

TEL
(562) 2904677/4678/4680

AFTN: SCSCYOYX

aischile@dgac.cl

www.dgac.cl

www.aipchile.cl

CHILE



AIC

AIP VOLUMEN I

NR 5

**DATE OF
PUBLICATION**

25 AUG 2011

Dirección General de Aeronáutica Civil
Departamento Aeródromos y Servicios Aeronáuticos
Subdepartamento Servicios de Tránsito Aéreo
Sección AIS/MAP - Oficina Publicaciones AIS
Dirección Comercial - Postal / *Commercial-Postal Address*
San Pablo 8381- Código Postal - 9020558 Pudahuel
Santiago - Chile

IMPLEMENTATION OF RNAV 5 ROUTES IN CONTINENTAL AIRSPACE OF CHILE

1.- PURPOSE

1.1 The purpose of this Aeronautical Information Circular (AIC) is to provide information about the implementation of RNAV 5 routes in continental airspace within the boundaries of the Flight Information Regions (FIR) of Antofagasta, Santiago, Puerto Montt and Punta Arenas as of 20 October 2011, as a way to encourage the participation of stakeholders, specifically:

- a) Aircraft operators;
- b) Air traffic service providers;
- c) Airspace management units;

1.2 The publication of this AIC does not preclude other dissemination activities, such as the development of supplements or amendments to the Aeronautical Information Publication (AIP – CHILE) or the issuance of specific regulations concerning RNAV 5 implementation.

2. INTRODUCTION

2.1 The continuous growth of civil aviation increases airspace demand, highlighting the need for an optimum use of available airspace. The enhanced operational efficiency resulting from the application of area navigation (RNAV) techniques has led to the development of navigation applications for all flight phases.

2.2 Navigation application specifications for specific routes or airspaces must be clearly defined in order to ensure that pilots and air traffic controllers (ATCs) are aware of the capabilities of the aircraft RNAV system in order to determine that the performance of the aircraft system is appropriate for airspace requirements.

2.3 RNAV systems have evolved in a way similar to conventional ground-based routes and procedures, in which a specific RNAV system was identified and performance assessed through analysis and in-flight inspection. However, airspace and obstacle clearance criteria were developed based on the performance of the available equipment, even getting to the point of identifying certain equipment models to be used in a given airspace.

2.4 Consequently, *prescriptive* requirement specifications were established, which, in turn, delayed the use of the new RNAV capabilities and generated higher maintenance and certification costs. Within this context, ICAO developed the Performance-Based Navigation (PBN) concept to avoid this type of prescriptive specifications and to enable the definition of aircraft equipment requirements, specifying primarily performance requirements.

2.5 The PBN concept specifies RNAV system performance requirements in terms of the accuracy, integrity, availability, continuity and functionality required for the operations proposed within the framework of a particular airspace concept. In summary, the PBN concept represents a change from system-based navigation to performance-based navigation.

2.6 The RNAV 5 navigation specification has been developed by ICAO to be used in en-route operations within the coverage of ground- or space-based navigation aids, or within the capacity limitations of stand-alone aids, or a combination of both.

2.7 The RNAV 5 specification does not require pilot alerting in case of blunder navigation errors, nor two RNAV systems; therefore, the potential loss of RNAV capability requires that the aircraft be provided with an alternate source of navigation.

2.8 The level of performance selected for RNAV 5 operations permits the approval of a broad range of RNAV systems for these operations, including INS inertial systems, with a 2-hour limit after their last position alignment update conducted on the ground in the absence of an automatic aircraft position radio update function.

2.9 Although the RNAV 5 specification does not require in-flight performance control and alert function, the on-board equipment must maintain a lateral and longitudinal navigation precision of + / - 5 NM or better, 95% of the total flight time.

2.10 ICAO Manual on Performance-Based Navigation (Doc. 9613) establishes various navigation specifications that can be applied on a global basis. According to air traffic characteristics in the South American Region, RNAV 5 is the most appropriate for en-route operations, since approval requirements will allow most RNAV-equipped aircraft to meet approval requirements.

2.11 Accordingly, the purpose of RNAV 5 implementation is to optimise the use of aircraft RNAV capability as soon as possible, without the need for most aircraft to make significant changes on airborne equipment.

3. Benefits of RNAV 5

3.1 RNAV 5 operations provide potential advantages and benefits over conventional ground-based operations. RNAV 5 benefits cover aspects such as safety, ATC and air traffic flow management (ATFM), and economic and environmental considerations, amongst others.

3.2 Airspace capacity can be increased, not only en route but also in terminal areas, through the implementation of more direct routes that do not require flying over radio aids, and through the establishment of parallel routes to address traffic demand. Accordingly, airspace can be used more efficiently through a more flexible structuring of the ATS route network, the establishment of shorter and more direct routes, together with parallel or dual routes, routes designed so that aircraft overfly high-density terminal areas, and alternate or contingency routes to meet the needs of the user community.

3.3 The potential reduction in the tracking required by ATC to ensure that aircraft maintain the course or the assigned levels/altitudes, the reduction of controller/pilot RTF communications, and the increase in the time available for conflict resolution lead to a reduction in the workload of both the controller and the pilot.

3.4 From an economic point of view, shorter and more direct routes reduce fuel consumption, resulting in cost savings. Operators can take advantage of this reduction to increase payload. Furthermore, the implementation of RNAV 5 results in a more efficient management of ground-based radio aids and a better planning of infrastructure. RNAV 5 equipment permits a better maintenance of the course, which leads to reduced fuel consumption and pollution, resulting in a positive environmental impact.

4.- DEFINITIONS AND ABBREVIATIONS

For purposes of this circular, the definitions and abbreviations contained in DGAC DAN 06 23, "Aprobación de Explotadores Nacionales para Operar en Rutas o Espacio Aéreo RNAV 5" apply.

5.- SCOPE

5.1 RNAV 5 will be applied on all RNAV routes within the continental airspace within the boundaries of the Antofagasta, Santiago, Puerto Montt and Punta Arenas FIR, with the exception of those routes declared with another navigation specification. Routes specified as RNAV 5, contained in national airspace, can be flown exclusively by operators whose aircraft have an operational authorization issued by their ANS for RNAV 5 operations that consider GNSS and / or INS/IRS sensors.

5.2 Without detriment to that stated in 7.2 and 7.7.5, the DGAC will not grant exemptions to the authorisation required to operate on RNAV 5 routes. Consequently, civil aircraft operators are urged to begin the corresponding approval process with the DGAC so that they will not be prevented from using such routes as of 20 October 2011.

6.- AIRWORTHINESS AND OPERATIONAL APPROVAL

6.1 A commercial operator will be authorized to fly specified RNAV-5 routes within national continental airspace only when he is granted with the corresponding operational authorization issued by their State AAC.

6.2 National operators must request DGAC operational authorization to operate in RNAV 5 routes, showing the accomplishment of the operational and technical requisites established in the DAN 06 23.

6.3 Foreign operators wanting to operate in specified RNAV-5 routes within national continental airspace must show appropriate authorization by presenting their operative specifications issued by their State CAA.

6.4 For general aviation operators, the required authorization will be the one issued by their State of registry CAA. For aircraft registered in Chile, this authorization will be issued by DGAC once the operator shows accomplishment with the operational and technical requirements established in DAN 06 23.

7.- PROCEDURES

7.1 In national continental airspace, except as stated in 7.2, only aircraft approved for RNAV 5 operations (airworthiness and operations approval) issued by their correspondent CAA, considering the GNSS and/or INS/IRS sensors, will be able to file flight plans for ATS routes designated as RNAV 5, as specified in AIP- Chile Volume I.

7.2 State aircraft, aircraft conducting SAR missions, humanitarian and maintenance or first delivery flights and those aircraft following DGAC DAP 11-114 "Operación de Aeronaves que efectúa vuelos de Sanidad y/o Asistencia", do not require RNAV 5 authorisation. The conditions for filing flight plans are those described in item 7.7.5.

7.3 Aircraft previously authorized as stated in item 6., operating on RNAV 5 routes will be equipped at least with on-board RNAV equipment that meets an en-route lateral and longitudinal navigation precision of ± 5 NM ($\pm 9,26$ KM) 95% of the total flight time.

7.4 Before starting an operation on an RNAV 5 route, the proper operation of the on-board RNAV system will be verified, including:

- a) A revision of records and forms, to make sure that maintenance has been performed in order to correct equipment defects;
- b) A revision of database validity (current AIRAC cycle), if installed.
- c) A revision of the approved flight plan, comparing charts or other applicable resources with the navigation system text display and aircraft display, if applicable. The exclusion of specific navigation aids, if applicable, shall be confirmed.

7.5 When operating on an RNAV 5 route, the proper operation of the on-board RNAV system will be verified, including confirmation:

- a) That the equipment required for RNAV 5 operation has not been degraded during the flight;
- b) That the route is consistent with the authorisation.
- c) Through cross-checks, that the aircraft navigation precision is appropriate for RNAV 5 operation;
- d) Other navigation aids shall be selected to permit a cross-check or immediate reversal in case of loss of RNAV capability;

7.6 If the ATC assigns a course that takes the aircraft off the route, the pilot shall not modify the flight plan in the RNAV system until cleared to go back to the route or until the ATC confirms a new authorisation. While the aircraft is not on the designated RNAV route, the specified precision requirement does not apply.

7.7.1 Flight Planning

7.7.1 An R will be inserted in box 10 (Equipment) of the flight plan to indicate that the aircraft meets the RNAV 5 specification prescribed for the route, and that the operator has obtained an authorisation as prescribed in item 6, and can meet the conditions of said authorisation. Likewise, box 18 will contain a description of the type of RNAV equipment installed on board as stated in 7.7.2

7.7.2 NAV/ will be inserted in box 18 of the flight plan, followed by the corresponding navigation specification code(s), in accordance with its operational authorization, according to the following table:

Code	Navigation Specification
B1	RNAV 5 - All sensors permitted
B2	RNAV 5 - GNSS
B3	RNAV 5 - DME/DME
B4	RNAV 5 - VOR/DME
B5	RNAV 5 - INS or IRS

7.7.3 When an aircraft of an operator with an RNAV 5 approval according to item 6 hereof has a failure or degradation prior to departure that prevents it from complying with the prescribed RNAV functionality and accuracy requirements, the operator will not insert the letter R in box 10 of the flight plan. For a flight operation based on an RPL, the latter will be cancelled and an appropriate new flight plan will be filed.

7.7.4 State aircraft, aircraft conducting SAR missions, humanitarian, and maintenance or first delivery flights and those aircrafts following DGAC DAP 11-114, that do not have RNAV approval can file flight plans for operations on RNAV routes. These aircraft must complete box 18 by inserting, RMK/NONRNAV10 and/or RMK/NONRNAV5. These aircraft must fill item 18 including after STS/ the reason for the special treatment; for example STATE, HUM, SAR, MAINT and DELIVERY.

7.7.5 Operators filing repetitive flight plans (RPL) will insert in box Q of the RPL all information concerning navigation equipment and capabilities, in keeping with box 10 of the flight plan. This includes the indicators and designators that describe the level of PBN approval granted to the operator.

7.8 Contingency Procedures

7.8.1 Regarding the in-flight degradation or failure of the RNAV system when the aircraft is on an ATS route designated as RNAV 5:

- a) The aircraft will be authorised to fly on the ATS routes defined with conventional navigational aids; or
- b) When the aforementioned procedures are not available, the ATC unit will provide the aircraft, whenever possible, with radar vectoring until the aircraft can resume its own navigation.
Note.- Aircraft authorised to fly according to a) or b) may request, whenever possible, radar surveillance by the corresponding ATC unit.

7.8.2 ATC measures with respect to an aircraft that cannot meet RNAV requirements due to failure or degradation of the RNAV system will depend on the nature of the reported failure and general traffic conditions. In many cases, operations may continue according to the current ATC clearance. When this is not possible, a revised clearance can be requested, as specified in 7.8.1, in order to fly on the ATS routes defined with conventional navigational aids.

7.9 PHRASEOLOGY

RNAV 5

<i>Circumstances</i>	<i>Fraseología</i>	<i>Phraseology</i>
Inform the ATC on degrading or RNAV failure.	<i>*(distintivo de llamada de aeronave) IMPOSIBLE RNAV DEBIDO A EQUIPO</i>	<i>*(aircraft call sign) UNABLE RNAV DUE EQUIPMENT</i>
Informa the ATC that there is no RNAV capacity.	<i>*(distintivo de llamada de aeronave) RNAV NEGATIVO</i>	<i>*(aircraft call sign) NEGATIVE RNAV</i>
<i>* Indicating a transmission from pilot.</i>		

8.- RELATED DOCUMENTS

- DGAC. DAN 06-23. Aprobación de Explotadores Nacionales para Operar en Rutas o Espacio Aéreo RNAV 5.
- DGAC DAP 11-114 “Operación de Aeronaves que efectúa vuelos de Sanidad y/o Asistencia.”
- ICAO Annex 6 - Operation of Aircraft
- ICAO Document 9613 - Manual on Performance-Based Navigation (PBN)
- ICAO Document 7030 - Regional Supplementary Procedures
- Document 7300 - Convention on International Civil Aviation
- Advisory Circular SRVSOP CA 91-002 (or CAA equivalent)

9.- ADDITIONAL INFORMATION

Additional information can be obtained through the following contacts:

- Dirección General de Aeronáutica Civil
 - DASA, Subdepartamento Servicios de Tránsito Aéreo:
-Tel: (56-2)2904711 Email: jrojas@dgac.cl
 - DSO, Subdepartamento Transporte Público:
-Tel: (56-2)4363769 Email: registraturatp@dgac.cl

//////