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|  | Ansökan PBN  (RNP-AR APCH, RNP 0,3) *Version 2018-02-20* |  |
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| Operatör: | | |
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| Tillståndsnummer: | Ifylld EASA Form 2 | |
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|  | | Bilaga nr: |
| Relevant elements defined in the mandatory part of the Operational Suitability Data (OSD) established in accordance with Regulation (EU) No 748/2012 are taken into account | |  |
| Transportstyrelsen | | |
| Ärendenummer: | Handläggare: | |
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| Berörda sektioner/samråd: | | |
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| Information | | |
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| Denna checklista är avsedd som stöd vid ansökan om Performance Based Navigation, PBN, i Operations Specifications benämnd Complex PBN. De navigationsprecisionskrav som är föremål för godkännande är:   * RNP-AR APCH, ”kurvade inflygningar” * RNP 0,3 endast för helikopterverksamhet   Övriga navigationsprecisionskrav kräver idag inget godkännande; operativa procedurer, träningsprogram och MEL skall detaljerat beskrivas i relevanta delar av operatörens manualverk och skickas in till myndigheten som revisioner för granskning. För mer information, se CAT.OP.MPA.126 med tillhörande AMC.  Vägledande material som refereras till i (EU) 965/2012:   * ICAO Doc 9613, PBN Manual * ICAO Doc 9997, PBN Ops Approval Manual   Varje regelparagraf i detta dokument följs av en ruta där operatören anger var i manualverket paragrafen omhändertagits och detta ska skrivas på detaljnivå för att underlätta och påskynda granskning och handläggning; att exempelvis endast ange OM-A kap 8 är inte acceptabelt.   |  | | --- | | Där grönmarkerade rutor förekommer ska relevanta bilagor sändas in. Bilagans nummer ska anges i checklistan. | | | |

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| SPA.GEN.100 |
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| (a) The competent authority for issuing a specific approval shall be:  (1) for the commercial operator the authority of the Member State in which the operator has its principal place of business;  (2) for the non-commercial operator the authority of the State in which the operator is established or residing.  b) Notwithstanding (a)(2), for the non-commercial operator using aircraft registered in a third country, the applicable requirements under this Annex for the approval of the following operations shall not apply if these approvals are issued by a third country State of Registry:  (1) Performance-based navigation (PBN);  (2) Minimum operational performance specifications (MNPS);  (3) Reduced vertical separation minima (RVSM) airspace |
| SPA.GEN.105 |
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| (a) The operator applying for the initial issue of a specific approval shall provide to the competent authority the documentation required in the applicable Subpart, together with the following information:  (1) the name, address and mailing address of the applicant;  (2) a description of the intended operation.  (b) The operator shall provide the following evidence to the competent authority:  (1) compliance with the requirements of the applicable Subpart;  (2) that the relevant elements defined in the mandatory part of the operational suitability data established in accordance with Regulation (EU) No 748/2012 are taken into account.  (c) The operator shall retain records relating to (a) and (b) at least for the duration of the operation requiring a specific approval, or, if applicable, in accordance with Annex III (Part-ORO). |
| AMC1 SPA.GEN.105(a) |
| DOCUMENTATION |
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| (a) Operating procedures should be documented in the operations manual.  (b) If an operations manual is not required, operating procedures may be described in a manual specifying procedures (procedures manual). If the aircraft flight manual (AFM) or the pilot operating handbook (POH) contains such procedures, they should be considered as acceptable means to document the procedures. |
| SPA.GEN.110 Priviliges of an operator holding a specific approval |
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| The scope of the activity that an operator is approved to conduct shall be documented and specified:  (a) for operators holding an air operator certificate (AOC) in the operations specifications to the AOC;  (b) for all other operators in the list of specific approvals. |
| SPA GEN.115 Changes to a specific approval |
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| When the conditions of a specific approval are affected by changes, the operator shall provide the relevant documentation to the competent authority and obtain prior approval for the operation. |

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| SPA.GEN.120 Continued validity of a specific approval | | |
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| Specific approvals shall be issued for an unlimited duration and shall remain valid subject to the operator remaining in compliance with the requirements associated with the specific approval and taking into account the relevant elements defined in the mandatory part of the operational suitability data established in accordance with Regulation (EU) No 748/2012. | | |
| SPA.PBN.100 | | |
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| a) An approval is required for each of the following PBN specifications:  (1) RNP AR APCH; and  (2) RNP 0.3 for helicopter operation.  (b) An approval for RNP AR APCH operations shall allow operations on public instrument approach  procedures which meet the applicable ICAO procedure design criteria.  (c) A procedure-specific approval for RNP AR APCH or RNP 0.3 shall be required for private instrument  approach procedures or any public instrument approach procedure that does not meet the applicable ICAO procedure design criteria, or where required by the Aeronautical Information Publication (AIP) or the competent authority. | | |
| GM1 SPA.PBN.100 PBN Operations | | |
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| GENERAL  (a) PBN operations are based on performance requirements, which are expressed in navigation specifications (RNAV specification and RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.  Table 1 provides a simplified overview of:  (1) PBN specifications and their applicability for different phases of flight; and  (2) PBN specifications requiring a specific approval.  (b) More detailed guidance material for the operational use of PBN applications can be found in ICAO Doc 9613 Performance-Based Navigation (PBN) Manual.  (c) Guidance material for the design of RNP AR APCH procedures can be found in ICAO Doc 9905 RNP AR Procedure Design Manual.  (d) Guidance material for the operational approval of PBN operations can be found in ICAO Doc 9997 Performance-Based Navigation (PBN) Operational Approval Manual. | | |
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| SPA.PBN.105 PBN operational approval | | |
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| To obtain a PBN specific approval from the competent authority, the operator shall provide evidence that: | | |
|  | Bilaga nr: | TS notering: |
| (a) the relevant airworthiness approval, suitable for the intended PBN operation, is stated in the AFM or other document that has been approved by the certifying authority as part of an airworthiness assessment or is based on such approval; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (b) a training programme for the flight crew members and relevant personnel involved in the flight preparation has been established; |  |  |
|  | Bilaga nr: | TS notering: |
| (c) a safety assessment has been carried out; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (d) operating procedures have been established specifying:  (1) the equipment to be carried, including its operating limitations and appropriate entries in the minimum equipment list (MEL); |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) flight crew composition, qualification and experience; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) normal, abnormal and contingency procedures; and |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (4) electronic navigation data management; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (e) a list of reportable events has been specified; and |  |  |
|  | Bilaga nr (om applicerbart): | TS notering: |
| (f) a management RNP monitoring programme has been established for RNP AR APCH operations, if applicable. |  |  |
| AMC1 SPA.PBN.105 | | |
| FLIGHT CREW TRAINING AND QUALIFICATIONS – GENERAL PROVISIONS | | |
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| (a) The operator should ensure that flight crew members training programmes for RNP AR APCH include structured courses of ground and FSTD training. | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) Flight crew members with no RNP AR APCH experience should complete the full training programme prescribed in (b), (c), and (d) below. |  |  |
|  | Detaljerade referenser i OM (om applicerbart): | TS notering: |
| (2) Flight crew members with RNP AR APCH experience with another EU operator may undertake an:  (i) abbreviated ground training course if operating a different type or class from that on which the previous RNP AR experience was gained;  (ii) abbreviated ground and FSTD training course if operating the same type or class and variant of the same type or class on which the previous RNP. AR experience was gained.  (iii) the abbreviated course should include at least the provisions of (d)(1), (c)(1) and (c)(2)(x) as appropriate.  (iv) The operator may reduce the number of approaches/ landings required by (c)(2)(xii) if the type/class or the variant of the type or class has the same or similar:  (A) level of technology (flight guidance system (FGS));  (B) operating procedures for navigation performance monitoring; and  (C) handling characteristics as the previously operated type or class. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) Flight crew members with RNP AR APCH experience with the operator may undertake an abbreviated ground and FSTD training course:  (i) when changing aircraft type or class, the abbreviated course should include at least the provisions of (d)(1), (c)(1), (c)(2);  (ii) when changing to a different variant of aircraft within the same type or class rating that has the same or similar of all of the following:  (A) level of technology (flight guidance system (FGS));  (B) operating procedures for navigation performance monitoring; and  (C) handling characteristics as the previously operated type or class.  A difference course or familiarisation appropriate to the change of variant should fulfil the abbreviated course provisions.  (iii) when changing to a different variant of aircraft within the same type or class rating that has significantly different at least one of the following:  (A) level of technology (FGS);  (B) operating procedures for navigation performance monitoring; and  (C) handling characteristics, the provisions of (c)(1) and (c)(2) should be fulfilled. |  |  |
|  |  | TS notering: |
| (4) The operator should ensure when undertaking RNP AR APCH operations with different variant(s) of aircraft within the same type or class rating, that the differences and/or similarities of the aircraft concerned justify such operations, taking into account at least the following:  (i) the level of technology, including the:  (A) FGS and associated displays and controls;  (B) FMS and its integration or not with the FGS; and  (C) on-board performance monitoring and alerting (OBPMA) system;  (ii) operating procedures, including:  (A) navigation performance monitoring;  (B) approach interruption and missed approach including while in turn along an RF leg;  (C) abnormal procedures in case of loss of system redundancy affecting the guidance or the navigation; and  (D) abnormal and contingency procedures in case of total loss of RNP capability; and  (iii) handling characteristics, including:  (A) manual approach with RF leg;  (B) manual landing from automatic guided approach; and  (C) manual missed approach procedure from automatic approach. |  |  |
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| (b) Ground training | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) Ground training for RNP AR APCH should address the following subjects during the initial introduction of a flight crew member to RNP AR APCH systems and operations. For recurrent programmes, the curriculum need only review initial curriculum items and address new, revised, or emphasised items. |  |  |
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| (2) General concepts of RNP AR APCH operation | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) RNP AR APCH training should cover RNP AR APCH systems theory to the extent appropriate to ensure proper operational use. Flight crew members should  understand basic concepts of RNP AR APCH systems, operation, classifications, and limitations. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) The training should include general knowledge and operational application of RNP AR APCH instrument approach procedures. This training module should in particular address the following specific elements:  (A) the definitions of RNAV, RNP, RNP APCH, RNP AR APCH, RAIM, and containment areas; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (B) the differences between RNP AR APCH and RNP APCH; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (C) the types of RNP AR APCH procedures and familiarity with the charting of these procedures; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (D) the programming and display of RNP and aircraft specific displays, e.g. actual navigation performance; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (E) the methods to enable and disable the navigation updating modes related to RNP; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (F) the RNP values appropriate for different phases of flight and RNP AR APCH instrument procedures and how to select, if necessary; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (G) the use of GNSS RAIM (or equivalent) forecasts and the effects of RAIM ‘holes’ on RNP AR APCH procedures availability; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (H) when and how to terminate RNP navigation and transfer to conventional navigation due to loss of RNP and/or required equipment; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (I) the method to determine if the navigation database is current and contains required navigational data; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (J) the explanation of the different components that contribute to the total system error and their characteristics, e.g. drift characteristics when using IRU with no radio updating, QNH mistakes; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (K) the temperature compensation: Flight crew members operating avionics systems with compensation for altimetry errors introduced by deviations from ISA may disregard the temperature limits on RNP AR APCH procedures if flight crew training on use of the temperature compensation function is provided by the operator and the compensation function is utilised by the crew. However, the training should also recognise if the temperature compensation by the system is applicable to the VNAV guidance and is not a substitute for the flight crew compensating for the temperature effects on minimum altitudes or the DA/H; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (L) the effect of wind on aircraft performance during RNP AR APCH operations and the need to positively remain within RNP containment area, including any operational wind limitation and aircraft configuration essential to safely complete an RNP AR APCH operation; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (M) the effect of groundspeed on compliance with RNP AR APCH procedures and bank angle restrictions that may impact on the ability to remain on the course centreline. For RNP procedures, aircraft are expected to maintain the standard speeds associated with the applicable category unless more stringent constraints are published; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (N) the relationship between RNP and the appropriate approach minima line on an approved published RNP AR APCH procedure and any operational limitations if the available RNP degrades or is not available prior to an approach (this should include flight crew operating procedures outside the FAF versus inside the FAF); |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (O) understanding alerts that may occur from the loading and use of improper RNP values for a desired segment of an RNP AR APCH procedure; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (P) understanding the performance requirement to couple the autopilot/flight director to the navigation system’s lateral guidance on RNP AR APCH procedures requiring an RNP of less than RNP 0.3; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (Q) the events that trigger a missed approach when using the aircraft’s RNP capability to complete an RNP AR APCH procedure; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (R) any bank angle restrictions or limitations on RNP AR APCH procedures; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (S) ensuring flight crew members understand the performance issues associated with reversion to radio updating, know any limitations on the use of DME and VOR updating; and |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (T) the familiarisation with the terrain and obstacles representations on navigation displays and approach charts. |  |  |
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| (3) ATC communication and coordination for use of RNP AR APCH | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) Ground training should instruct flight crew members on proper flight plan classifications and any ATC procedures applicable to RNP AR APCH operations. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) Flight crew members should receive instruction on the need to advise ATC immediately when the performance of the aircraft’s navigation system is no longer adequate to support continuation of an RNP AR APCH operation. |  |  |
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| (4) RNP AR APCH equipment components, controls, displays, and alerts | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) Theoretical training should include discussion of RNP terminology, symbology, operation, optional controls, and display features, including any items unique to an operator’s implementation or systems. The training should address applicable failure alerts and limitations. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) Flight crew members should achieve a thorough understanding of the equipment used in RNP operations and any limitations on the use of the equipment during those operations. |  |  |

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|  | Detaljerade referenser i OM: | TS notering: |
| (iii) Flight crew members should also know what navigation sensors form the basis for their RNP AR APCH compliance, and they should be able to assess the impact of failure of any avionics or a known loss of ground systems on the remainder of the flight plan. |  |  |
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| (5) AFM information and operating procedures | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) Based on the AFM or other aircraft eligibility evidence, the flight crew should address normal and abnormal operating procedures, responses to failure alerts, and any limitations, including related information on RNP modes of operation. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) Training should also address contingency procedures for loss or degradation of the RNP AR APCH capability. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iii) The manuals used by the flight should contain this information. |  |  |
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| (6) MEL operating provisions | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) Flight crew members should have a thorough understanding of the MEL entries supporting RNP AR APCH operations. |  |  |
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| (c) Initial FSTD training | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) In addition to ground training, flight crew members should receive appropriate practical skill training in an FSTD. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) Training programmes should cover the proper execution of RNP AR APCH operations in compliance with the manufacturer’s documentation. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) The training should include:  (A) RNP AR APCH procedures and limitations; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (B) standardisation of the set-up of the cockpit’s electronic displays during an RNP AR APCH operation; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (C) recognition of the aural advisories, alerts and other annunciations that can impact on compliance with an RNP AR APCH procedure; and |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (D) the timely and correct responses to loss of RNP AR APCH capability in a variety of scenarios embracing the breadth of the RNP AR APCH procedures the operator plans to complete. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) FSTD training should address the following specific elements:  (i) procedures for verifying that each flight crew member’s altimeter has the current setting before commencing the final approach of an RNP AR APCH operation, including any operational limitations associated with the source(s) for the altimeter setting and the latency of checking and setting the altimeters for landing; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) use of aircraft RADAR, TAWS or other avionics systems to support the flight crew’s track monitoring and weather and obstacle avoidance; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iii) concise and complete flight crew briefings for all RNP AR APCH procedures and the important role crew resource management (CRM) plays in successfully completing an RNP AR APCH operation; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iv) the importance of aircraft configuration to ensure the aircraft maintains any mandated speeds during RNP AR APCH operations; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (v) the potentially detrimental effect of reducing the flap setting, reducing the bank angle or increasing airspeeds may have on the ability to comply with an RNP AR APCH operation; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (vi) flight crew members understand and are capable of programming and/or operating the FMC, autopilot, autothrottles, RADAR, GNSS, INS, EFIS (including the moving map), and TAWS in support of RNP AR APCH operations; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (vii) handling of TOGA to LNAV transition as applicable, particularly while in turn; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (viii) monitoring of flight technical error (FTE) and related go-around operation; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ix) handling of loss of GNSS signals during a procedure; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (x) handling of engine failure during the approach operation; |  |  |

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|  | Detaljerade referenser i OM: | TS notering: |
| (xi) applying contingency procedures for a loss of RNP capability during a missed approach. Due to the lack of navigation guidance, the training should emphasise the flight crew contingency actions that achieve separation from terrain and obstacles.  The operator should tailor these contingency procedures to their specific RNP AR APCH procedures; and |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (xii) as a minimum, each flight crew member should complete two RNP approach procedures for each duty position (pilot flying and pilot monitoring) that employ the unique RNP AR APCH characteristics of the operator’s RNP AR APCH procedures (e.g. RF legs, missed approach). One procedure should culminate in a transition to landing and one procedure should culminate in execution of an RNP missed approach procedure. |  |  |
| FLIGHT CREW TRAINING AND QUALIFICATIONS – CONVERSION TRAINING | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (d) Flight crew members should complete the following RNP AR APCH training if converting to a new type or class or variant of aircraft in which RNP AR operations will be conducted. For abbreviated courses, the provisions prescribed in (a)(2), (a)(3) and (a)(4) should apply. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) Ground training  Taking into account the flight crew member's RNP AR APCH previous training and experience, flight crew members should undertake an abbreviated ground training that should include at least the provisions of (b)(2)(D) to (I), (b)((2)(N) to (R), (b)(2)(S), and (b)(3) to (6). |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) FSTD training  The provisions prescribed in (a) should apply, taking into account the flight crew member's RNP AR APCH training and experience. |  |  |

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| FLIGHT CREW TRAINING AND QUALIFICATIONS – RNP AR APCH PROCEDURES REQUIRING A PROCEDURE-SPECIFIC APPROVAL | | |
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| (e) Before starting an RNP AR APCH procedure for which a procedure-specific approval is required,  flight crew members should undertake additional ground training and FSTD training, as appropriate. | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The operator should ensure that the additional training programmes for such procedures include as at least all of the following:  (i) the provisions of (c)(1), (c)(2)(x) as appropriate and customised to the intended operation; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) the crew training recommendations and mitigations stated in the procedure flight operational safety assessment (FOSA); and |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iii) specific training and operational provision published in the AIP, where applicable. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) Flight crew members with prior experience of RNP AR APCH procedures for which a procedure-specific approval is required may receive credit for all or part of these provisions provided the current operator’s RNP AR APCH procedures are similar and require no new pilot skills to be trained in an FSTD. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) Training and checking may be combined and conducted by the same person with regard to (f)(2). |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (4) In case of a first RNP AR APCH application targeting directly RNP AR APCH procedures requiring procedure-specific approvals, a combined initial and additional training and checking, as appropriate, should be acceptable provided the training and checking includes all provisions prescribed by (a), (b), (c), (d) as appropriate, (e) and (f). |  |  |
| FLIGHT CREW TRAINING AND QUALIFICATIONS – CHECKING OF RNP AR APCH KNOWLEDGE | | |
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| (f) Initial checking of RNP AR APCH knowledge and procedures | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The operator should check flight crew members’ knowledge of RNP AR APCH procedures prior to employing RNP AR APCH operations. As a minimum, the check should include a thorough review of flight crew procedures and specific aircraft performance requirements for RNP AR APCH operations. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) The initial check should include one of the following:  (i) A check by an examiner using an FSTD. |  |  |

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|  | Detaljerade referenser i OM: | TS notering: |
| (ii) A check by a TRE, CRE, SFE or a commander nominated by the operator during LPCs, OPCs or line flights that incorporate RNP AR APCH operations that employ the unique RNP AR APCH characteristics of the operator’s RNP AR APCH procedures. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iii) Line-oriented flight training (LOFT)/line-oriented evaluation (LOE). LOFT/LOE programmes using an FSTD that incorporates RNP AR APCH operations that employ the unique RNP AR APCH characteristics (i.e. RF legs, RNP missed approach) of the operator’s RNP AR APCH procedures. |  |  |
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| (3) Specific elements that should be addressed are: | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (i) demonstration of the use of any RNP AR APCH limits/ minimums that may impact various RNP AR APCH operations; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ii) demonstration of the application of radio- updating procedures, such as enabling and disabling ground-based radio updating of the FMC (e.g. DME/DME and VOR/DME updating) and knowledge of when to use this feature; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iii) demonstration of the ability to monitor the actual lateral and vertical flight paths relative to programmed flight path and complete the appropriate flight crew procedures when exceeding a lateral or vertical FTE limit; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (iv) demonstration of the ability to read and adapt to a RAIM (or equivalent) forecast, including forecasts predicting a lack of RAIM availability; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (v) demonstration of the proper set-up of the FMC, the weather RADAR, TAWS, and moving map for the various RNP AR APCH operations and scenarios the operator plans to implement; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (vi) demonstration of the use of flight crew briefings and checklists for RNP AR APCH operations with emphasis on CRM; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (vii) demonstration of knowledge of and ability to perform an RNP AR APCH missed approach procedure in a variety of operational scenarios (i.e. loss of navigation or failure to acquire visual conditions); |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (viii) demonstration of speed control during segments requiring speed restrictions to ensure compliance with an RNP AR APCH procedure; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (ix) demonstration of competent use of RNP AR APCH plates, briefing cards, and checklists; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (x) demonstration of the ability to complete a stable RNP AR APCH operation: bank angle, speed control, and remaining on the procedure’s centreline; and |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (xi) knowledge of the operational limit for deviation from the desired flight path and of how to accurately monitor the aircraft’s position relative to vertical flight path. |  |  |
| FLIGHT CREW TRAINING AND QUALIFICATIONS – RECURRENT TRAINING | | |
|  | | |
| (g) The operator should incorporate recurrent training that employs the unique RNP AR APCH characteristics of the operator’s RNP AR APCH procedures as part of the overall training programme. | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) A minimum of two RNP AR APCH should be flown by each flight crew member, one for each duty position (pilot flying and pilot monitoring), with one culminating in a landing and one culminating in a missed approach, and may be substituted for any required 3D approach operation. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) In case of several procedure-specific RNP AR APCH approvals, the recurrent training should focus on the most demanding RNP AR APCH procedures giving credit on the less demanding ones. |  |  |
| TRAINING FOR PERSONNEL INVOLVED IN THE FLIGHT PREPARATION | | |
|  | | |
| (h) The operator should ensure that training for flight operation officers/dispatchers should include: | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) the different types of RNP AR APCH procedures; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) the importance of specific navigation equipment and other equipment during RNP AR APCH operations and related RNP AR APCH requirements and operating procedures; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) the operator’s RNP AR APCH approvals; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (4) MEL requirements; |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (5) aircraft performance, and navigation signal availability, e.g. GNSS RAIM/predictive RNP capability tool, for destination and alternate aerodromes. |  |  |
| AMC1 SPA.PBN.105(c) PBN operational approval | | |
| FLIGHT OPERATIONAL SAFETY ASSESSMENT (FOSA) | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (a) For each RNP AR APCH procedure, the operator should conduct a flight operational safety assessment (FOSA) proportionate to the complexity of the procedure. |  |  |
|  | | |
| (b) The FOSA should be based on: | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) restrictions and recommendations published in AIPs;  (2) the flyability check;  (3) an assessment of the operational environment;  (4) the demonstrated navigation performance of the aircraft; and  (5) the operational aircraft performance. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (c) The operator may take credit from key elements from the safety assessment carried out by the ANSP or the aerodrome operator. |  |  |
| GM1 SPA.PBN.105(c) PBN operational approval | | |
| FLIGHT OPERATIONAL SAFETY ASSESSMENT (FOSA) For the information in its entirety, refer to GM1 SPA.PBN.105(c) | | |
|  | | |
| (a) Traditionally, operational safety has been defined by a target level of safety (TLS) and specified as a risk of collision of 10-7 per approach operation. For RNP AR APCH operations, conducting the FOSA methodology contributes to achieving the TLS. The FOSA is intended to provide a level of flight safety that is equivalent to the traditional TLS, but using methodology oriented to performance-based flight operations. Using the FOSA, the operational safety objective is met by considering more than the aircraft navigation system alone. The FOSA blends quantitative and qualitative analyses and assessments by considering navigation systems, aircraft performance, operating procedures, human factor aspects and the operational environment. During these assessments conducted under normal and failure conditions, hazards, risks and the associated mitigations are identified. The FOSA relies on the detailed criteria for the aircraft capabilities and instrument procedure design to address the majority of general technical, procedure and process factors. Additionally, technical and operational expertise and prior operator experience with RNP AR APCH operations are essential elements to be considered in the conduct and conclusion of the FOSA. | | |
| AMC1 SPA.PBN.105(d) PBN operational approvalOPERATIONAL CONSIDERATIONS FOR RNP AR APCH | | |
|  | | |
| (a) MEL | | |
|  | Bilaga nr: | TS notering: |
| (1) The operator’s MEL should be developed/revised to address the equipment provisions for RNP AR APCH operations. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) An operational TAWS Class A should be available for all RNP AR APCH operations. The TAWS should use altitude values that are compensated for local pressure and temperature effects (e.g. corrected barometric and GNSS altitude), and include significant terrain and obstacle data. |  |  |
|  | | |
| (b) Autopilot and flight director | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) For RNP AR APCH operations with RNP values less than RNP 0.3 or with RF legs, the autopilot or flight director driven by the area navigation system should be used. Thus, the flight crew should check that the autopilot/flight director is installed and operational. |  |  |
|  | | |
| (c) Preflight RNP assessment | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The operator should have a predictive performance capability, which can determine if the  specified RNP will be available at the time and location of a desired RNP operation. This capability can be a ground service and need not be resident in the aircraft’s avionics equipment. The operator should establish procedures requiring use of this capability as both a preflight preparation tool and as a flight-following tool in the event of reported  failures. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) This predictive capability should account for known and predicted outages of GNSS satellites or other impacts on the navigation system’s sensors. The prediction programme should not use a mask angle below 5 degrees, as operational experience indicates that satellite signals at low elevations are not reliable. The prediction should use the actual GNSS constellation with the RAIM (or equivalent) algorithm identical to or more conservative than that used in the actual equipment. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) The RNP assessment should consider the specific combination of the aircraft capability (sensors and integration), as well as their availability. |  |  |
|  | | |
| (d) NAVAID exclusion | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The operator should establish procedures to exclude NAVAID facilities in accordance with NOTAMs (e.g. DMEs, VORs, localisers). Internal avionics reasonableness checks may not be adequate for RNP operations. |  |  |
|  | | |
| (e) Navigation database currency | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) During system initialisation, the flight crew should confirm that the navigation database is current. Navigation databases should be current for the duration of the flight. If the AIRAC cycle is due to change during flight, the flight crew should follow procedures established by the operator to ensure the accuracy of navigation data. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) The operator should not allow the flight crew to use an expired database. |  |  |
| AMC2 SPA.PBN.105(d) PBN operational approvalFLIGHT CONSIDERATIONS | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (a) Modification of flight plan  The flight crew should not be authorised to fly a published RNP AR APCH procedure unless it is retrievable by the procedure name from the aircraft navigation database and conforms to the charted procedure. The lateral path should not be modified; with the exception of accepting a clearance to go direct to a fix in the approach procedure that is before the FAF and that does not immediately precede an RF leg. The only other acceptable modification to the loaded procedure is to change altitude and/or airspeed waypoint constraints on the initial, intermediate, or missed approach segments flight plan fixes (e.g. to apply temperature corrections or comply with an ATC clearance/instruction). |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (b) Mandatory equipment  The flight crew should have either a mandatory list of equipment for conducting RNP AR APCH operations or alternate methods to address in-flight equipment failures that would prohibit RNP AR APCH operations (e.g. crew warning systems, quick reference handbook). |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (c) RNP management  Operating procedures should ensure that the navigation system uses the appropriate RNP values throughout the approach operation. If the navigation system does not extract and set the navigation accuracy from the on-board navigation database for each segment of the procedure, then operating procedures should ensure that the smallest navigation accuracy required to complete the approach or the missed approach is selected before initiating the approach operation (e.g. before the IAF). Different IAFs may have different navigation accuracy, which are annotated on the approach chart. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (d) Loss of RNP  The flight crew should ensure that no loss of RNP annunciation is received prior to commencing the RNP AR APCH operation. During the approach operation, if at any time a loss of RNP annunciation is received, the flight crew should abandon the RNP AR APCH operation unless the pilot has in sight the visual references required to continue the approach operation. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (e) Radio updating  Initiation of all RNP AR APCH procedures is based on GNSS updating. The flight crew should comply with the operator’s procedures for inhibiting specific facilities. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (f) Approach procedure confirmation  The flight crew should confirm that the correct procedure has been selected. This process includes confirmation of the waypoint sequence, reasonableness of track angles and distances, and any other parameters that can be altered by the flight crew, such as altitude or speed constraints. A navigation system textual display or navigation map display should be used. |  |  |
|  | | |
| (g) Track deviation monitoring | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The flight crew should use a lateral deviation indicator, flight director and/or autopilot in lateral navigation mode on RNP AR APCH operations. The flight crew of an aircraft with a lateral deviation indicator should ensure that lateral deviation indicator scaling (full-scale deflection) is suitable for the navigation accuracy associated with the various segments of the RNP AR APCH procedure. The flight crew is expected to maintain procedure centrelines, as depicted by on-board lateral deviation indicators and/or flight guidance during the entire RNP AR APCH operations unless authorised to deviate by ATC or demanded under emergency conditions. For normal operations, cross-track error/deviation (the difference between the area-navigation-system-computed path and the aircraft position relative to the path) should be limited to the navigation accuracy (RNP) associated with the procedure segment. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) Vertical deviation should be monitored above and below the glide-path; the vertical deviation should be within ±75 ft of the glide-path during the final approach segment. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) Flight crew should execute a missed approach operation if:  (i) the lateral deviation exceeds one time the RNP value; or  (ii) the deviation below the vertical path exceeds 75 ft or half-scale deflection where angular deviation is indicated, at any time; or  (iii) the deviation above the vertical path exceeds 75 ft or half-scale deflection where angular deviation is indicated; at or below 1 000 ft above aerodrome level; unless the pilot has in sight the visual references required to continue the approach operation. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (4) Where a moving map, low-resolution vertical deviation indicator (VDI), or numeric display of deviations are to be used, flight crew training and procedures should ensure the effectiveness of these displays. Typically, this involves demonstration of the procedure with a number of trained flight crew members and inclusion of this monitoring procedure in the recurrent RNP AR APCH training programme. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (5) For installations that use a CDI for lateral path tracking, the AFM should state which navigation accuracy and operations the aircraft supports and the operational effects on the CDI scale. The flight crew should know the CDI full-scale deflection value. The avionics may automatically set the CDI scale (dependent on phase of flight) or the flight crew may manually set the scale. If the flight crew manually selects the CDI scale, the operator should have procedures and training in place to assure the selected CDI scale is appropriate for the intended RNP operation. The deviation limit should be readily apparent given the scale (e.g. full-scale deflection). |  |  |
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| (h) System cross-check | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The flight crew should ensure the lateral and vertical guidance provided by the navigation system is consistent. |  |  |
|  | | |
| (i) Procedures with RF legs | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) When initiating a missed approach operation during or shortly after the RF leg, the flight crew should be aware of the importance of maintaining the published path as closely as possible. Operating procedures should be provided for aircraft that do not stay in LNAV when a missed approach is initiated to ensure the RNP AR APCH ground track is maintained. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) The flight crew should not exceed the maximum airspeed values shown in Table 1 throughout the RF leg. For example, a Category C A320 should slow to 160 KIAS at the FAF or may fly as fast as 185 KIAS if using Category D minima. A missed approach operation prior to DA/H may require compliance with speed limitation for that segment. |  |  |
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|  | Detaljerade referenser i OM: | TS notering: |
| (j) Temperature compensation  For aircraft with temperature compensation capabilities, the flight crew may disregard the temperature limits on RNP procedures if the operator provides pilot training on the use of the temperature compensation function. It should be noted that a temperature compensation by the system is applicable to the VNAV guidance and is not a substitute for the flight crew compensating for temperature effects on minimum altitudes or DA/H. The flight crew should be familiar with the effects of the temperature compensation on intercepting the compensated path as described in EUROCAE ED-75C/RTCA DO-236C Appendix H. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (k) Altimeter setting  Due to the performance-based obstruction clearance inherent in RNP instrument procedures, the flight crew should verify that the most current aerodrome altimeter is set prior to the FAF. The operator should take precautions to switch altimeter settings at appropriate times or locations and request a current altimeter setting if the reported setting may not be recent, particularly at times when pressure is reported or expected to be rapidly decreasing. Execution of an RNP operation necessitates the current altimeter setting for the aerodrome of intended landing. Remote altimeter settings should not be allowed. |  |  |
|  | | |
| (l) Altimeter cross-check | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) The flight crew should complete an altimetry cross-check ensuring both pilots’ altimeters agree within 100 ft prior to the FAF but no earlier than when the altimeters are set for the aerodrome of intended landing. If the altimetry cross-check fails, then the approach operation should not be continued. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) This operational cross-check should not be necessary if the aircraft systems automatically compare the altitudes to within 75 ft. |  |  |
|  | | |
| (m) Missed approach operation  Where possible, the missed approach operation should necessitate RNP 1.0. The missed approach portion of these procedures should be similar to a missed approach of an RNP APCH procedure. | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) In many aircraft, executing a missed approach activating take-off/go-around (TOGA) may cause a change in lateral navigation. In many aircraft, activating TOGA disengages the autopilot and flight director from LNAV guidance, and the flight director reverts to trackhold derived from the inertial system. LNAV guidance to the autopilot and flight director should be re-engaged as quickly as possible. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) Flight crew procedures and training should address the impact on navigation capability and flight guidance if the pilot initiates a missed approach while the aircraft is in a turn. When initiating an early missed approach operation, the flight crew should follow the rest of the approach track and missed approach track unless a different clearance has been issued by ATC. The flight crew should also be aware that RF legs are designed based on the maximum true airspeed at normal altitudes, and initiating an early missed approach operation will reduce the manoeuvrability margin and potentially even make holding the turn impractical at missed approach speeds. |  |  |
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| (n) Contingency procedures | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) Failure while en route  The flight crew should be able to assess the impact of GNSS equipment failure on the anticipated RNP AR APCH operation and take appropriate action. |  |  |

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|  | Detaljerade referenser i OM: | TS notering: |
| (2) Failure on approach  The operator’s contingency procedures should address at least the following conditions:  (i) failure of the area navigation system components, including those affecting lateral and vertical deviation performance (e.g. failures of a GPS sensor, the flight director or autopilot);  (ii) loss of navigation signal-in-space (loss or degradation of external signal). |  |  |
| AMC3 SPA.PBN.105(d) PBN operational approvalNAVIGATION DATABASE MANAGEMENT | | |
|  | | |
| (a) The operator should validate every RNP AR APCH procedure before using the procedure in instrument meteorological conditions (IMC) to ensure compatibility with their aircraft and to ensure the resulting path matches the published procedure. As a minimum, the operator should: | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (1) compare the navigation data for the procedure(s) to be loaded into the FMS with the published procedure. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (2) validate the loaded navigation data for the procedure, either in an FSTD or in the actual aircraft in VMC. The depicted procedure on the map display should be compared to the published procedure. The entire procedure should be flown to ensure the path is flyable, does not have any apparent lateral or vertical path disconnects and is consistent with the published procedure. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (3) Once the procedure is validated, a copy of the validated navigation data should be retained for comparison with subsequent data updates. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (4) For published procedures, where FOSA demonstrated that the procedure is not in a challenging operational environment, the flight or FSTD validation may be credited from already validated equivalent RNP AR APCH procedures. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (b) If an aircraft system required for RNP AR APCH operations is modified, the operator should assess  the need for a validation of the RNP AR APCH procedures with the navigation database and the modified system. This may be accomplished without any direct evaluation if the manufacturer verifies that the modification has no effect on the navigation database or path computation. If no such assurance from the manufacturer is available, the operator should conduct initial data validation with the modified system. |  |  |

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|  | Detaljerade referenser i OM: | TS notering: |
| (c) The operator should implement procedures that ensure timely distribution and insertion of current and unaltered electronic navigation data to all aircraft that require it. |  |  |
| AMC1 SPA.PBN.105(e) PBN operational approvalREPORTABLE EVENTS | | |
|  | Detaljerade referenser i OM: | TS notering: |
| The operator should report events which are listed in AMC2 ORO.GEN.160. |  |  |
| AMC1 SPA.PBN.105(f) PBN operational approvalRNP MONITORING PROGRAMME | | |
|  | Detaljerade referenser i OM: | TS notering: |
| (a) The operator approved to conduct RNP AR APCH operations, should have an RNP monitoring programme to ensure continued compliance with applicable rules and to identify any negative trends in performance. |  |  |
|  | Bilaga nummer: | TS notering: |
| (b) During an interim approval period, which should be at least 90 days, the operator should at least submit the following information every 30 days to the competent authority.  (1) Total number of RNP AR APCH operations conducted;  (2) Number of approach operations by aircraft/ system which were completed as planned without any navigation or guidance system anomalies;  (3) Reasons for unsatisfactory approaches, such as:  (i) UNABLE REQ NAV PERF, NAV ACCUR DOWNGRAD, or other RNP messages during approaches;  (ii) excessive lateral or vertical deviation;  (iii) TAWS warning;  (iv) autopilot system disconnect;  (v) navigation data errors; or  (vi) flight crew reports of any anomaly;  (4) Flight crew comments. |  |  |
|  | Detaljerade referenser i OM: | TS notering: |
| (c) Thereafter, the operator should continue to collect and periodically review this data to identify potential safety concerns, and maintain summaries of this data. |  |  |