



REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION A99-03

Flight recorder duration and power supply: Independent power source for cockpit voice recorders

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. The fire also resulted in an interruption to the aircraft's power to the Swissair Flight 111 flight recorders about 6 minutes before the aircraft struck the water.

One of the shortcomings identified during the investigation was the lack of a dedicated independent power supply to power the cockpit voice recorder (CVR) and the cockpit area microphone in the event that normal aircraft power sources to the CVR are interrupted.

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

Board Recommendation A99-03 (March 1999)

With maintenance-free independent power sources now available, it is feasible to power new-technology CVRs and the cockpit area microphone independently of normal aircraft power for a specific period of time in the event that aircraft power sources to the CVR are interrupted or lost. Therefore, to enhance the capture of CVR information needed for accident investigation purposes, the Board recommended to both Transport Canada (TC) and the European Joint Aviation Authorities that:

as of 1 January 2005, for all aircraft equipped with CVRs having a recording capacity of at least 2 hours, a dedicated independent power supply be required to be installed adjacent or integral to the CVR, to power the CVR and the cockpit area microphone for a period of 10 minutes whenever normal aircraft power sources to the CVR are interrupted.

TSB Recommendation A99-03

Transport Canada's response to Recommendation A99-03 (June 1999)

In its response of 07 June 1999, TC supports this recommendation with the provision that United States and Canadian requirements remain harmonized.

In the United States, the National Transportation Safety Board (NTSB) made a similar recommendation to the Federal Aviation Administration (FAA). In the FAA response to the NTSB, the FAA indicated that it would be introducing a Notice of Proposed Rulemaking (NPRM) to amend Technical Standard Order (TSO) 123(a) to address the requirement for a 10-minute independent power supply for CVRs. This TSO is based on a standard developed by the European Organisation for Civil Aviation Equipment, of which TC is a participating member.

TC indicated that it will monitor the progress of this standard and, when appropriate, consideration will be given to introducing this requirement into Canadian legislation.

TSB assessment of Transport Canada's response to Recommendation A99-03 (March 2000)

On 6 March 2000, TC staff provided clarification to TSB staff as to how this recommendation would be addressed. TC indicated that it would work with the TSB to change the European Organisation for Civil Aviation Equipment (EUROCAE) standard to address the Board's recommendation (the *Canadian Aviation Regulations* already require that CVR installations and their performance be in accordance with the EUROCAE document). In light of TC's written response to the recommendation, and the clarification it provided to TSB staff, the intent of the recommendation should be met.

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

Transport Canada's response to Recommendation A99-03 (December 2005)

In its update to the TSB, received 14 December 2005, TC stated that the FDR/CVR regulations are being reviewed with the intent of harmonizing with the FAA NPRM wherever possible. Notices of Proposed Amendment (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 Canadian Aviation Regulation Advisory Council (CARAC) technical committee meeting.

TSB reassessment of Transport Canada's response to Recommendation A99-03 (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. As of June 2006, the FAA has yet to release its final rule that would require that all CVRs be equipped with a 10-minute independent backup power source to allow recording even after all aircraft power sources are lost or interrupted. This proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-03.

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

Transport Canada's response to Recommendation A99-03 (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 A99-03 (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 regarding the details of the referenced NPAs or when these NPAs will be tabled at the CARAC technical committee meeting.

As of June 2007, the FAA has yet to release its final rule that would require that all CVRs be equipped with a 10-minute independent backup power source to allow recording even after all aircraft power sources are lost or interrupted. This proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-03.

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

Transport Canada's response to Recommendation A99-03 (March 2008)

In its response of 06 March 2008, TC supports this recommendation with the provision that United States and Canadian requirements are harmonized. TC also indicates that it is monitoring the progress of an FAA NPRM to TSO 123(a) published in response to a similar NTSB recommendation. TC states that, if appropriate, consideration will be given to introducing this requirement into Canadian legislation.

TSB reassessment of Transport Canada's response to Recommendation A99-03 (August 2008)

TC repeats its commitment to harmonize with the FAA with respect to addressing the deficiency as stated in Recommendation A99-03. The FAA's recently (7 March 2008) issued final rule entitled Revisions to Cockpit Voice Recorder and Digital Flight Data Recorder Regulations requires a CVR to have an independent power supply that provides 10 minutes of electrical power to operate both the CVR and cockpit-mounted area microphone on all turbine engine-powered airplanes by 7 April 2012.

Because TC's harmonization efforts are ongoing, whether or not the CARs will require a CVR having an independent power supply that provides 10 minutes of electrical power as stated in Recommendation A99-03 is unknown at this time.

The proposed regulatory change, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-03.

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

Transport Canada's response to Recommendation A99-03 (February 2010)

TC's latest response states that, as of 11 May 2009, it has changed its CVR regulations to harmonize with those of the FAA. Specifically, the CARs standards are amended to require that

all CVR installations include an independent power supply that provides 10 ± 1 minutes of electrical power to operate both the CVR and cockpit-mounted area microphone.

TSB reassessment of Transport Canada's response to A99-03 (September 2010)

In light of the information contained in TC's latest response, a review of the relevant CARs (sections 523.1457(d), 525.1457(d), 527.1457 (d), and 529.1457 (d) apply) reveals amendments that introduce requirements related to the deficiency identified in Recommendation A99-03. However, TC's response does not indicate whether or not NPAs are being developed to require that existing aircraft in the Canadian registry have their CVR installations retrofitted to meet the amended standards.

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.

Without a specific retrofit date, the time taken for the regulatory change to substantially reduce or eliminate the safety deficiency identified in Recommendation A99-03 is unknown.

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

Transport Canada's response to Recommendation A99-03 (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 A99-03 (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 A99-03. 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 A99-03.

The benefits of powering the CVR and cockpit area microphone independently of normal aircraft power for a specific period of time in the event that aircraft power sources to the CVR are interrupted or lost are well known. The loss of recorded voice and other aural information after normal aircraft power is lost 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 equipped with 2-hour CVRs will have a dedicated independent power supply to power the CVR and the cockpit area microphone for a period of 10 minutes whenever normal aircraft power sources to the CVR are interrupted.

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 A99-03 (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 A99-03 (Independent Power Supply) to be tabled at the September 2011 CARAC Technical Committee meeting. NPA 2011-010 to require that as of 01 January 2005, for all aircraft equipped with CVRs having a recording capacity of at least two hours, a dedicated independent power supply will be required to be installed adjacent or integral to the CVR, to power the CVR and the cockpit area microphone for a period of 10 minutes whenever normal aircraft power sources to the CVR are interrupted.

Expected to be pre published in Gazette 1, Spring 2012

Response of the European Aviation Safety Agency to Recommendation A99-03 (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 responses from Transport Canada and the European Aviation Safety Agency's to Recommendation A99-03 (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 A99-03. While the EASA has responded, it only acknowledges receipt of Recommendation A99-03 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 10-minute independent power supply for CVRs with a recording capacity of at least 2 hours as identified in Recommendation A99-03. 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.

The 10-minute independent power supply, as proposed by NPA 2011-010, would automatically be switched on in the event that power to the CVR is interrupted. No specific power source is proposed thereby allowing manufacturers to meet the requirement as best suits the needs of an individual aircraft installation and issues of safety and reliability. This 10-minute independent power supply is proposed as a retrofit and new manufacture requirement for both aeroplanes and rotorcraft.

Although the NPA does not specifically address the requirement to power the cockpit area microphones, as identified in Recommendation A99-03, it does specify that the independent power supply would need to be approved in accordance with Canadian Technical Standard Order CAN-TSO-C155 Recorder Independent Power Supply (RIPS). This RIPS specification is based upon EUROCAE ED-112, Minimum Operational Performance Specifications for crash protected airborne recorder systems. ED-112 contains the minimum specifications to be met for all aircraft RIPS installed to support a flight recorder. As currently written, ED-112 requires that the RIPS also power the cockpit area microphones.

NPA 2011-010 requires the in-service fleet be retrofitted with a CVR installation having a recording capacity of at least 2 hours that includes a 10-minute independent power supply. 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 A99-03.

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

Transport Canada's response to Recommendation A99-03 (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 A99-03 (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 Transport Canada's response to Recommendation A99-03 (March 2013)

As the European Aviation Safety Agency has not provided an update as to its activities to mitigate the residual risks associated with Recommendation A99-03 an assessment is impossible.

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 2011-10 was tabled at the 28 June 2012 Civil Aviation Regulatory Committee and was approved as revised. The intent of NPA 2011-10 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 A99-03.

Therefore, TC’s response is considered as **Satisfactory Intent**.

Response of the European Aviation Safety Agency to Recommendation A99-03 (March 2013)

The Agency was made aware of this Safety Recommendation in 2011 and will consider it in the frame of rulemaking task RMT.0076: “Introduction of FDR and CVR Improvements,” which will propose the introduction of cockpit voice recorder (CVR) and flight data recorder (FDR) specifications for already type-certificated aircraft. This task is part of the Rulemaking Programme inventory list.

[The status of the action taken with respect to Recommendation A99-03 is considered to be] Open.

Transport Canada’s response to Recommendation A99-03 (November 2013)

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

TSB assessment of the responses from Transport Canada and the European Aviation Safety Agency to Recommendation A99-03 (April 2014)

Transport Canada’s latest response updates the progress of Notice of Proposed Amendment (NPA) 2011-010. As previously reported, the scheduled submission of NPA 2011-010 to *Canada Gazette*, Part I 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 I 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. However, TC’s proposed action has not been sufficiently advanced to reduce the risks to transportation safety.

The response by the European Aviation Safety Agency (EASA) cites rulemaking task RMT.0076, which includes the following statement: “... this task will address the introduction in production of FDR and CVR improvements in harmonisation with FAA final rule docket n° FAA-2005-20245.”

The final rule of the Federal Aviation Administration (FAA), as contained in docket No. FAA-2005-20245, amended Federal Aviation Regulation (FAR) 25.1457(d)(5)(i) to require that the CVR installation have an independent power source that will provide 10 ±1 minutes of electrical power to operate both the CVR and cockpit-mounted area microphone.

EASA’s proposed action, when fully implemented, will substantially reduce or eliminate the safety deficiency identified in Recommendation A99-03. EASA considers its action with respect to Recommendation A99-03 as open.

Both jurisdictions are proposing regulatory changes that, when fully implemented, will substantially reduce or eliminate the safety deficiency identified in Recommendation A99-03.

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

Response of the European Aviation Safety Agency to Recommendation A99-03 (December 2014)

Regarding backup power for the Cockpit Voice Recorder (CVR), the more flexible concept of “alternate power source” has been recognised by flight recorder experts and it has replaced the concept of “recorder independent power supply” in both EUROCAE Document 112A (performance specifications for crash-protected airborne recorders) and ICAO Annex 6 Part I (International commercial air transport operations with aeroplanes).

This safety recommendation will be considered within the framework of rulemaking task RMT.0308 “Amendment of requirements for data recorders II .” The requirements referred to in the RMT title are the EU air operations requirements. This rulemaking task is included in the published Agency’s rulemaking programme.

In the meantime, ongoing rulemaking task RMT.0249, “Recorders installation and maintenance thereof - certification aspects” is considering, among other issues, the definition of new certification specifications for the alternate power source for the CVR. This task was launched on 18 September 2014 with the publication of the associated Terms of Reference.

Transport Canada’s response to Recommendation A99-03 (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 responses from Transport Canada and the European Aviation Safety Agency to Recommendation A99-03 (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, “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.

EASA reviewed its actions to date in response to Recommendation A99-03. The latest version of EASA rulemaking tasks RMT.0308 and RMT.0249 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 A99-03 (November 2015)

(Includes recommendations A91-13, A94-04, and A99-02.)

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 A99-03 (March 2016)

The Board has linked the mitigation of the risks associated with Recommendation A94-03 to its assessment of Recommendation A99-02. Transport Canada’s latest update repeats the statement that its proposed regulations to address the risks identified in Recommendation A99-03, 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 A99-03 (January 2017)

This safety recommendation is taken into account within rulemaking task RMT.0249. The terms of reference are published on the Agency's website.

The Notice of Proposed Amendment (NPA) from this rulemaking task, which will include the topic cockpit voice recorder (CVR) power supply, is planned to be published in the first quarter 2017.

TSB reassessment of the European Aviation Safety Agency's response to Recommendation A99-03 (March 2017)

A review of EASA's RMT.0249 rulemaking efforts indicates that it plans to issue 2 NPAs, one in the first quarter of 2017, and a second in mid-2018. In both cases, following public consultation, EASA intends to issue amendment decisions regarding its Large Aeroplanes Certification Specification CS-25 by the first quarter of 2019. EASA regulations will then reflect a requirement for the incorporation of an alternate power source for Large Aeroplanes CVR installation.

Until all regulatory changes proposed by EASA are fully implemented, the deficiency identified in Recommendation A99-03 continues to exist. However, EASA's proposed changes, if fully implemented, will substantially reduce or eliminate the risks associated with the safety deficiency identified in Recommendation A99-03.

Therefore, the response to Recommendation A99-03 is assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-03 (January 2017)

TC agrees with this recommendation and it is anticipated that the proposed regulations to address the CVR (independent power supply) component of this recommendation will be pre-published in the *Canada Gazette*, Part I, in 2017.

TSB reassessment of Transport Canada's response to Recommendation A99-03 (March 2017)

TC's latest update indicates that its proposed regulatory amendments, designed to mitigate the risks associated with the CVR (independent power supply) component of Recommendation A99-03, 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 A99-03 is assessed as **Unsatisfactory**.

Transport Canada's response to Recommendation A99-03 (October 2017)

TC agrees with this recommendation.

It is anticipated that the proposed regulations to address the cockpit voice recorder (CVR) independent power supply 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 A99-03 (March 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 30 September 1969, and manufactured before 1 January 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 A99-03 will continue to exist.

Therefore, the response to Recommendation A99-03 is assessed as **Satisfactory Intent**.

European Aviation Safety Agency's response to Recommendation A99-03 (June 2018)

This safety recommendation has been taken into account within the framework of EASA rulemaking task RMT.0249 entitled "Recorders installation and maintenance thereof – certification aspects".

The Notice of Proposed Amendment (NPA) 2018-03 was published on 27 March 2018 and it includes the following elements related to large aeroplanes' CVR power supply.

Among others, it proposes to:

- amend Commission Regulation (EU) No 965/2012, Annex IV (Part-CAT), CAT. | DE.A.185 Cockpit voice recorder, to require that aeroplanes with a Maximum Certified Take-Off Mass (MCTOM) of over 27 000 kg and first issued with an individual Certificate of Airworthiness (CofA) on or after [date of publication + 3 years] shall be equipped with an alternate power source to which the CVR and cockpit-mounted area microphone are switched automatically in the event that all other power to the recorder is interrupted;
- amend Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part-CAT, AMC1 CAT.IDE.A.185 Cockpit voice recorder, to mention that, if required to be installed, the alternate power source should provide electrical power to operate both the CVR and the cockpit area microphone for at least 9 minutes. If the cockpit voice recorder has a recording duration of less than 25 hours, the alternate power source should not provide electrical power for more than 30 minutes.

The Opinion to the European Commission proposing an amendment of Regulation (EU) No 965/2012 is planned to be issued by 4Q2018.

EASA Status: Closed – Partial agreement

Transport Canada's response to Recommendation A99-03 (November 2018)

TC agrees with the recommendation.

It is anticipated that the final regulations to address the CVR and Recorder Independent Power Supply (RIPS) component of this recommendation will be published in the *Canada Gazette*, Part II, in the winter of 2018. The new regulations will require aircraft to be retrofitted, if not already compliant, with a dedicated RIPS to power a CVR and a cockpit area microphone for a period of ten minutes, in case normal aircraft power sources to the CVR are interrupted. The operators impacted by these regulations will have four years, from the publication date of the new requirements in *Canada Gazette*, Part II, to comply.

TSB reassessment of Transport Canada's and the European Aviation Safety Agency's responses to Recommendation A99-03 (March 2019)

In its response, Transport Canada (TC) indicates that the proposed amendments to the *Canadian Aviation Regulations*, regarding a dedicated independent power supply to power the cockpit voice recorder (CVR) and the cockpit area microphone for a period of 10 minutes whenever normal aircraft power sources to the CVR are interrupted, 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 had 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); 5 years after the International Civil Aviation Organization (ICAO) effective date of 1 January 2018 for new type certified aeroplanes over 27 000 kg, and 15 years after the Federal Aviation Administration (FAA) effective date of 1 March 2008 for all new type certified aeroplanes. Of note, the scope of TC's proposed amendments may differ from that of ICAO and FAA, by including a requirement to retrofit existing categories of aeroplanes (see reassessment March 2018).

In addition, the European Aviation Safety Agency (EASA) published a Notice of Proposed Amendment (NPA 2018-03) in March 2018, which proposes new requirements to improve the availability and quality of CVR data. Aircraft with a Maximum Certified Take-Off Mass (MCTOM) of over 27 000 kg will be required to have an alternate power source to supply the CVR and cockpit-mounted area microphone for at least 9 minutes whenever normal aircraft power sources are interrupted. These requirements will apply to aircraft with a European certificate of airworthiness first issued 3 years after the publication of the proposed amendments. However, EASA has not confirmed if or when the proposed amendments will be adopted.

Until the new regulations come into effect, the risks associated with the safety deficiency identified in Recommendation A99-03 remain. Therefore, TC's and EASA's responses to Recommendation A99-03 are assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A99-03 (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; and,
- 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.

¹ Government of Canada, *Canada Gazette*, Part II, Volume 153, Number 11, Regulations Amending the *Canadian Aviation Regulations* (Parts I and VI – Flight Data Recorder and Cockpit Voice Recorder).

TSB reassessment of Transport Canada's response to Recommendation A99-03 (March 2020)

In its latest response, Transport Canada (TC) indicates that it agrees with Recommendation A99-03.

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 all aircraft equipped with CVRs having a recording capacity of at least 2 hours, to have a dedicated independent power supply installed adjacent or integral to the CVR, to power the CVR and the cockpit area microphone for a period of 10 minutes whenever normal aircraft power sources to the CVR are interrupted. 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 Board considers the response to the recommendation to be **Fully Satisfactory**.

Next TSB action

This deficiency file is **Closed**.