 2.3., § 2.4.

3. OPERATIONAL FLIGHT PLAN PREPARATION

3.1. Fill in your navigation log and your T.O. climb data card.

- expected T/O runway;
- SID or intended departure;
- route and minimum safety altitudes;
- STAR or intended arrival;
- routing to alternate.

3.2. Estimated gross weight

Compute your estimated gross weight.

3.3. Minimum required fuel.

Taking into account the estimated gross weight, work out your fuel consumption for :

- trip fuel (taxi fuel included) : -
- total reserve : contingency : -
  alternate : -
  holding : -
  extra (if any) : -

- minimum required fuel : -

in accordance with law, school or company policy.

3.4. Payload.

Actualise your gross weight and compare with your :

- MTOW (maximum T/O weight) + type of limitation
- MZFW (maximum zero fuel weight)
- MLW (maximum landing weight).

Determine your maximum payload.

Alter your payload according to the details obtained under § 3.2., § 3.3., § 3.4.
(A technical stop may be considered).

3.5. Weight & balance :

Finalise.

3.6. ATC flight plan :

File & check for ATFM (Air Traffic-Flow Management).

3.7. T.O. and climb data card :

Fill in for expected runway(s).

3.8. Descent and landing data card :

Prepare for short flight.

3.9. Compute the E.T.P. and the P.N.R. :

If applicable.

4. MAP & CHART

DETAILED STUDY

(Based on Jeppesen Airway Manual Terminology)

> Depending on pilot's experience, this study can be done at most convenient moment before departure.

MAX. PREPARATION ON GROUND = MIN. PAPERWORK AIRBORNE.

> Study in chronological order of use, all charts and maps related to your flight.
> Always keeping in mind the sequence :
> - ROUTING (plan VIEW)
> - PROFILE
> - navigation aids.

4.1. Departure airport frequencies :

Frequency of :
- ATIS
- Cpt (clearance prior taxi)
- ramp control
- TAXI
- TWR
- DEP

4.2. Start up & taxi :

Study :
- special start up and taxi procedures;
- parking area lay-out;
- taxi to runway identification of taxiway intersections.

4.3. T/O runway :

Study :
- preferential runway;
- noise abatement procedure;
- displaced threshold;
- available overrun;
- length available in case of intersection T/O;
- runway lighting;
- RVR measuring equipment.

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Note : Threshold elevation

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Mentally prepare your T/O and consider action in case of engine failure during T/O run.

4.4. Departure & climb :

- routing;
- profile :
  - first turn altitude;
  - power reduction altitude;
  - acceleration altitude;
  - check obstacles on the dep. flight path;
  - MSA, AMA, MEA, MORA;
  - specific SID altitudes;
  - transition altitude;
  - speed limit procedure;
  - safety altitudes during climb;
- nav. aids to be used
- air turn back (landing on T/O runway or other runway)

Verify the climb gradient required to comply with the proposed departure.
Are you able to fly the profile ?
Prepare engine failure flight path if proposed routing would become unsafe.
Keep in mind : FIRST FLY THE AIRCRAFT !

4.5. En route

Study :
- routing : all maps HI and/or LO to be used;
- safety altitudes - MEA - MORA - grid MORA (when flight outside published route is anticipated);
- optimum altitude;
- maximum altitude (all engines operating);
- maximum altitude (one engine out) and speed;
- navigation aids;
- en route alternates.

4.6. Descent :

Study :
- routing :
  - chronologically all maps and charts to be used (HI - LO – AREA - STAR - APP CHARTS);
  - speed limit procedures;
  - holdings;
- profile :
  - safe altitude during descent :

- grid MORA - MEA - AMA - MSA;
- transition level;
- min. holding altitude;
- know the topograhy;

- Nav. aids available and location in relation to the airport of landing;
- % slope needed for descent.

4.7. Approach :

Study :
- all available instrument approach procedures & MINIMA;
- IAF - FAF;
- minimum altitude at IAF;
- minimum altitude at FAF;
- MDA and/or DA;
- all suitable landing runways;
- landing RWY TDZ elevation;
- radio aids for approach
- alignment - offset
- descent slope - %
- MISSED APPROACH PROCEDURE.

4.8. Pull-up :

Study :
- routing;
- altitudes;
- navigation aids.

Contengency flight path in case of engine failure during GO AROUND.

4.9. Landing :

Study :
- approach lighting available;
- runway lighting available;
- RVR available;
- VASI/PAPI;
- runway length & width and number of suitable RWYs;
- displaced threshold;
- overrun available;
- high speed taxiways;
- arrester gear.

4.10. Taxi :

- expected parking;
- taxiways to parking;
- interference of runways with taxiway lay-out;
- ramp control & instruction;
- parking facilities.

4.11. Alternates :

- adequacy for your type of aircraft and operation;
- same study as your destination aerodrome.

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5. FLIGHT FOLLOW UP

AT ALL TIMES :
EXERCISE THE BEST POSSIBLE LOOK OUT AND MONITORING;
BE SAFETY ALTITUDE MINDED;
BE WIND MINDED;
KNOW WHAT IS IMPORTANT AND WHAT IS SECONDARY.

WHEN RUNNING OUT OF TIME :

- BE SELECTIVE;
- EXECUTE VITAL ACTIONS.

WHEN IN EMERGENCY :

- FLY THE AIRCRAFT FIRST;
- ASK FOR/OR EXECUTE APPROPRIATE CHECK LIST.

5.1. Prior start up :

Check :
- documents - see § 1.2.;
- trouble report & A/C technical status;
- fuel on board;
- loading;
- emergency equipment;

Aircraft external and internal inspection.
Cockpit set up.

- Special care :- latest weather ATIS;
  - flight instruments;
  - navigation aids initial set up;
  - R/T frequencies;
  - charts available in chronological order;
  - flight log available;

Crew briefing : or self briefing :

the briefing should contain :

- determination of pilot flying the aircraft (for crew);
- T/O & climb data;
- action in case of emergency;
- special procedures;
- cabin and passengers safety briefing.

AIRCRAFT CHECKLIST !

5.2. Taxi and/or run up :

Aircraft cockpit set up

Special care :
- flight instruments check;
- navigation aids set for departure specified in ATC clearance;
- changes to : flight preparation;
- T/O & climb data;
- crew briefing;
- cabin & passengers safety check.

AIRCRAFT CHECKLIST !

Mentally review T/O and action in case of engine failure during T/O run and initial climb.

STAY AHEAD OF YOUR AIRCRAFT

5.3. Line up.

AIRCRAFT set up

Special care : - compare threshold elevation against altimeter indication for:
- altimeter check
- QNH check;
- compass check for runway heading;
- transponder ON desired code.

AIRCRAFT CHECKLIST !

5.4. T/O roll.

FLY THE AIRCRAFT

According aircraft operating procedures.
- note or call IAS showing, mention the value in order to cross-check the IAS
- indicator(s);
- check engine(s) parameters;
- note or call T/O speeds.

5.5. Climb out :

FLY THE AIRCRAFT !

According aircraft operating procedures.
Keep in mind :
- best angle of climb speed up to the highest of SID - MSA - AMA - MEA - MORA (according to climb distance +/- 100 N.M.);
- en route climb : best R/C speed;
- operational climb speed;
- one engine out climb speed (best angle);
- altitude capability on one engine out & speed;
- engine out escape routing;

Respect - SID & departure procedures;
- R/T vigilance and correct phraseology.

AFTER T/O CHECKLIST

BE AWARE OF BEING BELOW YOUR SAFETY ALTITUDES

5.6. Cruise :

According aircraft operating procedures :

BE AWARE OF MEA, MORA, grid MORA

- know your altitude capability with one engine out and speed;
- determine type of cruise;
- fill in flight log : frequencies, airway clearances, sigmet and ETA;
- perform weather follow-up (alternates, en route and destinations);
- perform fuel management;
- watch on auxiliary frequency (if any) : - company frequency
  - operational frequency
  - emergency frequency (121,5 MHz.);
- actualise the E.T.P. and the P.N.R. (if any).

5.7. Before descent :

According aircraft operating procedures :

- plan top of descent point (T.O.D.), according obstacles a/c performances, wind;
- actualize weather and runway conditions at destination and alternate;
- plan minimum diverting fuel;
- plan holding fuel & maximum holding time;
- review : charts for descent, STAR, speed limit procedures, noise batement procedure, holdings, approach, landing, go around, taxi (see § 4.6. - 4.11)
- minima;
- take option for type of approach to be expected;
- decide on pilot flying (for crew);
- finalize descent and landing data;
- check for emergency routing if go around flight paht is unsafe in case of engine failure;
- prepare cabin and cockpit for landing;
- perform crew briefing or self briefing for descent and approach :
- STAR routing
- descent profile (MEA, AMA, MSA, grid MORA, transition level)
- radio aids to be used
- minima
- runway exit target taxiway
- pull-up procedure
- airport lay-out.

Aircraft cockpit set up

AIRCRAFT CHECKLIST

5.8. Approach :

According aircraft operating procedures.

5.8.1. General for all approaches

- set-up radio as soon as possible
  - check all aids;
  - use all equipment available;
  - verify radio aids for correct set up when turning on final course.
- Be wind-minded
  - wind limitations (X wind, tail wind);
  - increment on VREF;
  - patterns & timing correction;
  - rate of descent work out;
  - possible wind shear.
- Be aware of correct altimer setting
  - X check altimeters;
  - X check your actual QNH setting with different information sources
  - descent clearance, actual weather, forecast.
- Be aware of visibility changes
  - sun position;
  - general vis. & RVR;
  - continuance of approach/approach ban.
- Mentally prepare pull-up
  - aircraft go around procedure;
  - ATC pull up procedure;
  - emergency actions.
- Beware of abnormally steep descent slopes
  - (3° = 5 % is normal).
- Beware of offset final approach courses.
- Beware of abnormal touch down points
  - (300 m inside the runway is normal).
- Be aware of available approach and runway lighting
  - VASI & PAPI;
  - kind of approach lights;
  - TDZ lights;
  - CL.
- Use correct R/T phraseology and maintain listening watch at all times.

DO NOT HESITATE TO GO AROUND
If all conditions are not satisfied (profile, heading, speed, A/C configuration power) even below MDA or DA.
A go around does NOT require a clearance

5.8.2. Precision approach (ILS - PAR)

- See 5.8.1.
- Fly target speeds;
- Use standard call-outs;
- localizer alive;
- glide slope alive;
- OM - read altimeter for X check with published altitude;
- at F.A.F. (OM) ask landing clearance;
- any significant deviation from G/S loc, rate of descent, IAS;
- approaching minima;
- minima;
- when becoming visual : - approach lights in sight;
  - runway in sight.

5.8.3. Non precision approach

(Where no electronic glide slope guidance is available).

- See 5.8.1.
- Fly target speeds in order to be able to fly steady rate of descents & to respect precalculated timing.
- Ask for maximum brightness of approach lights if necessary;
- Try to see visual cues as soon as possible.
- Standard call-outs :
  - altitude at published fixes;
  - approaching minima;
  - minima;
  - when becoming visual :
    - ground contact;
    - approach lights in sight;
    - runway in sight (lateral & vertical off-set).
- Be aware that a missed approach or circling, weather conditions permitting, are the only possible actions when having late visual contact approaching missed approach point (MAP).

5.8.4. Circling

- Climb to or maintain circling altitude or higher.
- Stay in aerodrome protected area.
- Keep aerodrome in sight at all times.
- Be aware of pull-up procedure when loosing visual contact during circling.
- Do not descent below MDA before intercepting final descent profile.
- A circling approach needs an appropriate ATC clearance.

5.9.

ADVICE

- Consider all flights as being potentially difficult.
- Be ahead of the in flight presentation.
- When running out of time, be selective. Each phase of flight has its mandatory vital actions to be executed. Know is important and what is secondary.
- Be aware of doubtful clearance or instructions, do not hesitate to request "repetition".
- When a checklist is interrupted or uncompleted, keep it in view.
- "Share your experience" between crew members.
- Make use of T/O, climb, descent and landing data cards. This card should contain pertinent data for aircraft handling and for operational and safety altitudes.

5.10. Good to know (approximate values)

For planning purpose :

$$\text{Slope (\%)} = \frac{1}{60} \cdot \frac{\text{height (ft)}}{\text{distance (n.m.)}}$$

1 % = 60 ft/n.m.

1° : 1,75 % - 100 ft/n.m.

To check in flight :

$$\text{Vertical speed (ft/min)} = \text{slope (\%)} \times \text{GS (Kts)}$$

$$\text{Slope (\%)} = \frac{\text{Vertical speed (ft/min)}}{\text{G.S.(Kts)}}$$

Note : - a normal glide slope is 3° - 5 % - 300 ft/n.m. - 1/20;
- 3 x $\frac{FL}{10}$ = distance out for a 5 % gradient.

5.11. Post flight

AIRCRAFT CHECKLIST
AFTER LANDING
&
SHUTDOWN

- Cockpit clean up

Store flight documentation.

- Secure the aircraft

If a long stop or adverse weather conditions during stop over are anticipated, protect the aircraft :

- lock the flight controls;
- place wheel blocks;
- install pitot tube protection;
- install propeller and/or air intake protection.

- File the aircraft log book.

- If required file the following documents :

  - company or school reports;
  - trouble report;
  - technical flight incident report;
  - bird strike report;
  - lightning strike report;
  - near mid-air collision report.

- After landing on an uncontrolled aerodrome don't forget to close your ATC flight plan.