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**Approval of Egyptian Operators and Aircraft to Operate in Oceanic
Airspace where Required Navigation Performance 10 (R-10) Is Required**

EAC91.10.1 Purpose.

The purpose of this circular is to provide the requirements for obtaining operational approval of Required Navigation Performance 10 (RNP-10) capability. Guidance on airworthiness, continuing airworthiness, and RNP-10 operational approval are provided. This circular enables an applicant to be approved as capable of meeting the navigation element requirements when RNP-10 is specified.

EAC91.10.3 Related ECARs Sections

(a) ECAR 91.703 and 91.704.
(b) ECAR 121, Appendix G.

EAC91.10.5 Definitions

(a) RNP-10 group aircraft. For aircraft to be considered as members of a group for purposes of RNP-10 approval, they should satisfy the following conditions:

(1) Aircraft should have been manufactured to a nominally identical design and approved by the same Type Certificate (TC), TC amendment, or supplemental TC (STC), as applicable.

(2) The navigation system installed on each aircraft to meet the minimum RNP-10 approval should be manufactured to the manufacturer's same specifications and have the same part numbers.

(3) Where approval is sought for an aircraft group, the data package must contain the following information:

(i) A list of the aircraft group to which the data package applies.

(ii) A list of the routes to be flown and the maximum estimated time in navigation from alignment to the time in which the flight will leave Class II navigation airspace.

(iii) The compliance procedures to be used to ensure that all aircraft submitted for approval meet RNP-10 navigation capabilities for the RNP-10 approved time duration.

(iv) The engineering data to be used to ensure continued in-service RNP-10 capability for the RNP-10 approved time duration.

Note: Aircraft which have INS/IRU's which are of a different manufacturer or part number may be considered part of the group, if it is demonstrated that this navigation equipment provides equivalent navigation performance.

(b) RNP-10 non-group aircraft. An aircraft for which the operator applies for approval on the characteristics of the unique airframe and navigation system used rather than on a group basis.

EAC91.10.7 Related reading materials

(a) ICAO Doc. 7030/4 Regional Supplementary Procedures.
(b) ICAO Doc.9613-AN/937 Manual on Required Navigation Performance (RNP) types.
(c) FAA Order 8400.12A Required Navigation Performance 10 (RNP-10) Operational Approval.   .

EAC91.10.1.7 Background

(a) States and operators are beginning implementation of RNP as part of a worldwide ICAO effort to implement the Future Air Navigation Systems (FANS), Communication/Navigation/Surveillance (CNS) and Air Traffic Management (ATM) concept. To support this effort, the Informal Pacific Air Traffic Service Coordination Group (IPACG) has developed plans to implement 50 Nautical Mile (NM) lateral separation on the North Pacific (NOPAC) and Central East Pacific (CEPAC) routes based on approval of an RNP-10 capability for the total route of the flight. In accordance with ICAO coordinated regional agreements, operators will be required to obtain approval to the RNP-10 criteria, or equivalent criteria developed by the operator's state of registry. This performance capability requirement is similar to the existing Minimum Navigation Performance Specification (MNPS) over the Atlantic.

(b) Following the implementation of 50 NM lateral separation based upon an RNP-10 capability, additional separation reductions based on more stringent parameters will be implemented. The implementation of more stringent RNP capability, as well as other CNS elements, is part of a worldwide ICAO coordinated effort to improve ATM and CNS services. This first step is necessary to provide early benefits to users in terms of efficient use of airspace, more optimum routings, reduced delay, increased traffic flow capacity, increased flexibility, reduced costs, appropriately adjusted aircraft to aircraft separation standards and increased safety.

EAC91.10.9 Approval process for RNP-10

(a) Operators under (ECAR91&121) should submit an application to the FSSS in the form and manner prescribed by the ECASA. Each operator must submit his application at least 30 days before the date of intended operation along with the following:

(1) Eligibility airworthiness documents. Sufficient documentation should be available to establish that the aircraft has an appropriate AFM, AFM Supplement (AFMS), if applicable, and is otherwise suitably qualified to fly the intended routes (e.g., long-range navigation, communication).

(2) Description of aircraft equipment to be used for RNP-10.

(3) RNP-10 time limit for inertial Navigation Systems (INS) or Inertial Reference Units (IRU) (if applicable).

(4) Operational training programs and operating practices and procedures. (refer to the appendix of this circular)

(5) Operational manuals and checklists:

(i) ECAR121 operators. The appropriate manuals and checklists should be revised to include information/guidance on standard operating procedures detailed in appendix of this circular.

(ii) ECAR91 operators. An airplane flight manual and required supplements should be submitted with the approval package .

(6) Operating history that identifies relevant past problems and incidents, if any, related to Class II navigation errors for that operator and action taken to correct the situation.

(7) Minimum Equipment List (MEL) updates.

(8) Maintenance program updates.

(9) Procedures necessary for follow up action after navigation error reports, and the potential for removal of RNP-10 operating authority.

(b) To obtain operational approval, aircraft eligibility must be determined, appropriate crew procedures for the navigation systems to be used must be identified by the applicant (e.g., Class II Nav procedures); and database use and operating procedures must be evaluated, if applicable. Then appropriate operations specifications for ECAR 121 operators or a Letter of Authorization (LOA) for ECAR 91 operators may be issued by ECASA.

EAC91.10.11 RNP-10 Navigation capabilities requirements

(a) All aircraft operating in RNP-10 airspace shall have a 95% cross-track error of less than 10 NM. This includes positioning error, flight technical error (FTE), path definition error and display error. All aircraft shall also have a 95% along-track positioning error of less than 10 NM.

Note: For RNP-10 approval, navigation positioning error is considered the dominant contributor to cross-track and along-track error. Flight technical error, path definition error, and display error are considered to be insignificant for the purposes of RNP-10 approval. (RNP-10 is intended for oceanic and remote areas where aircraft separation minima, on the order of 50 NM, are applied.)

(b) At least one of the following navigation system configurations listed below must be installed and operational:

(1) At least two independent inertial navigation system (INS) approved for RNP-10.

(2) At least two flight management system/navigation sensor combinations (or equivalent) approved for RNP-10.

(3) At least two independent approved GPS navigation systems acceptable for primary means of Class II navigation in oceanic and remote areas.

(4) At least two approved independent LRNS from the list below that are acceptable for RNP-10:
(i) Inertial navigation system.
(ii) Flight management system/navigation sensor combination (or equivalent).
(iii) GPS navigation system approved for Class II navigation in oceanic and remote areas.

EAC91.10.13 RNP-10 aircraft eligibility.

(a) Aircraft eligibility through RNP certification (Eligibility Group 1). Group 1 aircraft are those that have obtained formal certification and approval of RNP in the aircraft.

(1) RNP compliance is documented in the AFM, and is typically not limited to RNP-10. The AFM will address RNP levels that have been demonstrated and any related provisions applicable to its use (e.g., NAVAID sensor requirements). Operational approval of Group 1 aircraft will be based upon the performance stated in the AFM.

(2) An airworthiness approval specifically addressing RNP-10 performance may be obtained by the manufacturer. A statement should be added in the AFM to identify any associated changes related to the performance of navigation equipment.

(b) Aircraft Eligibility through prior navigation system certification (Eligibility Group 2). Group 2 aircraft are those that can equate their certified level of performance, under previous standards, to the RNP-10 criteria. In this case, the operator should provide the FSSS with the navigation system make, model and part number, evidenced from the manufacturer of meeting RNP-10 criteria.

(c) Obtaining approval for an extended time limit for INS or IRU systems. The baseline RNP-10 time limit for INS and IRU systems after the system is placed in the navigation mode is 6.2 hours. This time limit may be extended by one of the following methods:

(1) An extended time limit may be established when RNP is integrated into the aircraft navigation system through a formal certification process (as described in paragraph 8a).

(2) When an INS or IRU has been approved using an existing approval standard, an extended time limit may be established by an applicant presenting justifying data to FSSS.

(d) Effect of en route updates. Operators may extend their RNP-10 navigation capability time by updating. Approvals for various updating procedures are based upon the baseline for which they have been approved minus the time factors shown below:

(1) Automatic updating using DME/DME = Baseline minus 0.3 hours (e.g., an aircraft that has been approved for 6.2 hours can gain 5.9 hours following an automatic DME/DME update).

(2) Automatic updating using DME/VOR = Baseline minus 0.5 hours.

(3) Manual updating using a method approved by the FSSS = Baseline minus one hour.

(e) Conditions under which automatic radio position updating may be considered as acceptable for flight in airspace where RNP-10 is required. Automatic updating is considered to be any updating procedure that does not require crews to manually insert coordinates. Automatic updating may be considered acceptable for operations in airspace where RNP-10 is applied provided that:

(1) Procedures for automatic updating are included in an operator's training program.

(2) Crews are knowledgeable of the updating procedures and of the effect of the update on the navigation solution.

(3) An acceptable procedure for automatic updating may be used as the basis for an RNP-10 approval for an extended time as indicated by data presented to the FSSS. This data must present a clear indication of the accuracy of the update and the effect of the update on the navigation capabilities for the remainder of the flight.

(f) Conditions under which manual radio position updating may be considered as acceptable for flight in airspace where RNP-10 is required. If manual updating is not specifically approved, manual position updates are not permitted in RNP-10

operations. Manual radio updating may be considered acceptable for operations in airspace where RNP-10 is applied provided that:

(1) Procedures for manual updating are reviewed by FSSS on a case-by-case basis.

(2) The operator shows that updating procedures and training contain measures for cross checking to prevent operational errors and that the crew qualification curriculum is found to provide effective pilot training.

(3) The operator provides data that establishes the accuracy with which the aircraft navigation system can be updated using manual procedures and representative navigation aids. Data should be provided that shows the update accuracy achieved in in-service operations. This factor must be considered when establishing the RNP-10 time limit for INS's or IRU's. (See paragraph 8d.)

EAC91.10.15 MEL

Operators should make MEL adjustments specifying any new required dispatch conditions.

EAC91.10.17 Continuing airworthiness (maintenance requirements).

All Aircraft RNP-10 operation should have an established maintenance program for the individual navigation systems. For others installing navigation systems, the operator will submit those changes appropriate to their existing maintenance manual for review and acceptability.

EAC91.10.19 Operational requirements

(a) Navigational Performance. All aircraft shall meet a track keeping accuracy equal to or better than ± 10 NM for 95% of the flight time in RNP-10 airspace. All aircraft shall meet along - track positioning accuracy of ± 10 NM for 95% of the flight time in RNP-10 airspace.

(b) Navigation Equipage. All aircraft RNP-10 operation in oceanic and remote areas shall have at least dual carriage of navigation systems of integrity such that the navigation system does not provide misleading information.

(c) Flight plan designation. Operators should use the appropriate flight plan designation specified for the RNP-10 route flown. The letter "R" should be placed in Block 10 of the ICAO flight plan to indicate that the pilot has reviewed the planned route of flight to determine RNP-10 requirements and the aircraft and operator have been approved by the ECASA to operate in areas or on routes where RNP-10 is a requirement for operation.

(d) Availability of NAVAIDs. At dispatch or during flight planning, the operator should ensure that adequate navigation aids, if required, are available en route to enable the aircraft to navigate to RNP-10.

(e) Route evaluation for RNP-10 time limits for aircraft equipped with only INS's or IRU's. As detailed in paragraph 8d, effects of en route updates, an RNP-10 time limit must be established for aircraft equipped only with INS's or IRU's to meet the RNP-10 accuracy requirement. When planning operations in areas where RNP-10 is applied, the operator must evaluate its intended route(s) of flight in relation to the RNP-10 time limit. In making this evaluation, the operator must consider the effect of headwinds. The operator may choose to make this evaluation on a one time basis (75% probability wind components) or on a per flight basis.

EAC91.10.21Removal of RNP-10 authorization:

The ECASA may revoke an RNP-10 authorization, if the ECASA determines that the operator is not complying, or is unable to comply with the requirements of this circular.

APPENDIX
Training Programs and Operating Practices and Procedures

EAC91.10.23 Introduction

The following items (detailed in paragraphs 2 through 5) should be standardized and incorporated into training programs and operating practices and procedures. Certain items may already be adequately standardized in existing operator programs and procedures. New technologies may also eliminate the need for certain crew actions. If this is found to be the case, then the intent of this appendix can be considered to be met.

EAC91.10.25 Flight planning

During flight planning, the cockpit crew should pay particular attentions to conditions which may affect operations in RNP-10 airspace (or on RNP-10 routes). These include, but may not be limited to:

(a) Verifying that the aircraft is approved for RNP-10 operations;

(b) That the RNP-10 time limit has been accounted for(see paragraph 11);

(c) Verify that the letter "R" is annotated in Block 10 (Equipment) of the ICAO flight plan;

(d) The requirements for GPS, if appropriate for the operation; and

(e) If required for a specific navigation system, accounting for any operating restriction related to RNP-10 approval.

EAC91.10.27 Preflight procedures at the Aircraft for each flight.

The following actions should be completed during preflight:

(a) Review maintenance logs and forms to ascertain the conditions of equipment required for flight in RNP-10 airspace or on an RNP-10 route. Ensure the maintenance action has been taken to correct defects to required equipment.

(b) During the external inspection of aircraft, particular attention should be paid to the condition of navigation antenna and the condition of the fuselage skin in the vicinity of each of these antenna (this check may be accomplished by a qualified and authorized person other than the pilot, e.g., a flight engineer or maintenance personnel).

(c) Emergency procedures for operations in RNP-10 airspace or on RNP-10 routes are no different than normal oceanic emergency procedures with one exception, crews must be able to recognize and ATC advised when the aircraft is no longer able to navigate to its RNP-10 approval capability.

EAC91.10.29 En route.

(a) At least, two long-range navigation systems capable of navigating to the RNP should be operational at the oceanic entry point. If this is not the case, then the pilot should consider an alternate routing which does not require that equipment or diverting for repairs.

(b) Before entering oceanic airspace, the aircraft's position should be checked as accurately as possible by using external Navigation Aids (NAVAIDs). This may require distance measuring equipment DME/DME and/or DME/VHF omni-directional (VOR) checks to determine navigation system errors through displayed and actual positions. If the system is updated, the proper procedures should be followed with the aid of a prepared checklist.

(c) Operator in-flight operating drills shall include mandatory cross checking procedures to identify navigation errors in sufficient time to prevent aircraft from inadvertent deviation from ATC cleared routes.

(d) Crews shall advise ATC of any deterioration or failure of the navigation equipment below the navigation performance requirements or of any deviations required for a contingency procedure.

EAC91.10.31 Crew knowledge.

(a) Commercial Operators should ensure that crews have been trained to ensure that they are knowledgeable of the topics contained in this order, limits of their RNP-10 navigation capabilities, effects of updating and RNP-10 contingency procedures.

(b) ECAR 91 operators should show the ECASA that pilots are knowledgeable on RNP-10 operations. The intent is for an applicant for RNP-10 authorization to show the ECASA that crew members are knowledgeable on the material contained in this circular.