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MILITARY AVIATION FLIGHT PROCEDURE DESIGN

This regulation lays down safety requirements for flight procedure design in military aviation. The regulation adds detail and contains exceptions to ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) for military aviation.

Enabling act:
Aviation Act (864/2014; sections 6 and 7)

Period of validity:
From 3.11.2023 until further notice

Repeal:
SIM-To-Lv-025, Sotilasilmailun lentomenetelmäsuunnittelu, Planering av flygprocedurer för militär luftfart, HO52, 17 January 2018

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ABBREVIATIONS

AP	Autopilot
APV	Approach Procedure with Vertical Guidance
BARO-VNAV	Barometric Vertical Navigation
CIRC	Circling
DA	Decision Altitude
DH	Decision Height
DME	Distance Measuring Equipment
FAF	Final Approach Fix
FD	Flight Director
GNSS	Global Navigation Surveillance System
HUD	Head-Up Display
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
INS	Inertial Navigation System
LNAV	Lateral Navigation
LOC	Localizer
LPV	Localizer Performance with Vertical guidance
MDA	Minimum Descent Altitude
MDH	Minimum Descent Height
MSA	Minimum Sector Altitude
MOC	Minimum Obstacle Clearance
NDB	Non-Directional Beacon
NM	Nautical Mile, 1852 metres
NPA	Non-Precision Approach
OAS	Obstacle Assessment Surface
OAT	Operational Air Traffic
OCA	Obstacle Clearance Altitude
OCH	Obstacle Clearance Height
PA	Precision Approach

PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
RNAV	Area Navigation
RNP	Required Navigation Performance
RVR	Runway Visual Range
SDF	StepDown Fix
SID	Standard Instrument Departure
SRA	Surveillance Radar Approach
TILS	Tactical Instrument Landing System
VNAV	Vertical Navigation
VOR	Very High Frequency Omnidirectional Range

DEFINITIONS

AD ELEV means aerodrome elevation from mean sea level (QNH) in metres/feet.

Air operator means the Air Force Command and Army Command.

Approach procedure with vertical guidance means an instrument approach procedure using lateral and vertical guidance which, however, does not meet the requirements for precision approach.

Arresting cable means a removable or permanent system in the runway intended for stopping an aircraft with an arrestor hook. The coordinates of the arresting cable are measured at the arresting cable on the runway centreline.

Highway strip means a road section intended for military aviation take-offs and landings.

Minimum descent height is the height determined for non-precision approaches below which the aircraft must not descend without the required visual reference.

Minimum sector altitude is the lowest altitude from sea level which provides the minimum clearance of 300 m (984 feet) from all objects located in the area contained within a sector of a circle with a 46 km (25 NM) radius centred (usually) on a radio aid to navigation.

Military aerodrome means any land area temporarily arranged to be used exclusively for military aviation take-offs and/or landings. A military aerodrome may be an airport, aerodrome, highway strip or auxiliary strip for departure temporarily taken into use by the Defence Forces.

Non-precision approach procedure means an instrument approach procedure with lateral guidance but no vertical guidance.

Obstacle clearance altitude means the lowest altitude from sea level (OCA) or the lowest height from aerodrome elevation (OCH) including obstacle clearance compliant with the criterion.

Precision Approach means an instrument approach procedure using lateral and vertical guidance with minima. These minima are determined by the category of operation.

RNAV 1 means precision area navigation. The navigation accuracy of this procedure is ± 1 NM for 95% percent of the total flight time.

RNAV 5 means basic area navigation. The navigation accuracy of this procedure is ± 5 NM for 95% percent of the total flight time.

TDP (TouchDown Point) means the touchdown point on the runway centreline aligned with PAPI lights. The line between this point and the stand of the PAPI light closest to the runway is at straight angles to the runway centreline. TDP coordinates are defined with the accuracy of one hundredth of a second and TDP height with the accuracy of one foot.

1 SCOPE OF APPLICATION

This regulation lays down safety requirements for the design of military flight procedures as referred to in section 7, subsection 1, paragraph 16 of the Aviation Act, by virtue of which the Finnish Defence Forces issues regulations on flight procedures for military aviation pursuant to sections 6 and 7 of the Aviation Act. Flight procedures for military aviation shall be designed in compliance with ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) as well as other ICAO regulations, with the exceptions laid down in this Military Aviation Regulation.

This regulation shall be complied with in the design of flight procedures for military aviation in Finland.

This English version is a translation of the original document in Finnish. However, in case of a discrepancy, the Finnish translation will prevail.

2 TAKE-OFF PROCEDURES

Take-off procedures for military aviation shall be designed in compliance with ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS).

The take-off procedures for military aviation are based on either coded Standard Instrument Departures or a route description indicated on the map.

3 ARRIVAL AND APPROACH PROCEDURES

Arrival and approach procedures for military aviation shall be designed in compliance with ICAO publications Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) and Performance Based Navigation Manual (DOC 9613), with the exceptions laid down in this regulation.

3.1 Arrival and approach segment

At military aerodromes, an obstacle clearance of 150 metres (492 feet) can be used in the arrival and initial approach segments instead of 300 metres (984 feet). In this case, the

smaller than standard obstacle clearance shall be indicated on the instrument approach chart.

When publishing the Minimum Sector Altitude (MSA) for military aviation, an exception may be made to the distance laid down in PANS-OPS (25 NM). The distance published on the instrument approach chart may be no less than 15 NM. In the design of procedures for military aviation, a 5 NM safety zone shall be complied with when determining the minimum sector altitude. As an exception to PANS-OPS, the Minimum Sector Altitude (MSA) for military aviation may be sectored into two parts.

3.2 Intermediate and final approach segment

The intermediate and final approach segments shall be designed in compliance with ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS), observing the exceptions laid down in this regulation.

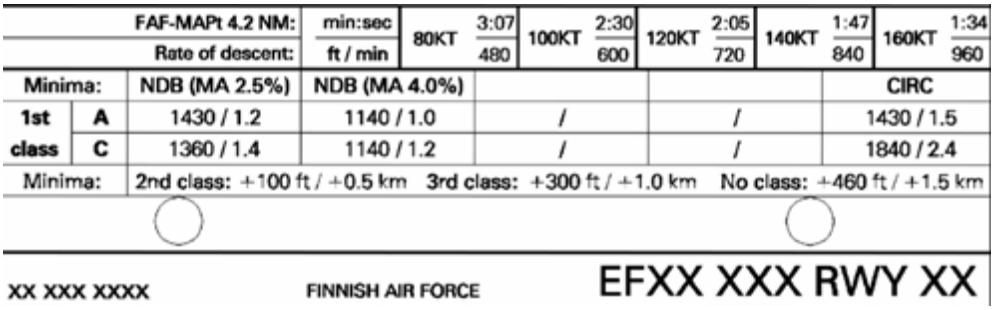
3.2.1 Landing climb gradient in the final approach segment

Instrument approach procedures for military aviation can be designed for landing climb gradients of at most a 4.0º. The impact of descent rate of landing climb gradients exceeding 4.0º will be assessed separately by the Finnish Military Aviation Authority, which will approve separately the minimum descent height and/or decision height for individual aircraft types for landing climb gradients exceeding 4.0º. Provisions on PinS procedures are laid down separately in Chapter 14.

3.3 Missed approach segment

The missed approach segment shall be designed in compliance with the criteria in ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) and with a minimum obstacle clearance (MOC) of 30 metres in NPA procedures. When specifying the OCA/Hs for the final approach segment, a 30-metre obstacle clearance shall be simultaneously guaranteed in the missed approach segment.

In the missed approach segment, a nominal climb gradient greater than 2.5% may be used if a missed approach procedure guaranteeing that MOCs set out in PANS-OPS are observed is designed separately.



		FAF-MAPt 4.2 NM:	min:sec	80KT 3:07	100KT 2:30	120KT 2:05	140KT 1:47	160KT 1:34
		Rate of descent:	ft / min	480	600	720	840	960
Minima:		NDB (MA 2.5%)	NDB (MA 4.0%)				CIRC	
1st	A	1430 / 1.2	1140 / 1.0	/	/		1430 / 1.5	
class	C	1360 / 1.4	1140 / 1.2	/	/		1840 / 2.4	
Minima:		2nd class: +100 ft / +0.5 km	3rd class: +300 ft / +1.0 km		No class: +460 ft / +1.5 km			

FIGURE 1. Table of minima. The minima have been calculated for both 2.5% and 4.0% missed approach climbing capacities.

The presentation method of the Finnish Defence Forces' instrument approach charts may deviate from the method laid down in ICAO Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS).

4 NON-PRECISION APPROACH

In the design of flight procedures for military aviation, an exception is made to the model presented in ICAO publication PANS-OPS (Doc 8168) for non-precision approach. The primary survey area of obstacles for military aviation in non-precision approaches corresponds fully to the ICAO area of survey. The width of the secondary area is 60% of ICAO secondary area width, and the gradient from primary area edge to secondary area edge consequently remains the same as the ICAO secondary area gradient. In this case, the full width of the obstacle survey area is 80% of ICAO area width.

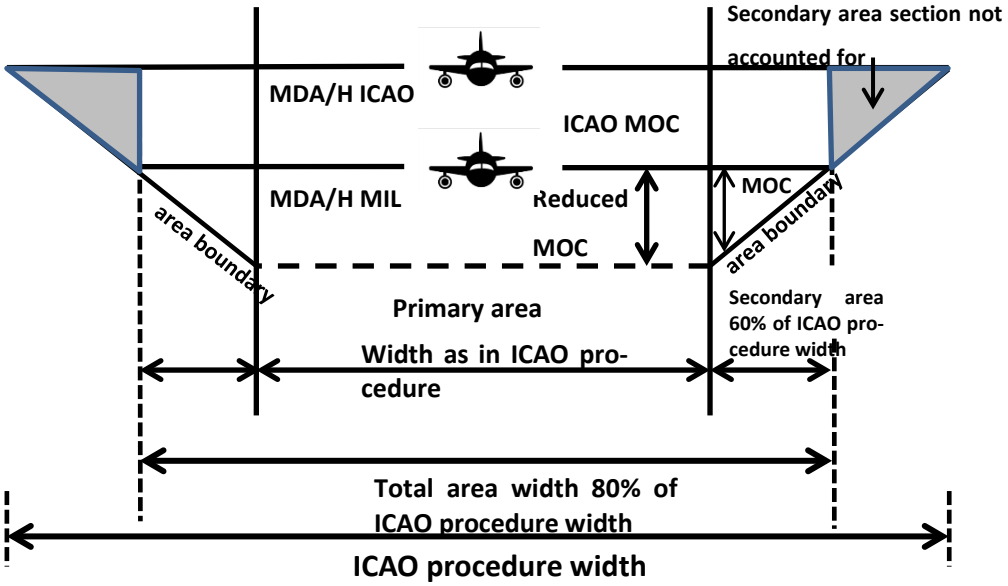


FIGURE 2. Deviation of Minimum Obstacle Clearance (MOC) from ICAO MOC in military aviation

In non-precision approaches in military aviation, ICAO criteria shall be complied with in the intermediate approach segment. In the final approach segment, a reduced obstacle clearance of 45 metres can be observed, which is obtained by deducting 30 metres from the corresponding OCA in PANS-OPS. If a dominant obstacle referred to in PANS-OPS is on the side of the missed approach segment, this deduction is not made, and the MDA is taken directly from ICAO OCA except if a separately designed steeper nominal climb gradient can guarantee that the missed approach segment MOCs are met, despite this deduction. In instrument approach procedures using an Obstacle Assessment Surface (OAS), the reduced obstacle clearance is not applied. In RNAV instrument approach procedures, the VNAV minimum may not exceed the calculated LNAV minimum.

An SRA approach ends at a distance separately laid down by the Military Aviation Authority specific to the equipment from the touchdown point, however, at the latest on the runway threshold.

5 APPROACH PROCEDURES WITH VERTICAL GUIDANCE (APV)

In military aviation, Approach Procedures with Vertical Guidance (APV) may rely on either barometric or satellite-based altimetry. When using barometric altitude, the impact of temperature shall be accounted for, and a minimum temperature shall be indicated. On the chart, the barometric procedure minimum is published with the heading VNAV and the satellite-based procedure minimum under LPV.

6 PRECISION APPROACH PROCEDURES

ICAO criteria shall be complied with in the precision approach procedures for military aviation. The published minimum shall account for the instrument approach minimum of 60 metres (Cat I) or 30 metres (Cat II) unless obstacles require an OCA/H greater than this. The value to be published is rounded up to the next full feet.

The satellite-based precision approach procedure minimum is published on the chart under the heading LVP.

7 MINIMUM OBSTACLE CLEARANCES AND SYSTEM MINIMA

The MOCs and system minima of instrument approach procedures for military aviation differ in part from the values specified in ICAO publication PANS-OPS (Doc 8168) (TABLE 1).

TABLE 1. Minimum Obstacle Clearances (MOCs) and system minima for military aviation

Procedure	**MOC**	**System minimum**
NON-PRECISION APPROACH (NPA)		
LOC only with FAF	75 m	
PinS (LNAV)	45 m	75 m

RNP (LNAV)	45 m	75 m
SRA	45 m	75 m
VOR with DME	45 m	75 m
NON-PRECISION APPROACH WITH VERTICAL GUIDANCE (APV)		
RNP (LPV, APV-I)	OAS	75 m
RNP (VNAV)	OAS	75 m
PinS (LPV)	OAS	75 m
PRECISION APPROACH (PA)		
RNP / LPV200 (Cat I)	OAS	60 m
PAR (Cat I)	OAS	60 m
ILS (Cat I)	OAS	60 m
ILS (Cat II)	OAS	30 m

8 RUNWAY VISUAL RANGE (RVR)

8.1 Runway visual range in non-precision procedures

For the smallest minima that may be used in non-precision approaches, see Tables 2 to 5.

TABLE 2. Required runway visual range (RVR) **– full facilities**

MDH	RVR (m) / aircraft speed category		
metres	A	B	C
75 or over	800	800	800

TABLE 3. Required runway visual range (RVR) – **intermediate facilities**

MDH	RVR (m) / aircraft speed category		
metres	A	B	C
75 or over	1 000	1 100	1 200

TABLE 4. Required runway visual range (RVR) – **basic facilities**

MDH	RVR (m) / aircraft speed category		
metres	A	B	C
75 or over	1 200	1 300	1 400

TABLE 5. Required runway visual range (RVR) – **nil approach light facilities**

MDH	RVR (m) / aircraft speed category		
metres	A	B	C
75 or over	1 500	1 500	1 500

NB. Tables 2 to 5 may only be applied to ordinary approaches with a nominal glide slope of no more than 4º. When using glide slopes greater than this, visual glide slope indication (e.g. PAPI) shall also be visible at Minimum Descent Height (MDH).

8.2 Minimum Obstacle Clearances and horizontal visibility minima for circling

In circling, the Minimum Obstacle Clearances and area radiuses laid down in ICAO publication PANS-OPS (Doc 8168) and the visibility minima for military aviation shall be observed.

TABLE 6. Minimum Obstacle Clearances and horizontal visibility minima for circling

Class	MOC metres (feet)	Horizontal visibility minimum metres
A	90 (295)	1 500
B	90 (295)	1 500
C	120 (394)	1 500

NB. The horizontal visibility minima are smaller than the ICAO minima.

8.2.1 Horizontal visibility minima for highway strips

TABLE 7. Increased minima for CIRC procedures

Instrument approach procedure	RVR (m) **increase** / aircraft speed category		
	MA	MB	MC
CIRC	500	500	500

8.3 Category 1 (Cat I) operations

See Tables 8 and 9 for the smallest required runway visual range minima that the air operator may apply in Category 1 operations.

TABLE 8. Required runway visual range (RVR) in metres in Category 1 operations

DH (metres)	Full facilities	Intermediate facilities	Basic facilities	Nil approach light facilities
60 or over	700	700	800	1 000

NB. This Table applies to standard approaches with a maximum glide slope of 4°. When using glide slopes greater than this, visual glide slope indication (e.g. PAPI) shall also be visible at Decision Height (DH).

See Table 9 for smaller runway visual range minima that may be applied in Category 1 operations when a liaison or transport aircraft or transport helicopter is operated by a trained crew of two pilots.

TABLE 9. Required runway visual range (RVR) in metres in Category 1 multicrew operations

DH (metres)	Full facilities	Intermediate facilities	Basic facilities	Nil approach light facilities
60 or over	300[1] / 550	700	800	1 000

NB. This Table applies to standard approaches with a maximum glide slope of 4°.

[1]When operating a transport helicopter (NH), the smallest runway visual range minimum is 300 metres.

Additionally, the runway visual range minimum in Table 9 is acceptable when autopilot (AP) or Flight Director (FD) is used in Category 1 precision approach, or the glide path and height information are monitored on a head-up display (HUD) down to decision height. In this case, reference to this shall be made on the instrument approach chart.

8.4 Category 2 (Cat II) operations

Category 2 flight procedures in military aviation shall be designed in compliance with ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS).

9 HOLDING PROCEDURES

For the part of holding procedures, ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) shall be observed, with the exceptions laid down in this Chapter.

The lowest permitted holding altitude calculated according to PANS-OPS guarantees a minimum obstacle clearance of 300 metres (984 feet) to obstacles in the holding area. Flight procedures for military aviation may also be designed with an MOC of 150 metres (492 feet), however. In this case, the smaller than standard MOC shall be indicated on the chart.

10 ROUTE

In route planning for military aviation, ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) shall be observed, with the exceptions laid down in this Chapter.

The MOC on the route is 150 metres (492 feet).

11 NOISE ABATEMENT PROCEDURES

In military aviation compliant with the General Air Traffic rules (GAT), the noise abatement procedures laid down in ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) shall be observed.

In military aviation compliant with the Operational Air Traffic rules (OAT), an exception may be made to the noise abatement procedures laid down in ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) where necessary.

12 ALTIMETER SETTING PROCEDURES

In military aviation compliant with the General Air Traffic rules (GAT), the altimeter setting procedures laid down in ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) shall be observed.

In military aviation compliant with the Operational Air Traffic rules (OAT), the altimeter setting procedures laid down in ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) shall be observed, with the exceptions laid down in Chapter 12.1.

12.1 Altimeter setting and altimeter corrections

A QNH, QFE or QNE altimeter setting may be required in military aviation compliant with Operational Air Traffic rules.

In military aviation compliant with the General Air Traffic rules (GAT), the temperature correction laid down in ICAO publication Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS) shall be observed.

13 PROCEDURE FOR DETERMINING AERDROME OPERATING MINIMA

The numerical values and minima in this regulation or greater minima laid down by the air operator shall be used on the Finnish Defence Forces' instrument approach charts. Following instructions issued by the Military Authority, instrument approach maps based on ICAO publication Doc 8168-OPS, including the charts of Jeppesen or other similar operator, can be used in flight operations instead of the Finnish Defence Forces' instrument approach charts. In this case, the minima indicated on the charts shall be observed.

The required runway visual range minima and DA or MDA altitudes shall be shown on the Finnish Defence Forces' instrument approach charts. The instrument and system minima shall be accounted for when defining these values.

On the Finnish Defence Forces' instrument approach charts, the StepDown Fix minimum shall be labelled as SDF in the crossing altitude table and profile. An aircraft may not descend below the StepDown Fix before overflowing the StepDown Fix.

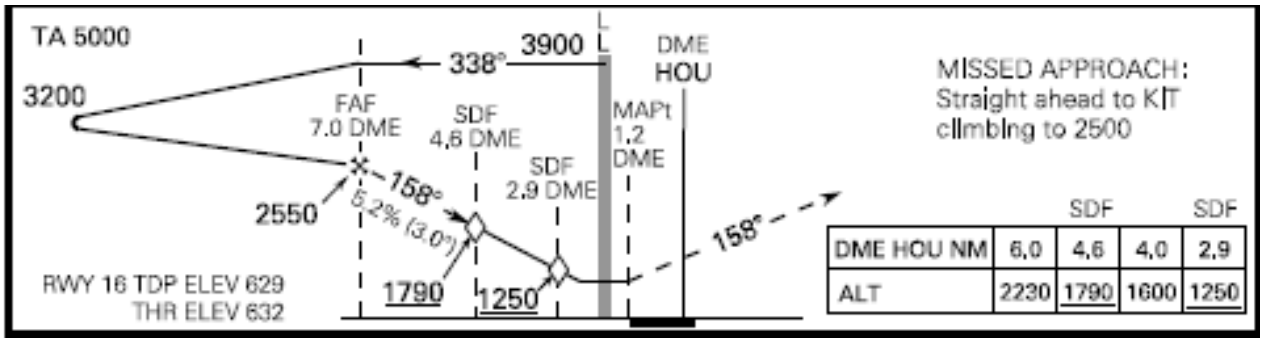


FIGURE 3. StepDown Fix

14 PROCEDURES FOR HELICOPTERS

In order to make full use of the capabilities of helicopters, procedures exclusively intended for helicopters (Class H) and approved for speeds lower than those for aircraft class A may be designed. Helicopter procedures for military aviation shall be designed in compliance

with ICAO publications Procedures for Air Navigation Services – Aircraft Operations (Doc 8168-OPS/611, PANS-OPS).

15 STANDARD OPERATING PROCEDURES (SOP)

The operator shall draw up Standard Operating Procedures (SOP) for individual aircraft types that provide the crew with instructions for safe, efficient, logical and predictable flight performance.

16 EXEMPTIONS

The Military Aviation Authority Finland may grant exemptions from this regulation based on a justifiable application addressing the exceptional features of the activities in question. The application process and instructions are detailed in the Military Aviation Authority Advisory SIO-Pe-YI-008 “Application for exemption to military aviation authority decision or military aviation regulation in force”.

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