



TSB Recommendation A16-10

Terrain awareness and warning systems for helicopters

The Transportation Safety Board of Canada recommends that the Department of Transport require terrain awareness and warning systems for commercial helicopters that operate at night or in instrument meteorological conditions.

Air transportation safety investigation report	A13H0001
Date the recommendation was issued	15 June 2016
Date of the latest response	December 2025
Date of the latest assessment	March 2026
Rating of the latest response	Unsatisfactory
File status	Active

Summary of the occurrence

On 31 May 2013, at approximately 0011 Eastern Daylight Time, the Sikorsky S-76A helicopter (registration C-GIMY, serial number 760055), operated as Lifeflight 8, departed at night from Runway 06 at the Moosonee Airport, Ontario, on a visual flight rules flight to the Attawapiskat Airport, Ontario, with 2 pilots and 2 paramedics on board. As the helicopter climbed through 300 feet above the ground toward its planned cruising altitude of 1000 feet above sea level, the pilot flying commenced a left-hand turn toward the Attawapiskat Airport, approximately 119 nautical miles to the northwest of the Moosonee Airport. Twenty-three seconds later, the helicopter impacted trees and then struck the ground in an area of dense bush and swampy terrain. The aircraft was destroyed by impact forces and the ensuing post-crash fire. The helicopter's satellite tracking system reported a takeoff message and then went inactive. The search-and-rescue satellite system did not detect a signal from the emergency locator transmitter (ELT). At approximately 0543, a search-and-rescue aircraft located the crash site approximately 1 nautical mile northeast of Runway 06, and deployed search-and-rescue technicians. However, there were no survivors.

The Board concluded its investigation and released report A13H0001 on 15 June 2016.

Rationale for the recommendation

This occurrence was a controlled flight into terrain (CFIT) accident, in which a serviceable aircraft was unintentionally flown into the ground. During an attempt to conduct a night visual departure in extremely dark conditions, an inadvertent descent developed, and the aircraft struck the terrain. When the flight crew recognized that an inadvertent descent had developed, they were at an altitude from which they were unable to recover. Although some aircraft of the operator's S-76A fleet were equipped with a terrain awareness and warning system (TAWS), the occurrence aircraft was not, and was not required by regulation to be equipped with one. As a result, the flight crew did not receive a timely warning of the inadvertent descent or the impending impact.

A large number of commercial helicopters routinely conduct flight operations at night or in instrument meteorological conditions (IMC), or both. Without the benefit of TAWS, such aircraft are at significantly greater risk for CFIT. The TSB has investigated a number of helicopter occurrences that took place at night or in IMC where TAWS may have proven useful in preventing an accident.

In Canada, commercially operated aeroplanes and some privately operated aeroplanes are required by regulation to be equipped with TAWS. However, there is no such regulatory requirement for commercial helicopters, despite the fact that they often operate along similar routes as commercial fixed-wing aircraft, and sometimes carry larger numbers of passengers. As a result, the regulations do not currently provide for an equivalent level of safety between commercial fixed-wing versus commercial rotary-wing operations.

Until there is a requirement for Canadian-registered commercial helicopters to be equipped with TAWS, the crew members and passengers who travel on those aircraft at night or in IMC will continue to be at increased risk for injury or death due to CFIT.

Therefore, the Board recommended that

the Department of Transport require terrain awareness and warning systems for commercial helicopters that operate at night or in instrument meteorological conditions.

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Previous responses and assessments

September 2016: response from Transport Canada

Transport Canada agrees in principle with this recommendation.

TC will engage the helicopter community in 2017 to inform the department on how to address this recommendation.

December 2016: update from Transport Canada

Transport Canada will be sending out a letter in 2017 to the helicopter community requesting data on terrain awareness & warning systems. The data will then be analyzed and TC will determine a way forward.

December 2016: TSB assessment of the response (unable to assess)

In its response, TC indicated that it agrees in principle with this recommendation and advises that it will be sending out letters to the helicopter community in 2017 to seek their input on this issue. As there is no indication as to what actions will be taken once the data collected has been analysed, it is unclear how and if the ensuing actions will address the intent of this recommendation.

Therefore, the Board is **unable to assess** Transport Canada's response to Recommendation A16-10.

October 2017: response from Transport Canada

TC agrees in principle with the recommendation.

While TC has not heard back from the Helicopter Association of Canada (HAC), TC will follow up and discuss this subject during HAC's upcoming safety meeting in the fall.

March 2018: TSB assessment of the response (unable to assess)

In its response, TC indicated that it was waiting to hear back from the Helicopter Association of Canada (HAC) and that it would follow up and discuss this issue at the HAC safety meeting that took place in November 2017. The TSB has not received any additional information following this meeting, indicating if TC has started collecting and analyzing data on terrain awareness and warning systems or determined what actions it intends to take in order to mitigate the risks associated with the safety deficiency identified in Recommendation A16-10.

The TSB is concerned with the lack of progress in addressing this safety deficiency.

Therefore, the Board remains **unable to assess** Transport Canada's response to Recommendation A16-10.

March 2019: response from Transport Canada

TC agrees in principle with the recommendation.

TC is considering making use of terrain awareness and warning systems (TAWS) mandatory in rotorcraft. Industry stakeholders, reporting to the night visual flight rules (NVFR) working group, are currently reviewing the available technology and its limitations, to develop appropriate wording intended for incorporation in the regulations and standards. This work is ongoing, and recommendations should be ready for submission for decision making by spring, 2020.

In the interim until a decision is taken, TC will promote the voluntary use of TAWS for rotorcraft starting in the summer of 2019 through social media, online engagement, and conference discussions.

May 2019: TSB assessment of the response (unable to assess)

In its response, Transport Canada (TC) indicated that it agrees in principle with this recommendation and advises that it is considering making terrain awareness and warning systems (TAWS) mandatory in rotorcraft, depending on recommendations from the night visual flight rules (VFR) working group. Until a decision is made, TC will promote the voluntary use of TAWS for rotorcraft starting in the summer of 2019.

As there is no indication as to what actions will be taken once the recommendations from the night VFR working group are received, it is unclear how and if the ensuing actions will address the intent of this recommendation.

Therefore, the Board remains **unable to assess** Transport Canada's response to Recommendation A16-10.

December 2019: response from Transport Canada

TC agrees in principle with the recommendation.

The topic is still under discussion in the TC Night VFR Working Group. No recommendation has been made yet, as emerging technologies such as enhanced visual systems are being evaluated to determine if they might be more effective or applicable. The working group meetings and deliberations are ongoing.

In the interim, beginning in early 2020, TC will promote the voluntary use of terrain awareness and warning system for rotorcraft through social media, online engagement, and conference discussions.

December 2020: additional information from Transport Canada

TCCA [Transport Canada, Civil Aviation] is addressing this matter by separately assessing safety considerations for helicopter operators who only operate VFR [visual flight rules] (day or night), from helicopter operators who also conduct Instrument Flight Rules (IFR) operations.

For VFR only operators (day or night), TCCA acknowledges the potential benefits of HTAWS [helicopter terrain awareness and warning systems] but does not support the mandatory requirement for HTAWS. Rather, TCCA believes that a more balanced solution is to continue to have industry associations and TCCA encourage the use of HTAWS and other parallel capabilities, complemented by the current effort to revise the *Canadian Aviation Regulations (CARs) 602.114 and 602.115* to redefine visual references for flight at night.

The next effort for TCCA is to assess safety matters (including HTAWS) for IFR helicopter operations. As discussions continue, TCCA will remain mindful of the International Civil Aviation Organization's recent recommendation to shape regulations in a "capability based" manner, which in the context of this matter, discourages the mandating of prescriptive aircraft equipment requirements in favor of a broader capability. For example, a "capability" to reduce the risk of a controlled flight into terrain could be achieved through any combination of Terrain Awareness Systems, Radar Altitude systems, Night Vision Imaging System, other emerging technologies, and/or regulatory changes.

February 2021: TSB assessment of the response (unable to assess)

In its responses, Transport Canada (TC) indicated that it agrees in principle with Recommendation A16-10 and outlined the following:

- The topic of helicopter terrain awareness and warning system (HTAWS) is still under discussion in the TC Night Visual Flight Rules (VFR) Working Group. To date, no recommendations have emerged from this working group.
- TC plans to address the safety considerations for helicopter operators who conduct only VFR operations (day or night) separately from those who also conduct instrument flight rules (IFR) operations.
- For VFR-only helicopter operations, TC will continue to encourage the use of HTAWS and other capabilities, while continuing its efforts to amend *Canadian Aviation Regulations (CARs) 602.114 and 602.115* to redefine visual references for flight at night.
- For IFR helicopter operations, TC will assess the safety deficiency, keeping in mind the International Civil Aviation Organization's (ICAO's) recent recommendation to shape regulations in a capability-based manner.

As there is no clear indication as to what actions will be taken, and when those actions will be completed, it is unclear how and if the ensuing actions will address the intent of this recommendation.

Therefore, the Board remains **unable to assess** Transport Canada's response to Recommendation A16-10.

September 2021: response from Transport Canada

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

Since the recommendation was issued, TC has consulted with industry through the night visual flight rules (VFR) working group and industry associations on the best means to address this recommendation while encouraging the voluntary installation of helicopter terrain awareness warning systems (HTAWS) in commercial helicopters.

In TC's December 2019 update and December 2020 update,¹ the Department committed to:

- Addressing the question of HTAWS for night VFR applications through the night VFR working group;
- Encouraging the use of HTAWS for VFR night operations while continuing its efforts to amend *Canadian Aviation Regulations* (CARs) 602.114 and 602.115 to redefine visual references for flight at night; and,
- Further assess the need to mandate HTAWS for Instrument Flight Rules (IFR) operations.

Following efforts to date on this subject, TC has concluded that, for both VFR only operators (day or night) and IFR operators, TC acknowledges the potential benefits of HTAWS but does not support their mandatory requirement.

As noted in previous updates, TC is mindful of the International Civil Aviation Organization's recommendations to shape regulations in a "capability based" manner, which in the context of this matter, discourages mandating prescriptive aircraft equipment requirements in favour of a broader capability. For example, a "capability" to reduce the risk of a controlled flight into terrain could be achieved through any combination of Terrain Awareness Systems, Radar Altitude systems, Night Vision Imaging System, other emerging technologies, and/or regulatory changes.

In keeping with this approach, in lieu of seeking to mandate HTAWS, TC will promote any combination of Terrain Awareness Systems, Radar Altitude systems, Night Vision Imaging System, other emerging technologies, and/or regulatory changes to continue to reduce the risk associated with controlled flight into terrain accidents.

¹ Transportation Safety Board of Canada (2021). *Additional information from Transport Canada (December 2020)*. Available at: <http://www.bst-tsb.gc.ca/eng/recommandations-recommendations/aviation/2016/rec-a1610.html>

Since the last update, TC published an article² in the June 2020 Aviation Safety Letter that promoted the voluntary use of TAWS for rotorcraft. Also, as noted in the update for recommendation A16-08, TC is currently conducting a disposition of comments following the closure of NPA 2020-007– *Minimum Visual Meteorological Conditions for VFR Flight - Sections 602.114 and 602.115 of the Canadian Aviation Regulations*³ comment period and still plans to make revisions to the night VFR regulations for all sectors (General Aviation included). The intent is to continue with regulatory changes to night VFR regulations, which should provide significant safety improvements to all sectors.

The target timelines for Stakeholders consultation for the NPA amending Part VI of the CARs was from May 1st to June 25th 2021 and for the NPA amending Part I, IV and VII of the CARs was from July 15th to August 15th 2021. It is anticipated that the NPAs will be published in *Canada Gazette* Part 1 in June 2022.

March 2022: TSB assessment of the response (Unsatisfactory)

In its response, Transport Canada (TC) stated that it agrees in principle with Recommendation A16-10; however, TC also indicated that while it acknowledges the potential benefits of helicopter terrain awareness and warning systems (HTAWS), it does not support their mandatory requirement. Alternatively, TC indicated it will promote any combination of terrain awareness systems, radar altitude systems, night vision imaging system, other emerging technologies, and/or regulatory changes to continue to reduce the risk associated with controlled-flight-into-terrain (CFIT) accidents.

As justification for not supporting HTAWS for commercial helicopters that operate at night or in instrument meteorological conditions, TC cites International Civil Aviation Organization recommendations to shape regulations in a “capability based” manner. However, similar Canadian regulations currently require the installation of terrain awareness warning systems on aeroplanes based on criteria such as the category of air operations as well as the size, seating configuration, and engine type.⁴ The regulations do not currently provide a comparable level of safety for private and commercial helicopter operations.

The Board acknowledges that TC will continue to promote ways of reducing the risk of CFIT accidents; however, the Board is concerned that this will be insufficient to ensure an acceptable level of protection against CFIT accidents within the commercial helicopter sector. As a result, it

² Transport Canada (2020). Aviation Safety Letter (TP185E – Issue 3/2016) - *Helicopter terrain awareness and warning system (HTAWS)*. Available at: <https://tc.canada.ca/en/aviation/publications/aviation-safety-letter/issue-1-2020/helicopter-terrain-awareness-warning-system-htaws>

³ Transport Canada (2021). NPA 2021-007 - *Minimum Visual Meteorological Conditions for VFR Flight -Sections 602.114 and 602.115 of the Canadian Aviation Regulations*. Available on the CARAC website at: <https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/canadian-aviation-regulations-sor-96-433/canadian-aviation-regulation-advisory-council-carac>

⁴ *Canadian Aviation Regulations* subsections 605.42(1), 703.71(1), 704.71(1)(2), and 705.84(1).

is highly likely that the risks associated with the safety deficiency identified in Recommendation A16-10 will persist.

Therefore, TC's response to Recommendation A16-10 is assessed as **Unsatisfactory**.

October 2022: response from Transport Canada

Transport Canada (TC) agrees in principle with the recommendation.⁵

Since the recommendation was issued TC has consulted with industry through the night visual flight rules (VFR) working group and industry associations on the best means to address this recommendation while encouraging the voluntary installation of helicopter terrain awareness warning systems (HTAWS) in commercial helicopters.

Following efforts to date on this subject, TC has concluded that, for both VFR only operators (day or night) and IFR operators, in TC's September 2021 update, the Department acknowledged the potential benefits of HTAWS but does not support their mandatory requirement until there are overall improvements in HTAWS systems as there are still issues with this equipment on helicopters.

At this time, TC's approach would be a safety campaign with voluntary adoption which was carried out by the publication of an article⁶ in the June 2020 Aviation Safety Letter that promoted the voluntary use of TAWS for rotorcraft. TC promotes any combination of Terrain Awareness Systems, Radar Altitude systems, Night Vision Imaging System, other emerging technologies, and/or regulatory changes to continue to reduce the risk associated with controlled flight into terrain accidents.

Also, as noted in the update for recommendation A16-08, Notice of Proposed Amendment (NPA) 2021-007 – *Minimum Visual Meteorological Conditions for VFR Flight - Sections 602.114 and 602.115 of the Canadian Aviation Regulations*⁷, in addition to introduce new definitions of VFR (Part VI), TC will be proposing additional equipment requirements (Part VI). This NPA is seen as the catalyst for several other initiatives to improve safety in night VFR and IFR and TC plans to include more formal discussion on the implementation of HTAWS into these future discussions and drafts.

⁵ All responses are those of the stakeholders to the TSB in written communications and are reproduced in full. The TSB corrects typographical errors and accessibility issues in the material it reproduces without indication but uses brackets [] to show other changes or to show that part of the response was omitted because it was not pertinent.

⁶ Transport Canada (2020). Aviation Safety Letter (TP185E – Issue 3/2016) - Helicopter terrain awareness and warning system (HTAWS). Available at: <https://tc.canada.ca/en/aviation/publications/aviation-safety-letter/issue-1-2020/helicopter-terrain-awareness-warning-system-htaws>

⁷ Transport Canada (2021). NPA 2021-007 - Minimum Visual Meteorological Conditions for VFR Flight – Sections 602.114 and 602.115 of the *Canadian Aviation Regulations*. Available on the CARAC website at: <https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/canadian-aviation-regulations-sor-96-433/canadian-aviation-regulation-advisory-council-carac>

March 2023: TSB assessment of the response (Satisfactory in Part)

In its latest response, Transport Canada (TC) stated that it agrees in principle with Recommendation A16-10.

As previously indicated, TC is assessing separately the safety concerns raised by Recommendation A16-10 for helicopter operators who operate only under visual flight rules (VFR) (day and night) and for those who operate under instrument flight rules (IFR).

- For VFR-only operators, TC acknowledges the potential benefits of helicopter terrain awareness warning systems (HTAWS), but it does not support its mandatory requirement. TC believes that a more balanced solution is to encourage the use of HTAWS and other parallel capabilities. Additionally, as per Notice of Proposed Amendment (NPA) 2021-007, TC intends to revise the *Canadian Aviation Regulations* (CARs) sections 602.114 and 602.115 to redefine visual references for flight at night. These proposed changes, expected to be published in the *Canada Gazette*, Part I in late 2023, will complement the use of HTAWS and other technologies to enhance safety during VFR operations.
- For IFR operators, TC is mindful of the International Civil Aviation Organization's recommendation to shape regulations in a "capability-based" manner. As such, TC indicated that it discourages the mandating of prescriptive aircraft equipment requirements in favor of a broader capability. In keeping with this approach, in lieu of seeking to mandate HTAWS, TC will promote any combination of Terrain Awareness Systems, Radar Altitude systems, Night Vision Imaging Systems, other emerging technologies, and/or regulatory changes to continue to reduce the risk associated with controlled flight into terrain (CFIT).

The Board is pleased to see progress being made towards amending sections 602.114 and 602.115 of the CARs to address VFR-only operations. However, it is unclear if TC's approach to promote or require a combination of technologies will ensure an acceptable level of protection against CFIT accidents for helicopter operations. As a result, it is likely that the risks associated with safety deficiency identified in Recommendation A16-10 will persist.

Therefore, the Board considers the response to Recommendation A16-10 to be **Satisfactory in Part**.

September 2023: response from Transport Canada

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

Since the recommendation was issued TC has consulted with industry through the night visual flight rules (VFR) working group and industry associations on the best means to address this recommendation while encouraging the voluntary installation of helicopter terrain awareness warning systems (HTAWS) in commercial helicopters.

Following efforts to date on this subject, TC acknowledged, for both VFR only operators (day or night) and IFR operators, the potential benefits of HTAWS but does not support their mandatory requirement until there are overall improvements in HTAWS systems as there are

still issues with this equipment on helicopters. With this goal in mind, TC undertook a safety campaign through the publication of an article in the June 2020 issue of the Aviation Safety Letter.⁸ This article actively advocated for the voluntary adoption of TAWS for rotorcraft. TC supports a diverse array of measures, encompassing Terrain Awareness Systems, Radar Altitude systems, Night Vision Imaging Systems, as well as other emerging technologies and potential regulatory adjustments. These combined efforts are geared towards an ongoing mitigation of the risks linked to accidents stemming from controlled flight into terrain incidents.

Furthermore, as indicated in TC's October 2022 update, along with this year's revision pertaining to recommendation A16-08, there are certain immediate actions to be taken. One of these involves the Notice of Proposed Amendment (NPA) 2023-005,⁹ which addresses the Minimum Visual Meteorological Conditions for VFR Flight. This amendment focuses on enhancing Sections 602.114 and 602.115 of the *Canadian Aviation Regulations*. Notably, it introduces new definitions of VFR within Part VI.

Additionally, TC is set to propose further requirements for equipment under Part VI. This NPA is expected to serve as a driving force for various other safety initiatives targeting night VFR and IFR. TC is also planning to incorporate a more comprehensive dialogue regarding the integration of HTAWS (Helicopter Terrain Awareness and Warning Systems) in these forthcoming discussions and draft proposals, underscoring its commitment to safety enhancement.

In the medium term, an NPA is on the horizon, mandating the incorporation of HTAWS into Helicopter Emergency Medical Services (HEMS), Offshore operations, and operations falling under 604 & Part VII categories for Night VFR and IFR flights. This significant step is expected to materialize in late 2024.

⁸ Transport Canada (2020). Aviation Safety Letter (TP185E – Issue 3/2016) - *Helicopter terrain awareness and warning system (HTAWS)*. Available at: <https://tc.canada.ca/en/aviation/publications/aviation-safety-letter/issue-1-2020/helicopter-terrain-awareness-warning-system-htaws>

⁹ Transport Canada (2023). NPA 2023-005 - Minimum Visual Meteorological Conditions for VFR flight in Controlled and Uncontrolled Airspace – Parts I, IV, VI, VII of the CARs and Associated Standards. Available on the CARAC website at: <https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/canadian-aviation-regulations-sor-96-433/canadian-aviation-regulation-advisory-council-carac>

Looking ahead to the long term, significant developments are already in motion. As of February 2020, RTCA¹⁰ SC-237¹¹ and EUROCAE¹² WG-110¹³ are actively engaged in crafting novel or enhanced RTCA DO-309¹⁴ *Minimum Operational Performance Standards (MOPS) tailored for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment*. In alignment with these advancements, TCCA will align its HTAWS requirements to conform with the forthcoming RTCA DO-309 Standards.

Once these standards receive their anticipated updates, TCCA will proceed to adopt them as the definitive benchmark for HTAWS utilization across all rotorcraft governed by Part VI & VII regulations in Canada. While the precise timeline for these advancements is still to be determined, the commitment to their realization remains unwavering.

February 2024: TSB assessment of the response (Satisfactory Intent)

In its latest response, Transport Canada (TC) reiterated that it agrees in principle with Recommendation A16-10.

TC's latest response highlights some of its past actions, which have been previously assessed by the Board, encouraging the voluntary installation of helicopter terrain awareness warning systems (HTAWS) in commercial helicopters.

The Board is encouraged that TC acknowledges the benefits of HTAWS and is committed to mandating, through the rulemaking process, the incorporation of HTAWS into helicopter emergency medical services (HEMS), offshore operations, and operations falling under Subpart 604 and Part VII of the *Canadian Aviation Regulations (CARs)* for night visual flight rules and instrument flight rules flights. The Board looks forward to future updates on the progress of this initiative, which is expected to materialize in late 2024.

TC's response also indicated that RTCA SC-237 and EUROCAE WG-110 are revising RTCA DO-309¹⁵ *Minimum Operational Performance Standards (MOPS) tailored for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment*, which TC will then use to update

¹⁰ RTCA is a private, not-for-profit association founded in 1935 as the Radio Technical Commission for Aeronautics, now referred to simply as "RTCA." They are the premier Public-Private Partnership venue for developing consensus among diverse, competing interests on critical aviation modernization issues in an increasingly global enterprise.

¹¹ SC-237 "Helicopter Terrain Awareness Warning System" was established by the Program Management Committee (PMC) on May 15, 2019, to work jointly with EUROCAE WG-110. The group will work to define a MOPS that will define "Classic Modes" that are included in fixed winged TAWS focused on off-shore operations for helicopters.

¹² EUROCAE is a non-profit organisation, created in 1963 as the "The European Organisation for Civil Aviation Equipment", with the objective to develop standards for European civil aviation.

¹³ WG-110 "Helicopter Terrain Awareness and Warning Systems (HTAWS)" was established to develop MOPS for Class A Helicopter Terrain Awareness and Warning Systems (HTAWS), analogous to fixed wing TSO-C151 Class A TAWS, in support of offshore helicopter operations.

¹⁴ This MOPS defines a Helicopter Terrain Awareness and Warning System (HTAWS), Airborne System.

¹⁵ DO-309 defines an HTAWS airborne system.

its own HTAWS requirements. The Board notes that TC plans to adopt these revised standards; however, it is unclear whether TC plans to make these mandatory for all rotorcraft governed by Part VI and Part VII of the CARs. Accordingly, the Board looks forward to additional clarification during future updates.

TC's proposed actions, once implemented, will significantly reduce or eliminate the risk associated with the safety deficiency identified in Recommendation A16-10. However, it remains unclear when that will occur and, until that time, the risk will persist.

Therefore, the Board considers the response to Recommendation A16-10 to show **Satisfactory Intent**.

September 2024: response from Transport Canada

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

Since the recommendation was issued, TC has consulted with industry through the night visual flight rules (VFR) working group and industry associations on the best means to address this recommendation while encouraging the voluntary installation of helicopter terrain awareness warning systems (HTAWS) in commercial helicopters.

Following efforts to date on this subject, TC acknowledged, for both VFR only operators (day or night) and IFR [instrument flight rules] operators, the potential benefits of HTAWS but does not support their mandatory requirement until there are overall improvements in HTAWS systems as there are still issues with this equipment on helicopters. With this goal in mind, TC undertook a safety campaign through the publication of an article in the June 2020 issue of the Aviation Safety Letter.¹⁶ This article actively advocated for the voluntary adoption of terrain awareness warning systems (TAWS) for rotorcraft. TC supports a diverse array of measures, encompassing terrain awareness systems, radar altitude systems, night vision imaging systems, as well as other emerging technologies and potential regulatory adjustments. These combined efforts are geared towards an ongoing mitigation of the risks linked to accidents stemming from controlled flight into terrain incidents.

In 2023, Transport Canada issued Notice of Proposed Amendment (NPA) 2023-005,¹⁷ which addressed the Minimum Visual Meteorological Conditions for VFR Flight. The NPA focused on enhancing sections 602.114 and 602.115 of the *Canadian Aviation Regulations* (CARs). Notably, it proposed the introduction of new definitions of VFR within Part VI of the CARs. Transport Canada is currently in the process of studying the numerous comments received from the

¹⁶ Transport Canada (2020). Aviation Safety Letter (TP185E – Issue 1/2020) - *Helicopter terrain awareness and warning system (HTAWS)*. Available at: <https://tc.canada.ca/en/aviation/publications/aviation-safety-letter/issue-1-2020/helicopter-terrain-awareness-warning-system-htaws> (last accessed on 12 May 2025).

¹⁷ Transport Canada (2023). NPA 2023-005 - *Minimum Visual Meteorological Conditions for VFR flight in Controlled and Uncontrolled Airspace – Parts I, IV, VI, VII of the CARs and Associated Standards*. Available on the CARAC website at: <https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/canadian-aviation-regulations-sor-96-433/canadian-aviation-regulation-advisory-council-carac> (last accessed on 12 May 2025).

consultation of NPA 2023-005 to determine the next steps. However, since TC's previous update in September 2023 (RDIMS 19764552), the night VFR file has been removed from the Forward Regulatory Plan planned for April 2024 – April 2026,¹⁸ as the department does not estimate the file will be completed prior to April 2026.

TC is planning to incorporate a more comprehensive dialogue regarding the integration of HTAWS (helicopter terrain awareness and warning systems) in forthcoming discussions and draft proposals, underscoring its commitment to safety enhancement.

Looking ahead to the long term, significant developments are already in motion. As of February 2020, RTCA¹⁹ SC-237²⁰ and EUROCAE²¹ WG-110²² are actively engaged in crafting novel or enhanced RTCA DO-309²³ *Minimum Operational Performance Standards (MOPS) tailored for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment*. In alignment with these advancements, TCCA plans to align its HTAWS requirements to conform with the forthcoming RTCA DO-309 Standards.

Once these standards receive their anticipated updates, TC will propose their adoption as the definitive benchmark for HTAWS utilization across all rotorcrafts governed in Part VI & VII regulations in Canada. While the precise timeline for these advancements is still to be determined, the commitment to their realization remains unwavering.

March 2025: TSB assessment of the response (Satisfactory Intent)

In its latest response, Transport Canada (TC) indicated that it continues to agree in principle with Recommendation A16-10.

TC's response remains largely unchanged from the previous year and speaks to "issues with this equipment on helicopters" as a reason for not currently supporting a mandatory helicopter terrain awareness warning systems (HTAWS) requirement. However, this position appears to

¹⁸ Transport Canada (2024). Forward Regulatory Plan: Aviation initiatives planned for April 2024 – April 2026. Available at: <https://tc.canada.ca/en/corporate-services/acts-regulations/forward-regulatory-plan/aviation-initiatives-planned> (last accessed on 12 May 2025).

¹⁹ RTCA is a private, not-for-profit association founded in 1935 as the Radio Technical Commission for Aeronautics, now referred to simply as "RTCA." It is the premier Public-Private Partnership venue for developing consensus among diverse, competing interests on critical aviation modernization issues in an increasingly global enterprise.

²⁰ SC-237 "Helicopter Terrain Awareness Warning System" was established by the Program Management Committee (PMC) on 15 May 2019, to work jointly with EUROCAE WG-110. The group will work to define a MOPS that will define "Classic Modes" that are included in fixed winged TAWS focused on off-shore operations for helicopters.

²¹ EUROCAE is a non-profit organisation, created in 1963 as the "The European Organisation for Civil Aviation Equipment," with the objective to develop standards for European civil aviation.

²² WG-110 "Helicopter Terrain Awareness and Warning Systems (HTAWS)" was established to develop MOPS for Class A Helicopter Terrain Awareness and Warning Systems (HTAWS), analogous to fixed wing TSO-C151 Class A TAWS, in support of offshore helicopter operations.

²³ This MOPS defines a Helicopter Terrain Awareness and Warning System (HTAWS), Airborne System.

be inconsistent with an article published in issue 1/2020 of TC's *Aviation Safety Letter*, which stated that "emerging technologies such as enhanced flight vision systems (EFVS) may become more affordable and provide better situational awareness for flight crew members."²⁴ Greater clarity is needed on the specific technical or operational challenges that prevent TC from supporting a mandatory requirement. The Board requests that TC provide this clarification in its next update to support future assessments.

TC also reiterated that efforts to update night visual flight rules (VFR) regulations have been delayed with no anticipated timeline provided.

Lastly, TC indicated that significant developments have been made since February 2020. RTCA²⁵ SC-237²⁶ and EUROCAE²⁷ WG-110²⁸ are actively engaged in crafting novel or enhanced RTCA DO-309²⁹ *Minimum Operational Performance Standards (MOPS) tailored for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment*. TC plans to make HTAWS requirements conform to the forthcoming RTCA DO-309 Standards.

As noted in the Board's previous assessment, the actions proposed by TC, once fully implemented, have the potential to significantly reduce or eliminate the safety deficiency identified in Recommendation A16-10. However, since these actions are contingent upon the work of RTCA SC-237 and EUROCAE WG-110, the timeline for implementation remains uncertain. Until these measures are in place, the safety risks associated with this deficiency will persist.

Therefore, the Board considers the response to Recommendation A16-10 to show **Satisfactory Intent**.

²⁴ Transport Canada, "Helicopter terrain awareness and warning system (HTAWS)", *Aviation Safety Letter* (Issue 1/2020), available at <https://tc.canada.ca/en/aviation/publications/aviation-safety-letter/issue-1-2020/helicopter-terrain-awareness-warning-system-htaws> (last accessed on 12 May 2025).

²⁵ RTCA is a private, not-for-profit association founded in 1935 as the Radio Technical Commission for Aeronautics, now referred to simply as "RTCA." It is the premier Public-Private Partnership venue for developing consensus among diverse, competing interests on critical aviation modernization issues in an increasingly global enterprise.

²⁶ SC-237 "Helicopter Terrain Awareness Warning System" was established by the Program Management Committee (PMC) on 15 May 2019, to work jointly with EUROCAE WG-110. The group will work to define a MOPS that will define "Classic Modes" that are included in fixed winged TAWS focused on off-shore operations for helicopters.

²⁷ EUROCAE is a non-profit organisation, created in 1963 as the "The European Organisation for Civil Aviation Equipment," with the objective to develop standards for European civil aviation.

²⁸ WG-110 "Helicopter Terrain Awareness and Warning Systems (HTAWS)" was established to develop MOPS for Class A Helicopter Terrain Awareness and Warning Systems (HTAWS), analogous to fixed wing TSO-C151 Class A TAWS, in support of offshore helicopter operations.

²⁹ This MOPS defines a Helicopter Terrain Awareness and Warning System (HTAWS), Airborne System.

Latest response and assessment

December 2025: response from Transport Canada

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

Since the recommendation was issued in 2016, TC has pursued mitigations to encourage the voluntary adoption of Terrain Awareness Warning Systems (TAWS) for rotorcraft and to address the risk associated with night visual flight rules (VFR) operations more broadly:

- TC consulted with industry via the Night VFR Working Group and industry associations on the best means to address this recommendation while encouraging the voluntary installation of Helicopter Terrain Awareness Warning Systems (HTAWS) in commercial helicopters.
- In 2020, TC published an article in the *Aviation Safety Letter*³⁰ advocating for the voluntary adoption of TAWS for rotorcraft.
- In 2023, TC issued Notice of Proposed Amendment (NPA) 2023-005³¹, which addressed the Minimum Visual Meteorological Conditions for VFR flight and focused on enhancing sections 602.114 and 602.115 of the *Canadian Aviation Regulations (CARs)*. As of December 2025, TC continues to address comments and concerns identified through the NPA. Given the large volume of input received in the NPA, additional consultation will be required. An updated NPA will be issued by the end of 2026.

TC is currently planning additional actions that will move toward mandating HTAWS in specific instances in line with international initiatives in this area. In 2025/2026, it is anticipated that an updated Minimum Operational Performance Standard for HTAWS (DO-309) will be published by the RTCA³². At the same time, international authorities are moving ahead with increased mandates for the installation of HTAWS. For example, the Civil Aviation Authority United Kingdom (CAA UK) CAAOID0020 has mandated HTAWS for offshore operations as of January 1, 2025.

In the short term and based on anticipated updates of the recent CAA UK directive, TC is drafting an NPA to mandate HTAWS by 2031 for:

- Offshore operations;
- Helicopter Medical Emergency Medical Services (HEMS);

³⁰ Transport Canada (2020). *Aviation Safety Letter* (TP185E – Issue 1/2020), “Helicopter terrain awareness and warning system (HTAWS)”. Available at: <https://tc.canada.ca/en/aviation/publications/aviation-safety-letter/issue-1-2020/helicopter-terrain-awareness-warning-system-htaws> (last accessed on 02 February 2026).

³¹ Transport Canada (2023). NPA 2023-005 - *Minimum Visual Meteorological Conditions for VFR flight in Controlled and Uncontrolled Airspace – Parts I, IV, VI, VII of the CARs and Associated Standards*. Available at: <https://wwwapps.tc.gc.ca/Saf-Sec-Sur/2/NPA-APM/npaapmr.aspx?id=3031&GoCTemplateCulture=en-CA> (last accessed on 02 February 2026).

³² RTCA is a private, not-for-profit association founded in 1935 as the Radio Technical Commission for Aeronautics, now referred to simply as “RTCA”.

- Search and Rescue (SAR); and,
- 604 and Part VII operations (except subpart 702) during night VFR and IFR.

In the last decade, nearly all helicopters manufactured, include modern avionics that incorporate HTAWS in their avionics suites. The financial burden to most operations will be minimal. HTAWS will be highly recommended for all other operations, including 602.

In the medium term and based on consultation from NPA 2023-005 (minimum conditions for night VFR flight), TC will review consideration to include mandatory HTAWS for 702 Night VFR or IFR operations by 2033.

In the long term, TC will continue to monitor new technologies to determine if HTAWS continues to be the best solution or if combinations of other systems can achieve an equivalent level of safety. These could include but are not limited to advanced imaging systems combined with Light Detection and Ranging (LIDAR) or forward-looking sensors combined with terrain and obstruction databases.

March 2026: TSB assessment of the response (Unsatisfactory)

In its latest response, Transport Canada (TC) reaffirmed that it agrees in principle with Recommendation A16-10.

According to its response, TC is drafting a Notice of Proposed Amendment (NPA) to mandate helicopter terrain awareness warning systems (HTAWS) by 2031 for:

- Offshore operations;
- Helicopter medical emergency medical services (HEMS);
- Search and rescue (SAR); and,
- *Canadian Aviation Regulations* (CARs) Subpart 604 and Part VII operations (except subpart 702) during night visual flight rules (VFR) and instrument flight rules (IFR).

Additionally, TC indicated that based on consultation from NPA 2023-005 (minimum conditions for night VFR flight), it will review consideration to include mandatory HTAWS for CARs Subpart 702 night VFR or IFR operations by 2033.

The Board acknowledges that TC is taking action to address this safety deficiency; however, the Board is concerned by the proposed timeline for implementation and the uncertainty surrounding CARs Subpart 702. According to TC's response, it will be at least another five years before HTAWS will be mandated for some CARs subpart operators, even though this recommendation has already been active for 10 years. Although, according to TC, most helicopters manufactured in the last decade include modern avionics that incorporate HTAWS into their avionics suites and the financial impact to many operations will be minimal, the Board encourages TC to advance this timeline to the maximum extent possible. Until HTAWS is mandatory for all helicopters that are operated under night VFR and IFR, the underlying safety deficiency will persist and the people who travel on those helicopters will be at increased risk of controlled flight into terrain (CFIT) accidents.

Although TC's planned actions will substantially reduce or eliminate the risk associated with the safety deficiency identified in this recommendation, the proposed timeline means that the safety deficiency will persist more than 15 years after the recommendation was issued.

Therefore, the Board considers the response to Recommendation A16-10 to be **Unsatisfactory**.

File status

The TSB will continue to monitor the progress of TC's planned actions to mitigate the risk associated with the safety deficiency identified in Recommendation A16-10, and it will reassess the deficiency on an annual basis or when otherwise warranted.

This deficiency file is **Active**.