EGNOS

(GNSS-based) Instrument Flight Procedures implementation for General Aviation

Uncontrolled Aerodromes and non-instrument runways

ESSP

GSA

EASA
European Aviation Safety Agency

Navigation solutions made in Europe

This document provides an assessment of the current operational status and examples to perform GNSS-based RNP APCH operations using Localizer Performance with Vertical guidance (LPV) on small aerodromes, without the need to upgrade runway infrastructure.

> **"The document is to be published as a Safety Promotion material under EASA's Together-4Safety, Safety Promotion initiative that is a key enabler to reach the ultimate objectives of the EU Aviation Safety Management Strategy and contributes to continuous improvement of our aviation safety system in Europe and worldwide, together with regulations and oversight."**

Safety promotion is also about sharing examples from authorities and industry and to contribute to the dissemination of regulatory developments.

It aims to provide a view on the current implementation enablers in different EU countries and based on EASA RMT (Rule Making Task) developments, share the examples in different countries, identify the gaps on the implementation process that would need to be modified in order to set a proportionate scenario for General Aviation IFP (Instrument flight procedure) implementation and also include the consensus of the different stakeholders that were contributing to its development. The content is not binding, but rather providing an overview of the different elements with informative purposes.

The target audience, comprises, but are not limited to all airspace users, aerodrome operators, aerodrome owners, and authorities planning to implement such operations.

The document was developed by the European GNSS Agency, in support to the *EASA Rule Making Task 0379 All-weather operations group*, with different stakeholders such as aviation associations, ANSPs, CAAs, etc. The European GNSS Agency would like to thank to all contributors and supporters of this initiatives as this support was fundamental for the development of this document. Special thanks goes to EASA, PPL IR, AOPA, EBAA, Austro control, DFS, IDRF, FOCA Swiss, Swedish Transport Agency, Europe Air Sports and European Regional Aerodromes Community. The publication of this document is considered as a starting point for the discussion within the general aviation community, trigger future pilot cases to obtain feedback and real conclusions in order to identify the necessary tools to be developed to support the implementation of the IFR procedures for general aviation

Released: September 2019

PDF	ISBN 978-92-9206-044-2	DOI 10.2878/75592	TS-03-19-827-EN-N

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01 Introduction

General Aviation (GA) market conducts millions of operations with a fleet equipped with GNSS-receivers demanding to benefit from the new aviation technologies. EU new basic regulation (CR (EU) 2018/1139, [RD-3]) has opened the door to enhance safety of small AD currently used only for VFR, with proportionate requirements for instrument flight operations. This document addresses the implementation process, analysing the existing regulatory scenario and best practices in EU countries and providing an overview of the different elements with informative purposes.

The document refers to regulations under development (RMT, NPA, ICAO SL) in many instances and it might need updates with applicable regulations once adopted. Every aspect considers the risk exposure to determine the best solution.

EASA Approach to General Aviation

EASA has a strategic objective to increase and facilitate IFR operations for GA, with a final objective of enhancing the safety of the operation taking advantage of GNSS technology. With new basic regulation [RD-2] EASA furthermore is required to consider economic and social impact. With regard to that, not only safety might be increased, but also connectivity within EU as a key-enabler for economic growth and social cohesion.

Introduction of PBN operations within AIR-OPS Part NCC/NCO [RD-13], and ICAO State letter 2018-103 [RD-12] on new non-instrument RWY definition are the main enablers for GNSS-based approach implementation.

Additionally other EASA RMT integrating proportionate requirements for GA users are analysed in detail thorough the document, fitting the pieces together to depict this changing process. These regulatory initiatives are driven to provide a proportionate environment tailored to GA needs and covering all EASA domains, from licensing through ATS to AD infrastructure.

EASA's efforts trigger major progress on airworthiness and pilot licensing in General Aviation, in specific with a proposal for a light Part-M, CS-STAN in airworthiness and Basic Instrument Rating /Declared Training Organizations in Pilot licensing. This will ease IFR implementations, however ATM and Aerodrome domains are not completely ready with proportionate requirements to enable GA operations in accordance with IFR.

RMT.0677 ToR *'Easier access of General Aviation (GA) pilots to instrument flight rules (IFR) flying'* quotes:

> **"In this context, it is expected that the comprehensive action plan will contain recommendations for changes of the aircrew, airworthiness, ATM, and aerodrome, etc. requirements".**

This initiative contributes to highlight the results of EASA RMTs which can be relevant for the implementation of IFR for General Aviation tackling the missing points and identifying implementation enablers.

The enablers and missing points proposed may have to be further discussed and defined together with the GA community (ideally within EASA remits) in order to facilitate the wide use of GNSS-based operations for GA at VFR locations. The most representative EASA RMTs involved in the implementation process which can be relevant for the purpose of this document and their results are summarized in the following table:

Main EASA development for GA			
Basic regulation		Proportionate requirements for GA. An EASA ADR certificate is no longer needed to implement IFR operations in GA-aerodromes	Reg. 2018/1139
ADR	RMT.0591	Introduces new ICAO RWY classification	CR 2018/401
ATM/ANS	RMT.0464	Common requirements for Air Traffic services AFIS/Non-ATS aeronautical stations	IR 201/373 Opinion 03-2018
	RMT.0477	Technical requirements and operational procedures for AIS and AIM (new AIS certificates)	Opinion 02-2018
	RMT.0455	Technical requirements and operational procedures for airspace design including flight procedure design	Opinion 02-2018
FCL	RMT.0677	Easier access of General Aviation (GA) pilots to instrument flight rules (IFR) - Basic Instrument Rating (BIR) - Declared Training organizations	Opinion 01-2019 CR (EU) 2018/1119
AIR-OPS	RMT.256-257 RMT.0379	Operation approval of performance-based navigation All Weather Operations group. NPA 2016-08 introduces a proposal of DH for non-IRE and lighting provisions for IFR operations at non-instrument RWYs	CR 2016/1199 NPA 2016-08
AUR	RMT.0639	PBN-IR. PBN approaches to be implemented in all IRE. Applicable to AD operators and ATM/ANS providers	CR 2018/1048
SERA	RMT.0476	Regular update of SERA rule	Opinion 03-2018

02

Concept view.
GNSS-based instrument operations for general aviation

The introduction of IFR solutions within VFR environments does not have a unique solution. There is a wide range of options depending on the characteristics of each aerodrome, the surrounding airspace and the local regulatory conditions. Based on the examples used in the USA and other EU countries jointly with EASA rulemaking developments, this section depicts a **theoretical example** of one of the many solutions available on how to perform instrument approaches at locations that are currently VFR only.

Our scenario is composed by an aircraft equipped with a certified GNSS-receiver (e.g. ETSO-145/146) and a pilot holding a licence to conduct IFR flights, e.g. a Basic Instrument Rating (BIR), which enables the use of instrument approaches with a limit on the operating minima of the approach down to about 500ft.

The state decides, based on the criteria set out in the ATM implementing regulation (e.g. the types and density of traffic using the AD) on the level of ATS to be provided, and where it is to be provided. This analysis may result in:

a) **ATC provided for the IAP and in the vicinity of the AD** (i.e. a controlled AD in class D) – this possibility is not further described in this paper as it is widely implemented in EU.

b) **ATC provided for all or part of the IAP, but not in the vicinity of the AD:** in this case, controlled airspace, likely to be class D or class E, will be established above a CTA floor above the AD and its surroundings. To protect the airspace surroundings a RMZ or TMZ may be used between the surface and the CTA floor to mitigate risk.

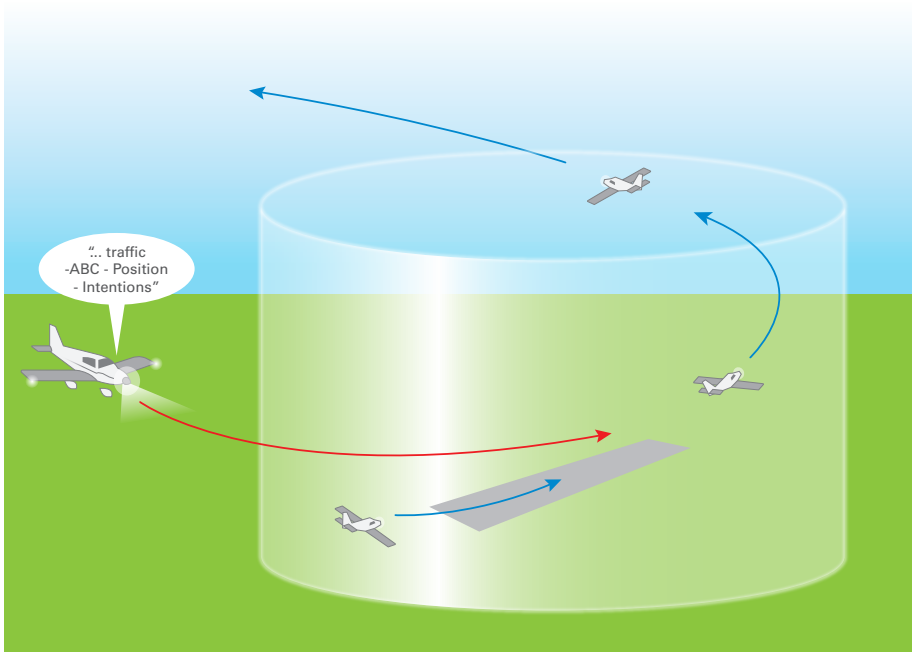
c) **ATC not provided for the IAP, nor in the AD vicinity:** in this case the airspace in the vicinity of the AD will be class G. A RMZ or TMZ may be used to mitigate risk.

In case (b), ATC (typically an Approach Control function) may clear the inbound aircraft for the approach, and will ensure separation from other IFR-aircraft in controlled airspace by procedural or radar separation. Pre-notification of the arrival to the AD AFIS unit, where AFIS is established, may be helpful.

On leaving controlled airspace in its descent, the pilot contacts the AD AFIS or transmits to other traffic on the UNICOM frequency for situational awareness. If the approach is continued to landing, the completion of the flight may be communicated to ATC by the AFIS, or by phone by the pilot. If a missed approach is necessary, the pilot may coordinate with the ATC unit by radio.

In case (c), the IAP is conducted entirely in uncontrolled airspace and separation from other IFR traffic is not provided. Therefore, it is up to the pilot to determine that the aircraft trajectory will not conflict with other airspace users. Sometimes, either an area control unit (ATC) or a FIR FIS may facilitate this process by offering information to inbound aircraft on activity at the specific AD, in particular on other aircraft that have indicated their intent to use the IAP. Pre-notification of the arrival to the AD AFIS unit, where AFIS is established, may be helpful.

In the absence of such a service at an area scale, the AD's AFIS may offer information to inbound aircraft on activity at the specific AD, in particular on other aircraft that have indicated their intent to use the IAP.



When no-ATS is available, UNICOM or a pre-notification/ reservation system may be sufficient to mitigate risk of two IFR flights coming into conflict on the IAP. Once safely on the ground, the pilot reports with blind call "runway vacated" on the RMZ frequency and closes the IFR flight plan (via phone or radio, if any), leaving the airspace free for other users to conduct a new approach.

The AD has an instrument or a non-instrument RWY available, with an instrument approach procedure (based on RNP APCH specification) published on its national AIP jointly with the information about the services available on its location, namely an APP/TWR/UNICOM/AFIS ("INFO") frequency or the source of MET information. The solutions regarding the provision of MET information may range from the operation of a (automatic) meteorological station (AWOS/ASOS) to the intervention of a Meteorological Service Provider from a near AD/MET station properly published in AIP, taking into due account the factors described in section 3.7.

03 Regulatory analysis of IAP implementation process for general aviation

EASA and ICAO provide a detailed regulatory framework that allows and fosters the implementation of IFP to non-instrument RWY.

After the analysis of the results of EASA rulemaking tasks there are relevant aspects regarding the implementation of GNSS-based operations at small AD involving almost every domain. Some of them are quite clear, but other aspects should be further developed at the State level. This section summarizes the most representative ones, to identify the gaps or potential barriers of IFR operations implementation for GA including a view of how to solve them when feasible, being aware that further EASA developments could change the presented understanding.

After each subsection the Implementation Enabler available and the activities arisen to solve the existing barriers or improve the implementation frame are also highlighted.

3.1 PBN operations

AIR-OPS has recently incorporated provisions related to PBN operations (CR 2016/1199, [RD-13]), removing the requirements for specific approvals for most PBN operations.

IAP based on RNP APCH specification is no longer considered within Part-SPA. The cases requiring a specific approval (only RNP 0.3 and RNP AR APCH specifications) have been significantly reduced in order to alleviate the unnecessary economic and administrative burden on operators, taking into account the experience and maturity already reached in approach operations utilizing the global navigation satellite system ('GNSS').

IMPLEMENTATION ENABLER:
GNSS-based instrumental approach operation (PBN are covered by EASA AIR OPS regulation, enabling its use for not only commercial aircraft (Part CAT), but also for GA users (Part NCC/NCO/SPO).

3.2 Aerodromes

At first glance, there are two types of non-instrument runways:

- runways located on an AD which is also operating instrument runways and
- those located on an AD which only operates non-instrument runways.

The first ones used to be served by a circle-to-land manoeuvre; nowadays they also can be served by a RNAV (GNSS) approach. The second category of non-instrument runways is related to currently VFR-only aerodromes, this is where most of the questions are.

ICAO New RWY classification

With the introduction of ICAO new RWY classification and definitions, instrument procedures are considered to be implemented in any runway type. ICAO State Letter 2018-103 states:

> **"non-instrument runway"** - a runway intended for the operation of aircraft using visual approach procedures or supporting **an instrument approach procedure with minima not lower than 150m (500ft) above aerodrome elevation.**

According to this, IFP can be implemented at non-instrument RWY, with no additional requirement in terms of RWY infrastructure or visibility; if minima is lower than 150m (500ft), the runway must be at least a non-precision approach runway.

To reinforce this understanding EASA Opinion 03-2016 [RD-18] quotes in its Executive Summary:

> "The specific objective of this Opinion is to maintain and, for specific types of runways (non-instrument and non-precision), enhance the high level of safety. It facilitates performance-based navigation approach operations with vertical guidance to be applied at non-precision approach runways, and instrument approach operations to be associated with non-instrument runways **without the need in both cases to upgrade runway infrastructure**"

In any case, the non-IRWY ICAO definition[1] was finally not adopted within CR (EU) 139/2014 [RD-3] and is under review in ICAO and EASA AWO group[2]. Nevertheless, there is nothing in EASA or ICAO references preventing the implementation of instrument approach procedures at non-instrument RWYs, but regulatory developments are driven to reinforce and clarify this understanding.

...STILL WORK TO DO:

To be aligned with ICAO Annex 14, adoption of non-instrument RWY definition at **EASA** level. Actual limitations concerning the use of non-instrument RWY and instrument RWY in terms of visibility (VMC or 500 ft criteria) are subject to be revised with the introduction of Performance-based Aerodrome Operating Minima (PB-AOM). In near future even more usability without additional adjustment of ADR-infrastructure could be expected.

New Basic Regulation. AD under EASA/MS certification scheme.

Not all aerodromes are subject to EASA ADR common rules; the Aerodromes to which EASA Regulation applies are defined in Article 2 (e) (i) (ii) (New Basic Regulation (EC) 2018/1139[RD-2]):

(i) are open to public use;

(ii) serve commercial air transport; and have a paved instrument runway of 800 metres or more, or exclusively serve helicopters using instrument approach or departure procedures;

In addition, article 2.7 of New Basic Regulation (EC) 2018/1139 give the possibility to Member States to exempt aerodromes handling less than 10000 passengers per year or less than 850 cargo movements. The rest of the aerodromes and those exempted according to article 2.7, remain under the regulatory control of the Member States.

Aerodromes exclusively operating for GA (VFR-to-IFR) typically do not serve commercial air transport, so most of small aerodromes are out of EASA Part ADR and therefore, do not need an European aerodrome certificate.

Each year EASA also publishes a list of AD under the scope of BR - CR 139/2014 [RD-3], following the statement in Article 4: Information to the European Aviation Safety Agency

https://www.easa.europa.eu/sites/default/files/dfu/List%20of%20aerodromes%20falling%20in%20the%20scope%20of%20R%28EU%29%202018_1139.pdf

This list compiles also the AD expected to ask for an exemption due to traffic expected providing information about the Aerodrome operator. So the information about which AD is under EASA ADR or grants an exemption is public and is available.

IMPLEMENTATION ENABLER:

There is nothing in **EASA** or **ICAO** references preventing the implementation of instrument approach procedures at non-instrument RWYs. The aerodrome certificate would be under EASA or MS scope, but both schemes consider flying IFR.

ADR certificate

GM1.ADR.AR.C.035 includes EASA models for the Aerodrome Operator certificate, the Aerodrome certificate and the terms of the certificate.

Following EASA AD Operator certificate, when implementing new IFR operations the terms of an existing certificate shall be modified to include them:

- Note 3, conditions to operate: IFR.
- Note 5, type of approaches.

In case the AD is under MS, the ADR certificate change process follows local regulations.

1 The existing non-IRWY ICAO definition indicates that a non-Instrument RWY is intended for the operation of aircraft using visual approach procedures or an IAP to a point beyond which the approach may continue in VMC.

2 At the time of the present document ICAO provisions have not been implemented in EU.

IMPLEMENTATION ENABLER:

A change on ADR certificate (GM1.ADR.AR.C.035, if under EASA scope) is needed to introduce IFR operations.

Runway requirements

Generally speaking, the best usability of a runway could be achieved following ICAO SARPs/EASA ADR on physical characteristics for instrument-runways and obstacle-free areas in accordance with ICAO PANS OPS (DOC 8168). A runway could be used for IFR-flights, but the level of visual aids determines the required visibility, while agglomeration of obstacles determines DH/MDH and the required climb gradient for take-off and go-around.

If only a non-instrument-runway is available, the same principle applies, but due to lack or partial lack of visual aids and obstacle-situation, the usability may be reduced.

Lighting requirements

For non-instrument runways there are no requirements for having an approach lighting system according to ICAO Annex 14, although a simple approach lighting system is recommended based on this Annex. However, for non-precision approach runways, it is required to have a simple approach lighting system.

Regarding EASA ADR/AIR-OPS regulation (CS ADR-DSN.M.625 and NPA 2018-06 (C)) for non-instrument runways, where physically practicable, a simple approach lighting system (IALS) as specified in CS ADR-DSN.M.626 *should* be provided to serve a non-instrument runway where the code number is 3 or 4, and intended for use at night, except when the runway is used only in conditions of good visibility, and sufficient guidance is provided by other visual aid, but no lighting is an option *(NPA 2018-06 (c) Table 8.A NALS; any other approach lighting system (HIALS, MALS or ALS) or no approach lights).*

In terms of the operation, the class of approach lighting systems available at the RWY does not have impact on the minima (M)DH achievable, it has an impact on the RVR needed to operate at the AD. In this sense, e.g. for a DH=500ft, RVR values range from 1600m to 2400m depending on the class of lighting facility (*AMC5 CAT.OP.MPA.110, Aerodrome operating minima, Table 5, [RD-13]; NPA 2018-06 (c) Table 5.A).*

Obstacle Limitation Surfaces

Implementing GNSS-based RNP APCH procedures at non-instrument RWY does not introduce additional requirements. The ICAO Annex 14 OLS (included in EU Reg 139/2014 Part ADR [RD-5]) are different depending on the runway classification (non-instrument, non-precision and precision) and runway code number, but considering ICAO SL with new runway definitions, it does not depend whether which type of Instrument procedures is available.

Both, non-precision approach and non-instrument runways require the same OLS, with different size parameters:

- conical surface
- inner horizontal Surface
- approach Surface
- transitional surface

OLS of non-instrument runway are less restrictive than non-precision approach ones, and this may be mitigated with increased DH if necessary.

IMPLEMENTATION ENABLER:

According to ICAO Annex 14 [RD-5], Reg. 139/2014 and NPA 2018-06 (c) (AIR-OPS), to operate GNSS-based procedures no upgrade on runway infrastructure is needed

- There are no lighting system requirements.
- There are no additional OLS requirements.

All RWY types (instrument or non-instrument) can implement IFR operations

PBN based solutions with vertical guidance are highly recommended (3D approach operation type A).

...STILL WORK TO DO:

Once IAP is allowed in all type of RWYs (according to ICAO); it would be positive an update of current OLS requirements/parameters to tailor them to the type of operation in use within the AD instead of the RWY code number.

This understanding seems to be more efficient to maintain airspace around free of obstacles.

***ICAO OLS Task Force works** to analyze OLS changes are on-going.*

3.3 ATS level

To determine the level of ATS to serve instrument operations at an AD, an assessment considering the local conditions shall be issued. According to ICAO Annex 11 [RD-7] and the incoming Part-ATS [RD-15], this assessment shall consider:

- The nature and density of the traffic sample expected to operate at the AD.
- The meteorological conditions and its influence on the flow of air traffic.
- The geographical conditions of the AD surroundings.
- The complexity of the airspace concerned.

For the purpose of implementing instrument procedures at an aerodrome, the following options are considered from more to less demanding:

- Air Traffic Control service (ATC).
- Flight Information Service in an aerodrome (AFIS, certified or declared, when only a position is open).
- ATS (ATC/AFIS) with a limited certificate/declaration.
- No ATC/AFIS.(UNICOM/None)

IMPLEMENTATION ENABLER:

According to Opinion 03-2018, in case there is no ATS implemented at the AD, en-route FIS service, which is normally available, can facilitate exchange of information.

Implementing ATC or AFIS may result in a non-positive business case in many small aerodromes with low traffic. Therefore, the preferred solution at small aerodromes with low level of traffic is no ATC (AFIS/UNICOM/None); traffic information to be ensured by pilot communications when reporting their positions and intentions.

IMPLEMENTATION ENABLER:

Tailored ATS solutions for GA:

- **AFIS:** with or without a limited certificate; declared, (**EASA ATS rules**) and
- **UNICOM** station (not considered ATS, **MS level**)
- None

*Each a**irspace change initiator** shall determine in coordination with national CAA, the most suitable solution considering local conditions.*

ATS with limited certificate

AFIS holding a limited certificate is not a widely used solution, but it is a figure intended for small service providers, to allow having more proportionate requirements to comply with ATM/ATS requirements. It is not available for all SP, only for ANSP (ATS, MET, AIS, CNS).

IR 2017/373 [RD-15] introduces a new approach to apply for a limited certificate from 1035/2011, with some relevant differences. IR 1035/2011 [RD-16] set limited certificates (Art.5) as a derogation granted by the competent authority of the existing requirements, setting the responsibility of maintaining the safety level on Member States. IR 2017/373 [RD-15] changes the point of view, now a limited certificate is a figure part of common requirements, ANSP do not obtain a limited certificate by the derogation of some articles, but complying with ATM/ANS.OR.A.010. This slight difference could enable the use of limited certificates for small ANSP through EU.

The scope of ANSP that could apply for a limited certificate does not change, small entities providing services at locations with low traffic:

- ATSP planning to provide its services for:
  - Aerial work
  - General Aviation
  - Commercial Air transport MTOM<10 tons or <20 pax
- ANSP:
  - With a gross annual turnover of less than EUR 1 000 000
  - Providing FIS with not more than one position at any AD

ANSP with a limited certificate are not required to comply with the whole Annex IV, only the applicable provisions listed on ATM/ANS.OR.010:

(1) point ATM/ANS.OR.B.001 Technical and operational competence and capability;
(2) point ATM/ANS.OR.B.005 Management system;
(3) point ATM/ANS.OR.B.020 Personnel requirements;
(4) point ATM/ANS.OR.A.075 Open and transparent provision of services;
(5) Annexes IV, V, VI and VIII, where those requirements are applicable

There are significant absences in the provisions to be compliant with, which can leverage the effort and expertise needed for small ANSP, e.g.:

- change management (ATM.ANS.OR.A.045; ATM.ANS.OR.B.010),
- Occurrence reporting (ATM.ANS.OR.A.065),
- Contingency plans (ATM.ANS.OR.A.070),
- Operations Manual (ATM.ANS.OR.B.035) or
- Liabilities and insurance cover (ATM.ANS.OR.D.020).

Non-ATS aeronautical station (UNICOM)

Opinion 03-2018 [RD-20] introduces a brief description of non-ATS aeronautical station (UNICOM).

UNICOM station comprises a frequency used by pilots (among other users) to announce their intentions at an aerodrome where ATS is not provided. It must be emphasised that a UNICOM station is not an air traffic service, meaning that pilots must accept more responsibility for their actions than when operating in a controlled aerodrome environment. As a reference, in some countries such as USA or Australia, this service is already provided and the frequency is clearly stated in the approach chart. UNICOM concept is also widely used in EU within VFR community, but it is less common to support IFP.

Users should not confuse AFIS units with a UNICOM station or a base radio. Only an AFIS can provide traffic information determined by the observations of the AFIS operators themselves. UNICOM stations are not able to interpret aircraft information and therefore may only relay from pilot or aircraft operator reports.

Non-ATS aeronautical station (UNICOM) is out of EASA competences and each MS shall set the frame for its provision.

Formal agreements

The needed **formal agreements** to ensure liabilities with other SPs in the case of UNICOM stations or ATS with limited certificate could be ensured by the EASA AD operator. Aerodrome operators holding a certificate follow a similar scheme as ATS providers, having similar provisions driven to ensure the safety of the operation.

Reg. 139/2014 [RD-14] sets the responsibility for AD operators under EASA scope to coordinate with the ANS needed for the operation (ADR.OR.C.005 *Aerodrome operator responsibilities (b) 1).*

For those aerodromes out of Reg. 139/2014 [RD-14], *Opinion 03-2018 Art. 3e* mandates Member States to ensure that arrangements for the necessary coordination and information exchange are established between the ATM/ANS providers and other parties outside the scope of the EASA Basic Regulation (e.g. operators of aerodromes outside the scope of Regulation (EU) No 139/2014), to ensure that such services are provided.

IMPLEMENTATION ENABLER:
Aerodrome Operator could lead the appropriate formal agreements with ANS providers (MET, CNS, AIS) in case the there is no ATS provider (ADR.OR.C.005).

3.4 Aeronautical Information Service (AIS)

Information to aviation users

Although there is no specific requirement, some countries have made available to airspace users information about how to conduct instrument operations in non-controlled aerodromes. This useful information facilitates the operation of IFR pilots and also provides guidance to VFR pilots on how to deal with the mix of traffic, the use of an open frequency and the expected reports during the operation.

Local procedures could also consider the language to be used in the communications and encourage GA pilots to submit a flight plan to help search and rescue operations in case the aircraft go missing.

France and New Zealand have chosen to publish it within ENR-1.10 while others like Switzerland have published a dedicated AIC.

IMPLEMENTATION ENABLER:
Publication of advisory information about the local procedures within ENR 1.10 or in dedicated AIC help aviation users to conduct safely the instrument operation at uncontrolled aerodromes.

Charting

New instrument procedures at small aerodromes are required to be included in the national AIP if they have an international designation. In this manner, data houses would code the instrument procedures base on corresponding AIRAC cycle. These charts could be included in different sections of the AIP depending on the nature of the aerodrome (public use / non-public use).

AD charts with an intended use limited to domestic flights (GA) are out of the scope of ICAO Annex 15 [RD-8], so they

may not be required to publish the IFP procedures within the national AIP.

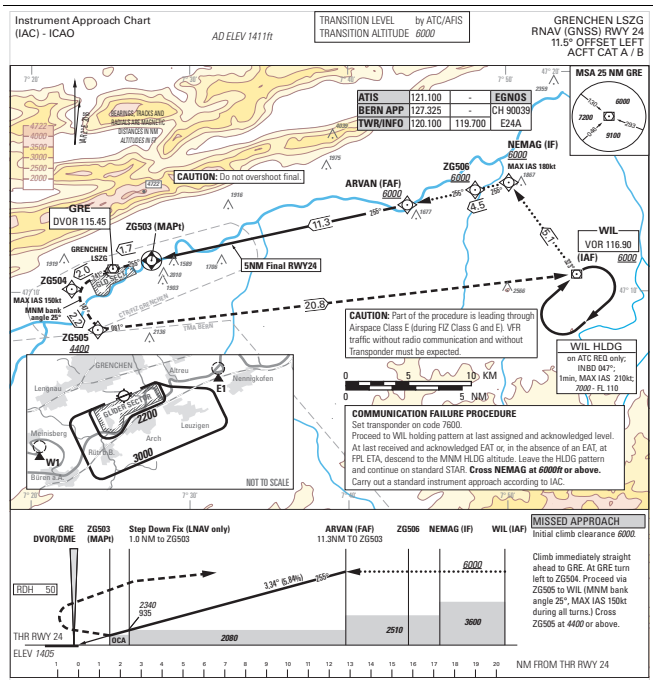
Nevertheless, according to GM ATS.OR.125 (Opinion 03-2018, [RD-20]), even when a Non-ATS aeronautical station is implemented at the AD, there is set of minimum information that may be available to airspace users within the national AIP.

Publication in the national AIP have other related implications, such as ICAO Annex 4 compliance of charting and ARINC 424 code of the procedures that may also be endangered if the publication process is out of AIP scope.

In the view of the above, arrangement to publish IFP related information within national AIS provider, even if it is not directly included in the national AIP seems to be the best available and preferred solution to guarantee that ICAO Annex 4/15 publication criteria is followed.

IMPLEMENTATION ENABLER:

The best available and preferred solution to publish IFP charts is to do it through national AIP; even if it is not a requirement if the AD is not open to international traffic.



NOTAM

ICAO Annex 10 [RD-6] requires Member States to ensure that NOTAM issuance and SBAS monitoring system is available before the implementation of an SBAS-based approach. In addition, according to ICAO Annex 15, Chapter 5, NOTAM [RD-8], aviation users shall be aware of GNSS (including SBAS) availability failures at that aerodrome. Regarding the SBAS services in Europe, the EGNOS Service provider generates EGNOS NOTAM.

If requested by the national CAA, the airspace user (i.e. AD operator or the Aircraft operator, [RD-1]) might need to establish a formal agreement with the EGNOS Navigation Provider to ensure the distribution of the EGNOS NOTAM information regarding IAP for GA operations at small aerodromes where there is no ATS in place. In the absence of an ATSP, either AD operator or the aircraft operator could centralize the formal agreements, if needed, as organizations entitled to have operational responsibility over the EGNOS based procedure, according to RE139/2004 for the AD operator and RE965/2012 for the aircraft operator.

It addition, EU SBAS provider provides a real-time information about EGNOS service availability status on its website for advisory purposes, not substituting the NOTAM service provision. If required, NOTAM information could be used from the local aerodromes that is already provided with this service. Furthermore, no additional monitoring of the GNSS signal is needed:

https://egnos-user-support.essp-sas.eu/new_egnos_ops/content/airports-availability

RAIM NOTAM provision is therefore also needed when Baro-based approaches are implemented.

IMPLEMENTATION ENABLER:

RNP APCH performance monitoring and alerting capability is included in on-board equipment.

Furthermore, NOTAM provision ensures that information about navaids availability status reach airspace users. The best available and preferred solution is to follow the traditional channel through national AIS provider.

3.5 Flight procedure design

Even if there is no need for additional runway infrastructure, IFPs require the assessment of the obstacle environment and regular monitoring.

Flight Procedures Design process ensures the obstacle clearance with the terrain, and the periodic review and continuous maintenance required in ICAO 9906 guarantees the validity of the IFP design.

Airspace structure

AFIS station needs an airspace structure (class G) to define the boundaries where the service is provided, the availability of the service and the requirements for aircraft operating inside this area.

The definition of an airspace structure is part of the FPD change process; it depends highly on criteria such as traffic density, traffic mix, leading to very different solutions depending on the scenario (airspace Class and type of airspace structure). A Radio Mandatory Zone (RMZ) Class G could be a suitable airspace structure, but it is not the unique solution.

SERA.6005 [RD-17] describes the operation within the RMZ, where pilot approaching makes an initial call containing the designation of the station being called, call sign, type of aircraft, position, level and the intentions of the flight. This operation is similar to the operational concept view proposed in Section 2.

IMPLEMENTATION ENABLER:
RMZ + Class G (e.g. 5 NM, 1000 ft AGL) is one of the available airspace structures to define the limits of AFIS/UNICOM services provided in small AD.

Other local solutions for airspace structures comprise the establishment of FIZ, ATZ or even none, when there is no ATS/UNICOM service.

Design criteria

Classic straight in approach with vertical guidance, based in GNSS is the preferred solution regardless of the RWY type or ATS level available.

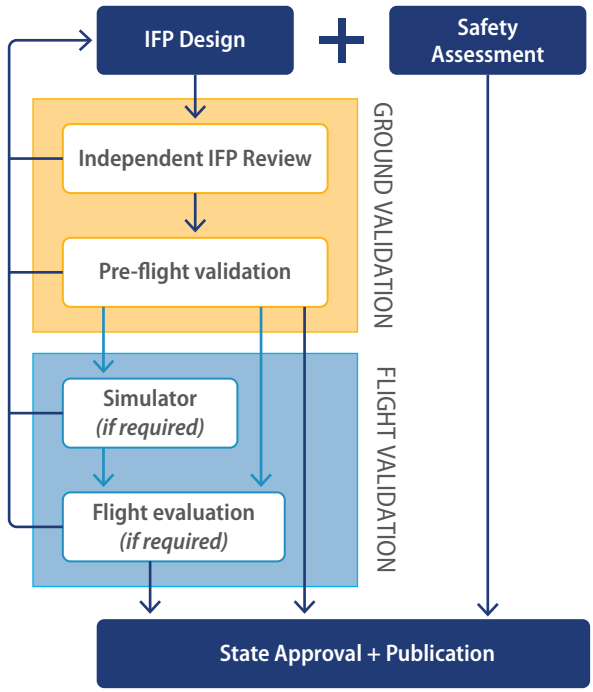
Once the OCH is defined, it is recommended to lower minima progressively to ensure a safe implementation, with a final objective of 500ft.

IMPLEMENTATION ENABLER:
IAP ending the final approach segment in a straight in approach with vertical guidance to the threshold or (M) DH is the preferred solution, as it maximizes the safety of the operation.

IFP design process

The regulatory frame of the IFP design process is part of EASA recent developments. It is based on ICAO Doc 9906 [RD-10], and describes the steps involved on a fight design to ensure the quality of the process.

IFP design process is currently one of the activities demanding more resources, in economic terms and qualified personnel. There are not defined direct proportionate requirements for GA to enable the implementation of IFP at small AD, they follow the same implementation process:



IMPLEMENTATION ENABLER:
ICAO IFP design process is going to be included under SES framework through EASA RMT.0445. The airspace change initiator of the implementation process can be the ATSP, the AD, national authority or even interested users.

3.6 Flight Crew Licensing

Basic Instrument Rating

EASA Opinion 01/2019 [RD-24] has the objective to provide a more accessible instrument rating for pilots holding non-commercial licenses in general aviation.

Under the Opinion, EASA is proposing the introduction of a Basic Instrument Rating (BIR), which is a qualification to fly in Instrument Flight Rules (IFR), but based on more proportionate requirements when compared to the traditional instrument rating and tailored to the need of GA pilots.

BIR holders will be restricted on an approach procedure, down to **200 ft** above the standard DH/MDH.

Training for BIR holders is modular, providing more flexibility, and only some modules are required to be trained by ATOs, but other can be flown/build outside training organizations.

IMPLEMENTATION ENABLER:

BIR license is a proportionate solution (modular/competence-based/flexible training) regarding to pilot licenses to enable the use IFR for GA.

Declared Training Organizations (DTO)

CR (EU) 2018/1119 proposes simplified pilot training standards for leisure flying, an option to provide training for GA-related non-commercial licenses outside an Approved Training Organization (ATO). This new 'declared training organization' (DTO) also benefits from simplified organisational and oversight requirements, deriving for being out of a certification process, only declaration is needed.

...STILL WORK TO DO:

Declared Training Organizations (DTOs), as defined by **EASA**, are still not allowed to provide a complete BIR training.

GA pilots willing to fly IFR still need to perform some modules of its training on ATOs.

Users demand more awareness information about IFR pilot license training options (modular BIR).

3.7 Aeronautical Meteorological Information supporting Instrument Approach Procedures

The scope of this section is to consider the instrumented approach procedure, and the meteorological requirements that support such procedures. Whilst the nature of the instrument approach procedures means that they may be safely undertaken in the absence of meteorological information at the aerodrome (see Appendix B), it is still necessary for the pilot to be fully briefed on the expected weather en-route and for the destination and alternate aerodromes.

Wind will be a factor for approach direction and any limitations with regard to cross wind especially when runway surfaces are wet. Low level turbulence may be induced by the wind, dependent on terrain. Temperatures may indicate criticalities, such as in-flight icing conditions, and runway surface condition when surface temperatures are close to zero Celsius.

Under IMC, embedded cumulonimbus cloud may be an unseen hazard resulting in severe turbulence, lightning and severe icing. Cloud base information will provide the pilot with the expected altitude to emerge from cloud, and visibility the expected conditions below cloud. Aerodrome QNH provides altitude information for barometric altimeters. In case there is no local QNH at the AD, ICAO PANS OPS [RD-9] sets that *"the OCA/H shall be increased at a rate of 0.8 m for each kilometre in excess of 9 km (5 ft for each nautical mile in excess of 5 NM)."* This statement may be applicable to all instrumental flight procedures, except for LNAV/VNAV minima

It is recommended that aerodromes intended for such approaches are equipped, as a minimum, with automatic weather stations (AWOS/ASOS) providing wind, temperature, dew point; and the means to pass the meteorological information to the pilot. The solutions regarding the provision of meteorological information may range from the operation of a (automatic) meteorological station (AWOS/ASOS) to the intervention of a Meteorological Service Provider from a near AD/station.

The additional methods might be considered as included in the Appendix B.

Where observations cannot be provided at the destination aerodrome, then the pilot should assess the expected conditions from the available forecasts, including nearby

aerodromes for which information is available, and are representative of the destination aerodrome. It is recommended to have a telephone briefing from the meteorological service provider.

Automated Meteorological Stations

ICAO provides guidance on how to implement and measure Automated Systems for meteorological stations in Manual on Automatic Meteorological Observing Systems at Aerodromes (Doc 9837). These systems are able to measure the relevant information for landing (wind, visibility, RVR, clouds, air temperature and QNH) although there are limitations on capability with regard to visibility, cloud and present weather.

EASA new Basic Regulation considers that the different solutions shall be assessed in view of exposure to risk. This applies also to MET data provision.

Météo-France and ENAC have implemented AUTO METAR. At each aerodrome equipped to issue AUTO METAR, local sensors, an automatic acquisition system and a micro-computer with a Meteo-France software called Caobs are installed. The telecommunication link between Caobs and the national centre in Toulouse is either an IP connection (Intranet) or a Public Telephone Line (for "small" airport.). This web-based service is available on more than 100 aerodromes and delivers every half an hour, 24 hours a day, 365 days a year a METAR AUTO / TREND message. This automatically generated message is valid for any kind of operations: from NCO to CAT operations and domestic / international flights, complying with ICAO Annex 3.

This system is coupled with PCL (pilot controlled lighting), so pilots can activate the automated message when there are no personnel in the AD.

There are other commercial solutions for AutoMET stations tailored for small GA Aerodromes.

IMPLEMENTATION ENABLER:

To perform an instrument approach GNSS-based, a pilot need meteorological information, in particular IMC/VMC conditions and QNH.

MET data can be provided by:

- Near MET station (solution widely adopted on EU countries)
- Automatic weather systems, transmitting MET information by automatic messages (France)
- Web-based solutions (skybriefing.com, Switzerland)
- Small MET stations

...STILL WORK TO DO:

The capabilities of automatic weather stations are variable. Cloud, visibility and present weather remain challenges to be observed by machine.

3.8 General Aviation SBAS equipage

For Instrument Flight Rules (IFR) operations, the type of architecture determines the functional class (beta, gamma or delta) of the SBAS receiver, as per RTCA DO-229D, being required to be certified against the corresponding European standard (ETSO-C145c or ETSO-C146c) to use them in SBAS-based operations.

Currently, certified SBAS-enabled receivers commercialized by the main manufacturers are extensively used by the aircraft manufacturers in their brand new models. Garmin (US), Honeywell/Bendix King (US) and Avidyne (US) are the most representative ones for general aviation.

The table 1 (p17) shows representative examples.

There are also numerous examples of aircraft fleet SBAS capable. Listing some of them:

- Cessna: Citation, Caravan and Single Engine
- Pilatus: PC6, PC24 and PC12/47E
- Diamond: DA20, 40XLT, 40CS, D-Jet,42 and 50
- Piper: Meridian, Seminole, Mirage, Matrix, Archer, Seneca V and Arrow
- Cirrus: SR20, SR22, SR22T and Vision SF50

So far, SBAS equipage rate in GA is high, so the need to work on new standards for light GNSS

IMPLEMENTATION ENABLER:

ETSO-145()/ETSO-146() are currently the available standards to fly SBAS based instrument approaches.

Manufacturer	Product	ETSO-145c	ETSO-146c
Garmin	GIA 6XW	X	
	GNS400W/420W/ 420AW/430W/430AW		X
	GNS 500W/530W/530AW		X
	CNX80/ GNS 480		X
	GTN 625/635/650		X
	GTN 725/750		X
	GPS 175/GNX 375		X
Honeywell/Bendix King	KFD ksn770		X
Avidyne Corp	IFD440		X
	IFD540		X

Table 1– SBAS receivers for GA

04 Future developments

After the review of different GA stakeholders and a consultation phase with different CAA, some future developments have been identified to enhance the implementation process to make it more cost-effective for GA community:

ADR

Users experience shows that the process to modify the conditions of an existing certificate is usually difficult, constituting a barrier to IFR implementation (feedback provided by European Regional Aerodromes Community).

Safety promotion activities to CAA and AD operators with the steps and docs needed to upgrade an ADR certificate to include IFR operations and safety implications of the change could help to make the process easier.

AIS

A small AD without international traffic is not required to publish in national AIP. This scenario could open the chart publication process to other entities not considered AIS providers interested on its publication like local AD websites or pilot training organisations, apps, etc. Experience up to now show that publication in national is still the most recommended and cost-efficient solution

ATS

UNICOM station is not considered an ATS level and despite its widely used for VFR, the use in IFR operations is cost-effective for GA environment, but there is still a lack of experience on it

MET

EASA is undertaking work, through its GA Roadmap 2.0, to assess the current and near future meteorological information that may be of benefit to the GA community generally for flight planning and in-flight update purposes, and may benefit procedures based on GNSS as described in this paper. The means of dissemination of that information to the GA pilot in-flight is also part EASA's work

Situational awareness

Situational awareness will become important due to the fact that aircraft could be potentially flying close together without visibility.

Training/Licensing

In addition to the instrument rating training syllabus already in Part-FCL, a proportionate and cost effective training solution is proposed in the Basic Instrument Rating in EASA Opinion 01/2019 [RD-24].

IFPD

There is a need of proportionate IFP requirements to avoid hampering IFR introduction for General Aviation, a 'light' part-ASD. However, steps required in the Flight Procedure Design process should not depend on the end user to reduce costs as it may compromise safety.

Efforts can be made to conceive more cost-efficient safety assessment and flight validation processes though, involving local pilots/users judgement and finding solutions proportionate to the risk.

Additionally there are other steps of procedure design that could be subject to be reviewed to set proportionate requirements to enable instrument operations at small AD, i.e. obstacle survey, independent IFP Designer review or maintenance process.

05 Summary

After the review of the current status of the regulatory framework for GNSS-based operations at small AD for GA and users readiness, the main conclusion is that there is a clear implementation scenario at almost every field, but there are also barriers that could hamper the implementation process and some activities raise to enable the most proper scenario for GA community.

The next step is to continue the activity and develop safety guidance material and other tools to facilitate the implementation of these procedures by GA.

In addition, the multidisciplinary group will be established with participation of experts and users in each area (ADR, ATS, AIS, MET, IFPD and standardization) and coordinated closely with EASA in order to develop the implementation solutions further and provide a review from a critical point of view the current available solutions in the EU frame. For solutions which are not feasible or proportionate, some improving activities might be proposed and GA community consulted to set priorities according to the utility of the action and maturity status of the field related. EASA operational expertise will be essential to focus the resources.

The results of each WG will build a complete scenario for the service provision aspects needed to implement and provide the information needed for users to operate in IFR at small AD where currently only VFR operations are permitted. This work is expected to be supported by new pilot cases in Europe in order to validate the concept. The outcomes are planned to be concluded in an update of this document by 2020.

The aim is that GNSS based operation will no longer be considered as a 'new aviation standard' but it becomes the main navigation channel to support safer GA operations, applying EASA view for GA (lighter-proportionate requirements) to the IFP implementation process.

Appendix A

IFP for GA examples

There are some countries where IFP are already been implemented at AD where there in not an ATS in place or the operating time schedule is limited. Each country has adopted a different approach to ensure the safety of the operation; this section compiles the most representative ones, namely Germany, France, Switzerland and New Zealand.

Appendix A.1 Germany

Germany has accomplished changes on its airspace structures with the premise that an aircraft shall be within controlled airspace the most part of the flight time. The change consists of rounding uncontrolled AD, formerly VFR, with IFR operations with RMZ categorized as airspace Class G. Additionally the adjacent airspace (Class E) lower limit has been reduced to 1000 ft AGL.

The decision to lower the surrounding controlled airspace class E allows starting the approach procedure under ATC clearance, ending the approach with only flight information (if requested). In this way DFS assumes the responsibility on the procedure, and the implications associated. A second benefit of the airspace E lowering is the resulting small dimensioning of the RMZ and the RMZ associated restrictions for en-route VFR traffic. The smallest RMZ will be achieved by lowering airspace class E down to 1000 ft AGL (Model 2, applied in Germany).

Germany only allows IAP to non-precision approach RWYs and with AFIS as a minimum. Additionally, decision of the ministry of transport of Germany already states that IAPs into non-instrument-RWYs are allowed if the aerodrome-certificate is changed accordingly.

Remark:
The implementation of the RMZ would also be possible without lowering airspace E (see left figure below, Model 1).

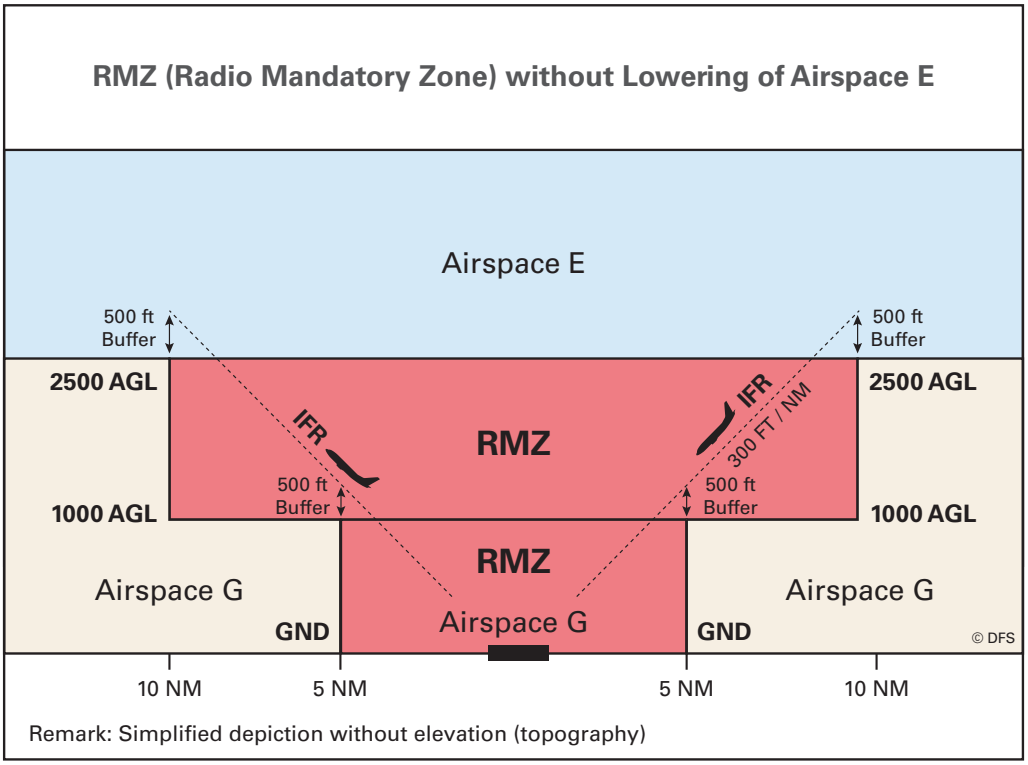
The RMZ replaces the former Airspace F, having the advantage that there is not an obligation of the radio connection. Before entering into the RMZ it is obligatory to report the call sign, aircraft type and pilot's intention, even if they are blind messages. It is mandatory to report leaving the RMZ as well.

Depending on the established IFR procedures, the lower part of the procedures (SID, Final Approach, Missed Approach) is within airspace class G. The upper part of the IFR procedures (SID, Final Approach, Missed Approach and Initial Approach completely) is within airspace class E.

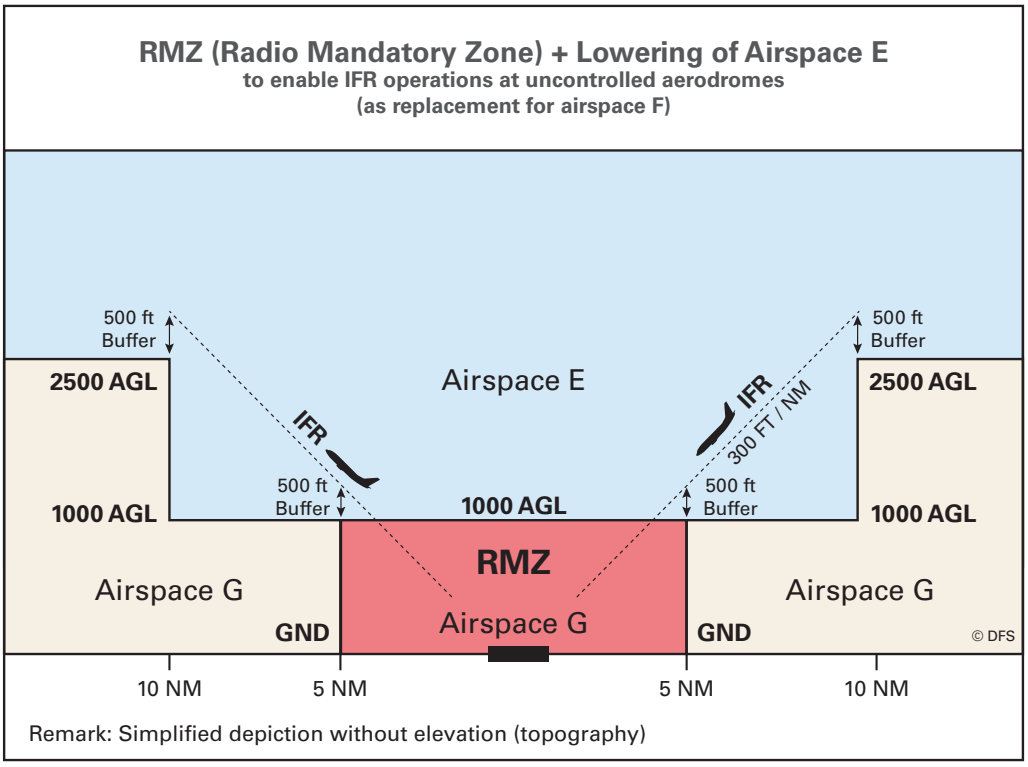
AFIS is provided by certified ANSP (mostly operated by the aerodrome operator) within the RMZ. Requirements regarding AFIS as a mandatory service are currently under discussion in Germany.

These operations are intended for small aircraft at small or low traffic-density-AD, since in Germany aircraft with MTOW>14000kg in commercial air transport are only allowed to be operated within controlled airspace.

See also AIP Germany ENR 1.8-21 (Extract page 22)



Model 1 (RMZ without lowering of airspace E)



Model 2 (RMZ with lowering of airspace E)

Flugbetrieb nach IFR an unkontrollierten Flugplätzen

1. Luftraum

1.1 Einrichtung von Radio Mandatory Zones (RMZ)

In der Umgebung von Flugplätzen mit IFR An- und Abflugverfahren im unkontrollierten Luftraum wird eine RMZ eingerichtet. Die RMZ beginnt am Boden und hat Anschluss an den kontrollierten Luftraum E.

2. Flugsicherungsverfahren für IFR-Flüge

2.1 Staffelung

Staffelung im Luftraum G wird nicht erstellt.

2.2 Flugverfahren für IFR-Flüge

IFR-Flüge in den kontrollierten Luftraum bedürfen einer Freigabe. Die Flugverfahren für IFR-Flüge im unkontrollierten Luftraum werden nach den gleichen ICAO-Kriterien (Doc. 8168) festgelegt, wie sie auch für die Verfahren im kontrollierten Luftraum gelten.

Die Verfahren werden ebenso im AIP, Teil ENR, veröffentlicht.

Dem Luftfahrzeugführer wird in den Instrumentenkarten angegeben, wann der IFR-Anflug den kontrollierten Luftraum E verlässt oder der IFR-Abflug in diesen Luftraum einfliegt.

Sollte ein IFR-Flug innerhalb Luftraum G von den veröffentlichten IFR-Flugverfahren abweichen müssen, besteht keine Möglichkeit, diesen Flug navigatorisch zu unterstützen.

2.3 Flugverkehrskontrollfreigaben

Flugverkehrskontrolle wird auf den veröffentlichten An- und Abflugverfahren nur im kontrollierten Luftraum durchgeführt. Die zuständige Flugverkehrskontrolle erteilt IFR-Anflugfreigaben und für IFR-Abflüge Streckenfreigaben. Streckenfreigaben können - wenn örtlich geregelt - von AFIS an den Luftfahrzeugführer übermittelt werden. In diesen Fällen darf der Start erst erfolgen, nachdem der Erhalt der Streckenfreigabe bestätigt worden ist.

Die Zusammenarbeit zwischen der Flugsicherungsstelle und AFIS kann entsprechend geregelt werden.

3. Flugverkehrsdienst an unkontrollierten Flugplätzen

Für den Flugplatzverkehr an unkontrollierten Flugplätzen wird von der Bodenstelle über Sprechfunk "Flugplatzinformationsdienst" zu den jeweils veröffentlichten Betriebszeiten gemäß ICAO vorgehalten. Die für die RMZ zu rufende Stelle ist INFO auf der jeweiligen Infofrequenz des IFR-Flugplatzes. Die Bodenstelle erteilt bei Bedarf Verkehrshinweise.

Die Sprechfunkverfahren für RMZ sind anzuwenden.

Anmerkung: Die Sprechfunkmeldungen sind auch für den Fall abzugeben, dass seitens der Bodenfunkstelle keine Antwort erfolgt.

IFR flight operations at uncontrolled aerodromes

1. Airspace

1.1 Establishment of radio mandatory zones (RMZ)

An RMZ will be established in the vicinity of aerodromes with IFR arrival and departure procedures in uncontrolled airspace. The RMZ starts at the ground and extends up to controlled Class E airspace.

2. Air navigation services procedures for IFR flights

2.1 Separation

Separation will not be provided in Class G airspace.

2.2 Flight procedures for IFR flights

IFR flights in controlled airspace require a clearance. The flight procedures for IFR flights in uncontrolled airspace will be laid down according to the same ICAO criteria (Doc 8168) as for procedures at controlled aerodromes.

The procedures will also be published in AIP part ENR.

The instrument charts inform the pilot when an IFR approach leaves controlled airspace E or when an IFR departure enters this airspace.

If an IFR flight in Class G airspace has to deviate from the published IFR flight procedures, it cannot be given navigational assistance.

2.3 ATC clearances

Air traffic control is only provided on the published arrival and departure procedures in controlled airspace. The competent air traffic control service will issue IFR approach clearances and en-route clearances for IFR departures. If so agreed locally, AFIS may transmit en-route clearances to the pilot. In such cases, take-off may only take place after the receipt of the en-route clearance has been confirmed.

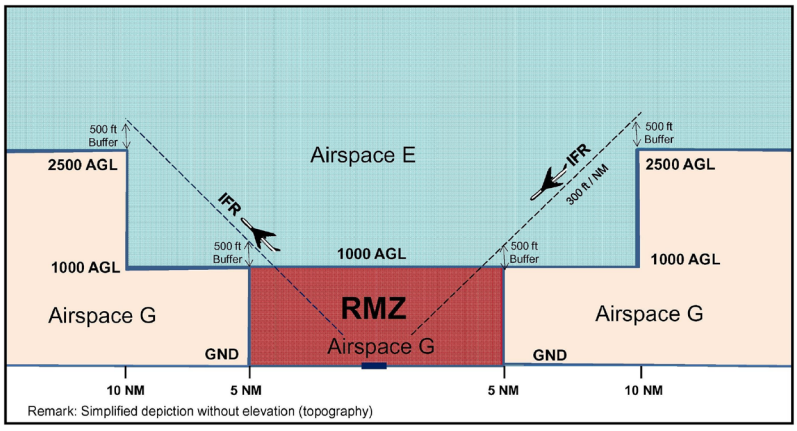
Cooperation between the air traffic services unit and AFIS can be agreed accordingly.

3. Air traffic services at uncontrolled aerodromes

For aerodrome traffic at uncontrolled aerodromes, the ground station will provide aerodrome flight information service by radiotelephony during the published operating hours, as laid down by ICAO. The unit to contact concerning the RMZ is INFO on the information frequency of the IFR aerodrome. The ground station will provide traffic information if required.

The radiotelephony procedures for RMZ shall be applied.

Note: Radiotelephony reports shall be made even if the aeronautical station does not answer.



Case of Study: Eggenfelden (AIP Germany)

- RWY dimensions:

Designations RWY NR	TRUE BRG	Dimensions of RWY (m)	Strength (PCN) and surface of RWY and SWY	THR coordinates RWY end coordinates THR geoid undulation	THR elevation and highest elevation of TDZ of precision APP RWY
1	2	3	4	5	6
08	87.20°	1160 x 23	46 ASPH	N 48 23 44.720 E 012 42 51.513	THR 1342 ft
26	267.20°	1160 x 23	46 ASPH	N 48 23 44.397 E 012 43 42.981	THR 1333 ft

- ATS service: ATIS+AFIS, APP München:

Service designation	Call sign	Channel/ Frequency (MHZ)	Hours of operation	Remarks
1	2	3	4	5
ATIS	EGGENFELDEN ATIS	125.075	WIN: 0800 – SS SUM: 0700 – SS MAX 1700 Other times: PPR	Designated operational coverage 25 NM, FL 100
APP	MUENCHEN RADAR	129.550	H24	
ATIS	EGGENFELDEN INFO	120.300	WIN: 0800 – SS SUM: 0700 – SS MAX 1700 Other times: PPR	Designated operattional coverage 25 NM, 4000 ft AGL

- Airspace: RMZ Class G:

1	Designation and lateral limits	RMZ
2	Vertical limits	1000 ft AGL
3	Airspace classification	G

- MET: MET information is provided by external MET office:

1	Associated MET Office	Meterological advisory center for aviation (MAC) South
2	Hours of service MET Office outside hours	H24

- OCA Minima published:

OCA (OCH)	A	B
LNAV	1890 (550)	1890 (550)
LNAV / VNAY	1890 (550)	1890 (550)
LPV	1890 (550)	1890 (550)
CIRCLING* OCH related to AD level	1940 (600)	2010 (680)

* South of aerodrome only

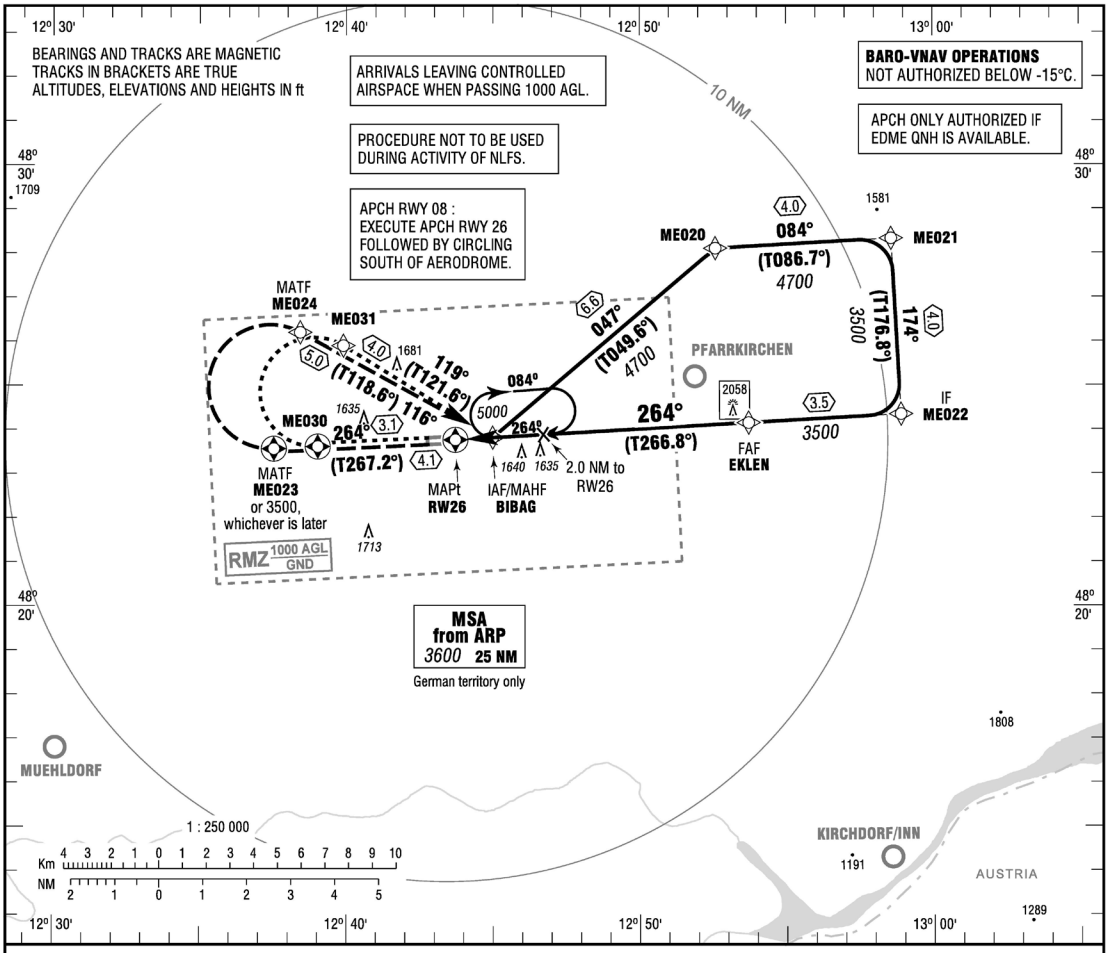
INSTRUMENT APPROACH CHART - ICAO

VAR 3° E

ELEV 1342
OCH RELATED TO THR 26 ELEV 1333

EGGENFELDEN WETTER	125.080
EGGENFELDEN INFO	120.305
MUENCHEN RADAR	129.555

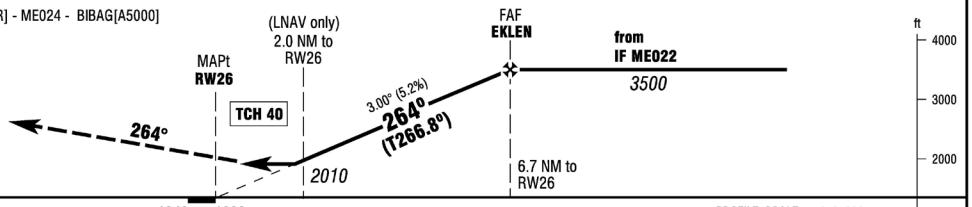
EGGENFELDEN
RNAV (GPS) RWY 26
EGNOS CH 67841 E26A



MISSED APPROACH PROCEDURE

On track 264° to ME023 or 3500, whichever is later;
RT, via ME024 on track 116° to BIBAG climbing to 5000.
Cross BIBAG at 5000.

ME023 - [A3500+; R] - ME024 - BIBAG[A5000]



OCA (OCH)	A	B		
LNAV	1890 (550)	1890 (550)		
LNAV / VNAV	1890 (550)	1890 (550)		
LPV	1890 (550)	1890 (550)		
CIRCLING* OCH RELATED TO AD ELEV	1940 (600)	2010 (680)		

* SOUTH OF AERODROME ONLY.

DIST THR / RW26	2	3	4	5	6	
ALTITUDE	2010	2330	2650	2970	3290	

Timing not authorized for defining the MAPt.

GS	kt	80	100	120	140
EKLEN - RW26 (6.7 NM)	MIN:SEC	5:02	4:01	3:21	2:52
Rate of descent (5.2%)	ft / MIN	420	530	640	740

Correction: Communications.

Appendix A.2 France

French AIP states how to perform instrument operations when there is no ATS in place:

ENR 1.5.2.10 Utilization of instrument procedures without air traffic service at the aerodrome instruments approach procedures are only permitted in following conditions:

- the parameter "altimeter setting QNH" is transmitted by a STAP (Automatic transmission system of parameters) ;
- QNH is transmitted by a designated station referred on the IAC.
- alternate airfield, selected by operator or aircrew is provided with an ATC unit during planned operating hours.

The approaches procedures are compulsorily followed with a circling for which minima are possibly increased and published. By night, an operator agent should have to be at the aerodrome to carry out scheduled air public transport operations and should to get approval instructions from the suitable air traffic service enabling him to trig the safety plan of aerodrome and emergency phases if necessary.

Instrument approach procedures are not allowed when:

- the following sentence is published: "prohibited procedure out of ATS HOR" (on account of necessary coordination, dangerous surroundings which prohibit definitely such manoeuvers);
- no approved station is published, and no STAP (Automatic transmission system of parameters) on the aerodrome.

IAP to non-instrument RWYs are still not implemented in France. As a case study, Ouessant AD (AIP France) has RNP APCH approaches implemented without a 24h ATS to a non-precision approach RWY:

- RWY dimensions:

AD 2 LFEC.12 **Caractéristiques physiques des pistes / *Runway physical characteristics***

RWY ID	Orientation Geo (MAG	Dimensions RWY	PCN	Surface	Position GEO THR (DTHR)	ALT	SWY CWY	Bande Strip
05	051 (054)	833 x 24	5.7 t	revêtue / paved	48°27'38.05"N 005°04'06.71"W (48°27'39.77"N 005°04'03.50"W)	THR: 119 ft DTHR : 120 ft	SWY 50 m CWY 30 m	
23	231 (234)	833 x 24	5.7 t	revêtue / paved	48°27'54.94"N 005°03'35.11"W (48°27'52.87"N 005°03'38.99"W)	THR: 142 ft DTHR : 139 ft	CWY 30 m	

- ATS service: AFIS with limited operational schedule:

7	ATS	AFIS du 01/10 au 31/05 : LUN - VEN : 0700-0930, 1330-1630 SAM : 0700-0930, 1430-1630 DIM - JF : 1430-1630 du 01/06 au 30/09 : LUN - SAM : 0700-1030, 1330-1630 DIM - JF : 1430-1630 En dehors de ces HOR : - O/R PN 1 HR pour évacuations sanitaires. PPR la veille, exclusivement pour vols commerciaux non programmés. Aérodrome d'OUESSANT - TEL : 02 98 48 82 09 - FAX : 02 98 48 88 29. E-mail : aerodrome.ouessant.@free.fr	AFIS from 01/10 to 31/05 : MON - FRI : 0700-0930, 1330-1630 SAT : 0700-0930, 1430-1630 SUN - HOL : 1430-1630 from 01/06 to 30/09 : MON - SAT : 0700-1030, 1330-1630 SUN - HOL : 1430-1630 Outside this SKED : - O/R PN 1 HR for EVASAN. PPR the day before, only for non scheduled commercial flights. Aérodrome d'OUESSANT - TEL : 02 98 48 82 09 - FAX : 02 98 48 88 29. E-mail : aerodrome.ouessant.@free.fr

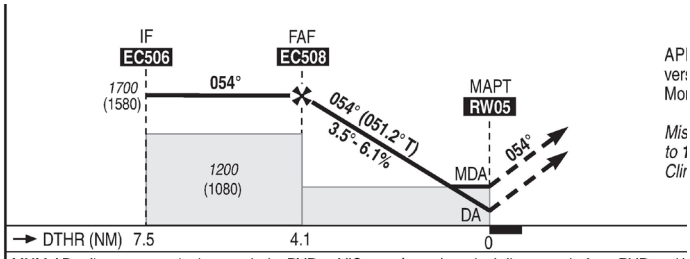
- MET: MET information is provided by BREST MET office (QNH)

1	Centre MET associé / *Associeted MET Office*	**BREST**

- Frequencies available:

APP : NL
TWR : NL
AFIS : OUESSANT information 118.1 *(FR seulement / FR only)*
Absence ATS : **A/A** FR seulement. Obtenir le QNH de Brest auprès de IROISE Approche 135.825
A/A *FR only. Obtain Brest QNH from IROISE Approach 135.825*

- OCA Minima published:



MNM AD : distances verticales en pieds, RVR et VIS en mètres / *vertical distances in feet, RVR and V*

CAT	LPV			LNAV			MVL / *Circling* (1)		MVL / *Circling* (1) Absence ATS sans QNH local / *without local QNH*	
	DA (H)	RVR	OCH	***MDA*** (H)	RVR	OCH	***MDA*** (H)	VIS	***MDA*** (H)	VIS
A	***480*** (360)	1500	360	***560*** (440)	1500	555	***770*** (650)	1500	***870*** (750)	1500
B	***500*** (380)		375					1600		1600

IAP are allowed when there is no ATS, but with the restriction of ending the approach with the circling approach. This understanding is aligned with ICAO new definition, depicting approach operations to non-instrument RWY as 'similar to PinS'.

MET information is provided either by an automated MET service or by the nearest AD, and in such a way it is published on its AIP. When there is no Local QNH, the corresponding limitation to MDA is also published. The usual UNICOM frequency for small non-towered fields is 123.50 Mhz.

AIP
FRANCE

AD 2 LFEC IAC RWY05 GNSS
23 MAY 19

APPROCHE AUX INSTRUMENTS — OUESSANT

Instrument approach

CAT A B

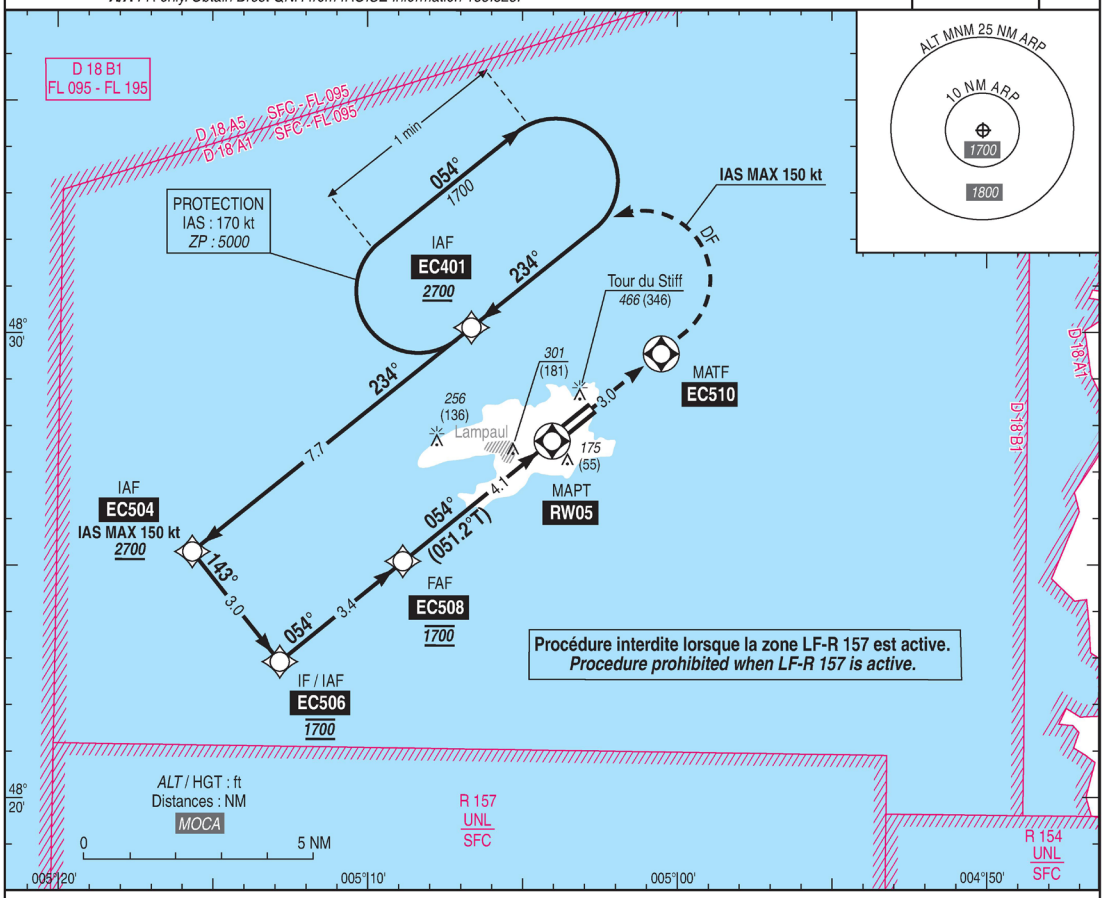
ALT AD : 142, ***DTHR : 120 (5 hPa)***

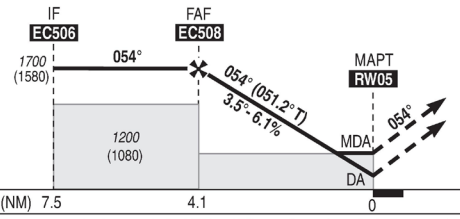
RNAV (GNSS) RWY 05

APP : NIL
TWR : NIL
AFIS : OUESSANT Information 118.1 (FR seulement / *FR only*)
Absence ATS : **A/A** FR seulement. Obtenir le QNH de Brest auprès de IROISE Information 135.825.
A/A *FR only. Obtain Brest QNH from IROISE Information 135.825.*

EGNOS
Ch 53234
E05A
RDH : 49

VAR
2°W
(15)





API : Monter **dans l'axe**. A **EC510**, **tourner à gauche** en montée vers ***1700*** (1580) pour rejoindre directement **EC401**.
Monter à *1000* (880) avant d'accélérer en palier.

Missed APCH : Climb ***straigth ahead***. *At* ***EC510***, ***turn left*** *climbing up to* ***1700*** *(1580) to join directly* ***EC401***.
Climb up to 1000 (880) prior to level acceleration.

MNM AD : distances verticales en pieds, RVR et VIS en mètres / *vertical distances in feet, RVR and VIS in metres.* REF HGT : *ALT DTHR*

CAT	LPV			LNAV			MVL / *Circling* (1)		MVL / *Circling* (1) Absence ATS sans QNH local / *without local QNH*	
	DA (H)	RVR	OCH	***MDA*** (H)	RVR	OCH	***MDA*** (H)	VIS	***MDA*** (H)	VIS
A	***480*** (360)	1500	360	***560*** (440)	1500	555	***770*** (650)	1500	***870*** (750)	1500
B	***500*** (380)		375					1600		1600

DIST RW05				
NM	**1**	**2**	**3**	**4**
ALT (HGT)	***541*** (421)	***913*** (793)	***1285*** (1165)	***1656*** (1536)

Observations / *Remarks* : (1) Circuits AD RWY 05 et 23 : interdit au Nord de la piste. / *AD circuits RWY 05 and 23 prohibited North of RWY.*
Panne de guidage GNSS lors de l'approche / *Loss of GNSS guidance during approach : voir / see AIP ENR 1.5*

FAF - MAPT	4.1 NM	70 kt	80 kt	90 kt	100 kt	110 kt	120 kt	130 kt	140 kt	150 kt	160 kt
		3 min 32	3 min 05	2 min 45	2 min 28	2 min 15	2 min 04	1 min 54	1 min 46	1 min 39	1 min 33
VSP (ft/min)		430	500	560	620	680	740	810	870	930	990

Appendix A.3 Switzerland

In Switzerland through its special orography only Zürich Geneva AD have in place instrument runways compliant with ICAO Annex 14. On regional aerodromes IFR approaches take place on non-instrument runways. GNSS based procedures, due to the flexibility in airspace design; provide high advantages in comparison with conventional ones and are widely implemented.

CAA has published Directive SI/SB-001 "IFR Approach Minimum on Non-Instrument Runways" applicable to IFR procedures for non-instrument RWYs by Jan 2010.

The main restriction is the limitation of the minimum published OCH down to 500 ft. AGL:

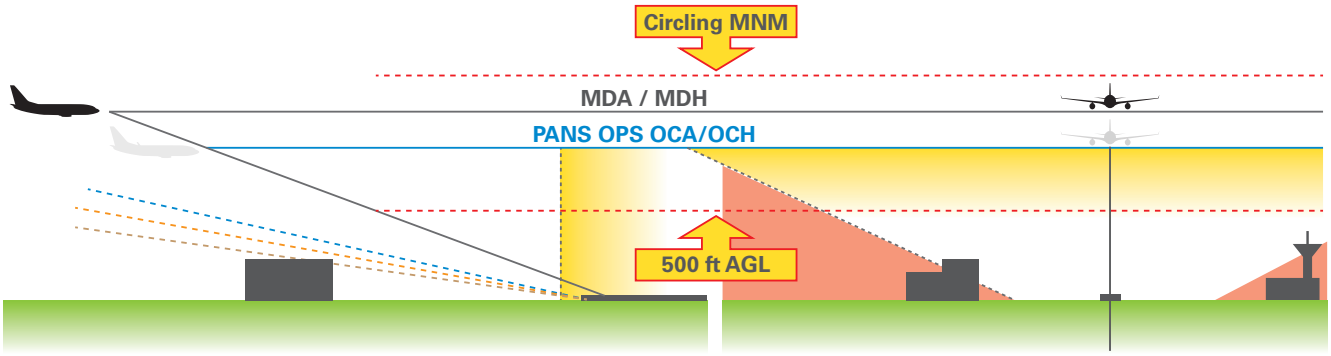


Figure 1 – Switzerland. OCA/H 500ft limitation

Case of study: Grenchen AD (AIP Switzerland)

Grenchen AD is the first implementation of IFP in non-instrument RWY open to traffic out of the ATS operating hours. An AIC devoted to explain this kind of operation is published (AIC 007/2017 A; Introduction of a radio mandatory zone (RMZ) in Grenchen (LSZG)). This AIC describes how the existing CTR (Class D, 4500ft) is transformed during peak-off periods into a RMZ (Class G, 2000ft):

- Operating principles:
  - Overriding principle: "see and avoid" in accordance with the visibility distances and proximity to clouds specified for the airspace classes concerned.
  - For IFR operations (departures and arrivals), the principle of "one at a time" is applied by Bern APP.
  - Bern APP will only provide RWY in use and QNH. No other flight and airport information services are provided.
  - The activation of radios on board all aircraft operating within the RMZ is compulsory at any time, all flight crews including glider pilots, shall maintain two-way communication within the RMZ.
  - All crews entering the RMZ will be obliged to make "blind calls" at specified reporting points and changes of their plan, flight altitude or flight direction.
  - IFR/VFR traffic rules are also described within the AIC[3]

3 https://www.skybriefing.com/portal/documents/10156/484322/LS_Circ_2017_A_013_en.pdf

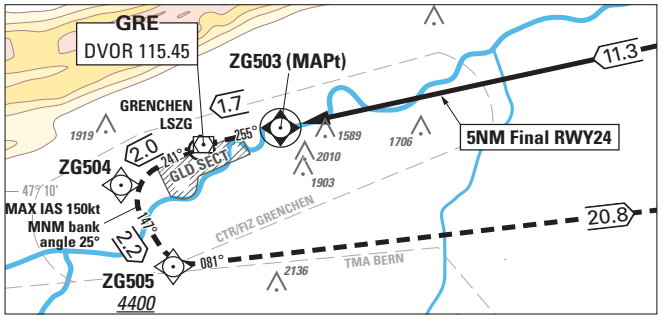
- RWY: Non instrument. 1060x60m:

Designations RWY NR	SWY dimensions (m)	CWY dimensions (m)	Strip dimensions (m)	OFZ	Remarks REF: AD1.1
1	8	9	10	11	12
06	NIL	NIL	1060 x 60	Not applicable	Non-instrument runway FCT: 0.72/*0.67* grooved 1000 m
24					Non-instrument runway FCT: 0.73/*0.66* grooved 1000 m

- ATS: TWR 0900LT until 12.15LT and 1345LT until 1700LT/ AFIS / None (out of ATS operating hours)

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Till 0800 (0700)	None	None	None	None	None	None	None
0800 - 1115 (0700) - (1015)	AFIS	ATC	ATC	ATC	AFIS	AFIS	AFIS
1115 - 1245 (1015) - (1145)	None	None	None	None	None	None	None
1245 - 1600 (1145) - (1500)	AFIS	ATC	ATC	ATC	AFIS	AFIS	AFIS
1600 - HRH/2100 (1500) - HRH/ 2000	None	None	None	None	None	None	None

- MET: skybriefing.com (online service that includes NOTAM briefing and FPL creation).
- CTR/RMZ GRENCHEN:
  - o CTR Vertical limit 4500ft, Class D
  - o RMZ, vertical limit 2000ft, Class G
- OCA Minima published: Over 500ft OCH



Missed APCH climb gradient requirement	STRAIGHT-IN APPROACH [1]	
	A	B
	OCA(H) LNAV	
2.5%	*2490* (1085)	
6.6%	*2010* (605)	
	OCA(H) LPV	
2.5%	*2060* (655)	
7.5%	*1915* (510)	
CIRCLING [2] [3]	A	B
OCA	*2270*	*2320*
VIS	1900 m	2800 m

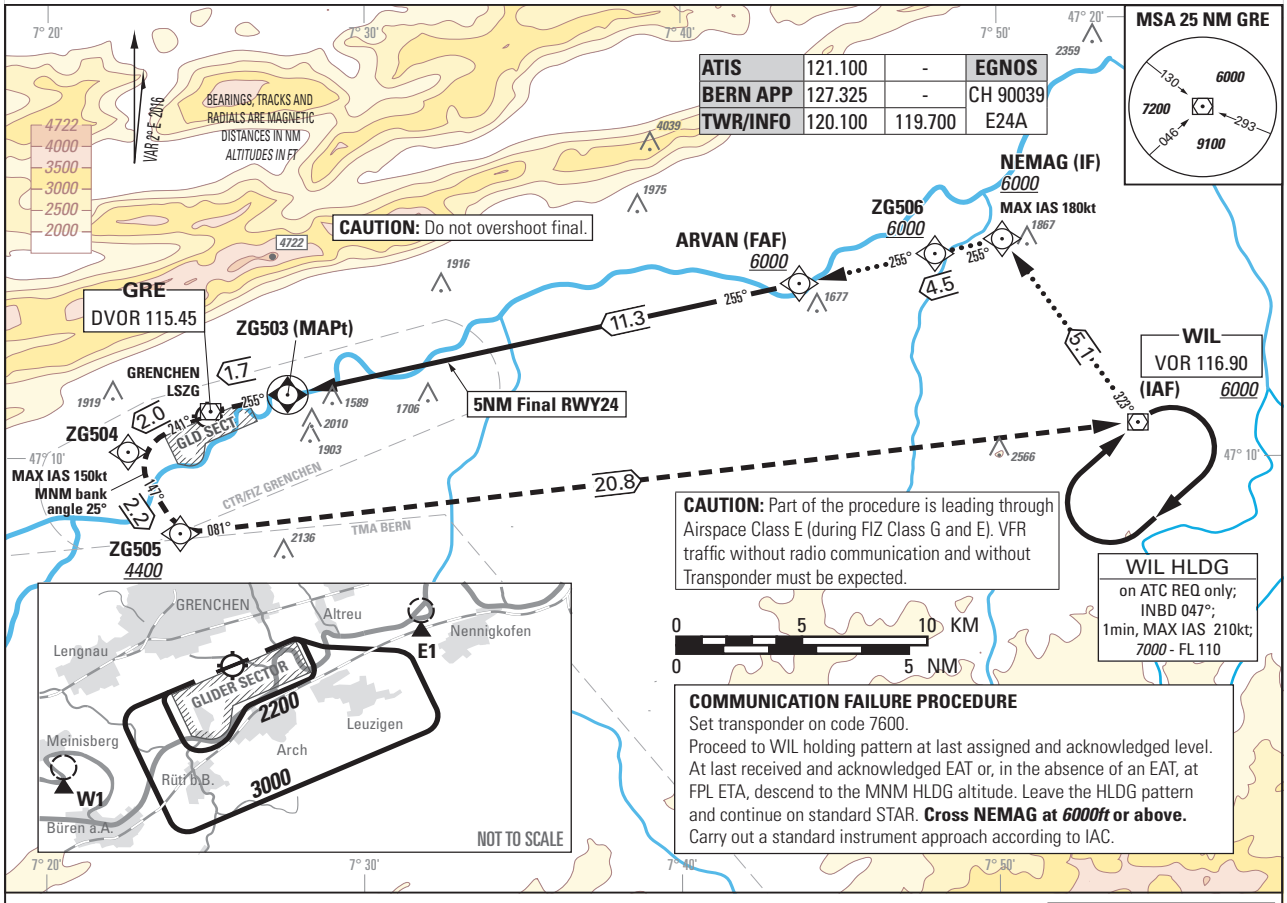
Figure 1 – Grenchen AD (Switzerland). Snapshot CTR/RMZ – OCA(H)

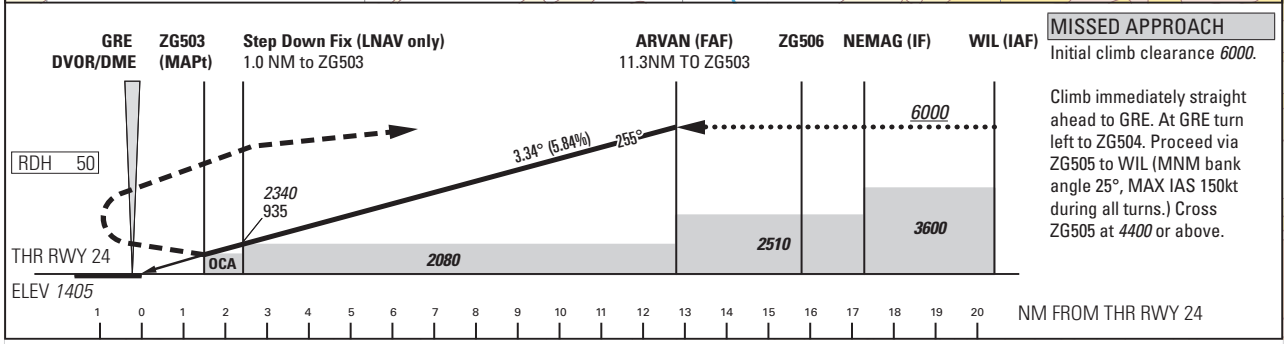
Instrument Approach Chart
(IAC) - ICAO

AD ELEV 1411ft

TRANSITION LEVEL	by ATC/AFIS
TRANSITION ALTITUDE	*6000*

GRENCHEN LSZG
RNAV (GNSS) RWY 24
11.5° OFFSET LEFT
ACFT CAT A / B





MISSED APPROACH
Initial climb clearance *6000*.

Climb immediately straight ahead to GRE. At GRE turn left to ZG504. Proceed via ZG505 to WIL (MNM bank angle 25°, MAX IAS 150kt during all turns.) Cross ZG505 at *4400* or above.

Missed APCH climb gradient requirement	STRAIGHT-IN APPROACH [1]	
	A	B
	OCA(H) LNAV	
2.5%	*2490* (1085)	
6.6%	*2010* (605)	
	OCA(H) LPV	
2.5%	*2060* (655)	
7.5%	*1915* (510)	
CIRCLING [2] [3]	A	B
OCA	*2270*	*2320*
VIS	1900 m	2800 m

ROD	GS kt	90	110	130	150
	FT/MIN	533	651	769	888

NOTE
[1] Noise abatement:
- do not turn onto final before reaching 1.2 NM GRE

[2] Circling:
- avoid overflying villages
- ATC: whenever possible, circling ALT *3000ft* on outer downwind
- AFIS: circling ALT *3000ft* on outer downwind mandatory

[3] No circlings north of RWY 06/24.

CAUTION
- Visual Segment Surface (VSS) penetrated by terrain right of track up to *1560ft*.
- Glider sector.

REMARK
- Training RNAV Approach: MDA (H) *3000ft* (1590ft).

DIST ZG503	1	2	3	4	5	6	7	8	9	10	11	11.3
DIST FTP	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	12.8
ALT FT	*2350*	*2700*	*3060*	*3410*	*3760*	*4120*	*4470*	*4830*	*5180*	*5540*	*5890*	*6000*

COR: FIZ Grenchen, BB sectors, Notes (WEF 29MAR2018)

Appendix A.4 IFP for GA in Non-EU countries

New Zealand

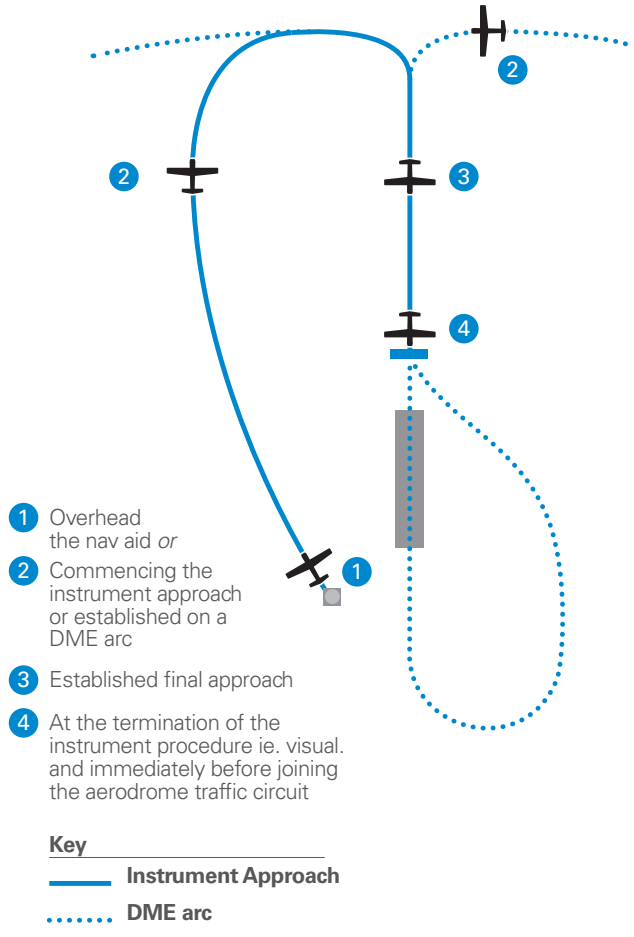
New Zealand have many years of experience in the operation of IFR operations at non-controlled AD's (unattended aerodromes, *Case of study: NZKK IAC)*They have developed guidance material to support this operations devoted to IFR and VFR pilots and the operation is detailed in AIP- ENR:

AIP NZ ENR 1.1-10:

- *(ENR 6.2.1)* **Unattended Aerodromes**: Include controlled/AFIS AD outside the hours of attendance
- **Position Reporting** for instrument approaches:

(ENR 6.2.2) Pilots of all aircraft operating outside controlled airspace below 3000 ft AGL/ radius of 10 NM maintain a continuous listening watch on the frequency listed published in the COM box on the aerodrome chart, or on 119.1 MHz if there is no such chart.

(ENR 6.2.3) For the benefit of other traffic, pilots should broadcast their position, altitude and intentions as listed below:



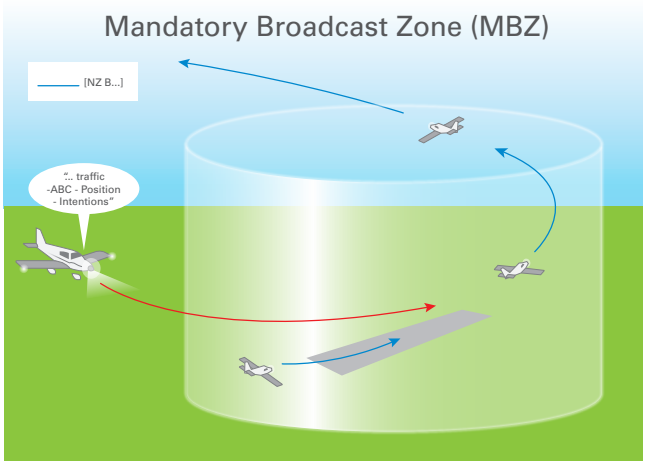
(i) commencing instrument approach and
(ii) when established on final approach; and
(iii) at the termination of the instrument procedure, and
(iv) immediately before joining the aerodrome traffic circuit.

(ENR 6.24/6.2.5) **Phraseology:** Example: "TIMARU TRAFFIC CESSNA FOUR ZERO TWO ALFA BRAVOCHARLIE DOWNWIND ONE THOUSAND FEET LANDING RUNWAY TWO ZERO".

- *(ENR 9.8)* **Separation of IFR Flights** Outside Controlled Airspace – FIS provision
  - o The pilot is responsible for maintaining separation from other traffic.
  - o To assist pilots in providing their own separation from other traffic, the appropriate ATS unit will, in addition to passing collision hazard information as part of a FIS, on request from the pilot pass information on the movement of other IFR flights in the area prior to commencing an instrument approach.
  - o "NO REPORTED IFR TRAFFIC" will be used when no IFR flights are known to be in the area.

Mandatory Broadcast Zone (MBZ)

- Broadcast position and intentions on entry, when joining the circuit, before entering a runway, and at specified intervals
- Anti-collision and/or landing lights must be on if so equipped
- Aircraft without an operable radio must not enter an MBZ[4].



4 (This airspace structure is not considered within SERA, but it is considered similar to RMZ)

ELEV 492

RWY 15 THR ELEV 478

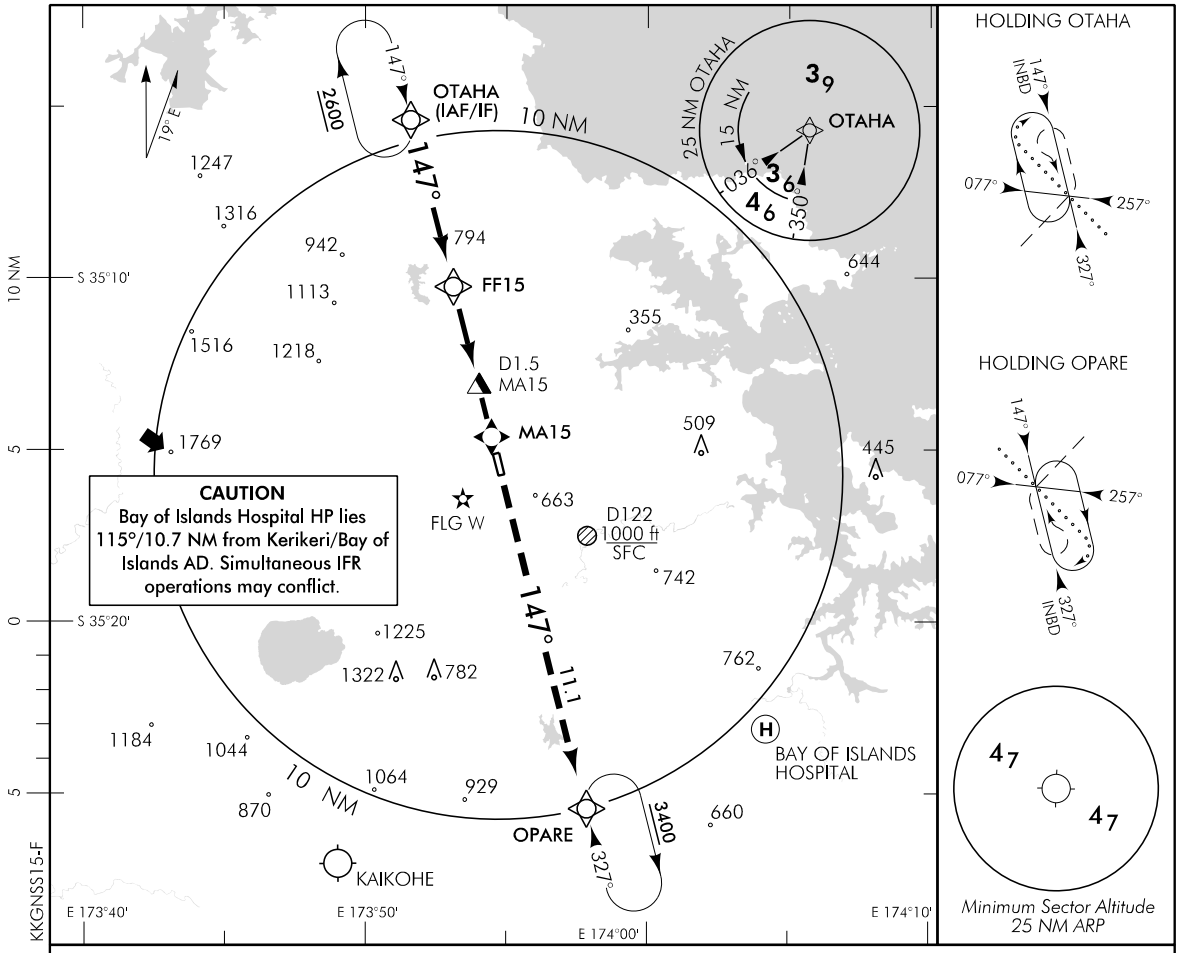
CAT A,B,C

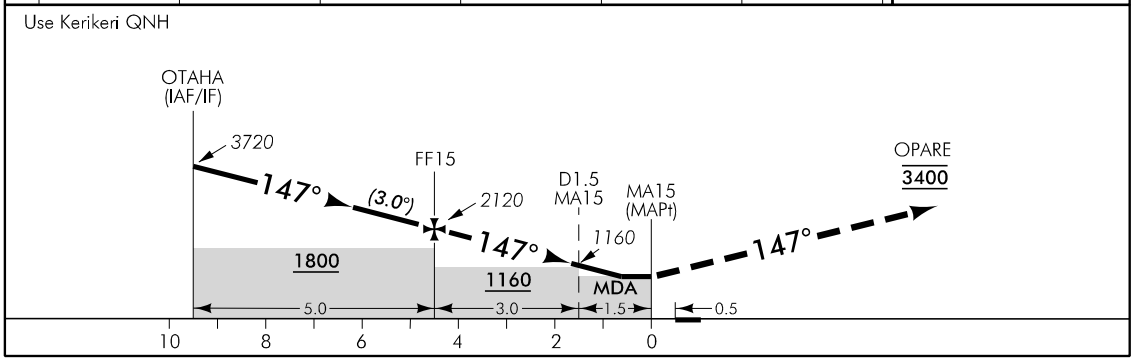
KERIKERI/BAY OF ISLANDS

RNAV (GNSS) RWY 15

CHRISTCHURCH INFORMATION: 124.1 118.5

UNATTENDED: 119.4





MISSED APCH: Track 147° to OPARE 3400

DISTANCE to WPT	OTAHA	4	3	2	1	FF15	4	3	2	1	0.8	MA15
Advisory Altitude 5.2%	3720	3400	3080	2760	2440	2120	1960	1640	1320	1000	MDA	MDA
Category	A			B			C			D		
LNAV	**930**(452) – 1600						**930**(452) – 2400			NA		
Circling	**1280**(788) – 2800						**1650**(1158) – 4800					

Changes from 2 FEB 17: Bay of Islands Hospital HP and caution note added, TAA, minima, missed approach text.

Appendix B

Meteorological information

to support instrument approach procedures

1) A pre-flight meteorological briefing (including self-briefing) is essential for any IFR flight to ensure that the flight can be undertaken in full cognisance of the expected weather conditions at departure, destination and alternate aerodromes, and during the en-route phase. When there is limited or meteorological information at the intended destination, the importance of a thorough situational briefing and alternate planning is even greater.

2) For a 2D approach operation (or BaroVNAV, where the glide path is determined based on the QNH), the DH/MDH should be increment if a remote or regional QNH is used as documented in PANS-OPS.

   "OCA/H shall be increased at a rate of 0.8 m for each kilometre in excess of 9 km (5 ft for each nautical mile in excess of 5 NM"

3) Where wind, visibility or cloud information is not available, there should always be an alternate where that information is available. This is equivalent, for planning purposes, to presuming that an aerodrome where wind, visibility or cloud information is not available is below minima or out of limits.

4) Where wind information is not available, circling minima should be applied, to allow the pilot some time to assess the situation visually before making a final selection of runway. Note that circling is not required, only the conditions that would permit it if necessary.

Parameter	Operational Purpose	IFR special relevance	Comment	Mitigation if not available*
*** Mitigation through pre-flight briefing (including self-briefing) on meteorological situation is applicable to all items, and is not repeated for each point**				
Wind	Selection of runway and procedure	Procedure must be selected before a windsock is observed	More temptation to land downwind than VFR	Circling might be required.
Wind	Crosswind	None – equivalent to VFR		Requirement for alternate with met info
Visibility	Anticipation of visual reference	Probability of acquisition of visual reference at DH		Requirement for alternate with met info
Wx	Specifically hazardous conditions (TS)	More difficult to detect a TS visually when IFR	Equivalent to enroute risk	Acceptable without mitigation

Parameter	Operational Purpose	IFR special relevance	Comment	Mitigation if not available*
Wx	Indicator of runway state	Perhaps less time to assess local conditions than VFR		
Cloud type	Specifically hazardous conditions (CB)	More difficult to detect a CB visually when IFR	Equivalent to enroute risk	Acceptable without mitigation
Cloud amount	Anticipation of visual reference	Probability of acquisition of visual reference at DH		Requirement for alternate with met info
Cloud amount	Feasibility of circling	Perhaps less time to assess local conditions than VFR	Observation is an indication, not a guarantee	Requirement for alternate with met info
Cloud layer base height	Anticipation of visual reference	Probability of acquisition of visual reference at DH		Requirement for alternate with met info
Temperature	Icing risk	Descent through cloud specific to IFR	2m temperature probably a poor guide to icing risk	Acceptable without mitigation
Dewpoint	Robustness of visibility to sudden changes	None – equivalent to VFR		Acceptable without mitigation
QNH	Altimeter setting for minima	Required for determination of decision point of IAP	On a 2D approach operation, the QNH is the only way of determining level, and is more critical in the final approach segment for obstacle clearance. Use PANS-OPS procedures for remote QNH. On a 3D approach operation, the vertical guidance assures obstacle clearance.	Use remote QNH with a safety increment for 2D approach operation. Could substitute a range on a 3D approach operation, or use increment Familiarity with the pressure pattern – is the pressure likely to be lower/higher than that of the remote QNH? Strong pressure gradients (where differences in QNH will be greater) may preclude flight for other reasons – strong winds, turbulence.
QNH	Altimeter setting for obstacle clearance in initial and intermediate segments	Similar to enroute with 1000 ft obstacle clearance, slightly more critical with 500 ft		Acceptable without mitigation
Trend	Assessment of risk of deterioration	None – equivalent to VFR	Not available at many IFR airports	Acceptable without mitigation
Runway State	Braking action and field performance	None – equivalent to VFR	Not available at many IFR airports	Acceptable without mitigation

Appendix c

Reference documents and acronyms

Appendix C.1 Reference documentation

[RD-1] EGNOS Safety of Life Service Definition Document

[RD-2] Regulation (EC) No 2018/1139 of 04/07/2018 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency

[RD-3] Commission Regulation (EU) No 139/2014 laying down requirements and administrative procedures related to aerodromes

[RD-4] Commission Regulation (EU) 2018/401 of 14 March 2018 amending Regulation (EU) No 139/2014 as regards the classification of runways

[RD-5] ICAO Annex 14 Aerodromes

[RD-6] ICAO Annex 10 Vol I Aeronautical Telecommunications

[RD-7] ICAO Annex 11 Air Traffic Services

[RD-8] ICAO Annex 15 Aeronautical Information Service

[RD-9] ICAO Doc 8168 PANS-OPS

[RD-10] ICAO Doc 9906 Quality Assurance Manual for Flight Procedure Design

[RD-11] ICAO State Letter SL-2012-40

[RD-12] ICAO State Letter SL-2018-103

[RD-13] EASA Easy Access Rules AIR OPS (Regulation (EU) No 965/212 + AMC/GM)

[RD-14] Easy Access Rules for Aerodromes (Regulation (EU) No 139/2014 + AMC/GM)

[RD-15] Commission implementing regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight

[RD-16] Commission Implementing Regulation (EU) No 1035/2011 of 17 October 2011 laying down common requirements for the provision of air navigation services

[RD-17] Commission Implementing Regulation(EU) No 923/2012 of 26/09/2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation (SERA)

[RD-18] EASA Opinion 03-2016 Maintaining the aerodromes rules - ICAO new approach classification

[RD-19] EASA NPA 2016-14 Easier access for general aviation pilots to instrument flight rules flying

[RD-20] EASA Opinion 03-2018 Requirements for Air Traffic Services

[RD-21] EASA NPA 2016-02 Requirements for Aeronautical Information Management (AIS-AIM)

[RD-22] EASA NPA 2016-14 Easier Access for General Aviation

[RD-23] EASA Opinion 11-2016 Training outside approved training organisations

[RD-24] EASA Opinion No 01/2019 (A) & (B). Easier access for GA pilots to IFR flying & Revision of the balloon and sailplane licensing requirements

Appendix C.2 Acronyms

AD	Aerodrome
ADR	Aerodrome
AFIS	Aerodrome Flight Information Service
AGL	Above Ground Level
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
AIS	Aeronautical Information Service
ALS	Approach Light System
AMC	Acceptable Means of Compliance
ANS	Air Navigation Service
ANSP	Air Navigation Service Provider
AOPA	Aircraft Owners and Pilots Association
APCH	Approach
APP	Approach
ASD	Airspace Design
ASOS	Automated Surface Observing System
ASOS	Automated Surface Observing Systems
ATC	Air Traffic Control
ATIS	Air Traffic Information Service
ATM	Air Traffic Management
ATO	Approved Training Organisations
ATS	Air Traffic Service
ATSP	ATS Provider
AWOS	Automated Weather Observing System
BIR	Basic Instrument Rating
CAA	Civil Aviation Authority
CAT	Commercial Air Traffic
CFIT	Controlled Flight into Terrain
CNS	Communication, Navigation and Surveillance
CTA	Control Area
CTR	Control zone
DA/H	Decision Altitude/Height
DFS	Deutsche Flugsicherung
DTO	Declared Training Organizations
EASA	European Aviation Safety Agency
EBAA	European Business Aviation Association
EC	European Commission
EGNOS	European Geostationary Navigation Overlay Service
ENR	Enroute
ESSP	European Satellite Services Provider
ETSO	European Technical Standard Order
EWA	EGNOS Working Agreement
FCL	Flight Crew Licensing
FIR	flight information region
FIS	Flight Information Service
FOCA	Federal Office of Civil Aviation
FPD	Flight Procedure Design
FT	Feet
GA	General Aviation
GM	Guidance Material
GNSS	Global Navigation Satellite System
GSA	European GNSS Agency
HIALS	High Intensity Approach Lighting System
IAC	Instrument Approach Chart
IALS	Intermediate Approach Light System
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IR	Implementing Rule
LPV	Localizer Performance with Vertical guidance
MALS	Medium-Intensity Approach Light System
MBZ	Mandatory Broadcast Zone
MDA/H	Minimum Descent Altitude/Height
MET	Meteorological Service
METAR	Meteorological Aerodrome Reports
MS	Member State
MTOW	Maximum Take-Off Weight
NCC	Non-commercial operations with complex motor-powered aircraft
NCO	Non-commercial operations with other than complex-motor-powered aircraft
NM	Nautical Mile
NOTAM	Notice to Airmen
NPA	Notice of Proposed Amendment
NSA	National Supervisory Authority
OCA/H	Obstacle Clearance Altitude/Height
OLS	Obstacle Limiting Surface
OPS	Operations
PANS	Procedures for Air Navigation Services
PB-AOM	Performance-based Aerodrome Operating Minima
PBN	Performance Based Navigation
PinS	Point-in-space approach
QNH	Atmospheric Pressure
RAIM	Receiver Autonomous Integrity Monitoring

RMT	Rule Making Task
RMZ	Radio Mandatory Zone
RNP	Required navigation performance
RNP APCH	Required Navigation Performance Approach (NAV Spec)
RNP AR APCH	RNP APCH with authorisation required
RTCA	Radio Technical Commission for Aeronautics
RVR	Runway Visual Range
RWY	Runway
SARP	Standards and Recommended Practices
SBAS	Satellite Based Augmentation System
SDD	Service Definition Document
SES	Single European Sky
SID	Standard Instrument Departure
SL	State Letter
SP	Service Provider
SPO	Specialised operations
TMZ	Transponder Mandatory Zone
TOR	Terms of Reference
TREND	Trend type forecast
TWR	Tower
UNICOM	Non-ATS aeronautical station
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
WG	Working Group


EGNOS