



Reassessment of the response to TSB Recommendation A15-02

Required use of child restraint systems

Background

On 22 December 2012, the Perimeter Aviation LP, Fairchild SA227-AC Metro III (registration C-GFWX, serial number AC650B), operating as Perimeter flight PAG993, departed Winnipeg/James Armstrong Richardson International Airport, Manitoba, at 1939 Coordinated Universal Time (1339 Central Standard Time) as a charter flight to Sanikiluaq, Nunavut. Following an attempted visual approach to Runway 09, a non-precision non-directional beacon (NDB) Runway 27 approach was conducted. Visual contact with the runway environment was made and a circling for Runway 09 initiated. Visual contact with the Runway 09 environment was lost and a return to the Sanikiluaq NDB was executed. A second NDB Runway 27 approach was conducted with the intent to land on Runway 27. Visual contact with the runway environment was made after passing the missed approach point. Following a steep descent, a rejected landing was initiated at 20 to 50 feet above the runway; the aircraft struck the ground approximately 525 feet beyond the departure end of Runway 27. The 406 MHz emergency locator transmitter activated on impact. The 2 flight crew and 1 passenger sustained serious injuries, 5 passengers sustained minor injuries, and 1 infant was fatally injured. Occupants exited the aircraft via the forward right overwing exit and were immediately transported to the local health centre. The aircraft was destroyed. The occurrence took place during the hours of darkness at 2306 Coordinated Universal Time (1806 Eastern Standard Time).

The Board concluded its investigation and released Aviation Investigation Report A12Q0216 on 29 June 2015.

TSB Recommendation A15-02 (June 2015)

Although there is a lack of data readily available on the number of infants and child passengers travelling, data retrieved from a sample of 4 Canadian operators in the course of this investigation show that children and infants make up a significant portion (nearly 14%) of their total passengers. These numbers reflect only a portion of the number of infants and children travelling by air. There are currently 583 registered commercial fixed-wing operators in Canada. Transport Canada (TC) statistics show that passenger traffic at Canadian airports increased 2.9% in 2013, to reach 85.2 million enplaned and deplaned passengers.

Biomechanical research has found that, due to limitations in human clasping strength, it is not always possible for adults to restrain children adequately in their laps by holding onto them. Infants are therefore exposed to undue risk of injury when seated on an adult's lap. In most countries around the world, including Canada, infants are not required to be restrained in an age- and size-appropriate child restraint system (CRS) at any time during a flight. Research has also shown that, given the specific physical features of young children, the standard adult seatbelt does not provide a suitable method of restraint.

Most jurisdictions recommend that infants and young children travel restrained in an approved CRS during a flight; however, its use is not mandatory. Although research has been conducted over the last 25 years, and participation in the development of CRS standards and training standards has taken place and is ongoing, there has been no progress on the required use of appropriate CRS on commercial aircraft.

Although passengers are required to securely stow all carry-on baggage during takeoff and landing because of the potential risk of injury to other passengers should an unexpected hazardous event occur, passengers continue to be permitted to hold in their lap a child of a size and weight equal to carry-on baggage. If children under 2 years old are not required to be restrained for their own safety, the safety of other passengers also becomes an issue.¹

The National Transportation Safety Board of the United States has identified several occurrences where crew, adult passengers, and children have sustained injury during unexpected moderate-to-severe turbulence, and described how lap-held infants and children would likely have survived the occurrences or suffered less severe injury had they been properly restrained.² A number of aircraft accidents, including the occurrence under investigation, have demonstrated the risk to infants and young children who are not properly restrained. Given the overall safety performance of commercial aviation, passengers may underestimate the risks associated with unexpected in-flight turbulence and emergency situations.

TC has no further plans to educate the travelling public or promote the use of CRS at this time. The Board is concerned that until such time as the use of age- and size-appropriate CRS is required, parents and guardians will continue to travel with infants and children without the safety benefits provided by CRS.

Infants and children who are not properly restrained are at risk of injury and possibly death, and may cause injury or death to other passengers. Until new regulations on the use of CRS are

¹ United Airlines Flight 232-Sioux City, IA 1989; US Air Flight 1016-Charlotte, NC 1994; Continental Flight 267-Severe turbulence 1995; American Airlines Flight 903-Inflight upset 1997; Southwest Airlines Flight 2809-Severe turbulence 2008; General Aviation occurrence, Butte, MT 2009.

² V. Gowdy and R. DeWeese, The performance of child restraint devices in transport airplane passenger seats, Federal Aviation Administration (FAA) Office of Aviation Medicine, Report No. DOT/FAA/AM-94/19. September 1994.

implemented, lap-held infants and young children are exposed to undue risk and are not provided with an equivalent level of safety compared to adult passengers.

Therefore, the Board recommended that

the Department of Transport work with industry to develop age- and size-appropriate child restraint systems for infants and young children travelling on commercial aircraft, and mandate their use to provide an equivalent level of safety compared to adults.

TSB Recommendation A15-02

Transport Canada's response to Recommendation A15-02 (September 2015)

The Department of Transport will take action to reduce the risk to which infants and young children are exposed when travelling by air, whether it is on flights in Canada's remote north, from city to city domestically, or on international carriers flying into Canada.

In the short term, the department will explore ways to increase the range of child restraint systems (CRS) that parents can use on Canadian air carriers. The intent is to allow not only the currently approved CRS but also those approved by foreign authorities to be accepted for use on Canadian aircraft.

In the medium term, the department is planning an awareness campaign focused on the risks to which children are exposed to while travelling on commercial aircraft. The campaign will be launched in the fall 2015 and will be aimed at the industry, to ensure ground agents and crew members are well informed on permissible mitigation measures, as well as the travelling public.

During fiscal year 2016–17, the department will initiate an in-depth regulatory examination of the issue. The department would issue a notice that would articulate its intent to determine the most effective means of addressing the recommendation and would then outline its plan and consult industry stakeholders.

Transport Canada will continue to participate in and support international efforts to improve passenger safety, particularly through the International Civil Aviation Organization (ICAO) passenger Safety Working Group and follow-on activities with a view to harmonization with international partners.

TSB assessment of Transport Canada's response to Recommendation A15-02 (November 2015)

In its response, Transport Canada indicated that it will take a threefold approach to address this recommendation and reduce the risk to which infants and young children are exposed when travelling by air.

In the short term, Transport Canada will explore ways to increase the range of child restraint systems accepted for use on Canadian aircraft. In the medium term, it is planning an awareness

campaign in late 2015, for industry, on the risks to which children are exposed while travelling on commercial aircraft. In the longer term, during fiscal year 2016/2017, it will initiate an in-depth regulatory examination of the issue and outline its plan to consult industry stakeholders.

The Board is encouraged to note that Transport Canada is planning to take some short and medium term actions, while initiating an in-depth review to address the safety deficiency. However, the Board also notes that the International Civil Aviation Organization (ICAO) has recently published guidance to regulators on implementing regulations for child restraint systems. The availability of this material may be useful in accelerating the regulatory examination. Although Transport Canada's proposed actions may have some benefits, its response does not yet identify specific solutions that will ensure infants and young children are provided a level of safety comparable to adults.

Therefore, the response to Recommendation A15-02 is assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A15-02 (January 2016)

Short term: Exemption NCR 2015-078—Exemption from Subsection 605.26(1) of the *Canadian Aviation Regulations* (CARs) was completed last November. The purpose of the exemption is to "...exempt all passengers using a Child Restraint System foreign-approved to design standards not included in paragraph 551.501(b)(1) of the AWM, all passengers responsible for an infant and all passengers responsible for a person using a Child Restraint System foreign-approved to design standards not included in paragraph 551.501(b)(1) of the AWM from the requirements under subsection CAR 605.26(1)."

Medium term: Transport Canada (TC) is committed to launch a public awareness campaign on CRS in the summer/fall 2016 timeframe. TC is currently at the design stage of this project.

TSB reassessment of Transport Canada's response to Recommendation A15-02 (April 2016)

In its response, Transport Canada indicated that it will take a threefold approach to address this recommendation and reduce the risk to which infants and young children are exposed when travelling by air.

In the short term, Transport Canada issued an exemption to increase the range of child restraint systems accepted for use on Canadian aircraft. In the medium term, Transport Canada is planning a public awareness campaign in the summer/fall 2016 timeframe on the risks to which children are exposed while travelling on commercial aircraft. In the longer term, during fiscal year 2016–17, Transport Canada will initiate an in-depth regulatory examination of the issue and outline its plan to consult industry stakeholders.

The Board is encouraged to note that Transport Canada has started taking action, while initiating an in-depth review to address the safety deficiency. However, the Board also notes that ICAO has published guidance to regulators on implementing regulations for child restraint

systems. The availability of this material may be useful in accelerating the regulatory examination.

Although Transport Canada's proposed actions in the medium and long term may have some benefits, the TSB cannot evaluate if these actions will provide specific solutions that will ensure infants and young children are provided an equivalent level of safety compared to adults.

Therefore, the response to Recommendation A15-02 is assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A15-02 (February 2017)

In 2016-17, work was initiated on an in-depth regulatory examination of the issue. TC has progressed on gathering data and analyses done by other civil aviation authorities to help inform our direction. The department plans to complete the in-depth regulatory examination this fall. The department would then issue a notice that would articulate its intent to determine the most effective means of addressing the recommendation and would then outline its plan and consult industry stakeholders.

Since launching the awareness campaign, including a number of advisory circulars and some social media activities, TC is planning a second phase to its awareness activities, which it plans on implementing this summer.

TSB reassessment of Transport Canada's response to Recommendation A15-02 (March 2017)

TC's latest response indicates that it has started an in-depth regulatory examination of this issue, which includes collecting data and analyses done by other civil aviation authorities. This examination will conclude in the fall. In addition, TC is planning a second phase to its awareness activities, starting this summer. Subsequently, TC advised it will also participate in the upcoming ICAO Cabin Safety Group meeting to work on the development of revised international guidance on child restraint systems.

The Board is encouraged that TC is taking various actions. However, at this time, the Board is unable to determine if these actions will result in specific solutions to address the safety deficiency identified in Recommendation A15-02.

Therefore, the response to Recommendation A15-02 is assessed as **Satisfactory Intent**.

Transport Canada's response to Recommendation A15-02 (March 2019)

TC agrees in principle with the recommendation.

TC's examination of Canada's regulations regarding child restraint systems (CRS) is on track to be completed in fall 2019. As part of this work, TC is consulting leading aviation safety regulators, such as the United States Federal Aviation Administration and the European Aviation Safety Agency. The scope of the consultations is to measure the safety benefit of

mandating the use of child restraint systems and identify existing best practices by international aviation partners.

TC has taken various actions to address this recommendation and reduce the risks that infants and young children face when travelling by air. TC has:

- Enabled/permitted passengers to use CRS, which improved the experience for travelers who fly with both domestic and foreign operators during the same trip and now meet certain specified foreign design standards that were not previously permitted: <http://www.tc.gc.ca/CivilAviation/Regserv/Affairs/exemptions/docs/en/2954.htm>;
- Provided more detailed guidance to Canadian air operators to assist their front line staff in recognizing, accepting and encouraging the use of approved CRSs (Advisory Circular 605-003: <http://www.tc.gc.ca/en/services/aviation/reference-centre/advisory-circulars/ac-605-003.html>)
- Launched a public information campaign to promote the voluntary use of CRS <https://travel.gc.ca/travelling/children/taking-children-on-a-plane>;
- Taken steps to reduce the likelihood of such accidents including an awareness/inspection campaign to reduce the number of unstabilized approaches, and the introduction of new Crew Resource Management Standards <http://www.tc.gc.ca/eng/acts-regulations/regulations-sor96-433.htm>; and
- Conducted comprehensive examination of mandating CRS.

In spring 2018, TC consulted Canadians via the Let's Talk Transportation website (Link to Let's Talk Car Seats on Planes: https://letstalktransportation.ca/carseats?tool=forum_topic#tool_tab about the benefits and risks of making car seats, or other CRS mandatory on commercial flights for children under two years, and how this would impact air travelers. The results of the consultation concluded with mixed results. As part of the consultation, the issue paper was made public <http://www.tc.gc.ca/eng/mandating-child-restraint-systems-commercial-aircraft.htm>.

A discussion with industry stakeholders took place on September 28, 2018, to review the results of the online consultation and initiate discussions on actions going forward.

TC continues to analyze the feedback and aims to formalize a way forward by fall 2019. TC will invite the TSB to meet on this subject by the end of fall 2019.

Update to Transport Canada's response to Recommendation A15-02 (February 2021)

The *Let's Talk Car Seats on Planes* consultation was part of the longer-term response to conduct an in-depth regulatory examination of the issue and to consult industry stakeholders.

Also, NPA 2020-016 "Aircraft Equipment and Installation, Child Restraint Systems" was posted for consultation on January 8th, 2021. This proposal was part of the short term response to increase the range of foreign child restraint systems that could be accepted for use on Canadian aircraft (currently permitted via exemption NCR-110-2020).

Action items are still ongoing and timelines for the completion are being re-evaluated.

TSB reassessment of Transport Canada’s response to Recommendation A15-02 (March 2021)

Transport Canada (TC) agrees in principle with the recommendation, and has taken various actions to address this recommendation and reduce the risks to which infants and young children are exposed when travelling by air. These actions include:

- Participating in the International Civil Aviation Organization’s (ICAO’s) Passenger Safety Working Group;
- Permitting the use of foreign-approved CRS on board Canadian aircraft;
- Updating Advisory Circular (AC) No. 605-003, Child Restraint Systems and Other Seating Devices;
- Consulting Canadians on the mandatory use of CRS on board commercial flights for children under 2 years of age and discussing the results with industry stakeholders;
- Promoting the use of CRS through a public information campaign; and
- Conducting an examination on mandating the use of CRS.

In its recent update, TC confirmed that Notice of Proposed Amendment (NPA) 2020-016 “Aircraft Equipment and Installation, Child Restraint Systems” was published for consultation in January 2021. This proposal increases the range of foreign child restraint systems that could be accepted for use on Canadian aircraft (currently permitted via exemption NCR-110-2020). TC also specified that its consultation initiative was part of the longer-term response to conduct an in-depth regulatory examination of the issue and to consult industry stakeholders. Furthermore TC indicated that these actions are still ongoing and timelines for their completion are being re-evaluated.

The Board is encouraged that TC has taken various actions, that it continues to analyze the feedback received following its online consultation with Canadians, and that it aims to formalize a way forward. The Board also notes that ICAO has published guidance to regulators on implementing regulations for child restraint systems. The availability of this material may be useful in accelerating the regulatory examination. However, until TC’s actions result in specific long-term solutions, the risks associated with the safety deficiency identified in Recommendation A15-02 remain.

Therefore, the Board considers the response to Recommendation A15-02 to show **Satisfactory Intent**.

Transport Canada’s response to Recommendation A15-02 (September 2021)

Transport Canada (TC) agrees in principle with the recommendation.

Since the recommendation was issued in 2015, TC has worked to implement a 3 prong approach to addressing this safety issue that has included: removing barriers to the use of child

restraint systems (CRS) on commercial aircraft; educating industry, crew and the public on the appropriate use of CRS; and, examining the potential for increased regulatory requirements for the use of CRS through regulatory review and cooperation with international partners.

In our latest update in March 2019, the Department committed to:

- Increasing the range of foreign child restraint systems that could be accepted for use on Canadian aircraft (previously permitted via exemption NCR 110-2020³); and,
- Conducting an in-depth regulatory examination of the issue and to consult industry stakeholders by the “Let's Talk Car Seats on Planes”⁴ page.

Removing barriers to the use of child restraint systems on aircraft

To facilitate the use of CRS on aircraft, in November 2015, TC issued Exemption NCR 2015-078 from Subsection 605.26(1) of the *Canadian Aviation Regulations* (CARs) to “...permit all passengers to use on Canadian aircraft Child Restraint System [CRS] devices that are foreign-approved to design standards not included in paragraph 551.501(b)(1) of the AWM [Airworthiness Manual].” This Exemption was renewed in 2020 as NCR 110-2020.

Since the last update, TC continued to remove barriers to the use of CRS on commercial aircraft. Standard 551 - *Aircraft Equipment and Installation - 551.501 Child Restraint Systems*,⁵ came into effect on May 24, 2021. This standard brought the provisions of the previously issued exemptions into regulation, permanently increasing the range of foreign child restraint systems accepted for use on Canadian aircraft.

Education and awareness

Since this recommendation was issued in 2015, TC has issued multiple guidance documents aimed at both industry and the public to raise awareness of the proper use of CRS on aircraft including:

- Published in July 2016, Advisory Circular (AC) 605-003- *Child Restraint Systems and Other Seating Devices*⁶ provided operators with information regarding the use of CRS on aircraft, the acceptance of additional CRS manufactured to foreign standards, the use of

³ Transport Canada (2020). NCR 2020-110 -*Exemption from subsection 605.26(1) of the Canadian Aviation Regulations*. Available at <https://www.tc.gc.ca/CivilAviation/Regserv/Affairs/exemptions/docs/en/3350.htm>

⁴ Transport Canada (2018). *Let's Talk Car Seats on Planes*. Available at : <https://letstalktransportation.ca/car-seats>

⁵ Transport Canada (2021). Amendment to Standard 551 -*Aircraft Equipment and Installation - 551.501 Child Restraint Systems*. Available at: <https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/canadian-aviation-regulations-sor-96-433/standards/airworthiness-chapter-551-aircraft-equipment-installation-canadian-aviation-regulations-cars>

⁶ Transport Canada (2016). Advisory Circular (AC) 605-003- *Child Restraint Systems and Other Seating Devices*. Available at: <https://tc.canada.ca/en/aviation/reference-centre/advisory-circulars/advisory-circular-ac-no-605-003>

other seating devices by infants, children, or special needs passengers, and the evacuation of infants and small children; and,

- Launched in 2016, the "Taking children on a plane" public awareness campaign⁷ promotes the voluntary use of CRS and provides specific rules on flying with children and using CRS on board the aircraft.

TC continues its awareness efforts and will publish consultation results from the "Let's Talk Car Seats on Planes" page in Fall 2021.

As such, TC will continue to promote the safety benefits of car seats on board aircraft starting with the winter travel season. As the COVID-19 pandemic grounded most flights over the last 18 months, the audiences TC intended to reach were not travelling by air during this time. There is also an intent to include CRS content in the upcoming Air Taxi Safety Campaign once it launches next year (details on the Air Taxi Safety Campaign can be found in Recommendation A18-03).

Potential for additional measures

TC continues to work with its international partners to address and reduce the risks that infants and young children face when traveling by air including participation in the International Civil Aviation Organization's (ICAO's) Passenger Safety Working Group.

Currently, ICAO has not established an international standard mandating the use of CRS although its position is that the safest way to secure an infant or child onboard an aircraft is in a State-approved CRS, appropriate for that infant or child in a dedicated seat. Similarly, other regulatory authorities including the United States Federal Aviation Administration (FAA) and European Aviation Safety Agency (EASA) have not mandated the use of CRS.

Given the challenges associated with unilaterally mandating the use of CRS, TC is not prepared to move further on the question of mandating the use of CRS at this time. Instead, TC will continue to support international efforts to improve the safety for children travelling by air and will ensure our efforts are harmonized with our international partners while continuing to strongly encourage the use of CRS through the continued removal of systemic barriers to their use, education and safety promotion.

TSB reassessment of Transport Canada's response to Recommendation A15-02 (March 2022)

Transport Canada (TC) agrees in principle with the recommendation, and has continued to take various actions to address this recommendation and reduce the risks to which infants and young children are exposed when travelling by air. These actions include:

- Removing barriers to the use of child restraint systems (CRS) on aircraft by amending Standard 551 - *Aircraft Equipment and Installation* - 551.501 *Child Restraint Systems*.

⁷ Transport Canada (2020). *Taking children on a plane*. Available at: <https://travel.gc.ca/travelling/children/taking-children-on-a-plane>

This amended standard, which came into effect on 24 May 2021, brought the provisions of the previously issued exemptions into regulation, permanently increasing the range of foreign child restraint systems accepted for use on Canadian aircraft;

- Updating Advisory Circular (AC) No. 605-003, Child Restraint Systems and Other Seating Devices;
- Continuing to promote the safety benefits of car seats on board aircraft starting with the winter travel season; and
- Continuing to work with its international partners to address and reduce the risks that infants and young children face when travelling by air, including participation in the International Civil Aviation Organization's Passenger Safety Working Group.

While TC continues to work with its international partners, it indicated that in the absence of an international regulatory standard, the Department is not prepared to unilaterally move further on the question of mandating the use of CRS at this time. Instead, it will continue to support international efforts to improve the safety for children travelling by air and will ensure that its efforts are harmonized with its international partners while continuing to strongly encourage the use of CRS through the continued removal of systemic barriers to their use, education and safety promotion.

Although the Board is encouraged by these ongoing efforts, without a clear mandate for the use of CRS that will ensure infants and young children are provided an equivalent level of safety compared to adults, the residual risk may be reduced but is not eliminated.

Therefore, the response to Recommendation A15-02 is assessed as **Satisfactory in Part**.

Next TSB action

Given that TC is not prepared to move further on the question of mandating the use of child restraint systems, continued reassessments will not likely yield further results. Therefore, this recommendation will not be reassessed on a regular basis. The Board may reassess if circumstances change or actions have been taken that significantly change the level of residual risk.

This deficiency file is **Dormant**.