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Swiss Confederation

Swiss Federal Department of the Environment, Transport, Energy and Communications (DETEC)

Swiss Federal Office of Civil Aviation (FOCA)
Flight Operations Division

Directive O-017 E

Subject:

Flight Operations: Guidelines for Instrument Rated (IR) pilots conducting RNAV GNSS Approaches (formerly GPS Approaches) in categories NCO Aeroplane and NCO/NCC Helicopter

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Reference / 58-00.92 / O-017 E

Applicable legislation:	Regulation (EC) No 216/2008 Commission Regulation (EU) No 1178/2011 EASA AMC 20-27 and EASA AMC 20-28 (EU) No 965/2012 ANNEX V [PART-SPA] ICAO DOC 9613 and Doc 8168 Volume I
Target group:	Instrument Rated pilots NCO Aeroplane; Instrument Rated pilots NCC/NCO Helicopter; Flight Instructors FI(A), FI(H), TRI(A), TRI(H), CRI(A), IRI(A), IRI(H), SFI(H), SFI(H), STI(A), STI(H) and Examiners with a Swiss pilot license; Swiss ATOs /FTOs; Aircraft owners and operators of Swiss registered Aeroplanes NCO and Helicopter NCC/NCO Student pilots undergoing IR Training
Version:	Entry into effect of this version: 01 October 2013 This version: 2.0 Entry into effect of first version: 01 October 2013
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1 Background

The implementation of satellite navigation for instrument approaches requires world-wide harmonization in the application of technical requirements and pilot training standards. EASA has therefore implemented (EU) No 965/2012 Air Operations Annex V [Part-SPA] Subpart B requiring specific approvals covering the field of Performance-Based Navigation (PBN). In accordance with this regulation, a formal approval would be required to fly "RNP Approaches" generally referred to as "RNAV GNSS approaches" and which formerly had been called "GPS approaches" irrespective of aircraft type (including Helicopter).

Due to the high amount of certification activity which would result of the multitude of participants in aviation applying for such an approval, it is expected that EASA will move some elements of Air Operations Annex V Subpart B to the EASA Aircrew Regulation Part FCL training requirements in the near future. Therefore it may be expected that following categories may be released from a formal approval process but still must comply with AMC 20-27 and AMC 20-28 comparable technical and training requirements:

- Non-commercial operations with other than complex motor powered aircraft (NCO) - Aeroplane,
- Non-commercial operations with other than complex motor powered aircraft (NCO) - Helicopter,
- Non-commercial operations with complex motor-powered aircraft (NCC) - Helicopter.

Note:
All instrument rated pilots with a Swiss pilot license of the categories NCO - Aeroplanes and NCO/NCC Helicopter (including Air Operations Annex VIII [PART-SPO]), shall not fly RNAV GNSS Approaches in Switzerland or abroad, until appropriate training has been completed as explained in this directive.

All foreign pilot license holders may only fly RNP approaches in Switzerland if they can provide evidence of thorough training of the subjects as listed in this national directive.

Training records may be checked by the FOCA during audits of an ATO/FTO (Approved Training Organisation). Confirmation of successful training has to be entered by a qualified Instructor or Examiner of an ATO/FTO in the pilots flight log and together with the signed training confirmation document, shall be produced by the respective pilot upon request of the competent authority (appendix C).

2 Purpose

With regard to EASA AMC 20-27 and AMC 20-28, the FOCA recognises the need to ensure proper training for all instrument rated (IR) pilot license holders in the categories NCO Aeroplanes and NCC/NCO Helicopter intending to fly RNP Approaches with APV BARO-VNAV or APV SBAS or lateral guidance only.

This directive shall ensure proper training of the above listed group of pilots. It shall clarify the necessary training elements which will qualify for conducting RNP Approaches in Switzerland and world-wide, as far as local restrictions do not ask for additional trainings and/or an approval. Furthermore, this directive shall improve the awareness of the responsible personnel conducting associated training or checks.

3 Scope of Application

This directive for the operations of NCO Aeroplane and NCO/NCC Helicopter applies to the following groups:

- All instrument rated pilots with a Swiss pilot license intending to fly RNAV GNSS Approaches in Switzerland and world-wide as far as specific national and international regulations do not ask for additional technical and training requirements and approvals;
- All instrument rated pilots with a pilot license issued by a foreign state wishing to fly RNAV GNSS Approaches in Switzerland in addition to their own national technical and training requirements;
- All Flight Instructors under a Swiss ATO/FTO, namely FI(A), FI(H), TRI(A), TRI(H), CRI(A), IRI(A), IRI(H), SFI(H), SFI(H), STI(A), STI(H) involved in the subject of practical and/or theoretical RNAV GNSS Approach training;
- All Swiss ATOs/FTOs providing theoretical and/or practical training in the field of RNAV GNSS Approaches;
- All aircraft owners and operators such as ATOs /FTOs, private aircraft rental operators and ownership groups of Swiss registered aircraft;
- All student pilots undergoing Instrument Rating training.

This directive shall also be applicable for non commercial Special Operations for other than complex Aeroplane/Helicopter and complex Helicopter as mentioned under EASA Air Operations Annex VIII [Part-SPO] in addition to conventional IFR requirements for the purpose of flying instrument approaches by means of RNAVGNSS sensor systems.

Note:
This Directive does not cover Commercial Air Transport (CAT) or NCC Aeroplane operations, which has to comply fully with the requirements as listed under EASA AMC 20-27 and 20-28.

4 Definitions

Explanations to definitions used within this directive may be found in Appendix B to this document.

5 Directive

General

Pilots of the category NCO Aeroplane and/or category NCC/NCO Helicopter shall undergo specific training before conducting RNAV GNSS Instrument Approaches which thereafter will become an additional privilege to an existing Instrument Rating. Furthermore, the technical certification status of the aircraft (including Helicopter) and it`s onboard equipment in use must be compared against required certification standards before RNAV GNSS Approaches may be flown.

Pilots shall contact an ATO/FTO which will provide specific RNP Approach [RNAV (GNSS) Approach] training before commencing such type of approaches unsupervised. The necessary training has to fulfill minimum requirements as covered by Appendix A to this directive. Attended initial practical and theoretical training as well as recurrent practical checks of the subject shall be recorded in the pilots flight log and signed off by a qualified Instructor of an ATO/FTO. Additionally, initial and difference training shall be confirmed on a signed attestation as listed under Appendix C to this directive.

An ATO/FTO providing RNP Approach theoretical and practical training for pilots shall reveal the course content to FOCA SB sections OC/HE/FL upon request. FOCA may require an ATO/FTO providing practical and theoretical RNP Approach training to adopt, correct and/or extend its offered training to meet minimum safety standards.

Note:
This directive is covering requirements for the use of RNP Approaches into civil Aerodromes only. Only procedures which have been released by the appropriate state authority and which are published in the national AIP shall be used.

Technical certification requirements

Before planning a flight, pilots must ensure that the equipment and its installation on board the aircraft meet the airworthiness requirements for the intended operation.

To fly an RNAV GNSS Approach, the aircraft and all GNSS receivers and associated equipment must be certified in accordance with the applicable legal requirements as listed under EASA AMC 20-27 and EASA AMC 20-28. For pilots of Swiss registered aircraft, the necessary certification status can be found in the scope of certification (Zulassungsbereich) which is listed in the attachment to the airworthiness certificate (blue booklet). For pilots of non Swiss registered aircraft, upon request by a FOCA inspector, pilots must be able to show evidence that their aircraft and equipment fully meet the technical requirements as listed under EASA AMC 20-27 and EASA AMC 20-28. Such evidence may be a statement of compliance within an extract from an approved aircraft flight manual from the manufacturer or a comparable legal document. If a pilot is in doubt over these requirements, he should seek the advice of the approved installer or an appropriately licensed engineer.

Note:
All hand-held GPS Receiver Systems and some of today`s existing aircraft installations do not meet the requirements for RNP Approach operations. None of the available hand-held receivers are approved for IFR or RNP Approach operations.

Operations requirements pre-flight

During pre-flight preparation, it is the pilots duty to check the following items before any RNAV GNSS Approach may be planned:

- The pilot has to check that the aircraft and its onboard navigation equipment is fully compliant with the technical certification requirements;
- The NAV database is updated and valid and contains data exclusively provided by a LOA Type 2 Nav Data provider. The NAV database is covering the area of operations;
- The NOTAMS, Weather Reports and NAV Data Alerts, NANUS are checked to impose no restriction for the intended operation;
- The RAIM is checked (if applicable) to provide sufficient satellite coverage for the estimated arrival time (ETA) of the planned RNP Approach +/- 15 minutes;
- Either the destination or the alternate aerodrome approach shall be planned with conventional navigation in case of a GPS system outage;
- Other specific onboard navigation equipment such as VOR or NDB receivers are fully functioning where the missed approach procedure is depending on such systems;
- A pre-flight functional check of the navigation system is performed;
- CDI scaling is set to automatic.

Operations requirements in-flight

During cruise, as a well planned preparation for the intended approach, the pilot shall:

- Check CDI scaling as required for the RNP Approach;
- Check map display settings and de-clutter map indication (if applicable);
- Select the display to show at least: Desired Track, Ground Speed, Distance to Next Waypoint;
- Insert the appropriate RNAV GNSS Approach in accordance with applicable weather conditions;
- Review the loaded approach and compare it with the published approach chart;
- Use automatics such as the Autopilot and Flight Director where applicable and necessary, according manufacturer published recommendations and system limitations.

Before reaching the Initial Approach Fix (IAF), the pilot shall:

- Check RAIM (if applicable) for adequate satellite coverage at updated ETA +/- 15 minutes if not automatically performed;
- Check RNAV status and that the appropriate navigation modes are selected or armed;
- Check ATIS for the intended approach and crosscheck temperature and QNH settings which may limit the use of the APV BARO-VNAV function (if applicable);
- Check that the correct approach procedure is loaded and perform an accuracy check covering:
  - Waypoint sequence of the loaded approach with reasonableness of tracks and distances of the approach and missed approach
  - Identification of Fly-by and Fly-over waypoints
  - Comparing the approach on the Navigation Display against the approach chart
- Check that the CDI/HSI navigation indicator source is set to the GPS sensor system;
- Check CDI scaling to be 1 nautical mile or as appropriate if level of service if different;
- Perform an approach briefing covering the whole approach and missed approach;
- Set altimeters to QNH when cleared to an altitude.

Just before commencing the approach and before reaching the FAF, the pilot shall:

- At latest 2 nautical miles before reaching the FAF, check that the approach mode or comparable necessary navigation status for approach guidance has been correctly activated or captured;
- Perform a cross error check towards ground based navigation aids where possible;
- Check indicated tracks and distances to the next waypoint continuously against charted values;
- Check CDI scaling to be 0.3 nautical miles or as appropriate if level of service is different;
- Check for no system malfunctions indicated and all messages and flags clear;

Note:
The manual entry of coordinates or waypoints into the RNAV system, for route sections within the terminal area or anywhere below minimum safe altitude, is hazardous and must not be performed.

During the RNP Approach, the pilot shall:

- Monitor cross track error during the whole approach;
- Fly a continuous descent final approach (CDFA) with a rate of descent as indicated by the correctly programmed APV system (where vertical guidance is available) or as calculated with reference to ground speed (if no vertical guidance is available) and compare altitude versus distance against charted values;
- Fly the approach as stable as possible providing a nearly continuous rate of descent;
- Check altitude and QNH when passing the outer marker or its substitute and perform a final check to ensure final flaps configuration and landing gear extension (where applicable) before landing;
- Perform a missed approach with no delay, when reaching the published DA (Decision Altitude) for an LPV, LNAV/VNAV or LNAV approach or when overflying the missed approach point whichever happens first without having attained the necessary visual cues for the intended runway;
- Fly immediately a missed approach and inform ATC in case of excessive lateral or vertical deviation from prescribed flight path or when a system failure and/or warning appears or if there is any doubt about the accuracy or reliability of the RNAV GNSS on board.

Note:
Flying a level-off at DA with a horizontal segment to the missed approach point is prohibited during any type of RNAV GNSS Approach.
ICAO uses the term MDA for the vertical LNAV approach minimum.

Training requirements

ATOs/FTOs providing RNP Approach training shall constitute a structured training programme covering at least the theoretical and practical topics as listed in Appendix A to this directive.

A summarized written test shall confirm sufficient theoretical competence in the mentioned field. The test results shall be stored by the ATO/FTO in accordance with FCL.1030 for a period of five years. After successful practical and theoretical training, the ATO/FTO shall provide a signed training confirmation to the trainee as listed in Appendix C to this directive. Additionally, the statement "**RNP Approach practical and theoretical Training performed**" shall be signed in the pilots flight log by a qualified instructor associated to the ATO/FTO. The type of aircraft and navigation equipment used during the practical part of the training shall also be listed in the pilots flight log.

6 Implementation

All Swiss ATOs/FTOs providing theoretical and practical training for RNAV (GNSS) Approaches shall implement this directive in their provided specific training modules. The implementation must be accompanied by a properly elaborated and documented safety and risk analysis and the respective mitigation measures where necessary.

Instrument Rating Instructors (IRI) may profit from limited grandfather rights allowing them to gain expertise on an aircraft without undergoing a full practical training programme. In any case, IRIs either have to provide or attend a full theoretical course covering all subjects as listed in Appendix A to this directive. Before exercising their privileges of instructing RNP Approaches on an aircraft, Instrument Rating Instructors themselves shall fly their first two RNAV GNSS Approaches followed by a missed approach in meteorological conditions equal to VMC. IRI RNP Approach training flights shall normally take place under the supervision of a second IRI or, in exceptional cases only, with a type/class rated safety pilot who must be instrument rated and specially briefed for this task.

To maintain a minimum level of safety after initial training, an instrument rated pilot may have to refresh theoretical items associated to the topic RNP Approach after a certain time. FOCA examiners may therefore check practical and theoretical items listed in Appendix A to this directive during the yearly proficiency checks. This shall ensure that an instrument rated pilot maintains a continuous basic understanding of this subject.

FOCA will address the necessity of fulfilling technical certification requirements as well as pilot training requirements within its national AIP.

7 Exemptions

Exemptions may be granted by following positions:
For ATOs/FTOs contact one of following sections: FOCA-SBFL/ FOCA-SBHE /FOCA-SBOC
All others shall contact FOCA-SBFP.

FOCA will only consider exemptions if they offer an equal or higher level of safety.
In any case, exemptions must be well justified and thoroughly analysed by means of a systematic Risk and Hazard identification with appropriate mitigating measures.

8 Entry into effect

This directive enters into effect on **01 October 2013.**

Federal Office of Civil Aviation

Roland Steiner
Director Flight Operations Division

Thomas Gass, Senior Flight Inspector
Section Operations Complex Aeroplanes

Appendix A

Training requirements Theory

ATOs/FTOs providing RNP Approach trainings shall constitute a structured training programme which shall start with a profound theoretical training part. This shall be followed by a practical exercise on the aircraft or an approved Flight Simulator Training Device (FSTD) or Flight Navigation and Procedure Trainer (FNPT I/II) as appropriate under the supervision of an authorized instructor.
The theoretical part of the training shall cover at least the items listed below in adequate depth.
A summarized written test shall confirm sufficient theoretical competence of the applicant in the mentioned field. The test results shall be stored by the ATO/FTO in accordance with FCL.1030 for a period of five years. In addition to providing a signed training confirmation to the trainee (sample in Appendix C to this directive), the statement "**RNP Approach practical and theoretical Training performed**" shall be confirmed in the pilots flight log and signed off by a qualified Instructor associated to the ATO/FTO.

The following non exhaustive tables contain the minimum of the required theoretical training items of a modular syllabus to attain the permission for flying RNP Approaches in Switzerland and abroad. After an initial training course, difference training onto new RNAV equipment may be limited to the limitations, functionality and the normal/abnormal procedures applicable for the new system. The part SOPs and abnormal procedures listed in the following tables should be trained complementary to a suitable computer based training (CBT) if available.

Theoretical Training – Topic	**Minimum standard of performance**
Basic Knowledge Satellite Navigation (general)	
USA Navstar GPS – Global Positioning System, European Galileo, Russian Glonass	The candidate knows the different Satellite Navigation Systems, the technical functionality of the US Navstar GPS and its accuracy and limitations.
GPS Navigation performance and associated system errors	The candidate knows the factors affecting GPS performance in regard to: • Accuracy • Integrity • Availability • Continuity • Vulnerability
Satellite Navigation Augmentation Systems	The candidate receives an overview over the various augmentations systems: • GBAS (general knowledge) • SBAS and ABAS The worldwide used SBAS systems are mentioned during training (e.g. EGNOS, WAAS, GAGAN, SDCM, MSAS).
RAIM (for Barometric systems) and WFDE prediction	If applicable, the candidate is able to check the integrity of the RNAV system by means GPS satellite Fault Detection (FD) with the RAIM function. The WFDE prediction tools are discussed in detail.

Theoretical Training – Topic	Minimum standard of performance
Basic Knowledge PBN (general)	
Traditional IFR compared with RNAV	The candidate is able to list the differences comparing traditional IFR (VOR/ILS/NDB) with PBN.
RNAV versus RNP	The candidate is able to list the differences comparing RNAV with RNP.
Overview RNP/RNAV in accordance with the ICAO PBN manual ICAO DOC 9613-AN/937	The candidate is able to describe the limitations and purpose of following RNP/RNAV types: • 0.1 RNP (AR) Approach - authorization required • 0.3 RNP Approach • 1.0 (P-RNAV for SID and STAR) • 4 (Oceanic) • 5 (B-RNAV) • 10 (Oceanic and remote areas)
Technical Certification of Aircraft and Navigation Equipment including Nav Data Base Integrity	
Certification of the aircraft and onboard Navigation Equipment in accordance with the technical certification requirements as listed in this directive	The candidate knows where to find the approved Navigation Equipment Certification status. He is able to evaluate the validity of the certification status and compliance towards certification criteria as listed in this directive. Data may be taken from the scope of utilisation list which is an attachment to the FOCA airworthiness certificate. For non Swiss registered aircraft, data may be found in a valid Aircraft Flight Manual (AFM), Pilots' Operating Handbook (POH) or equivalent approved documentation. All aircraft installations must have the appropriate certification for RNAV (GNSS) operations entered in the respective document (AFM or POH or equivalent).
Aeronautical Navigation Database	Pilots are trained to use only an updated Navigation Database provided by a LOA Type 2 Nav Data provider for the purpose of flying RNP Approaches or NPA overlay approaches. Candidates know how to check the validity of the loaded NAV database and how to activate a new database in case the active one is expired.
Technical Limitations of the aircraft	The candidate knows all vital technical limitations of the aircraft and its onboard systems (e.g. autopilot, flight director, navigation with an engine failure).
Nav Database Coding, ARINC and AIRAC Cycle	
The flow of navigation data from the originator to the end-user in accordance with AUROCAE ED 77 and ED 76	The candidate knows the different steps in processing Navigation Data from the origin to the end user in cockpit.
AIRAC Cycle	The candidate knows the scheduling mechanism behind the AIRAC cycle of 28 days.
ARINC	The candidate has a basic understanding of the ARINC 424 database name and coding conventions especially for the airport related CNF codes for approach and missed approach.
ARINC path terminators including Fly-by and Fly-over waypoints	The candidate must be able to distinguish the various path terminators and he knows their applicability. He knows the difference of Fly-over and Fly-by waypoints and how to read them on navigation charts and on a map display on the aircraft.

Theoretical Training – Topic	Minimum standard of performance
SOP`s / System Settings and Display Parameters (aircraft specific)	
Standard Operating Procedures (SOP`s)	Pilots should be trained in the proper use of the onboard equipment. They must check that the system settings and display parameters are correctly set before every flight and especially before and during the approach. The appropriate displays should be selected to present the following information during the entire RNAV GNSS Approach: • The GPS computed desired track (DTK) • Aircraft lateral position relative to the DTK (XTE) -This should be available on the pilot's main CDI/HSI • Groundspeed (GS) • Distance to the next waypoint (DIS); and • Absence of RAIM or Loss Of Integrity (LOI) alert The use of the autopilot and/or flight director and its associated modes during the RNP Approach has to be discussed in good detail (if applicable).
Safety check before RNP Approach	In order to eliminate critical errors, the candidate shall be trained to check minimum integrity of a programmed approach procedure before its use. The check should include at least a verification of the position of the Final Approach Fix (FAF) by means of coordinates or a reliable plausibility check (e.g. NAV display with VOR/DME and defined Radial). Additionally, from the FAF the track and distance to the Missed Approach Point (MAPt) has to be checked for correctness. The lateral and vertical part of the programmed flight path between the Intermediate Fix (IF) and the MAPt shall not be modified by the flight-crew under any circumstances as this would invalidate the whole procedure and would be potentially hazardous. The used database itself must be valid.
Obstacle clearance requirements, accuracy, approach charts	
ICAO pans ops Doc 8168 Vol I RNAV Overlay approaches and the CDFA technique	The candidate is trained in the differences between published RNAV overlay approaches where no ground based navigation station may be required against the approach type where RNAV guidance is only supplementary. The necessity to fly a CDFA (Continuous Descent Final Approach) with no level off at DA/MDA for all types of RNAV GNSS approaches as promoted by ICAO shall be discussed in adequate detail.
RNP accuracy requirement	The candidate is able to list the individual accuracy factors adding up to the Total System Error (TSE) including: • Path Definition Error (PDE) • Across Track Error • Along Track Error • Position Estimation Error • Flight Technical Error (FTE) • Path Steering Error (PSE)
Approach charting and vertical minima - the different use of terms by NAV chart providers when compared with the AIP	The candidate is trained how to read the approach charts for RNAV GNSS Approaches with the different minima for: • APV BARO VNAV - LNAV/VNAV with DA • APV SBAS – LPV with DA • Lateral guidance only – LNAV with DA (MDA for ICAO) Furthermore, the candidate knows the onboard system requirements associated to the various vertical approach types. Approach charts for all three RNAV (GNSS) vertical minima are discussed in adequate detail.

Theoretical Training – Topic	Minimum standard of performance
Vertical guidance during approach	
APV BARO VNAV and APV SBAS	The candidate shall be trained in the use of vertical guidance based on barometric and/or SBAS provided data. He knows the implications and limitations of temperature deviations from ISA for barometric systems which may produce a vertical shift when compared with the required vertical approach profile. The existence of pre-programmed additional vertical reference steps for some approaches in the database which are not listed on the approach chart shall be discussed in detail.
Communication with ATC	
RTF phraseology	The candidate is trained on how to communicate with ATC when requesting a clearance to fly an RNAV GNSS Approach.
NOTAMs and Navigation Data Alerts	
Important information on RNAV Database Errors and Navigation Data Alerts	The candidate knows the importance of checking NOTAMs and possible Navigation Data Alerts before planning to conduct an RNP Approach.
General safety considerations	
Waypoints below Minimum Safe Altitude (MSA)	The candidate has to be made aware of the fact that for operations in IMC below minimum safe altitude including P-RNAV Operations and RNAV Approaches, inserting self created waypoints and modifications of the published procedure with temporary fixes not provided in the database is potentially hazardous and not allowed.
Abnormal and contingency procedures	The candidate knows and understands the possible RNAV system warnings, the associated abnormal and contingency procedures and the system limitations in case of a technically degraded aircraft (e.g. engine failure for twin engine aeroplanes or autopilot inoperative).

Training requirements practical part

Part of the RNP Approach practical training shall be performed in an approved FSTD or FNPT I or II or the aircraft in flight under the supervision of an authorized flight instructor.
Practical training shall cover at least following training items:

Practical Training – Topic	Minimum standard of performance
Checks during flight preparation (aircraft specific)	
The flight instructor explains all the necessary pre-flight checks and the preparation items	The candidate is able to check: • the certification status of the aircraft and its equipment, • the NAV Database validity and the LOA TYPE 2 certification of the NAV Data provider, • NOTAMS, weather data, NAV Data Alerts, PRAIM, • Correct display setting for take-off and departure.

Practical Training – Topic	Minimum standard of performance
During cruise (aircraft specific)	
In-flight, the flight instructor demonstrates the use of the RNAV system	The candidate shall be able to: • Select the correct RNP Approach procedure; • Retrieve an APV Approach procedure from the database (e.g. using its name and/or the SBAS channel number) if applicable; • Program a procedure change at destination airport and change the destination and/or alternate airport as a flight plan.
Before and during approach (aircraft specific)	
Before commencing the approach, the flight instructor demonstrates the necessary checks and system setups. Thereafter the approach is flown as stable and constant as possible. All the necessary checks are performed before and/or during the approach.	The candidate has a good understanding of: • Onboard automatics such as the autopilot and/or flight director and their use; • The programming and crosschecking of the transitions, approach and missed approach procedures; • The flight guidance modes behaviour and its limitations; • The lateral and vertical path management and the necessary crosschecks; • Flying the interception of the initial or intermediate segment of an approach following ATC notification; • Flying the interception of the extended final approach segment (e.g. using the VTF function); • Flying the approach procedure in all the approved modes (if various modes are available); • The GNSS approach mode indication and the different applicable minima for LPV, LNAV/VNAV, LNAV approaches; • The use of other aircraft equipment to support track monitoring, weather and obstacle avoidance; • All RNAV related abnormal and contingency procedures; • The necessary adherence to speed and/or altitude constraints; • The use of lateral navigation mode(s) and associated lateral control techniques; • The use of vertical navigation mode(s) and associated vertical control techniques; • Flying the missed approach and reprogramming a new approach; • ATC procedures associated to RNP Approaches with the related R/T phraseology.

Note:
For practical training, a minimum of two RNAV GNSS approaches with associate missed approaches shall be flown within the required tolerances and to the satisfaction of the instructor. At least one approach shall be flown to the LPV minima (if available) whilst the second may be flown to the LNAV minimum.

Appendix B

Definitions

ABAS	**Aircraft Based Augmentation System** An augmentation system that augments and/or integrates the information obtained from the other GNSS elements with information available on board the aircraft.
Accuracy	The degree of conformance between the estimated, measured, or desired position and/or the velocity of a platform at a given time, and its true position or velocity. Navigation performance accuracy is usually presented as a statistical measure of system error and is specified as predictable, repeatable and relative.
Aeroplane	Means an engine-driven fixed-wing aircraft heavier than air which is supported in flight by the dynamic reaction of the air against its wings.
Aircraft	Means any machine which can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface. Helicopter as well as fixed wing aeroplanes are considered aircraft.
APV	**Approach Procedure with Vertical guidance** An instrument approach procedure which utilises lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.
RNAV	**Area navigation (RNAV):** A method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.
ARINC	Aeronautical Radio Inc.
ASE	**Altimetry System Error** Altimetry error refers to the electrical output and includes all errors attributable to the aircraft altimetry installation including position effects resulting from normal aircraft flight attitudes.
ATO	**Approved Training Organisation**
Availability	An indication of the ability of the system to provide usable service within the specified coverage area and is defined as the portion of time during which the system is to be used for navigation during which reliable navigation information is presented to the crew, automatic pilot, or other system managing the flight of the aircraft.
BARO VNAV	**Barometric Vertical NAVigation** is a navigation system that presents to the pilot a computed vertical guidance based on barometric altitude.
Basic GNSS operation	Operation that are based on GNSS Aircraft Based Augmentation System (ABAS). An ABAS system is typically a GNSS receiver with fault detection compliant to E/TSO C 129a, E/TSOC145() or E/TSOC146().
CBT	**Computer Based Training**
Continuity of Function	The capability of the total system (comprising all elements necessary to maintain aircraft position within the defined airspace) to perform its function without non scheduled interruptions during the intended operation.
DA(H)	**Decision altitude (DA) or Decision height (DH).** A specified altitude or height in the precision approach or approach with vertical guidance at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.
CDFA	Continuous Descent Final Approach - ICAO 8168 Vol I
CNF	**Computer Navigation Fix** may be provided by ARINC 424 when suitable waypoints are missing.
ETA	**Estimated Time of Arrival**
FDE	**Fault Detection and Exclusion** FDE is a receiver processing scheme that autonomously provides integrity monitoring for the position solution, using redundant range measurements. The FDE consist of two distinct parts: fault detection and fault exclusion. The fault detection part detects the presence of an unacceptably large position error for a given mode of flight. Upon the detection, fault exclusion follows and excludes the source of the unacceptably large position error, thereby allowing navigation to return to normal performance without an interruption in service.

FAP	**Final Approach Point**
FTO	**Flying training organisation** Expression used und JAR-FCL.
GNSS stand-alone receiver	A GNSS system incorporating the GNSS sensor, the navigation capability and the navigation data base.
GNSS sensor	A GNSS system incorporating only the GNSS receiving and positioning part. It doesn't incorporate the navigation capability and the navigation data base.
HCE	**Horizontal Coupling Error** The vertical error component of an along track positioning error.
Integrity	The ability of a system to provide timely warnings to users when the system should not be used for navigation.
LOA Type 2	**Letter of Acceptance Type 2**
LPV	Localiser Precision with Vertical guidance.
LPV approach operation	RNAV GNSS approach operation conducted down to LPV minima.
LPV approach procedure	RNAV GNSS approach procedure containing LPV minima.
LPV approach capability	Airborne capability to fly LPV approach procedure.
LPV OCA(H)	Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.
MDA(H)	Minimum descent altitude (MDA) or minimum descent height (MDH). A specified altitude or height in a non-precision approach or circling approach, below which, descent should not be made without the required visual reference.
NCC	EASA term for non-commercial operations with complex motor-powered aircraft (including helicopter).
NCO	EASA term for non-commercial operations with other-than-complex motor-powered aircraft (including helicopter).
NSE	**Navigation System Error** The difference between true position and estimated position.
OCA/H	In a precision approach procedure (or APV), the OCA/H is defined as the lowest altitude/height at which a missed approach must be initiated to ensure compliance with the appropriate obstacle clearance design criteria.
On board Monitoring and Alerting function	This function is the main element which determines if the navigation system complies with the necessary safety level associated to a RNP application; it relates to both lateral and longitudinal navigation performance. Onboard performance monitoring and alerting allows the flight crew to detect that the RNAV system is not achieving the navigation performance required. Onboard performance monitoring and alerting is concerned with the monitoring of all type of errors which may affect the aircraft ability to follow the desired flight path.
PBN	**Performance Based Navigation** A term used by ICAO covering the whole spectrum of RNAV operations.
PDE	**Path Definition Error** The difference between the defined path and the desired path.
RAIM	**Receiver Autonomous Integrity Monitoring** A technique whereby a GNSS receiver/processor determines the integrity of the GNSS navigation signals using only GPS signals or GPS signals augmented with altitude. This determination is achieved by a consistency check among redundant pseudorange measurements. At least one satellite in addition to those required for navigation should be in view for the receiver to perform the RAIM function
RNAV	**Area Navigation** A method of navigation which permits aircraft operation on any desired flight path within the coverage of station referenced navigation aids or within the limits of the capability of self contained aids, or a combination of these.
RNAV System	A navigation system which permits aircraft operation on any desired flight path within the coverage of stationreferenced navigation aids or within the limits of the capability of selfcontained aids, or a combination of these, it may be part of a FMS.

RNAV(GNSS) approach:	A GNSS RNAV approach promulgated by a State and designed in accordance with PANSOPS Criteria Doc 8168, Volume II, Part III, Section 1, Chapter 2 and Section 3, Chapter 3 (Basic GNSS). Such approach should be flown by using an airborne RNAV system approved for RNP APCH operations.
RNP APCH	**RNP APproaCH** A RNP approach defined in the ICAO Performance Based Manual (PBN) manual. An approach equivalent to the RNAV (GNSS) one.
SBAS	**Satellite Based Augmentation System** SBAS augments core satellite constellation by providing ranging, integrity and correction information via geostationary satellites. This system comprises a network of ground reference stations that observe satellites signals, and master stations that process observed data and generate SBAS messages for uplink to the geostationary satellites, which broadcast the SBAS message to the users.
SOP`s	**Standard** Operating **Procedures**
TCH	**Threshold Crossing Height** The height of the Glide Path above the threshold.
TSE	**Total System Error** The difference between true position and desired position. This error is equal to the root sum square (RSS) of the Flight Technical Error (FTE), Path Definition Error (PDE), and Navigation System Error (NSE).
Vertical Navigation	A method of navigation which permits aircraft operation on a vertical flight profile using altimetry sources, external flight path references, or a combination of these.
VPA	**Vertical Path Angle** Angle of the published final approach descent.

Appendix C

Sample confirmation document which shall be provided by the ATO/FTO to the trainee upon completed theoretical and practical training.

Name of ATO/FTO
CH-ATO/FTO number
Address of the ATO/FTO

Confirmation of RNP Approach Training

for Instrument Rated (IR) pilots conducting RNAV GNSS Approaches in categories NCO Aeroplane and NCO/NCC Helicopter in full compliance with the Swiss FOCA Directive O-017E.

Trainee	Name/first name:	
	Date of birth:	Pilot license number:
Details of general RNP Approach theoretical training	Date of training: Instructor`s name/first name: Location of theoretical training:	
Details of specific aircraft type and RNAV equipment theoretical training/CBT	Date of training: Aircraft type/variant: Instructor`s name/first name: Location of theoretical training:	RNAV equipment type:
Details on general and type specific theoretical examination	Date of theoretical examination: Supervising instructor`s name/first name: Location of theoretical training:	
Practical pilot RNP Approach training	Date of training: Aircraft type/variant: FSTD or FNPT I or II ID-number (if applicable): Airport used during practical training: Number and type of approaches/missed approaches flown: Instructor`s name/first name:	RNAV equipment type:

For the accuracy of the details on this confirmation sheet:

Trainee	Date and place:	Signature:
Instructor of above ATO/FTO	Name/first name: Date and place:	Signature: