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Agenda Item 6: Other Business

TRANSPORT CANADA AND NAV CANADA - COLLABORATIVE SAFETY MANAGEMENT

(Presented by Canada)

EXECUTIVE SUMMARY

This Information Paper provides an overview of the safety management partnership which exists in Canada between Transport Canada, the regulator, and NAV CANADA, the primary Air Navigation Service Provider (ANSP).

Strategic Objectives:

- Safety
- Air Navigation Capacity and Efficiency

References:

- ICAO Safety Management Manual (Doc 9859)
- Canadian Aviation Regulations, Part VIII - Air Navigation Services, Subpart 5 - Safety Management Program - 1996/10/10.

1. Introduction

1.1 Implementation of effective Safety Management Systems (SMS) by service providers is one of the eleven elements of the State Safety Programme (SSP). States are expected to require service providers to implement SMS and establish “the controls which govern how service providers will identify hazards and manage safety risks”¹. The effectiveness of the SMS is therefore substantiated by the effectiveness of the State’s regulatory oversight. This paper provides an overview of the safety management partnership which exists in Canada between Transport Canada, the regulator, and NAV CANADA, the primary Air Navigation Services Provider (ANSP).

2. Discussion

2.1 The purpose of an SMS is to identify safety hazards, implement actions to reduce safety risks, monitor safety performance and achieve continuous improvement in safety performance. The purpose of the SSP is the regulation and administration of safety by the State. These functions are clearly interdependent and reliant upon a collaborative approach to safety management between those organizations required to implement an SMS and the regulatory authority of the State.

¹ *Safety Management Manual (SMM)* (Doc 9859)

2.2 NAV CANADA came into being in November of 1996; although the Canadian regulatory framework specifically addressed safety management, it was relatively non-prescriptive in this regard. The Canadian Civil Aviation Regulations (CARs) were developed under the strong concept of “performance base” compared with the prescriptive approach of the former Air Navigation Orders (ANOs). As a holder of an Air Traffic Services (ATS) Operations Certificate, NAV CANADA was required to “establish a safety management program that provides for an internal system of oversight to ensure the safety provision of air navigation services”². The regulation also required that the manager of this program have direct access to the chief executive officer on operational system safety matters, conduct risk assessments of current and proposed operational policies, plans and procedures and coordinate the collection and analysis of operational risk related data.

2.3 The Canadian legislative framework required (and continues to require) detailed reporting of timely information concerning operational occurrences within the National Civil Air Transportation System (NCATS) translating into early identification of potential hazards and system deficiencies. This framework requires cooperation with information requests and investigations by Transport Canada and the Transportation Safety Board (TSB).

2.4 Transport Canada’s mission is to “develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians using a systems approach to managing risks.” To this end, Transport Canada takes a systems approach to risk management which promotes transparent processes that establish clear lines of accountability for decision-making. An acceptable level of risk is determined on a case-by-case basis through a sophisticated risk assessment process.

2.5 NAV CANADA formally adopted a corporate Safety Management System in 1999 which included most elements of what would eventually be defined by ICAO for SMS. As early as 1998, NAV CANADA had established safety goals and begun publishing yearly a *Corporate Safety Plan* to detail how those goals would be achieved and to report on progress. These yearly plans described in detail the evolution and implementation of NAV CANADA’s Safety Management System. NAV CANADA’s SMS contributes directly to the achievement of its Corporate Strategic Safety Goal: to reduce risks to a level As Low As Reasonably Practicable (ALARP).

2.6 As part of its regulatory responsibility, Transport Canada ensures, on an ongoing basis, that NAV CANADA complies not only with the regulations pertinent to providing ANS and being a member of the aviation community, but also the safety management regulations (paragraph 2.2 above refers). As such, NAV CANADA is subject to findings, counselling or fines when its performance has not fully complied with regulatory requirements. In all such cases, Transport Canada works collaboratively with NAV CANADA, as it would with any aviation stakeholder, to clarify expectations, review corrective action plans and monitor the effectiveness of agreed corrective actions.

2.7 Amendment 40 to Annex 11 - *Air Traffic Services* in 2001 introduced ATS safety management Standards and Recommended Practices (SARPs). Transport Canada immediately determined a requirement to update its safety management regulations to include more detail as to what would be required in the SMS of ATS Operations Certificate holders. In keeping with the regular coordination between Transport Canada and NAV CANADA regarding ANS and regulatory developments, NAV CANADA was advised. As a result, by 2003, NAV CANADA had begun the task of reviewing and updating its SMS processes to comply with the ICAO Annex 11 requirements and what was foreseen for the Canadian regulatory changes.

² Canadian Aviation Regulations, Part VIII - Air Navigation Services, Subpart 5 - Safety Management Program - 1996/10/10.

2.8 NAV CANADA worked closely with Transport Canada and was therefore well-placed to be compliant with most aspects of the new safety management regulations as they began to be updated beginning in January 2008. As a result of this coordination, NAV CANADA enhanced its framework and developed a Quality Management System for the SMS.

2.9 The detailed and inter-linked SMS requirements enacted by Canada are provided in **Attachment A**. Although enforcement focussed first on Canada's major air carriers, NAV CANADA continued to work closely with Transport Canada to implement the new regulatory framework for SMS as it pertained to ANS provision. In July 2012 Transport Canada confirmed that NAV CANADA's SMS had been implemented in accordance with the applicable regulations.

2.10 Canada operates an Aviation Occurrence Reporting system which gathers information on all reported safety-related aviation occurrences in Canada or involving Canadian operators. NAV CANADA is subject to regulations requiring that all such occurrences be reported. Essentially, the reporting requirement is that almost anything out of the ordinary should be reported; a detailed list is provided in **Attachment B**. NAV CANADA conducts investigations into all occurrences involving NAV CANADA facilities or the provision of services by NAV CANADA. The scale of the investigation is commensurate with the seriousness of the incident and with the level of effort required to determine causal factors and identify the required mitigations. NAV CANADA's investigative processes focus on human factors and the relationships between the users of the equipment or procedures and other users, equipment, procedures and the operational environment. Transport Canada independently determines whether investigation of any reported occurrence is required by them. The same is true of the Transportation Safety Board. As required by the regulations, NAV CANADA cooperates with all such investigations.

2.11 Other Transport Canada reporting schemes include the Civil Aviation Daily Occurrence Reporting System (CADORS), Civil Aviation Issues Reporting System (CAIRS) and the Civil Aviation Contingency Operations (CACO) Aviation Incident Database (reporting mechanism of occurrences filed online by Airports, Airlines and private citizens).

2.12 In addition to the aviation occurrence reporting required under the regulations, NAV CANADA has instituted a number of internal reporting regimes to encourage a reporting culture. Included in this suite is a confidential reporting system which was instituted in 1998; on average, 70 reports a year are submitted under this program. Twelve to fourteen thousand Aviation Occurrence Reports (AOR) are filed by NAV CANADA each year.

2.13 NAV CANADA is required to operate under all applicable aviation regulations. Standards are enacted pursuant to the Regulations which dictate the provision of ATS, including the application of separation. In cases where the regulations or standards may not take account of enhanced ground system or aircraft capabilities, NAV CANADA requests exemptions. All such requests must be supported, at minimum, by a detailed justification, the conditions under which the exemption would be exercised, an explanation of how and why the exemption would be in the Public Interest, a safety analysis showing that safety is either positively affected or not affected, the Hazard Identification and Risk Analysis supporting the safety analysis, the Safety Management Plan for the changes which would be made if the exemption were granted, the training plan, if personnel training is required and amendments to operational documents, if required to implement the exemption.

2.14 When NAV CANADA is considering a significant change to its systems or procedures, its SMS requires a Hazard Identification and Risk Analysis (HIRA) be carried out prior to implementation. The HIRA and its outcome form an integral part of the Safety Management Plan (SMP) which must be developed to support any such change. An SMP is a roadmap to how safety management activities will be coordinated and conducted. The SMP describes a credible and feasible program of work, which will demonstrate that the appropriate safety management activities will be undertaken and due diligence employed. It also describes how the required HIRAs will be conducted. If the change may be affected by existing or planned regulations, it is not uncommon for there to be consultation with Transport Canada to ensure all activities and documentation will be completed and documented in accordance with regulatory requirements.

2.15 NAV CANADA and Transport Canada together benefit from their collaborative approach to safety management. Under a regulated Safety Management System, NAV CANADA is expected to take an ownership role in proactively managing its safety risks and having the necessary systems in place to ensure it complies with regulatory requirements on an on-going basis. The regulatory framework and transparent working relationships between the two organizations support robust safety oversight. Additionally, it provides a coherent basis for planning and implementing improvements to the aviation system with the assurance that regulatory requirements are being met, including those associated with operational trials or exemption requests.

3. Action by the Meeting

3.1 The NACC/WG/4 is invited to note the information provided.

APPENDIX A
EXTRACTS FROM THE CANADIAN AVIATION REGULATIONS

Canadian Aviation Regulations (CARs), Part I - General Provisions

Subpart 6 - Accountable Executive

(amended 2005/05/31; no previous version)

Application

106.01 This Subpart applies in respect of the following certificates:

- (a) an airport certificate issued under section 302.03; (*amended 2008/01/01*)
- (b) a flight training unit operator certificate issued under section 406.11; (*amended 2008/01/01*)
- (c) a manufacturer certificate issued under section 561.03; (*amended 2008/01/01*)
- (d) an approved maintenance organization (AMO) certificate issued under section 573.02; (*amended 2008/01/01*)
- (e) an air operator certificate issued under section 702.07, 703.07, 704.07 or 705.07; and (*amended 2008/01/01*)
- (f) an ATS operations certificate issued under section 801.05. (*amended 2008/01/01*)

Appointment and Acceptance

106.02 (1) The applicant for, or the holder of, a certificate referred to in section 106.01 shall

- (a) appoint an individual as accountable executive to be responsible for operations or activities authorized under the certificate and accountable on their behalf for meeting the requirements of these Regulations;
- (b) notify the Minister of the name of the person appointed; and
- (c) ensure that the accountable executive submits to the Minister a signed statement that they accept the responsibilities of their position within 30 days after their appointment.

(2) No person shall be appointed under subsection (1) unless they have control of the financial and human resources that are necessary for the activities and operations authorized under the certificate.

Accountability

106.03 The responsibility and accountability of the accountable executive appointed under subsection 106.02(1) are not affected by the existence of

- (a) a person responsible for the maintenance control system appointed under paragraph 406.19(1)(a) or 706.03(1)(a);
- (b) a person responsible for maintenance appointed under paragraph 573.03(1)(a);
- (c) an operations manager referred to in section 702.07, 703.07, 704.07 or 705.07; or
- (d) a maintenance manager referred to in section 702.07, 703.07, 704.07 or 705.07.

More Than One Certificate

106.04 If a certificate holder is the holder of more than one certificate referred to in section 106.01, only one accountable executive shall be appointed under paragraph 106.02(1)(a) to be responsible for the operations or activities authorized under the certificates.

Subpart 7 - Safety Management System Requirements (Content last revised 2007/12/30)

Application

107.01 (1) This Subpart, except paragraph 107.03(g), applies to an applicant for, or a holder of, one of the following certificates: (*amended 2008/01/01*)

(a) an approved maintenance organization (AMO) certificate issued under section 573.02 authorizing the holder to perform maintenance on an aircraft operated under Subpart 5 of Part VII;

or

(b) an air operator certificate issued under section 705.07.

(2) This Subpart applies to an applicant for, or a holder of, one of the following certificates: (*amended 2008/01/01; no previous version*)

(a) an airport certificate issued under section 302.03; and

(b) an ATS operations certificate issued under section 801.05.

Establishing a Safety Management System

107.02 The applicant for, or the holder of, a certificate referred to in section 107.01 shall establish, maintain and adhere to a safety management system.

Safety Management System

107.03 A safety management system shall include

(a) a safety policy on which the system is based;

(b) a process for setting goals for the improvement of aviation safety and for measuring the attainment of those goals;

(c) a process for identifying hazards to aviation safety and for evaluating and managing the associated risks;

(d) a process for ensuring that personnel are trained and competent to perform their duties;

(e) a process for the internal reporting and analyzing of hazards, incidents and accidents and for taking corrective actions to prevent their recurrence;

(f) a document containing all safety management system processes and a process for making personnel aware of their responsibilities with respect to them;

(g) a quality assurance program; (*amended 2008/01/01*)

(h) a process for conducting periodic reviews or audits of the safety management system and reviews or audits, for cause, of the safety management system; and

(i) any additional requirements for the safety management system that are prescribed under these Regulations.

Size

107.04 A safety management system shall correspond to the size, nature and complexity of the operations, activities, hazards and risks associated with the operations of the holder of a certificate referred to in section 107.01.

Canadian Aviation Regulations (CARs), Part VIII - Air Navigation Services

Subpart 5 - Safety Management System (Content last revised: 2008/01/01)

Requirements

805.01 The safety management system required under section 107.02 in respect of an applicant for, or a holder of, an ATS operations certificate shall

(a) meet the requirements of Subpart 7 of Part I and section 805.02; and

(b) be under the control of the accountable executive appointed under paragraph 106.02(1)(a).

Components of the Safety Management System

805.02 (1) The safety management system shall include, among others, the following components:

(a) a safety management plan that includes

(i) a safety policy that the accountable executive has approved and communicated to all employees,

(ii) the roles and responsibilities of personnel assigned duties under the safety management system,

(iii) performance goals and a means of measuring attainment of those goals,

(iv) a policy for the internal reporting of hazards, incidents and accidents, including the conditions under which immunity from disciplinary action will be granted, and

(v) a process for reviewing the safety management system to determine its effectiveness;

(b) procedures for reporting hazards, incidents and accidents to the appropriate manager;

(c) procedures for the collection of data relating to hazards, incidents and accidents;

(d) procedures for the exchange of information in respect of hazards, incidents and accidents among the operators of aircraft and the provider of air traffic services at an airport and the airport operator;

(e) procedures for analysing data obtained under paragraph (c) and during an audit conducted under subsection 805.03(3) and for taking corrective actions;

(f) training requirements for the accountable executive and for personnel assigned duties under the safety management system;

(g) procedures for making progress reports to the accountable executive at intervals

(h) procedures for involving employees in the implementation and ongoing development of the safety management system.

(2) The components specified in subsection (1) shall be set out in a manual or another document established by the holder of the ATS operations certificate that includes

(a) a record of any amendments to the manual or document;

- (b) a description of the procedures for amending the manual or document; and
- (c) a statement, signed by the accountable executive, certifying that the manual or document is complete and its content accurate.

(3) The Minister shall approve the manual or document if it contains the information and statement required under subsection (2).

Quality Assurance Program

805.03 (1) The quality assurance program required under paragraph 107.03(g) in respect of an applicant for, or a holder of, an ATS operations certificate shall include a process for quality assurance that includes periodic reviews or audits of the activities authorized under a certificate and reviews or audits, for cause, of those activities.

(2) The holder of an ATS operations certificate shall ensure that records relating to the findings resulting from the quality assurance program are distributed to the appropriate manager for corrective action and follow-up in accordance with the policies and procedures specified in the manual or document established under subsection 805.02(2).

(3) The holder of an ATS operations certificate shall establish an audit system in respect of the quality assurance program that consists of the following:

- (a) an initial audit conducted within 12 months after the day on which the ATS operations certificate is issued;
- (b) an audit of the entire quality assurance program carried out every three years, calculated
 - (i) in the case of an ATS operations certificate issued before January 1, 2008, from that date, and
 - (ii) in the case of an ATS operations certificate issued on or after January 1, 2008, from the date of the initial audit;
- (c) checklists of all activities carried out under the certificate;
- (d) a record of each occurrence of compliance or non-compliance with the checklists in respect of the activities carried out under the certificate that is found during an audit referred to in paragraph (a) or (b);
- (e) procedures for ensuring that each finding of an audit is communicated to the accountable executive;
- (f) follow-up procedures for ensuring that corrective actions are effective; and
- (g) a system for recording the findings of an audit referred to in paragraph (a) or (b), corrective actions and follow-ups.

(4) The audit referred to in paragraph (3)(b) shall be carried out in one of the following ways:

- (a) as a complete audit, or
- (b) as a series of audits conducted at intervals determined by the holder of the ATS operations certificate and set out in the manual or document established under subsection 805.02(2).

(5) The records resulting from a system required under paragraph (3)(g) shall be retained for the greater of

- (a) two audit cycles, and
- (b) two years.

(6) The duties related to the quality assurance program that involve specific tasks or activities among the activities of an ATS operations certificate holder shall be fulfilled by persons who are not responsible for carrying out those tasks or activities unless

- (a) the size, nature and complexity of the operations and activities authorized under the ATS operations certificate justify the fulfilling of those duties by the person responsible for carrying out those tasks or activities;
- (b) the holder of the ATS operations certificate demonstrates to the Minister by means of a risk analysis, that the fulfilling of those duties by the person responsible for carrying out those tasks or activities will not result in an unacceptable risk to aviation safety; and
- (c) the holder of the ATS operations certificate provides the Minister, in writing, with the information required under paragraphs (a) and (b).

Duties of the Certificate Holder

805.04 The holder of an ATS operations certificate shall ensure that

- (a) corrective actions are taken in respect of any findings resulting from the safety management system referred to in section 805.01; and
- (b) the accountable executive performs the duties prescribed in section 805.05.

Management of the Safety Management System

805.05 (1) The accountable executive shall

- (a) establish and maintain a reporting system to ensure the timely collection of information related to hazards, incidents and accidents that may adversely affect safety;
- (b) identify hazards and carry out risk management analyses of those hazards;
- (c) investigate, analyze and identify the cause or probable cause of all hazards, incidents and accidents identified under the safety management system;
- (d) establish and maintain a safety data system, by either electronic or other means, to monitor and analyze trends in hazards, incidents and accidents;
- (e) monitor and evaluate the results of corrective actions with respect to hazards, incidents and accidents;
- (f) monitor the concerns of the civil aviation industry in respect of safety and their perceived effect on the holder of the ATS operations certificate; and
- (g) determine the adequacy of the training required by paragraph 805.02(1)(f).

(2) The accountable executive shall, if a finding resulting from a quality assurance program referred to in subsection 805.03(1) or a safety management system referred to in section 805.01 is reported to them,

- (a) determine what, if any, corrective actions are required and carry out those actions;
- (b) keep a record of any determination made under paragraph (a) and the reason for it;
- (c) if management functions have been assigned to another person under subsection (3), communicate any determination regarding a corrective action to that person; and

- (d) notify the certificate holder of any systemic deficiency and of the corrective action taken.
- (3) The accountable executive may assign the management functions of the safety management system referred to in section 805.01 to another person if the assignment and its scope are described in the manual or document referred to in subsection 805.02(2).
- (4) The person to whom management functions have been assigned under subsection (3) shall notify the accountable executive of any systemic deficiency and of the corrective action taken.
- (5) The responsibility of the accountable executive is not affected by the assignment of management functions to another person under subsection (3).

APPENDIX B REPORTABLE OCCURRENCES

Reports from Flight Crew - Any reportable occurrence that is reported by flight crew to ATS must be reported through the AOR processes, regardless of ATS's assessment of the occurrence (e.g. if the pilot reports a bird strike, an AOR is to be submitted regardless of whether or not the bird strike can be confirmed).

Aircraft Accident - A person, other than a stowaway, sustains a serious injury or fatal injury that is not self-inflicted or inflicted by another person or caused by natural causes, as a result of that person

- i) being in the aircraft,
- ii) coming into direct contact with any part of the aircraft,
- iii) being directly exposed to the jet blast/propeller wash of the aircraft.

An aircraft sustains damage or structural failure adversely affecting the structural strength, performance or flight characteristics of the aircraft normally requiring major repair or replacement of any affected component part.

The occurrence is not reported as an accident if the damage or failure is limited to:

- i) the engine, its cowlings or its accessories,
- ii) the propellers, wing tips, antennae, tires, brakes or fairings, or
- iii) small dents or puncture holes in the aircraft skin.

In these situations, the occurrence must be reported only if it meets other criteria of reportable occurrences.

An aircraft is missing or is completely inaccessible

Any of the following:

An engine fails.

Smoke or fire occurs, other than an engine fire that is contained within the engine and does not result in engine failure or damage to component parts of the aircraft.

Difficulty in controlling the aircraft in flight are encountered due to any aircraft system malfunction, weather phenomena, wake turbulence, operations outside the approved flight envelope or uncontrolled vibrations.

An aircraft fails to remain within the landing or takeoff area, lands with one or more landing gear retracted or drags a wing tip or engine pod.

Any crew member is unable to perform his/her flight duties as a result of incapacitation.

Decompression, explosive or otherwise, occurs that necessitates an emergency descent.

A fuel shortage occurs that necessitates a diversion or requires approach and landing priority at the destination of the aircraft.

An aircraft is refuelled with the incorrect type of fuel or contaminated fuel.

A loss of separation occurs. Or, a collision or risk of collision with any other aircraft or with any vehicle, terrain, pedestrians or obstacle occurs, including a collision or risk of collision that may be related to air traffic services (includes criteria for ATS-OI) or equipment failures.

An aircraft receives a TCAS/ACAS Resolution Advisory or a GPWS/TAWS warning.

A flight crew member declares an emergency or indicates any degree of emergency that requires priority handling by an air traffic services unit or the standing by of Aircraft Rescue and Fire Fighting. This category includes aircraft reporting to be in weather difficulty or lost, regardless of whether an emergency is declared.

Toxic gases or corrosive materials leak from any area aboard the aircraft.

All unauthorized incursions or operating irregularities involving vehicles or pedestrians. Incursions by animals are reported only when an aircraft is on the manoeuvring area or on the approach.

Failure or unplanned outage of a navigational aid, approach aid, communications system or airport lighting.

Any other equipment/system breakdown (including ATS systems, power bumps, VDF, laser ceilometer) should be reported only if a pilot reports an effect on on-board systems, or if it has an adverse effect upon flight safety or a major impact upon operations (e.g. limits the flow of traffic).

Note: National system outages (such as AFTN or Aviation Weather Data dissemination network) are reported to the National Operations Centre (NOC), which assesses the situation and advises whether an AOR should be submitted.

Operation without a serviceable transponder and automatic pressure-altitude reporting equipment (excluding balloons and gliders) in transponder airspace.

AWOS outages, errors or discrepancies with pilot reports, if it has an adverse effect upon flight safety or a major impact upon operations.

Unlawful interference - aircraft hijacking, terrorist activities, hostage taking, criminal action, or bomb threat or bomb found.

ATS Unit evacuation.

Aircraft evacuation.

Unavailability of a runway due to snow accumulation, ice, flood, obstruction or foreign object that results in a major impact on airport operations, as reported by Airport Management (a NOTAM must also be filed).

Note: An AOR is not required for planned runway closures.

All bird or wildlife strikes, regardless of impact on operations.

Missing aircraft reports, Search and Rescue action or ELT activation outside of testing period.

Significant building and equipment fire or other major damage on airport or NAV CANADA property and sites.

Labour action affecting operational capability.

ATS unit operating outside published hours.

Item dropped from aircraft or unplanned or emergency release of an external load (“sling load”).

Alleged regulatory infractions. This category includes events such as SID deviations, Gross Navigation Errors (GNEs), Large Height Deviations (LHDs) and operations below minima arrivals and departures, and taxi operations.

Unlawful use of ATS frequencies.

Environmental emergencies such as significant fuel spill, hazardous chemical or radioactive spill on airport or NAV CANADA property. Always submit a report if reported by someone external to NAVCANADA, regardless of “significance”.

— B3 —

Laser or other directed bright light illumination.

Missed approaches: All missed approach procedures conducted by domestic, foreign and commuter airlines, air taxi operators, corporate flight operations and freight carriers in controlled/uncontrolled airspace except those believed to be due to the aircrew not acquiring visual reference to the ground. If one or more aircraft conducts a missed approach reported in another category listed in the Aviation Occurrence Reporting Procedures Manual (e.g. risk of collision, TCAS Resolution Advisory, bird strike, equipment malfunction, alleged CARs violations), only one AOR needs to be issued for the event.

Any occurrence which may generate a high degree of public interest or concern or could be of direct interest to specific foreign air authorities. These occurrences shall be discussed with the NOC, and the NOC will determine if an AOR is to be filed.

Any other event which is irregular, unplanned or non-routine in nature which has an adverse effect upon flight safety or a major impact upon operations.

— END —