



NAV CANADA Policy

Delivery of Air Navigation Services

Version 2.0

TABLE OF CONTENTS

| | |
|--|----|
| INTRODUCTION..... | 5 |
| 1.0 LEVEL OF SERVICE POLICY | 6 |
| 2.0 NAV CANADA PRACTICE IN THE DELIVERY OF SERVICE | 7 |
| 2.1 The Aeronautical Study Process..... | 7 |
| 2.2 Contractual Agreements | 7 |
| 3.0 LEVEL OF SERVICE ASSESSMENT CRITERIA..... | 8 |
| 3.1 Air Traffic Control Services | 8 |
| 3.2 Flight Information Services..... | 12 |
| 3.3 Aeronautical Communication Services | 14 |
| 3.4 Aeronautical Radio Navigation Services Airport Approach Systems..... | 16 |
| 3.5 Aviation Weather Services | 21 |
| 3.6 Aeronautical Information Management Services | 23 |
| 3.7 Emergency Assistance Services..... | 25 |
| 3.8 Land Use | 25 |
| 3.9 Customer Service..... | 26 |
| 4.0 REFERENCE DOCUMENTS..... | 27 |

CHANGE RECORD PAGE

| VERSION | DATE | DESCRIPTION OF CHANGE |
|----------------|------------------|---|
| 1.0 | October 31, 1997 | Original |
| 2.0 | January 16, 2016 | Changes to Para 3.3.2, 3.4.4, 3.4.5 and Section 3.6 |

ISSUE AND CONTROL

This manual is distributed electronically and currency must be validated against the revision number and date listed on the NAV CANADA Intranet.

It is the responsibility of every user of printed copies of this manual to validate currency against the revision number and date listed on the NAV CANADA Intranet.

INCORPORATION OF CHANGES

NAV CANADA may make editorial changes to the Policy from time to time in respect of which NAV CANADA will not give notice or consult as they are insignificant or editorial in nature. All amendments are subject to approval by the VP Engineering, VP Operations, and VP Technical Operations.

MANUAL APPROVAL

This manual is electronically authorized for use by the parties indicated below. The signatures will be kept on file.

VP, Engineering

VP, Operations

VP, Technical Operations

INTRODUCTION

This document is produced in accordance with section 23 of the Civil Air Navigation Service Commercialization Act, S.C. 1996, Chapter C-20 (the ANS Act). It describes the policy to be followed by NAV CANADA in the provision of air navigation services, such as air traffic control services and flight information services, and contains assessment criteria for indicating the site-specific need for those services. Assessment criteria shall be used together with the Aeronautical Study process described in the document "Aeronautical Study Standards and Guidelines" available from NAV CANADA.

Specified flight information services, such as Community Aerodrome Radio Stations (CARS), were based on different criteria than activity based level of service. The NAV CANADA obligation for the existing Transport Canada CARS were assigned pursuant to S.10(5) of the ANS Act. As a result these facilities are not addressed with any detail in this document.

When a need for review or adjustment to air navigation services is identified that materially affects a significant number of users, an Aeronautical Study shall be initiated. A need for review or adjustment to level of service may be identified from within or outside of NAV CANADA. An Aeronautical Study will normally be the source of a recommendation regarding the nature of air navigation services. Application shall consider all other NAV CANADA policies or decisions in force, including those with respect to business opportunity and user charges.

Assessment criteria for the provision of specific air navigation services are generally accompanied by recommended practices for their delivery. Recommended practices include processes to ensure that where NAV CANADA provides, or plans to provide an air navigation service, other persons or agencies having related responsibility are identified.

Application of Level of Service Guiding Criteria and Their Relationship to the Aeronautical Study Process

NAV CANADA's intent in applying its level of service criteria is to be responsive to the needs of its users to the greatest practicable extent, while maintaining a high level of safety and consistent level of service across the civil air navigation system. Identification of need will normally result from one of three initiating factors: identification of an opportunity (for improved service, greater efficiency, or cost saving), from within NAV CANADA, a suggestion or complaint from a client, or direction from the Minister of Transport.

The Canadian Aviation Regulations Part VIII Section 806 (SOR 96/ 433) makes specific reference to the Aeronautical Study as the method by which any safety risks related to a change of air navigation service are assessed. For evaluation of any change to air navigation services, NAV CANADA has adopted an Aeronautical Study process that is based on the Canadian Standards Association standard Q850 - Risk Management: Guidelines for Decision Makers. This is a national standard with international recognition; as such, it has been agreed by Transport Canada and NAV CANADA that it is well suited to addressing risk issues associated with changes to air navigation services.

1.0 LEVEL OF SERVICE POLICY

NAV CANADA provides a level of air navigation service to respond to the needs of its users. User needs, issues and concerns are identified through continuous consultation at the regional and national levels and through representation on the NAV CANADA Board of Directors. NAV CANADA applies its level of service policies in a consistent manner; NAV CANADA may realign the level of service:

- (a) in response to:
 - (i) user requests for service changes;
 - (ii) internal review; or
 - (iii) external or internal audit;

Change shall occur only in accordance with the ANS Act and upon the recommendation of an Aeronautical Study;

- (b) where level of service assessment criteria in this document suggest an existing level of service should be terminated or materially reduced, and where this reduction is supported by an Aeronautical Study the procedure to adjust the service shall be according to the ANS Act; or
- (c) where the Governor in Council, on the recommendation of the Minister, directs NAV CANADA to provide service in accordance with section 24 of the ANS Act.

Where users desire to contract for any NAV CANADA services in excess of those required to be provided, the additional service(s) may be provided in accordance with NAV CANADA contractual terms and conditions.

A total systems approach to service delivery will be taken such that when a change in level of service at a particular location occurs, the impact on the whole air navigation system will be evaluated and adjusted as required.

For definitions of terms and abbreviations used in this document, please refer to the glossaries found in the Canada Flight Supplement (CFS) and the Aeronautical Information Publication (AIP).

2.0 NAV CANADA PRACTICE IN THE DELIVERY OF SERVICE

The level to which NAV CANADA provides civil air navigation services is based upon identified need and practices that respond to safety considerations, consultation and technological innovation. The Canadian Aviation Regulations Part VIII Section 806 makes specific reference to the Aeronautical Study as the method by which any safety risks related to certain changes in level of service are assessed. Aeronautical Studies will be the means by which a review and change to current levels of service or recommended practices are made.

NAV CANADA has adopted an Aeronautical Study process based on the CSA Standard *Q850: Risk Management*, that represents the Canadian approach to overall risk management, and incorporates perception and communications components not presently found in other risk management frameworks. The model also incorporates common elements of pre-existing models used throughout the world and standardizes the terminology.

2.1 The Aeronautical Study Process

The Aeronautical Study consists of a six-step process: initiation, preliminary analysis, risk estimation, risk evaluation, risk control and action/monitoring.

Initiation: This step consists of defining the opportunity or problem and the associated risk issues; setting up the risk management team; and beginning to identify potential users who may be affected by any change.

Preliminary Analysis: This step consists of defining the basic dimensions of the risk problem and undertaking an initial identification, analysis and evaluation of potential risks. This preliminary evaluation will help determine: (1) whether a situation exists that requires immediate action; (2) whether the matter requires further study prior to any action being taken; or, (3) whether the analysis should be ended as the risk problem is determined not to be an issue.

Risk Estimation: This step consists of estimating the frequency and consequences of any potential losses.

Risk Evaluation: The benefits and operational costs of the activity are integrated into the analysis and the risk is evaluated in terms of the benefits of the activity and the needs, issues, and concerns of affected users.

Risk Control: This step consists of identifying feasible alternatives (*risk control options*) for reducing risk. These risk control options act to reduce either the frequency of the loss or the consequence of the loss should it occur.

Action/Monitoring: This step entails implementing the chosen risk control option(s), evaluating the effectiveness of the risk management decision process, and implementing an ongoing monitoring program.

2.2 Contractual Agreements

Where NAV CANADA provides service, suitable contractual agreements will be entered into with the other parties.

3.0 LEVEL OF SERVICE ASSESSMENT CRITERIA

This section describes the criteria by which the need for services is initially assessed. The criteria are neither rigid nor absolute, but provide a measure by which consistency of delivery of service levels may be evaluated. These criteria draw attention of decision makers and stakeholders to those service elements that may not be optimized in terms of safety, cost effectiveness or user requirements. These criteria also assist in setting priorities for analysis workload. It must be emphasized, however, that these are not decision criteria. It is the Aeronautical Study process that would determine the site-specific need for services, and identify and recommend a course of action, or present options for decision makers to act upon.

Where pre-existing or proposed service(s) are provided that are not in alignment with these criteria, an Aeronautical Study will be conducted to determine that the recommended service is the most effective and acceptable means of risk control. In cases where there are direct economic or financial consequences a Benefit/Cost Analysis (BCA) shall form a component of the Aeronautical Study.

These criteria, in concert with the Aeronautical Study process, are intended to assure an equitable distribution of services across the Canadian Civil Air Navigation System.

3.1 Air Traffic Control Services

3.1.1 Airport Control Service

Criteria

Airport control service may be provided where:

- (i) using the Airport Traffic Services economic model a positive Net Present Value (NPV) results; or
- (ii) total annual aircraft movements exceed 60,000 (see FIGURE TWO); or
- (iii) a client contracts for the service.

Depending on site-specific traffic mix and the risk control measures defined by an Aeronautical Study, with the exception of contracted service, airports with greater than 60,000 annual aircraft movements may not warrant airport control service. Similarly, another airport with less than 60,000 annual aircraft movements may warrant this service. In all cases the Aeronautical Study shall document and demonstrate the site-specific need and the rationale for the level of service decision.

Practices

In cases where service is provided less than 24 hours per day or 7 days per week, during the period when service is not provided, the service(s) remaining, if any, and their availability will be published in the Canada Flight Supplement (CFS) and other appropriate documents.

3.1.2 En Route Air Traffic Control Services

Criteria

En route navigation systems are comprised of navigation aids and communications facilities. These facilities and air traffic services will be provided where a Benefit Cost Analysis shows a positive result, or by a commercial contractual arrangement. The purpose is to provide adequate navigation and communications facilities in support of the safe and efficient movement of air

traffic within Canadian Domestic Airspace using published airways or air routes and for area navigation (RNAV), random routes, minimum time tracks or any other means of navigation.

Practices

The establishment of airways, air routes or RNAV routes shall require the provision of the appropriate level of air traffic management, communications facilities and navigational aids, and the necessary resources to provide the level of service.

The en route navigation systems criteria matrix indicates the navigation aids and communications that shall be provided to support the identified airspace elements.

A Benefit Cost Analysis (BCA) to establish any airway, air route or RNAV route segment shall include aircraft movement statistics for all IFR flights for the proposed route. These data are required for a period of at least six months and forecasts must confirm that this activity will be maintained or increase. In the case of an identified requirement based on an industry forecast, a detailed justification must be submitted that verifies the requested service is expected to continue for a period that would justify the infrastructure investment.

Nav aids not owned or operated by NAV CANADA that form a component of an airway, or support a published instrument approach, may be used by Air Traffic Control (ATC) in the same manner as the equivalent NAV CANADA facility if it meets the applicable standards and practices of NAV CANADA.

NAV CANADA and the Nav aid owner may enter into an agreement that defines their respective responsibilities and specifies the practices of each party with respect to the use and operation of the facility.

The suitability of satellite navigation (GNSS) and communication capabilities shall be considered when planning the provision of ground based en route navigation and communications facilities.

**FIGURE ONE
EN ROUTE NAVIGATION/COMMUNICATIONS SYSTEMS CRITERIA MATRIX**

| AIRSPACE ELEMENT | CRITERIA FOR AIRSPACE ELEMENT | NAVIGATION AID | COMMUNICATIONS (1) |
|--|---|--|--|
| CONTROLLED AIRSPACE | | | |
| AIRWAYS | A route-specific Benefit Cost Analysis (BCA) shall show a positive result for a 15 year life cycle. | VOR/DME VORTAC NDB(3)(4) GNSS | Facilities are required to establish VHF communications (2) between pilots and ATS* |
| CONTROL AREAS, CONTROL AREA EXTENSIONS, & OTHER CONTROLLED AIRSPACE | As per TP 8757 | N/A | Facilities shall be provided to establish VHF communications (2) between pilots and ATS* in accordance with criteria. |
| DIRECT ROUTES FIXED & RANDOM RNAV | Where an additional ground based navigation or communications facility is required to support these operations, a route specific BCA shall show a positive result for a 15 year life cycle. | Any ground based navigation facility or GNSS | VHF communications (2) between pilots and ATS* at and above the base of controlled airspace is desirable but not essential. |
| UNCONTROLLED AIRSPACE | | | |
| DIRECT ROUTES FIXED & RANDOM RNAV | Where an additional ground based navigation or communications facility is required to support these operations, a route specific BCA shall show a positive result for a 15 year life cycle. | Any ground based navigation facility or GNSS | VHF communications (2) between pilots and ATS* at and above MOCA or 3,000 feet AGL, whichever is higher, is desirable but not essential. |
| AIR ROUTES | As above . | NDB or GNSS | As above. |
| *ATS means any ATS communications facility: ACC, TCU, PAL (DCPC), Tower, FSS or RCO. | | | |

MATRIX NOTES: (Refer to Figure One).

- (1) ATC instructions and clearances may be relayed through a control tower, FSS, RCO or other suitable communications means. However, direct controller/pilot VHF communications facilities (local or peripheral - PAL (DCPC)) should be provided where the cost of delays or restrictions to scheduled or regular IFR traffic that are attributable to deficiencies in the existing communications system, or controller workload, would justify the additional expense. All associated air traffic management costs must be accounted for.
- (2) VHF communications coverage may be established by relaying messages through facilities along or within the defined routes/areas, or by activating a communications facility, either from an aircraft or an ATS site, in order to acquire ATS/pilot communications.

Other suitable modes of communications may be used outside of airport control zones or Terminal Control Areas, to supplement, or by specific arrangement, replace VHF air/ground communications (e.g. - HF, SATCOM, DATALINK etc.). The intent is to provide the most cost-effective means of enabling communications coverage for the entire designated airspace, airway or route segment.

- (3) DME may be collocated with an NDB to provide more accurate position fixing capability where required. Prior to establishing a DME, the suitability of GNSS shall be considered.
- (4) An NDB may be used to define the beginning or end of a VHF airway segment.

Controlled Airspace

The establishment of an airway predicated on ground-based navigation aids will require an adequate number of these aids to provide track guidance along the airway or within the designated area. In the case of VHF airways, VOR or VOR/DME installations and communications facilities should be located, wherever practical and consistent with the Benefit Cost Analysis, at intervals which ensure that the MEA is as close as possible to the MOCA in the low altitude airway structure.

GNSS or RNAV routes will be established in accordance with TP 9064, Guidance Material on the Application of Area Navigation (RNAV) in Canadian Domestic Airspace, and TP 308, Criteria for the Development of Instrument Procedures.

Within controlled airspace, a VHF communications system shall be the standard methodology used for air/ground communications between ATS facilities and pilots. The requirement for all controlled airspace is:

- (i) a VHF air/ground communications system capable of permitting ATC clearances and instructions to be relayed in a timely manner; and
- (ii) outside of Terminal areas, any suitable mode of communication may supplement, or by specific arrangement, replace VHF air/ground communications.

An approved altimeter setting source (available through ATS communication facilities), is, where practical, to be made available to pilots every 150 nautical miles along low level airways within the altimeter setting region.

Uncontrolled Airspace

The establishment of an air route will require:

- (i) suitable navigation signals (e.g. GNSS, NDB, VOR) capable of providing track guidance along the route. Navigation gaps are only acceptable in accordance with the criteria in TP 308 Criteria for the Development of Instrument Procedures;
- (ii) VHF air/ground communications (e.g. PAL, RCO, FSS) capable of permitting Flight Information Service to be provided either directly or through relay. Communication gaps along the route should not exceed 120 nautical miles at the MOCA or 3,000 feet AGL (whichever is higher); and
- (iii) any suitable mode of communication (e.g. datalink) may supplement VHF air/ground communications to provide Flight Information Service to pilots and receive their acknowledgments or requests.

“Approved Company Routes” will not be shown on navigation charts or documents.

3.2 Flight Information Services

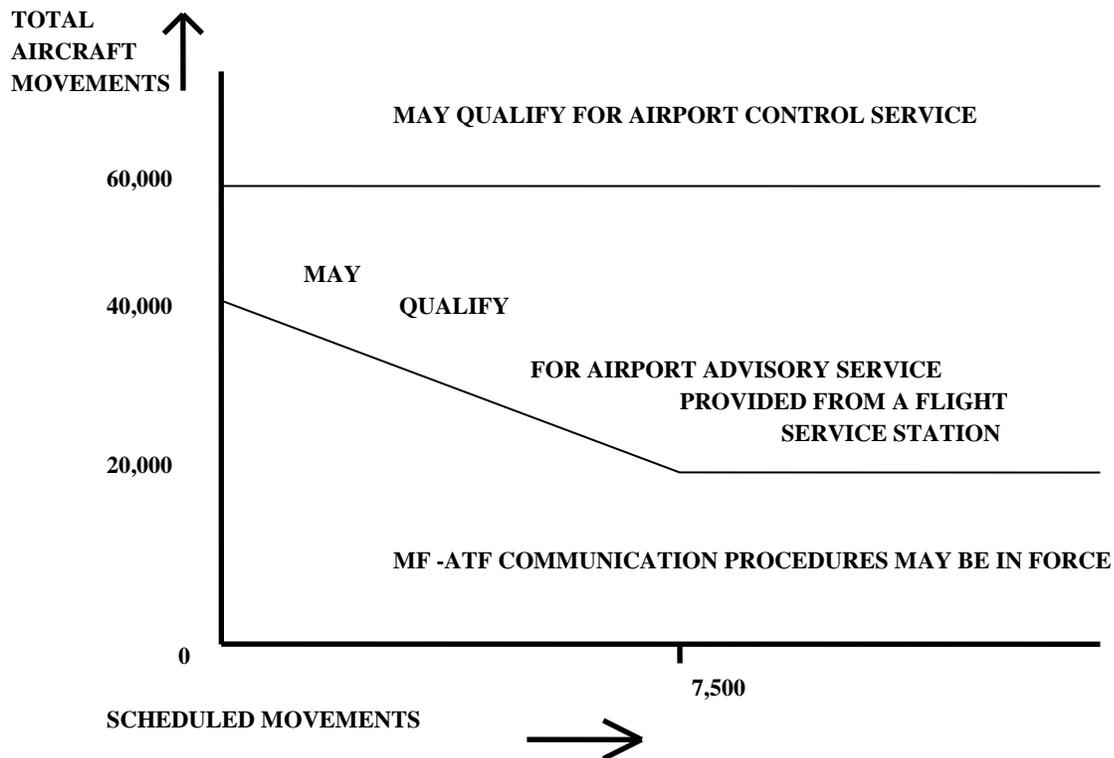
3.2.1 Advisory Service

Flight Service Station Criteria

Airport advisory service using an on-site Flight Service Station (FSS) may be provided where:

- (i) applying the Airport Traffic Services economic model a positive Net Present Value (NPV) results; or
- (ii) total annual airport aircraft movements exceed 20,000 with a component of 7,500 scheduled movements or greater. As movements increase the required scheduled movements decrease linearly until at 40,000 annual movements they are zero (see FIGURE TWO); or
- (iii) a client contracts for the service.

**FIGURE TWO
AIRCRAFT MOVEMENTS - AIRPORT TRAFFIC SERVICES CHART**



Note: Depending on site-specific traffic mix and the risk control measures defined by an Aeronautical Study, airports meeting the above criteria may not qualify for airport advisory service using an FSS. Similarly, another airport with less than the required annual aircraft movements may qualify for this service. In all cases the Aeronautical Study shall document and demonstrate the site-specific need and the rationale for the level of service decision.

Practices

In cases where service is provided less than 24 hours per day or 7 days per week, during the period when service is not provided, NAV CANADA and the airport operator shall enter into an agreement for:

- (a) communication service that will be provided by the aerodrome operator or others (if any) during periods that the NAV CANADA facility is closed;
- (b) air-side access and vehicle operator communication procedures;
- (c) publication of hours of NAV CANADA service and availability of alternate services that may be provided by the aerodrome operator or others; and
- (d) availability of airport approach systems.

Other Advisory Service Criteria

Remote Aerodrome Advisory Service (RAAS) or Flight Information Service En route (FISE) may be provided through Remote Communications Outlets (RCOs) or other means where a NAV CANADA Regional review, or a stakeholder, has identified a potential requirement and:

- (a) for RAAS:
 - (i) Authorized Approach UNICOM is not an acceptable alternative; and
 - (ii) a benefit/cost analysis shows a positive NPV; and
 - (iii) an Aeronautical Study supports the requirement; or
 - (iv) a client contracts for the service.

RAAS shall only be provided at aerodromes that are equipped to provide weather information to the FSS position providing the service. The weather information will, at minimum, provide hourly altimeter setting and wind information.

- (b) for FISE:
 - (i) a benefit/cost analysis shows a positive NPV; and
 - (ii) an Aeronautical Study supports the requirement; or
 - (iii) a client contracts for the service.

Practices

In the case of sites with advisory service of less than 24 hours per day or 7 days per week operation, during the period when advisory services are not provided, NAV CANADA and the airport operator may enter into an agreement for:

- (i) air-side access and vehicle operator communication procedures; and
- (ii) availability of airport approach systems.

RVAS communication between the FSS specialist and vehicle operators may use a dedicated frequency other than the MF where:

- (i) an Aeronautical Study determines that site specific vehicle operations contribute materially to frequency congestion; or

- (ii) the aerodrome is normally served part-time by an on-site staffed facility using a dedicated vehicle control frequency.

Where FISE is a requirement, the service should normally be provided on a site-specific en route frequency - not necessarily on 126.7.

CONTROL OF MANOEUVRING AREA LIGHTING may be contracted to NAV CANADA on behalf of the aerodrome operator.

MEAN WIND INFORMATION (ref. A.I.P. MET 1.1.5) - in the absence of an on-site AWOS with a voice generator module transmitting continuously on a VHF frequency, aerodromes sited at a geographically wind sensitive area (strong and gusty winds common) or aerodromes with a precision approach system may require the provision of mean wind information. This wind information will be available at the responsible FSS position. The site specific need will be identified through an Aeronautical Study.

3.3 Aeronautical Communication Services

3.3.1 Automatic Terminal Information Service (ATIS)

ATIS is an automated broadcast service that continuously provides operational airport information in a standard format to:

- (i) relieve congestion on control or mandatory frequencies by making operational airport information continuously available to pilots for planning their arrival, departure or over-flight; and
- (ii) relieve the controller and/or flight service specialist from transmitting repetitive airport information.

ATIS information shall be confined to concise essential data as described in the accompanying standards.

ATIS may be provided at any airport with a control tower or Flight Service Station where an operational requirement (supported by an Aeronautical Study) is identified.

ATIS will be provided:

- (i) on a discrete VHF frequency and/or on a discrete UHF frequency where it has been supported by the Regional Director Air Traffic Services;
- (ii) on separate discrete frequencies at airports that are provided with bilingual services; and
- (iii) concurrently in a format suitable for DATALINK where an operational requirement exists.

ATIS message content shall be in standard ATIS Format in accordance with NP 703 Air Traffic Control Manual of Operations (MANOPS) and NP 2043 FSS Manual of Operations.

ATIS procedures and update criteria shall be in accordance with NP 703 ATC MANOPS and NP 2043 FSS Manual of Operations.

3.3.2 Data link

Criteria

NAV CANADA shall provide air traffic control and Flight Information Services via a suitable electronic “gateway” that may connect to data link service providers.

Practices

Data link service providers shall meet all applicable standards and regulations prior to operational approval.

An agreement between NAV CANADA and any data link service provider shall be entered into that specifies:

- (i) the responsibilities of both parties; and
- (ii) any technical specifications needed to assure system reliability and integrity.

3.3.3 Toll Free Telephone Access to Flight Information Services

Criteria

Pilots will be permitted toll-free telephone access to NAV CANADA facilities that provide Flight Information Services or accept the filing or closure of flight plans.

Practices

The appropriate telephone numbers shall be published for all aerodromes in the Aerodrome Directory of the Canada Flight Supplement and the Water Aerodrome Supplement.

3.3.4 Provision of Direct Access to Aeronautical Fixed Telecommunications Network

Criteria

Upon application, direct access to the Aeronautical Fixed Telecommunications Network (AFTN) or its equivalent may be provided to aircraft operators and commercial flight planning agencies on a fee-for-service basis.

Practices

An agreement shall be entered into between NAV CANADA and any agency requesting AFTN service. The agreement shall specify:

- (i) the responsibilities of all parties; and
- (ii) any other terms and conditions required by the NAV CANADA.

3.3.5 Domestic Communication Services to Airlines: Domestic Paid Air-Ground (DPAG) and Domestic Air-Ground Message Service (DAGMS)

Criteria

NAV CANADA will, upon request and pursuant to a fee-for-service agreement, provide communication services other than those for the handling of flight safety and flight regularity messages described in ICAO Annex 10, Volume II, Chapter 2, paragraph 2.2. The services will be

provided by designated NAV CANADA ATS facilities using air-ground and associated fixed telecommunications circuits.

3.4 Aeronautical Radio Navigation Services Airport Approach Systems

Criteria

Airport approach systems and related services up to operational level 5 (refer to Figure Three - Operational Levels Matrix) may be provided when a benefit cost analysis, as described in NP6887 Benefit Cost Model for Airport Approach Systems, is positive.

The operational level of the approach system to be provided shall be based upon a BCA as detailed in NP 6887 Benefit Cost Model for Airport Approach Systems.

Airport approach systems may only be provided where an aerodrome operator enters into an agreement with NAV CANADA for the provision of this service.

The service will only be provided to the extent the operating environment permits.

**FIGURE THREE
OPERATIONAL LEVELS MATRIX**

| OPERATIONAL LEVELS | NOTES |
|---|---|
| (1) DAY (non NAV CANADA level) | Non-instrument runway day only - no lighting |
| (2) NIGHT (non NAV CANADA level) | Non-instrument runway - lighted, day and night operations |
| (3) CIRCLING | Non-instrument runway - lighted, day and night operations with no straight-in landing authorization to the landing runway |
| (4) NON-PRECISION STRAIGHT-IN | Instrument runway - lighted, day and night operations and straight-in authorization to the landing runway |
| (5) PRECISION CATEGORY I | Precision Instrument runway - lighted, day and night operations with positive lateral and vertical track guidance to the runway |

| |
|--|
| Proponents identifying requirements for CAT II or CAT III systems shall be responsible for funding all incremental system costs |
|--|

| | |
|---|---|
| (6) PRECISION CATEGORY II (7) PRECISION CATEGORY III | Category II and III approach systems provide positive lateral and vertical track guidance to a runway with a higher degree of accuracy, integrity and continuity than CAT I |
|---|---|

Practices

3.4.1 Introduction of Global Navigation Satellite System (GNSS)

Existing Airport Approach Systems

Using the economic model and methodology described in NP6887 Benefit Cost Model for Airport Approach Systems, existing ground-based Airport Approach Systems shall be reviewed as required by the Director Safety and Service Design and compared with a GNSS option to determine their continued economic viability. As soon as practical, when GNSS is a viable option, considering ICAO and other commitments where applicable, and supported by an Aeronautical Study, ground-based Airport Approach Systems shall be decommissioned.

New Airport Approach Systems

In accordance with Canada's GNSS plan, and where GNSS operational capability could meet the requirement for an Airport Approach System at the runway under consideration, an Aeronautical Study that includes an economic evaluation will be conducted to determine whether GNSS will meet the need. Prior to the implementation of any new ground based Airport Approach System, the capability of GNSS to fulfill the operational requirement shall be determined.

Use of en route/Existing Navigation Facilities

Instrument approach procedures may be based upon existing conveniently located en route navigation facilities, such as VORs and NDBs.

NDBs, localizer/AZ, and/or DME may be installed separately or in combination with each other or with suitably located existing facilities where this is identified as being operationally advantageous.

Visual Aids

Required runway and approach lighting systems and other visual aids associated with any NAV CANADA airport approach system are a necessary precondition and must be available in accordance with the specifications contained in TP 312 Aerodrome Standards and recommended Practices. These systems and aids are the responsibility of the airport operator.

Communication

Prior to commissioning any new airport approach procedure, the required communications services shall be available. Communications may be provided through facilities such as a control tower, Flight Service Station, Airport Advisory Station, PAL (DCPC), RCO, CARS, Authorized Approach UNICOM, AWOS with voice capability that includes NOTAM for runway condition, or, in the case of an air carrier, company flight dispatch and/or agent.

General

Where there is an operational requirement stated for more than one approach system at an airport, the incremental benefits for each individual approach system, as compared to a base case, must be justified through a benefit cost analysis in accordance with criteria contained in NP 6887 Benefit Cost Model for Airport Approach Systems. Refer to Note 1 below for the definition of a base case.

Facilities for operational level 3 (IFR circling) are only to be installed if it is not practical to align facilities and provide the requisite services or the runway is not certified to enable operational level 4 (IFR straight-in).

NAV CANADA will provide funding support only to operational level (5) approach systems.

NOTE 1: DEFINITION OF A “BASE CASE”

Although the base case is likely to resemble the status quo to a substantial degree, rarely would it represent a “do-nothing” option. The base case should be designed to make the most of existing facilities. Adjustments to present operations or facilities, consistent with ordinary managerial discretion in maintaining efficient operations, should be assumed. In short, a base case represents the best that managers can do without major investment.

Agreements

In the case of sites with communication service of less than 24 hours per day or 7 days per week operation, during the period when services are not provided NAV CANADA and the airport operator shall agree upon:

- (I) air-side access and vehicle operator communication procedures; and
- (ii) availability of airport approach systems.

3.4.2 Status Monitoring and Reporting - Requirements for Status Indication at ATS Positions

Wherever practical, Nav aids shall be status monitored and the status reported by NAV CANADA. This does not imply full-time dedicated circuits. Other forms of monitoring such as dial-up circuits or any other technical means to perform this function on an as required basis (as decided by Engineering) may be used. An executive monitor, for example, that takes action and sends a message only after a fault is detected is acceptable.

NAV CANADA is responsible for meeting the navigation system availability requirement and to determine the technical means to do this, including status monitoring. When a system deficiency exists there are a range of methods to issue this information so that appropriate action can be taken. The actions to be taken in order of priority are:

- (i) affected ATS units are to be notified immediately;
- (ii) without delay, the NOTAM process and data entry are to be initiated; and
- (iii) maintenance response is to be initiated.

The Technical Operations Coordination Centre (TOCC) shall be the designated work centre in each Region responsible for the monitoring function. The TOCC will be the focal point to initiate any actions regarding system status. Should an TOCC not have the full capability to meet the requirement, ATS have agreed to perform this function on an interim basis at designated sites. Where this occurs, there shall be an established agreement between ATS and Technical Operations describing:

- (i) that delegation;
- (ii) the means to perform without delay the initiation of NOTAM;
- (iii) the data entry process to other systems;
- (iv) procedure of advising the TOCC; and
- (v) where required, provision of the resources to do it.

It may be impractical or excessively costly to monitor some navaids. The following guidelines will be used to determine if the effort and/or cost is warranted:

- (i) operational safety;
- (ii) ICAO standards and international commitments;
- (iii) commercial importance;
- (iv) age and estimated time to replacement of the navaid;
- (v) availability of maintenance services;
- (vi) system reliability; and
- (vii) incremental cost of procuring, installing and maintenance back-up, standby, and monitoring and status reporting equipment.

Those navaids that are not status monitored by any means shall be noted on HE charts, LO charts and in the CFS. This includes sites with limited hours of monitoring such as at CARS.

Where an ATS facility is closed, or hours of operation are reduced to less than 24 hours seven days per week, required monitoring shall be rerouted to a TOCC. Monitoring may be routed to an alternate ATS facility as an interim solution where this is more practical. An arrangement shall be entered into between ATS and Engineering if the monitoring function is rerouted to an interim ATS facility.

Information about system elements is required to be available to affected controllers for control and planning purposes. ILS status indication is required at the responsible control position where simultaneous parallel approaches are conducted. ILS status indications elsewhere must be approved by the ATS. Where ATS personnel are required to turn an ILS on or off (control function) a status indication of that action having taken effect is required. In both the above cases (unless an MOU to this effect is in place with Technical Operations) this is not a maintenance monitoring function for the purpose of reporting the status of navaids, it is a status indication provided for operational use.

The status of precision approach aids:

- (i) shall be displayed at designated ATS facilities where simultaneous parallel approaches are conducted or where Air Traffic Services determines a requirement. The requirement should be stated separately for periods when the on-site facility (control tower or Flight Service Station) is closed; and
- (ii) system status shall be reported for maintenance purposes.

At aerodromes where precision approach aids are unmonitored during periods when the monitoring agency is closed, a cautionary statement shall be published in appropriate documents.

In certain circumstances monitoring may be discontinued for a specific navaid. This process shall be coordinated through the HO Engineering Branch and the request will be accompanied by a risk/impact analysis. Maintenance is the designated authority and will coordinate the request with Head Office Operations.

Under no circumstances shall an individual within a Region decide not to monitor a navaid or neglect to issue NOTAM when a system deficiency is identified. Similarly, when system elements are planned to be unavailable due to a need for maintenance, NOTAM will be issued before the facility is affected.

3.4.3 Monitoring Non-NAV CANADA NAVAIDS

Costs (capital and operating) incurred for status monitoring of non-NAV CANADA navigation aids shall normally be borne by the navaid owner.

3.4.4 Emergency Power For Navigation Aids

Emergency power shall be provided for the following navigation aids:

- (i) All ILS localizer and glide path transmitters, as well as DME transponders associated with those ILS; and
- (ii) All VOR transmitters, as well as DME transponders associated with those VORs.

Emergency power shall be provided for NDBs supporting published instrument approach procedures to runways not also served by ILS, LOC or VOR approaches, in cases where:

- (i) A published RNAV (GNSS) instrument approach procedure with equivalent weather minima is not available, or
- (ii) A significant number of IFR operators using the NDB approach are not equipped for GNSS approach operations.

Emergency power shall be provided for NDBs that are integral to published ILS, LOC or VOR instrument approach procedures, in cases where a significant number of IFR operators using the NDB are not equipped for GNSS approach operations.

Emergency power shall be provided for NDBs supporting published airways or air routes in cases where published RNAV routes are not available, or where a significant number of IFR operators using the NDB airways or air routes are not equipped to use RNAV.

Emergency power shall be provided for NDBs supporting compass setting for published instrument approach procedures to airports designated as using True North navigation, in cases where only a single NDB is available to support compass setting.

Navigation aids may share emergency power sources with air/ground communications facilities.

RADAR and ADS-B facilities shall have an emergency power source separate from other navigation or air/ground communications facilities.

Note: This policy does not require that navigation aids be removed from service during periods when emergency power is not provided.

3.4.5 Maintenance Response Time

Electronic facilities commissioned by NAV CANADA shall be assigned a maintenance response time priority level based on the impact of an individual ANS electronic failure on operating aircraft.

Maintenance response time priority levels shall be assigned by a Regional Committee based on the criteria outlined below and assign priority levels consistent with that rationale. The Committee shall produce an agreement that documents the rationale and records the priority levels.

Maintenance response time priorities assignment shall be based on the following criteria:

| <u>Criteria/Priority</u> | 1 | 2 | 3 |
|--------------------------|------|--------|-----|
| Flight Safety Impact | high | medium | low |
| Operational Impact | high | medium | low |

When exceptional circumstances create a situation that warrants a faster or slower response, the Operations shift manager may request temporary assignment of the new priority.

The following notes will facilitate consistent application of the criteria:

- (i) "Failure" is defined as the loss of service of a system element which results in a reduction in level of service.
- (ii) "Response time" is defined as the elapsed time between notification of a system failure to the designated maintenance contact and the departure of the repair crew to the site.
- (iii) "Minimum down-time" is computed, for NOTAM purposes, as the response time plus travel time to the facility.
- (iv) An inoperative primary element of a dual system (which is operating satisfactorily on the back-up element) shall normally be treated as a Priority 3.
- (v) It is difficult to relate VHF/DF and ATS voice recorders to the criteria of this policy because neither directly impacts routine air traffic. Their utility is in unusual, emergency situations. These facilities should be assigned priorities as follows:
 - (a) VHF/DF facilities should be accorded priority 2 or 3 depending on Regional assessment; and
 - (b) voice recorders in ACCs and TCUs should be priority 1 and those in towers and FSSs normally should be priority 2.

(vi) The following response times are associated with the priority assignments:

| <u>Priority</u> | <u>Response Time</u> | |
|-----------------|---|--|
| | <u>Failure Reported During Working Hours</u> | <u>Failure Reported After Hours or on Holidays</u> |
| 1 | Immediate (within 0.5 hr) | Immediate/call-out (within 2.0 hr) |
| 2 | Same day (within 9 hrs) | Within 24 hours |
| 3 | same day, or next working day (within 72 hrs) | Next working day (within 72 hrs) |

3.5 Aviation Weather Services

3.5.1 Aviation Weather Information Services

NAV CANADA shall disseminate aviation weather information toll-free. Access to route and area specific weather information which has been integrated in time and space to meet the needs of a particular flight will be provided.

3.5.2 Aerodrome Forecasts (TAFs)

An aerodrome forecast (TAF) shall be provided when a site:

- (i) is designated as an ICAO destination or alternate; or
- (ii) qualifies for the establishment or retention of an Air Traffic Service facility (in accordance with TP 11479E), except where that facility primarily serves a local VFR training requirement and another TAF is produced for a site within 25 NM.

Criteria

An aerodrome forecast (TAF) may be provided when:

- (i) a site has scheduled air carrier passenger service and, in the context of an Aeronautical Study, it meets appropriate benefit/cost criteria (under development); or
- (ii) a site is designated to do so as the result of an Aeronautical Study, in order to meet unique criteria including, but not limited to, the provision of an IFR alternate option in data sparse areas.

Practices

- (i) Aerodrome forecasts (TAFs) shall be produced in accordance with the MANAIR (Manual of Standards and Procedures for Aviation Weather Forecasts). Aerodrome forecasts shall be issued by meteorologists who meet, as a minimum, the standard set by the World Meteorological Organization (WMO) for Class I meteorological personnel.
- (ii) The daily hours of aerodrome forecast service at a given site should normally be adjusted to cover scheduled air carrier departures and arrivals.
- (iii) Any aerodrome for which an instrument approach procedure is published in the Canada Air Pilot should normally have an aerodrome which has a TAF within one (1) hour flying time at a representative mean average cruising speed, as determined by NAV CANADA management. Where this is not the case and where suitable aerodromes exist within that radius, NAV CANADA management should designate the most appropriate aerodrome within that radius as requiring a TAF for possible selection as an IFR alternate.
- (iv) Where the centres of two or more aerodromes which qualify for a TAF are within 25 nautical miles of one another, NAV CANADA management should consider conducting an Aeronautical Study to decide whether to discontinue one of the aerodrome forecast services or, where possible, providing an aerodrome advisory forecast instead (using off site surface weather observation data).

3.5.3 Surface Weather Observations (METAR/SPECI)

Surface weather observations shall be taken to meet the national requirement for aviation forecast production and for specific VFR requirements identified in an Aeronautical Study as being related to the safety of flight.

Practices

Technical standards, including required instrument accuracy, for surface weather observations shall be in accordance with the Manual of Surface Weather Observations (MANOBS).

Observations taken at sites with an operational Air Traffic Service (ATS) facility shall normally be to the human standard when that facility is staffed.

At locations with an operational ATS facility within 25 NM of a human standard observation, AWOS observations may meet the requirement, subject to an Aeronautical Study.

At locations with an operational ATS facility where the primary flying activity is local VFR training, observations may not be required.

3.6 Aeronautical Information Management Services

Under the *Civil Air Navigation Services Commercialization Act* (CANSCA), NAV CANADA is responsible for providing aeronautical information services (AIS) for the purposes of Annexes 4 and 15 to the Chicago Convention. Services include the collection, verification/validation, storage and publication of AIS data.

NAV CANADA is responsible for data related to the infrastructure of the Air Navigation System (ANS) – runways, routes, navigational aids, frequencies, etc., associated status or condition. The provision of aerodrome data is the responsibility of the aerodrome operator under *TP312 Aerodrome Standards and Recommended Practices*.

NAV CANADA issues AIRAC CANADA on a regular basis to keep chart makers and suppliers of aeronautical information up to date regarding impending changes within the Canadian Domestic Airspace and the Gander Oceanic Control Area.

NAV CANADA distributes, by means of telecommunications, all NOTAMs originated by an authorized source, containing information concerning the establishment, conditions or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

3.6.1 Instrument Procedure Design

NAV CANADA designs and maintains instrument approach and departure procedures at civil aerodromes in Canada without specific charge to those civil aerodromes that meet the eligibility criteria defined in section 3, subject to the qualifications identified in section 4.

The types of approach and departure procedures supported at an aerodrome are based on; operators' capabilities, level of service reviews, redundancy requirements, regulatory requirements, and risk analysis.

3.6.2 Eligibility Criteria

Civil aerodromes must meet one or more of the following criteria to be considered by NAV CANADA for development and maintenance of instrument procedures:

- (i) The aerodrome serves scheduled passenger and/or cargo air service;
- (ii) The aerodrome is regularly filed as an Instrument Flight Rules (IFR) alternate for scheduled passenger and/or cargo air service;
- (iii) Aerodrome IFR access is vital to the community owing to a lack of alternate means of access;
- (iv) The aerodrome has an aviation weather observation program sponsored by NAV CANADA;
- (v) NAV CANADA has recommended supporting the aerodrome as a result of a level of service review or because it is integral to the operation of a major terminal area.

3.6.3 Exceptional Charges

Changes to aerodrome data as a result of changes to aerodrome infrastructure (e.g. runway extension) initiated outside of NAV CANADA that require an instrument procedure maintained by NAV CANADA to be redesigned prior to the regular review date will be completed on a cost recovery basis with full responsibility applied to the organization which created the change.

3.6.4 Engagement of External Design Organizations (EDOs)

The operator of a civil aerodrome that does not meet the eligibility conditions defined in Section 3 for NAV CANADA design services may engage an External Design Organization (EDO) with respect to development, maintenance and submission of approach and/or departure procedures for publication in the Canada Air Pilot (CAP) or the Restricted Canada Air Pilot (RCAP). NAV CANADA will correspond with the civil aerodrome operator to coordinate the exchange of required EDO documentation. All submissions must be in accordance with guidelines published by NAV CANADA to ensure effective coordination of changes to aeronautical data.

A sponsor or aerodrome operator seeking to engage an EDO for the development and maintenance of a procedure at a civil aerodrome that meets NAV CANADA's eligibility criteria defined in Section 3 must notify NAV CANADA prior to the development of the procedure to ensure effective coordination of aeronautical data amendments. Submissions must be in accordance with guidelines published by NAV CANADA and rules for "mixed sites" where some procedures are designed and maintained by NAV CANADA and other procedures are designed and maintained for aerodrome operators or procedure sponsors.

3.6.5 Submission Sponsor

Any request for design of an instrument procedure must be submitted by an aerodrome operator or by a sponsor (i.e. air operator). When submitted by a sponsor, the sponsor must demonstrate that the aerodrome operator is committed to providing and maintaining the aerodrome aeronautical and facilities data that is necessary to support the design and operational use of the procedure.

3.6.6 Responsible Source Documentation

The following documentation must be in place before NAV CANADA will commence work on an instrument approach or departure procedure:

- NAV CANADA has received a complete aerodrome information package from the aerodrome operator;
- The aerodrome is published in the Canada Flight Supplement (CFS) and Aeronautical Information Publication (AIP);
- The navigation system(s) proposed for the procedure design meet all regulatory requirements.

3.6.7 Public and Restricted Designs

NAV CANADA makes every effort to develop an instrument procedure that is available for public use and published in the Canada Air Pilot (CAP).

When there is an operational limitation or advantage that can be achieved through the application of a deviation from approved design criteria, NAV CANADA may develop a restricted procedure and publish the procedure in the RCAP. The decision to develop an RCAP procedure is dependent upon Transport Canada approval of all associated deviations or exemptions to standards and/or

criteria as well as the instrument procedure meeting the requirements of NAV CANADA's safety management system.

3.7 Emergency Assistance Services

These services are provided in accordance with NP 2043 Flight Service Station Manual of Operations (FSS-MANOPS) and NP 703 Air Traffic Control Manual of Operations (ATC-MANOPS).

3.7.1 Very High Frequency Direction Finding (VDF) equipment

Criteria

VDF equipment may be installed in ATS facilities to provide emergency navigational assistance to pilots of light aircraft where:

- (i) there is no VOR; and
- (ii) frequent restrictions to visibility occur owing to historically adverse weather conditions or industrial atmospheric pollutants; or
- (iii) there are a lack of suitable landmarks or topographical features to assist in map reading; and
- (iv) no primary radar is available for providing emergency navigation assistance in the circumstances above.

Practices

Normally the VDF antenna will be installed in the vicinity of the controlling ATS facility. In exceptional circumstances where a safety problem has been identified related to VFR navigation, and the criteria in this policy are met, a VDF antenna may be located to serve an area remote from the controlling ATS facility. These sites may be designated by NAV CANADA management.

3.8 Land Use

The NAV CANADA Land Use program contributes to the Air Navigation System's integrity by ensuring that land use projects are fully assessed for any potential interference with NAV CANADA services or Communication/Navigation/Surveillance/Weather facilities.

The program, developed for potential land use applicants and development owners, outlines the assessment processes used by NAV CANADA to assess potential impacts on aviation safety from land development and identify appropriate mitigations. Where possible, these processes seek to ensure that current and future aerodrome operations are not adversely affected.

The Land Use program assessment process applies to NAV CANADA interests only, and assesses the impact of a proposed physical structure as it may relate to the ANS. The evaluation of land use proposals and construction proposals by NAV CANADA neither constitutes nor replaces any approvals or permits required by Transport Canada, other Federal Government Departments, Provincial or Municipal land use authorities, or any agency from which any approval is required.

A detailed description of the NAV CANADA Land Use program requirements is located on the NAV CANADA website at www.navcanada.ca.

3.9 Customer Service

Customer requests or questions related to this policy should be directed to NAV CANADA Customer Service.

Email: service@navcanada.ca

Global toll free telephone number: 1-800-876-4693-4 (within North America disregard the last digit)

TTY Line for the hearing impaired: 1-866-662-6478

Toll-free fax line: 1-877-663-6656

Local fax line: 1-613-563-3426

Address - Head Office: 77 Metcalfe Street, Ottawa, ON K1P 5L6

Mailing address:
NAV CANADA
P.O. Box 3411 Station 'D'
Ottawa, ON K1P 5L6

4.0 REFERENCE DOCUMENTS

4.1 Aeronautical Studies Standards and Guidelines Document

4.2 Air Traffic Control Services

- NP 703 Air Traffic Control Manual of Operations (ATC MANOPS)
- NP 11479 Economic Criteria for Airport Traffic Services
- NP 11478 User's Guide - Economic Criteria Model for Airport Traffic Operation
- TP 5599 ANSROD-93-02 - Airport Control Services Hours of Operation
- NP 1362 Measurement of Tower Workload
- NP 210 Control Tower Site and Design Standards
- TP 308 Criteria for the Development of Instrument Procedures
- TP 8757 Procedures for the Management of Canadian Domestic Airspace
- TP 9064 Guidance Material on the Application of Area Navigation (RNAV) in Canadian Domestic Airspace

4.3 Flight Information Services

- NP 2043 Flight Service Station Manual of Operations (FSS-MANOPS)
- NP 3244 Staffing Standard for Flight Service Stations
- NP 11479 Economic Criteria for Airport Traffic Services
- NP 11478 User's Guide - Economic Criteria Model for Airport Traffic Operation
- NP 5827 Flight Service Station Facility Standards and Guidelines
- TP 5599 ANSROD-93-01 - Application of Economic and Traffic Criteria for Airport Traffic Services

4.4 Aeronautical Communication Services

Provision of VOR Receiver Test (VOT) Facilities or VOR Check Points

- A.I.P. COM 4.6
- ICAO Annex 10, Vol. I
- TP 312 Manual of Aerodrome Standards and Recommended Practices
- Canada Air Pilot

Data Link

- ICAO SARPS
- NAV CANADA standards
- FANS ICAO Guidelines for Provision of Data Link Services

Toll Free Telephone Access to Flight Information Services

- IFR and VFR Supplements
- 7-4STNDS

Provision of Direct Access to Aeronautical Fixed Telecommunications Network

- DOC 4444 - Rules of the Air and Air Traffic Services, Part 8
- ICAO Annex 10, Volume II
- NP 7827 6-2ADIS Manual of Operations
- NP 9198 Direct User Access Terminal System (DUATS) Service

Domestic Communications Services to Airlines: Domestic Paid Air-Ground (DPAG) and Domestic Air-Ground message Service (DAGMS)

- ICAO Annex 10, Volume II
- NP 3244 FSS Standards and Requirements, Chapter 5
- FSS MANOPS, Chapter 17
- NP 7827 6-2ADIS-2

4.5 Aeronautical Radio Navigation Services

- Meteorological Analysis For Airport Planning (MAAP)
- ICAO Manual of Runway Visual Range Observing and Reporting Practices
- ICAO Aeronautical Telecommunications, Annex 10
- ICAO Manual of All Weather Operations, First Edition 1982
- TP 1490 Manual of All Weather Operations, Category II
- TP 3308 Manual of Criteria for non-TC Navigational Aids
- TP 1247
- TP 312 Aerodrome Standards and Recommended Practices
- NP 6887 Benefit-Cost Model for Airport Approach Systems

4.6 Aviation Weather Services

- Manual of Standards and Procedures for Aviation Forecasts (MANAIR)
- Manual of Surface Weather Observations (MANOBS)

4.7 Aeronautical Information Service

- NP 8671 Aeronautical Information Services Procedures Manual;
- TP 667 Canadian Location Indicators;
- Canadian NOTAM Procedures;
- AIRAC CANADA;
- TP12809 E/F CANADA AIR PILOT - GPH 200 Specifications;
- TP12810 E/F CFS/WAS/CFSS Specifications;
- TP 7124E/F, En route Low Altitude Charts Specifications
- En route High Altitude Charts;
- Terminal Area Charts;
- WAC Specifications;
- VNC Specifications;
- VTA Specifications;
- Aeronautical Information Services Self-study Course;
- Canada Air Pilot - 7 volumes + General Pages;
- Canada Flight Supplement: two editions (Eng. and Bil.);
- Water Aerodrome Supplement
- Low En route Charts;
- Aeronautical Charts for Visual Flight:
 - i) World Aeronautical Charts (WAC);
 - ii) VFR Navigation Charts (VNC);
 - iii) VFR Terminal Area Charts (VTA).

4.8 Emergency Assistance Services

- TP 1521 Joint Manual of Training
- NP 703 Air Traffic Control Manual of Operations (ATC MANOPS)

- NP 2043 Flight Service Station Manual of Operations (FSS MANOPS)