



REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION A99-02

Flight recorder duration and power supply: Duration of cockpit voice recorder information

Background

On 2 September 1998, Swissair Flight 111, a McDonnell Douglas MD-11 aircraft, departed John F. Kennedy Airport in New York, New York, en route to Geneva, Switzerland. Approximately 1 hour after take-off, the crew diverted the flight to Halifax, Nova Scotia, because of smoke in the cockpit. While the aircraft was manoeuvring in preparation for landing in Halifax, it struck the water near Peggy's Cove, Nova Scotia, fatally injuring all 229 occupants on board. The investigation revealed that the flight crew had lost control of the aircraft as a result of a fire in the aircraft's ceiling area, forward and aft of the cockpit bulkhead.

One of the shortcomings identified during the investigation was the limited recording capacity of the aircraft's cockpit voice recorder (CVR). The CVR was able to record only 30 minutes, and therefore did not capture the timeframe when the fire started.

On 9 March 1999, the Board released interim safety recommendations as part of its investigation (A98H0003) into this occurrence.

TSB Recommendation A99-02 (March 1999)

A lack of recorded voice and other aural information can inhibit safety investigations and delay or prevent the identification of safety deficiencies. Given the need for longer periods of recorded sound to capture the initiating events of aviation accidents, and the availability of two-hour CVRs, the Board believed that such recorders should be mandated by regulatory authorities worldwide. However, it also recognized that a period of several years may be reasonably required for manufacturers and operators to implement this change. The Board believed that, with appropriate lead time, a retrofit program was warranted for aircraft already in service. Therefore, the Board recommended to both Transport Canada (TC) and the European Joint Aviation Authorities that:

As of 1 January 2005, all aircraft that require both an FDR and a CVR be required to be fitted with a CVR having a recording capacity of at least 2 hours.

TSB Recommendation A99-02

Transport Canada's response to Recommendation A99-02 (June 1999)

In Transport Canada's (TC) response received by the TSB on 07 June 1999, TC indicated support for this recommendation with the provision that the United States Federal Aviation Administration (FAA) and Canadian requirements remain harmonized. TC's stated intention

was to introduce an appropriate Notice of Proposed Amendment (NPA) into its Canadian Aviation Regulation Advisory Council (CARAC) process.

TSB assessment of Transport Canada's response to Recommendation A99-02 (March 2000)

TC's intent to initiate a process towards the promulgation of regulations, when fully implemented, will substantially reduce or eliminate the safety deficiency on which the Board's recommendation was based.

Therefore, the response is assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-02 (December 2005)

In its update to the TSB, dated 14 December 2005, TC stated that the FDR/CVR regulations are being reviewed with the intent of harmonizing with the FAA rulemaking wherever possible. NPAs have been drafted to address this issue and others related to the update and harmonization of the FDR/CVR regulations. The NPAs will be presented at an upcoming CARAC Technical Committee meeting.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (July 2006)

In its response dated 14 December 2005, TC states that a draft NPA harmonized with the FAA rulemaking (FAA-2005-20245 refers) will be tabled at an upcoming CARAC Technical Committee meeting.

On 3 March 2006, as part of the ongoing investigation (A05F0047) into a loss-of-rudder occurrence, the TSB sent an Aviation Safety Advisory (A060008-1) to TC suggesting that it expedite its efforts to mitigate the risks associated with Recommendation A99-02. As of June 2006, the FAA has yet to release its final rule that would require that all CVRs be able to retain the last 2 hours of cockpit audio.

This proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-02.

Therefore, the assessment is **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-02 (February 2007)

TC's letter to the TSB dated 07 February 2007 restates its 14 December 2005 position.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (July 2007)

TC's response dated 7 February 2007 is a repeat of its position as stated 14 December 2005. The response provides no new information about the details of the referenced NPAs or when these NPAs will be tabled at the CARAC Technical Committee meeting.

On 3 March 2006, as part of the ongoing investigation (A05F0047) into a loss of rudder occurrence, the TSB sent an Aviation Safety Advisory (A060008-1) to TC suggesting that it

expedite its efforts to mitigate the risks associated with Recommendation A99-02. As of June 2007, the FAA has yet to release its final rule that would require that all CVRs be able to retain the last two hours of cockpit audio.

TSB's assessment remains the same in that the proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-02.

Therefore, the assessment is **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-02 (March 2008)

In its response of 06 March 2008, TC states that it will introduce an appropriate NPA into the CARAC process. The Department supports this recommendation with the provision that United States and Canadian requirements are harmonized. TC's work is ongoing with respect to this issue. Harmonizing with the FAA regulations is taking longer than expected due to differing priorities. Internal revisions to the drafted NPAs continue.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (August 2008)

TC's response provides no new information regarding the details of the referenced NPAs or when they are to be tabled at the CARAC Technical Committee meeting.

On 7 March 2008, the FAA issued its final rule entitled *Revisions to Cockpit Voice Recorder and Digital Flight Data Recorder Regulations* stating that, by 7 April 2012, CVRs on all turbine engine-powered airplanes have a 2-hour recording capacity. Because TC's harmonization efforts are ongoing, it is unknown at this time whether or not the CARs will require a CVR having a recording capacity of at least 2 hours as stated in Recommendation A99-02.

TSB's assessment remains the same in that the proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-02.

Therefore, the assessment is **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-02 (February 2010)

TC's latest response states simply that NPAs are currently being developed.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (September 2010)

This reassessment is hindered by the lack of detailed information with respect to the nature of what will be proposed in the NPAs. It is assumed that the referenced NPAs are the same initiatives mentioned in TC's 6 March 2008 response.

As per the preamble to Recommendation A99-02, the Board is anticipating that any proposed regulatory change would include a retrofit requirement for aeroplanes already in service. TC has previously (6 March 2008) stated that it intended to harmonize with the FAA's Final Rule dated 7 March 2008 which amends Federal Aviation Regulations (FARs) to require that turbine

engine-powered airplanes have a 2-hour recording capacity by 7 April 2012. At no time has TC provided the TSB with sufficient details about the content of its developing NPAs to allow the TSB to accurately assess whether or not the NPA contains a retrofit component.

Given the protracted activities required to prepare an NPA, receive approval through the CARAC process, and implement regulatory change, it would appear unlikely that TC can promulgate an amendment to the CARs that would match the FAA's implementation date of 7 April 2012.

The Board is concerned that, notwithstanding TC assurances that it intends to harmonize its rulemaking efforts with those of the FAA, TC's proposed rulemaking will fail to match the FAA's in both scope and schedule.

TSB's assessment remains the same in that TC's proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-02.

Therefore, the assessment remains **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-02 (January 2011)

TC's latest response states that Civil Aviation plans to present NPAs on the subject at the scheduled September 2011 CARAC Technical Committee Meeting.

TSB reassessment of the response to Recommendation A99-02 (March 2011)

Since its first response dated 7 June 1999, Transport Canada has stated its intention to initiate NPA action in order to address the deficiency identified in Recommendation A99-02. With each subsequent update it has repeated its original intention. Almost 12 years after its initial response, the oft-promised NPA has yet to be tabled at a CARAC Technical Committee Meeting which means the actual changes, if adopted, are many years away. This is despite the fact that the U.S. has issued its final rule effective 7 April 2012.

At no time during the past decade has TC provided TSB with sufficient detail regarding its mitigation strategy. Without such details TSB is unable to conduct an accurate assessment beyond stating that TC remains intent on proposing change to its regulations to align with those of the FAA. Consequently, TSB has continued to reassess TC's responses as Satisfactory Intent in the expectation that TC was working towards a satisfactory mitigation of the risks associated with Recommendation A99-02.

The benefits of longer CVR recordings are well known. The lack of longer periods of recorded voice and other aural information continues to inhibit occurrence investigations and delay or prevent the identification of safety deficiencies. The Board is not satisfied that TC's intentions have been supported with the necessary degree of action. This means there is no assurance that aircraft requiring both an FDR and a CVR will be fitted with a CVR having a recording capacity of at least 2 hours.

While TC has promised action, the inordinate time taken to implement changes to the CARs has maintained the status quo and allowed the safety deficiency to potentially put persons and property at risk. Therefore, the assessment is changed to **Unsatisfactory**.

Transport Canada's response to Recommendation A99-02 (May and September 2011)

May 2011 Input:

An Issue Paper will be presented at the September 2011 Technical Committee to discuss the Transport Canada proposal with regards to amending requirements for CVR/FDR.

September 2011 update:

NPA 2011-010 addressing A99-02 (CVR 2-Hour Recording Capacity) to be tabled at the September 2011 CARAC Technical Committee meeting. NPA 2011-010 to require that as of 01 January 2005, all aircraft that require both an FDR and a CVR will be required to be fitted with a CVR having a recording capacity of at least two hours.

Expected to be pre-published in Gazette 1, Spring 2012.

Response of the European Aviation Safety Agency to Recommendation A99-02 (January 2012)

EASA acknowledges receipt of this Safety Recommendation. Please be advised that it is under consideration and that the outcome will be communicated to you in due course.

TSB reassessment of the responses from Transport Canada and the European Aviation Safety Agency to Recommendation A99-02 (March 2012)

The European Aviation Safety Agency (EASA) has taken over the responsibility of recommendations issued to the Joint Aviation Authorities (JAA). The TSB requested that EASA provide an update as to the progress of activities taken to mitigate the residual risks associated with Recommendation A99-02. While the EASA has responded, it only acknowledges receipt of Recommendation A99-02 and does not offer any details of action taken over the past 13 years or of any planned actions. This lack of details prevents a meaningful assessment of EASA's response.

As for TC, its latest update states that NPA 2011-010 addresses the 2-hour CVR recording capacity as called for in Recommendation A99-02. This NPA was on the published agenda for the September 2011 CARAC Technical Committee meeting and TC indicated that it is expected to be pre-published in *Canada Gazette*, Part I in the spring of 2012.

TC has previously adopted Airworthiness Manual amendments which establish a requirement for new aircraft types and new design approvals of CVRs and FDRs to have a recording capacity of at least 2 hours. As equipment gets replaced, this requirement will improve the quantity of recorded information and increase the potential for retaining important information needed for occurrence investigations. However, these changes were not applicable to the in-service fleet and did nothing to mitigate the risk identified in Recommendation A99-02.

However, NPA 2011-010 requires the in-service fleet be retrofitted with a CVR having a recording capacity of at least 2 hours. The aircraft retrofits apply to all aircraft currently operating or that are manufactured before the compliance date (effective date plus 4 years) of this new requirement. In addition, aircraft that are manufactured on or after the compliance date of this new requirement would have to comply at the time of manufacture.

At the time that NPA 2011-010 was drafted, it was estimated that the effective date of the new requirement would be 1 January 2012 with a compliance date 4 years later (1 January 2016).

Presently, the proposed action has not been sufficiently advanced to reduce the risks to transportation safety. However, the planned action, when fully implemented, will substantially reduce or eliminate the safety deficiency identified in Recommendation A99-02.

Therefore, the responses in aggregate are considered as **Satisfactory Intent**.

Response of the European Aviation Safety Agency to Recommendation A99-02 (December 2012)

The Agency was made aware of this Safety Recommendation in 2011. The Agency's interim response [Ref. 22/03/2012 - Reply doc Ref, 51418 (2012)] referred to rulemaking tasks RMT.0404 and 0405 [former OPS.092 (a) and (b)]. These tasks have been merged with RMT.0400 and 0401, which were launched on 26 September 2012 with the publication of the associated Terms of Reference. This Safety Recommendation is being considered within the framework of these tasks. Status: Closed - Partial agreement.

Transport Canada's response to Recommendation A99-02 (December 2012)

Since the March 2012 update, the amendments are progressing well. Although it had been anticipated that the rules would be published in 2012, our commitment to respond to this recommendation remains a priority.

Transport Canada's response to Recommendation A99-02 (February 2013)

NPA 2011-010 was submitted to the CARAC Technical Committee on June 28, 2012 for revision as a result of amendments to ICAO Annex 6 Standards that occurred after September 2011. These revisions have not materially altered the intent of NPA 2011-010 as presented to the Committee in September 2011.

TSB reassessment of the responses from Transport Canada and the European Aviation Safety Agency to Recommendation A99-02 (March 2013)

EASA's response indicates that activities to mitigate the residual risks associated with Recommendation A99-02 include the creation of 2 rulemaking tasks (RMT.0400 and RMT.0401). These latest rulemaking tasks were launched on 26 September 2012 and form part of EASA's 2013-2016 version of its 4-year Rulemaking Programme (RMP). The RMP predicts that both tasks will be completed by end of calendar year 2016. The successful accomplishment of these rulemaking efforts will amend CVR recorder requirements to extend recording duration to 2 hours as specified in Recommendation A99-02.

In its September 2011 update TC predicted that NPA 2011-010 was "Expected to be pre published in Gazette 1, Spring 2012". While the regulator (TC) did not meet this schedule, NPA 2011-010 was tabled at the 28 June 2012 Civil Aviation Regulatory Committee and was approved as revised. The intent of NPA 2011-010 has not been materially altered.

TC's proposed action has not been sufficiently advanced to reduce the risks to transportation safety. However, the planned action, when fully implemented, will substantially reduce or eliminate the safety deficiency identified in Recommendation A99-02.

Therefore, the responses in aggregate are considered as **Satisfactory Intent**.

Response of the European Aviation Safety Agency to Recommendation A99-02 (March 2013)

The Agency was made aware of this Safety Recommendation in 2011. The Agency's interim response [Ref. 22/03/2012: Reply doc Ref, 51418 (2012)] referred to rulemaking tasks RMT.0404 and RMT.0405 [former OPS.092 (a) and (b)]. These tasks have been merged with RMT.0400 and 0401, which were launched on 26 September 2012 with the publication of the associated Terms of Reference. This Safety Recommendation is being considered within the framework of these tasks. Partial agreement: Closed.

Transport Canada's response to Recommendation A99-02 (November 2013)

This item remains a regulatory priority. It is anticipated that proposed regulations will be pre-published in Part I of the *Canada Gazette* in fall 2014.

TSB reassessment of the responses from Transport Canada and the European Aviation Safety Agency to Recommendation A99-02 (April 2014)

Transport Canada's latest response updates the progress of NPA 2011-010. As previously reported, the scheduled submission of Notice of Proposed Amendment (NPA) 2011-010 to *Canada Gazette*, Part 1 was delayed so that it could be amended to reflect 2011 amendments to International Civil Aviation Organization (ICAO) Annex 6 Standards. The amended version of NPA 2011-010 was approved on 28 June 2012 and is not expected to be pre-published in the *Canada Gazette*, Part 1 until the last quarter of CY2014. It would appear that the process required to finalize the regulatory changes as proposed in NPA 2011-010 is moving forward.

EASA's latest response, in March 2013, refers to its letter dated 18 December 2012 and states that its action to mitigate the risks associated with Recommendation A99-02 form part of 2 rulemaking tasks (RMT.0400 and RMT.0401). These rulemaking tasks are scheduled to be implemented by the end of CY2016 as part of EASA's four-year Rulemaking Programme. The successful accomplishment of these rulemaking efforts will amend cockpit voice recorder (CVR) requirements to extend recording duration to 2 hours, as specified in Recommendation A99-02.

As EASA considers its action with respect to Recommendation A99-02 closed, no further updates are anticipated.

Both jurisdictions are proposing regulatory changes that, when fully implemented, will substantially reduce or eliminate the safety deficiency identified in Recommendation A99-02.

Therefore, the responses in aggregate are considered as **Satisfactory Intent**.

Response of the European Aviation Safety Agency to Recommendation A99-02 (November 2014)

EASA has provided a closing reply to this safety recommendation on 18/12/2012. As foreseen in this reply, this safety recommendation was considered within the framework of rulemaking tasks RMT.0400 and RMT.0401, "Amendment of requirements for flight recorders and underwater locating devices" which were launched on 26 September 2012.

The results of these considerations were published in a Notice of Proposed Amendment (NPA 2013-26) in December 2013. The resulting EASA Opinion (Opinion 01/2014) was then published in May 2014.

This Opinion includes the proposal to require that, by 01 January 2019, all aeroplanes which are required to carry a Cockpit Voice Recorder (CVR) shall be fitted with a CVR which has a minimum recording duration of 2 hours.

The Opinion was submitted to the European legislator (European Commission, European Parliament and Council), which is currently assessing it.

Transport Canada’s response to Recommendation A99-02 (March 2015)

Transport Canada agrees with the intent of the recommendation. It is anticipated that proposed regulations that address this recommendation will be pre-published in the *Canada Gazette*, Part I in spring 2016.

TC indicated that delays are sometimes inevitable when higher priority tasks take up resources in the regulatory program. The defined criteria for assigning priority to regulatory initiatives are presented in the following table.

Transport Canada list of regulatory priorities

Priority 1	Speech from the throne, Budget, Other High Level Government Commitment, initiatives related to the Red Tape reduction and Canada-U.S. Regulatory Cooperation Council
Priority 2	Ministerial priority, Urgency, Transportation Safety Board Watchlist Initiatives
Priority 3	High Strategic Outcome Priority, International/Federal-Provincial Obligations, Time Pressure, other TSB initiatives
Priority 4	Efficiency, Parliamentary, Stakeholder Priorities
Priority 5	Miscellaneous Amendments

Note that the TSB Watchlist initiatives and other TSB initiatives are assigned Priority 2 and 3 respectively. These high ratings were assigned because the department takes TSB safety action very seriously. Occasionally, however, even important regulatory initiatives are shifted due to higher priority issues. The Board should be aware, however, that once Civil Aviation commits to regulatory action, timing may change, but the department will proceed with the initiative until it is completed.

TSB reassessment of the response to Recommendation A99-02 (March 2015)

The TSB made this recommendation over 15 years ago. In earlier responses, Transport Canada indicated it would amend the CVR regulations subject to harmonization with the FAA rules. The final FAA rule was issued in March 2008 stating that, by April 2012, the CVRs must have a 2-hour recording capacity. In September 2010, the TSB indicated that: “Given the protracted activities required to prepare an NPA, receive approval through the CARAC process, and implement regulatory change, it would appear unlikely that TC can promulgate an amendment to the CARs that would match the FAA’s implementation date of 7 April 2012.”

In December 2012, Transport Canada assured the TSB that “...our commitment to respond to this recommendation remains a priority.”

In its latest response, Transport Canada indicates that it plans to pre-publish these regulations in the spring of 2016. It further explains its rationale for these delays. In the meantime, the CARs will continue to lack harmonization with both the FAR requirement and the ICAO standard for 2-hour CVR.

EASA reviewed its actions to date in response to Recommendation A99-02. The latest version of EASA rulemaking tasks RMT.0400 and RMT.0401 would indicate that implementation is now scheduled for 1 January 2019.

While Transport Canada's proposed measures are reasonable, the protracted delays are not.

Therefore, the assessment rating for this recommendation is changed to **Unsatisfactory**.

Transport Canada's response to Recommendation A99-02 (November 2015)

(Includes recommendations A91-13, A94-04, and A99-03.)

Transport Canada agrees with the intent of the recommendation. It is anticipated that the proposed regulations that address this recommendation will be pre-published in the *Canada Gazette*, Part I in 2016.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (March 2016)

Transport Canada's latest update repeats the statement that its proposed regulations, to address the risks identified in Recommendation A99-02, are to be pre-published in the *Canada Gazette*, Part I in 2016.

While Transport Canada's proposed regulatory changes are reasonable, the protracted delays are not.

Therefore, the assessment rating for this recommendation remains **Unsatisfactory**.

European Aviation Safety Agency's response to Recommendation A99-02 (January 2017)

Commission Regulation (EU) 2015/2338 (resulting from EASA rulemaking task RMT.0400) in December 2015 amended Commission Regulation (EU) No 965/2012 on Air Operations. Among other changes, the provisions related to Cockpit Voice Recorder (CVR) recording duration were modified.

- Commission Regulation (EU) No 965/2012 contains the following provisions on CVR recording duration for Commercial Air Transport (CAT) operations:

For aeroplanes: CAT.IDE.A.185 Cockpit voice recorder

(a) The following aeroplanes shall be equipped with a cockpit voice recorder (CVR):

- (1) aeroplanes with an MCTOM of more than 5 700 kg; and
- (2) multi-engined turbine – powered aeroplanes with an MCTOM of 5 700 kg or less, with an MOPSC of more than nine and first issued with an individual CofA on or after 1 January 1990.

- (b) Until 31 December 2018, the CVR shall be capable of retaining the data recorded during at least:
 - (1) the preceding 2 hours in the case of aeroplanes referred to in (a)(1) when the individual CofA has been issued on or after 1 April 1998;
 - (2) the preceding 30 minutes for aeroplanes referred to in (a)(1) when the individual CofA has been issued before 1 April 1998; or
 - (3) the preceding 30 minutes, in the case of aeroplanes referred to in (a)(2).
- (c) By 1 January 2019 at the latest, the CVR shall be capable of retaining the data recorded during at least:
 - (1) the preceding 25 hours for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2021; or
 - (2) the preceding 2 hours in all other cases.

For helicopters: CAT.IDE.H.185 Cockpit voice recorder

- (a) The following helicopter types shall be equipped with a cockpit voice recorder (CVR):
 - (1) all helicopters with an MCTOM of more than 7 000 kg; and
 - (2) helicopters with an MCTOM of more than 3 175 kg and first issued with an individual CofA on or after 1 January 1987.
- (b) The CVR shall be capable of retaining the data recorded during at least:
 - (1) the preceding two hours for helicopters referred to in (a)(1) and (a)(2), when first issued with an individual CofA on or after 1 January 2016;
 - (2) the preceding one hour for helicopters referred to in (a)(1), when first issued with an individual CofA on or after 1 August 1999 and before 1 January 2016;
 - (3) the preceding 30 minutes for helicopters referred to in (a)(1), when first issued with an individual CofA before 1 August 1999; or
 - (4) the preceding 30 minutes for helicopters referred to in (a)(2), when first issued with an individual CofA before 1 January 2016.

Commission Regulation (EU) No 965/2012 contains the following provisions on CVR recording duration for Non-Commercial operations with Complex motor-powered aircraft (NCC), and for Specialised Operations (SPO):

For aeroplanes: NCC.IDE.A.160/SPO.IDE.A.140 Cockpit voice recorder

- (a) The following aeroplanes shall be equipped with a CVR:
 - (1) aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2016; and
 - (2) aeroplanes with an MCTOM of more than 2 250 kg:
 - (i) certified for operation with a minimum crew of at least two pilots;

- (ii) equipped with turbojet engine(s) or more than one turboprop engine; and
 - (iii) for which a type certificate is first issued on or after 1 January 2016.
- (b) The CVR shall be capable of retaining data recorded during at least:
- (1) the preceding 25 hours for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2021; or
 - (2) the preceding 2 hours in all other cases.

For helicopters: NCC.IDE.H.160/SPO.IDE.H.140 Cockpit voice recorder

- (a) Helicopters with an MCTOM of more than 7 000 kg and first issued with an individual CofA on or after 1 January 2016 shall be equipped with a CVR.
- (b) The CVR shall be capable of retaining data recorded during at least the preceding 2 hours.

With the publication of the above-mentioned provisions, the Agency has completed its actions to ensure that the CVR has a recording duration which is adequate for the aircraft it is installed in, with a minimum baseline duration of 2 hours for all aeroplanes used for CAT or SPO, and for complex aeroplanes used for non-commercial operations.

TSB reassessment of the European Aviation Safety Agency's response to Recommendation A99-02 (March 2017)

EASA has amended Commission Regulation No. 965/2012 with respect to its provisions on CVR recording duration for Commercial Air Transport operations.

Currently, the regulation requires CVRs of 2-hour duration in aircraft with a Maximum Certified Take-Off Mass of more than 5700 kg, whose Certificate of Airworthiness has been issued on or after 1 April 1998. By 1 January 2019, all CVRs shall be capable of retaining the data recorded during at least the preceding 2 hours, in all aircraft that require a CVR by regulation. These regulations will eliminate the safety deficiency underlying Recommendation A99-02.

Therefore, this response to Recommendation A99-02 is assessed as **Fully Satisfactory**.

Transport Canada's response to Recommendation A99-02 (January 2017)

TC agrees in principle with the recommendation.

It is anticipated that the proposed regulations that address the CVR (2-hr recording capacity) component of this recommendation, will be pre-published in the *Canada Gazette*, Part I, in summer 2017.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (March 2017)

TC's latest update indicates that its proposed regulatory amendments, designed to mitigate the risks associated with Recommendation A99-02, is anticipated to be pre-published in the *Canada*

Gazette, Part I, in summer 2017. Since 2011, this milestone has been revised 3 times, extending the anticipated pre-publishing in the *Canada Gazette*, Part I, from 2012 to 2017.

Progress toward mitigation of the risks associated with this recommendation has been slow. Such extended delays have prompted the TSB to add an item to its key safety issues Watchlist that calls for both TC and the Government of Canada to move towards an improved and accelerated process for taking action on TSB recommendations.

While TC's proposed regulatory changes are reasonable, the protracted delays are not.

Therefore, the response to Recommendation A99-02 is assessed as **Unsatisfactory**.

Transport Canada's response to Recommendation A99-02 (October 2017)

TC agrees with the recommendation.

It is anticipated that the proposed regulations that address the cockpit voice recorder (CVR) 2-hr recording capacity component of this recommendation, will be pre-published in the *Canada Gazette*, Part I, in Fall 2017.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (February 2018)

TC's proposed amendments to the *Canadian Aviation Regulations* (CARs) were pre-published in the *Canada Gazette*, Part I, in December 2017, and include the following new cockpit voice recorder (CVR) requirements:

- The CVR recording time will be extended from 30 minutes to 2 hours;
- CVR systems will require a 10-minute independent backup power supply in order for CVRs and cockpit area microphones to function in the event of a total aircraft power failure; and
- Pilot-to-controller communications will need to be recorded by the CVR if data-link communication (DLC) equipment is currently installed in order to reduce voice communication congestion, and potential verbal misunderstandings or misinterpretations.

The proposed amendments will apply to Canadian commuter and transport category aeroplanes, and will capture:

- Aeroplanes with a maximum certificated take-off weight (MCTOW) over 5700 kg (manufactured after 1987);
- Turbine-powered aeroplanes with an MCTOW over 27 000 kg (type certificated after September 30, 1969, and manufactured before January 1, 1987);
- Transport category helicopters with an MCTOW over 7000 kg (manufactured after 2002); and
- Multi-engined turbine-powered aeroplanes configured for 6 or more passenger seats and operated by 2 crew members, regardless of the minimum crew requirements set out in the aircraft type certificate or in the subpart of the CARs under which the aeroplane is operated.

The Board is encouraged by these proposed amendments and believes that, if fully implemented as published in the *Canada Gazette*, Part I, the amended regulations will address the safety deficiency associated with this recommendation. However, until the new CVR requirements come into effect, the risks associated with the safety deficiency identified in Recommendation A99-02 will continue to exist.

Therefore, the response to Recommendation A99-02 is assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-02 (November 2018)

TC agrees with the recommendation.

It is anticipated that final regulations that address the Cockpit Voice Recorders (CVR) (two-hour recording capacity) component of this recommendation will be published in the *Canada Gazette*, Part II, in the winter of 2018. The new regulations will implement the International Civil Aviation Organization (ICAO) standards with respect to aircraft requiring a two hour CVR recording capacity and align the CARs with the U.S. Federal Aviation Administration (FAA) standards in Title 14 of the United States Code of Regulations. The operators impacted by these regulations will have four years from the publication date of the new requirements in *Canada Gazette*, Part II, to upgrade their aircraft.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (March 2019)

In its response, Transport Canada (TC) indicates that the proposed amendments to the *Canadian Aviation Regulations*, regarding cockpit voice recorders (CVRs) recording capacity of at least 2 hours, will be published in the *Canada Gazette*, Part II, in the winter of 2018/2019. However, at the time of the reassessment, the proposed amendments have yet to be published.

The Board is encouraged by these proposed amendments and believes that, if fully implemented as published in the *Canada Gazette*, Part I, the amended regulations will address the safety deficiency associated with this recommendation. However, the new requirements will only take effect in 2023, at the earliest (4 years from the publication date of the new requirements in the *Canada Gazette*, Part II); 7 years after the International Civil Aviation Organization effective date of 1 January 2016, and 11 years after the Federal Aviation Administration effective date of 7 April 2012.

Until the new requirements come into effect, the risks associated with the safety deficiency identified in Recommendation A99-02 remain.

Therefore, the response to Recommendation A99-02 is assessed as **Satisfactory Intent**

Transport Canada's response to Recommendation A99-02 (October 2019)

TC agrees with Recommendations A99-02 and A99-03.

TC's amendments to the *Canadian Aviation Regulations* (CARs) (Parts I and VI – Flight Data Recorder and Cockpit Voice Recorder) published in the *Canada Gazette*, Part II, in May 2019,¹ addresses the safety deficiency associated with recommendations A99-02 & A99-03.

It includes the following new Cockpit Voice Recorder (CVR) requirements:

- The CVR recording time will be extended from 30 minutes to 2 hours.
- CVR systems will require a 10-minute independent backup power supply in order for CVRs and cockpit area microphones to function in the event of a total aircraft power failure.
- Pilot-to-controller communications will need to be recorded by the CVR if Data Link Communication (DLC) equipment is currently installed in order to reduce voice communication congestion, and potential verbal misunderstandings or misinterpretations.
- A requirement for an underwater locating device for CVR.

The implementation time frame is four years from the publication of the amended regulations in the *Canada Gazette*, Part II.

TSB reassessment of Transport Canada's response to Recommendation A99-02 (March 2020)

In its latest response, Transport Canada (TC) indicates that it agrees with Recommendation A99-02.

In May 2019, the amendments to the *Canadian Aviation Regulations* for flight data recorders and cockpit voice recorders (CVRs) were published in the *Canada Gazette*, Part II. These amendments include the requirement for CVRs to be capable of recording at least 2 hours. These requirements will come into effect in May 2023.

The Board believes that these amendments will address the safety deficiency associated with this recommendation.

Therefore, the response to Recommendation A99-02 is assessed as **Fully Satisfactory**.

Next TSB action

This deficiency file is **Closed**.

¹ Government of Canada, *Canada Gazette*, Part II, Vol. 153, No. 11, at: <http://www.gazette.gc.ca/rp-pr/p2/2019/2019-05-29/html/sor-dors130-eng.html>.