



TSB Recommendation A16-08

Night visual flight rules regulations

The Transportation Safety Board of Canada recommends that the Department of Transport amend the regulations to clearly define the visual references (including lighting considerations and/or alternate means) required to reduce the risks associated with night visual flight rules flight.

Air transportation safety investigation report	A13H0001
Date the recommendation was issued	15 June 2016
Date of the latest response	October 2022
Date of the latest assessment	February 2023
Rating of the latest response	Satisfactory Intent
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

In this occurrence, the pilots took off on a night visual flight rules (VFR) flight in conditions that did not permit them to safely maintain visual reference to the surface. Although the *Canadian Aviation Regulations* (CARs) indicate that night VFR requires a pilot to maintain visual reference to the surface, they do not adequately define the visual references required for compliance. For example, the regulations do not define the cultural/ambient light requirements, nor do they provide for an alternate means of compliance when this cannot be achieved. During the investigation, it was determined that many pilots who conduct night VFR operations believe that it is acceptable to do so at night, regardless of lighting conditions, as long as the reported weather conditions (i.e., ceiling and visibility) meet the minimums specified by regulation. These differences in the ways in which the regulations are being interpreted significantly increase the risk to those who travel on VFR aircraft at night. Further, there is no regulatory requirement, as there is in some countries, for commercial operators to demonstrate to Transport Canada (TC) that their night VFR routes can be reasonably carried out by relying on cultural or ambient lighting, or by alternative means such as night vision goggles (NVG), before they receive TC approval of their night VFR routes.

Night VFR flights are routinely conducted across Canada. In heavily populated areas, it may be easy for pilots to maintain visual reference to the surface using cultural lighting. However, flights are often conducted in remote locations of Canada, where there may be little to no cultural lighting available to help pilots maintain visual reference to the surface without some type of alternative means, such as NVGs. The risks associated with conducting night VFR operations in conditions where pilots are unable to maintain visual reference to the surface are well documented in TSB investigation reports. In a TC study, the regulator identified a number of instances in which flights were conducted under the auspices of night VFR, but with inadequate cues to maintain reference to the surface. Strong evidence therefore exists to suggest that the current night VFR regulations should be re-examined and amended to clearly establish the conditions required to meet the intent of the regulation. For example, in the United States, the *Federal Aviation Regulations* (FARs) state that no person shall operate a helicopter under VFR at night unless that person has “visual surface light reference, sufficient to safely control the helicopter.”

Without clearly defined night VFR requirements that establish unaided visual reference/lighting considerations or alternative means of maintaining visual reference to the surface (i.e., night-vision imaging systems), it is highly likely that accidents such as this one will continue to occur:

Therefore, the Board recommended that

the Department of Transport amend the regulations to clearly define the visual references (including lighting considerations and/or alternate means) required to reduce the risks associated with night visual flight rules flight.

TSB Recommendation A16-08

Previous responses and assessments

September 2016: response from Transport Canada

Transport Canada agrees with this recommendation.

TC will address this recommendation in two steps; first with safety promotion and education activities as early as fall 2016; and secondly, by initiating a regulatory amendment project in 2017 including consultation with our key stakeholders. Safety promotion and education will leverage TC's recently published Advisory Circular No. 603-001 — *Use of Night Vision Imaging Systems*.

December 2016: TSB assessment of the response (Satisfactory Intent)

In its response, TC indicated that it will take a two-fold approach to address this recommendation to reduce the risks associated with night visual flight rules flights. In the short term, TC will conduct safety promotion/education activities, which will be followed in 2017 by a regulatory amendment project. The Board is pleased that TC is taking action to address this safety deficiency.

However, until specific details about the proposed regulatory changes are fully known, the TSB cannot evaluate if these actions will fully address the safety deficiency associated with visual flight rules flights.

Therefore, the response to Recommendation A16-08 is assessed as **Satisfactory Intent**.

March 2019: response from Transport Canada

TC agrees with the recommendation and has created an internal Working Group that is working toward addressing the recommendation.

The first phase of work to address this recommendation involved a pilot project to further evaluate and develop appropriate conditions for the use of Night Vision Imaging Systems for night VFR operations. As a result of the data collected during the pilot project, a new Special Authorization (SA) and associated Advisory Circular (AC) for Night Vision Imaging Systems (NVIS) Operations will replace Ops Spec 603 for NVIS. The AC has been drafted and has been sent out for consultation. A copy of the email and draft AC is attached in Annex 1. TC is currently reviewing the comments received as part of the consultation process. Publication of the AC and availability of the new Special Authorization is being planned for the end of June 2019.

The revised Special Authorization Advisory Circular for Night Vision Imaging Systems requirements for night VFR expands on current definitions and introduces new definitions regarding VFR. The SA introduces language such as "Discernible Horizon" and "Black Hole Effect", and expands the current definition of VFR to include the following wording "*...has sufficient visual cues to see water, terrain and ground objects and provides a discernible horizon where these visual cues allow the flight to operate safely in accordance with CARs Part VI and VII requirements for NVFR.*"

Going forward, regulatory development is underway. A separate notice of proposed amendment is anticipated to be released for public consultation in 2019 that will also respond to TSB recommendations.

May 2019: TSB assessment of the response (Satisfactory Intent)

To date, the following actions have been taken by Transport Canada (TC) to address the safety deficiency identified in Recommendation A16-08, regarding a clear definition of the visual references required to reduce the risks associated with night visual flight rules (VFR) flight:

- A pilot project was carried out to evaluate and develop appropriate conditions for the use of Night Vision Imaging Systems for night VFR operations; and
- A proposed Special Authorization (SA) and associated Advisory Circular (AC) have been drafted and sent out for consultation. These documents expand on current definitions and introduce new definitions regarding VFR. TC plans on having these documents approved and published by the end of June 2019.

In addition, TC indicated, as it did previously in 2016, that regulatory development is currently underway. In its latest response, TC anticipates that the proposed amendments to the *Canadian Aviation Regulations* will be released for public consultation in 2019.

The Board is encouraged by TC's efforts to address Recommendation A16-08. The SA and AC enhance current definitions and introduce new definitions regarding VFR. However, as the regulatory development is currently underway, no details of the proposed amendments are yet available. Until the regulations are finalized, the Board is unable to determine to what extent these actions will address the safety deficiency identified in Recommendation A16-08.

Therefore, Transport Canada's response to Recommendation A16-08 remains as **Satisfactory Intent**.

December 2019: response from Transport Canada

TC agrees with the recommendation.

TC will publish an updated version of Advisory Circular (AC) 603-001¹ that will introduce the Special Authorization for Night Vision Imaging System (NVIS) by the end of 2019. It includes the new language that will form the basis of the NPA to night visual flight rules (VFR) requirements and condition for NVIS operations.

To further mitigate the risks associated with night VFR flight, TC is in the process of drafting two NPAs that will lead to updating the night VFR requirements and propose changes that would require 2 levels of night rating.

¹ Transport Canada (2019), Advisory Circular 603-001 – Issue 04 – Special Authorization for Night Vision Imaging Systems Operations. RDIMS-#12633781-ADVISORY CIRCULAR 603-001 ISSUE 4 SPECIAL AUTHORIZATION FOR NVIS.

Given the scope of the work, these two NPA packages are expected to be completed by mid-2021.

In the meantime, TC continues to take action to mitigate the risks associated with night VFR flight through pilot education and awareness. In addition to the update to AC 603-001 already described, TC has published several articles in recent *Aviation Safety Letter* highlighting issues associated with night VFR:

1. In 2017, an article provided a review of TSB Final Report A1500188 - Collision with terrain at Night - Cessna 182H;² and
2. In 2019, an article was published to remind pilot of certain Night Flying Tips.³

February 2021: TSB assessment of the response (Satisfactory Intent)

In its response, Transport Canada (TC) indicated that it agrees with Recommendation A16-08. To address the safety deficiency identified in Recommendation A16-08,

- TC published an updated version of Advisory Circular (AC) 603-001 – Special Authorization for Night Vision Imaging Systems.
- TC is developing 2 Notices of Proposed Amendments (NPAs): one to update the night visual flight rules (VFR) requirements and a second one to propose a requirement for 2 levels of night rating. The expected completion date for the NPAs is mid-2021.

In addition to the above noted steps, TC has published articles in 2017 and 2019 in the *Aviation Safety Letter* to educate pilots and to raise awareness of the risks associated with the safety deficiency associated with Recommendation A16-08.

When fully implemented, TC's proposed regulatory changes should substantially reduce or eliminate the safety deficiency associated with Recommendation A16-08. However, until regulations that clearly define the visual references required to reduce the risks associated with night VFR flight come into effect, the risks to transportation safety remain.

Therefore, the response to Recommendation A16-08 is assessed as **Satisfactory Intent**.

September 2021: response from Transport Canada

Transport Canada (TC) agrees with the recommendation.

Since its publication in June 2016, TC has been taking steps to raise awareness of the hazards associated with night visual flight rules (VFR) flight while pursuing changes to the regulations

² Transport Canada (2017), TP185E Issue 4/2017. Available at : https://www.tc.gc.ca/media/documents/ca-publications/ASL_4_2017E.pdf

³ Transport Canada (2019), TP185E Issue 1/2019. Available at : https://www.tc.gc.ca/media/documents/ca-publications/ASL_01-2019_EN_new.pdf

by publishing several articles in Aviation Safety Letter highlighting issues associated with night VFR:

- In 2017, an Aviation Safety Letter article (TP185E Issue 4/2017⁴) provided a review of TSB Final Report A1500188 - Collision with terrain at Night - Cessna 182H; and,
- In 2019, an Aviation Safety Letter article (TP185E Issue 1/2019⁵) was published to remind pilots of certain Night Flying Tips.

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

- Publish an updated version of Advisory Circular (AC) 600-001 that will introduce the Special Authorization for Night Vision Imaging System (NVIS); and,
- Draft two Notices of Proposed Amendments (NPA) that will lead to updating the night VFR requirements and propose changes that would require 2 levels of night ratings.

Since the previous update, and resulting from the work done by the Night VFR Working Group created in 2016, TC published on March 31st, 2021 an updated version of Advisory Circular (AC) 603-001 introducing the Special Authorization for Night Vision Imaging System (NVIS).⁶ It includes the new language that will form the basis of the NPA to night visual flight rules (VFR) requirements and conditions for NVIS operations.

Also, NPA 2021-007- *Minimum Visual Meteorological Conditions for VFR Flight - Sections 602.114 and 602.115 of the Canadian Aviation Regulations*⁷ was published for consultation on the Canada Aviation Regulation Advisory Council (CARAC) website on May 14, 2021. It is anticipated that comments on this NPA may lead to several other NPAs addressing related issues with Part IV Licencing and Currency requirements, Part VI Aircraft Equipment Requirements, Part VII Instrument Rating requirements and associated training and checking currency. It is anticipated there may be several other NPAs required. As NPA 007-2021 goes for the final draft of the regulation, TC will concurrently draft the other NPAs and work to get those out via the CARAC process for consultation.

The target timelines for stakeholders' consultation for the NPA amending Part VI of the *Canadian Aviation Regulations* (CARs) was from May 1st to June 25th 2021 and for the NPA

⁴ Transport Canada (2017). Aviation Safety Letter (TP185E – Issue 4/2017) - *Review of TSB Final Report A1500188 - Collision with terrain at Night - Cessna182H* - Available at: https://tc.canada.ca/sites/default/files/migrated/asl_4_2017e.pdf

⁵ Transport Canada (2019). Aviation Safety Letter (TP185E – Issue 1/2019) – *Night Flying Tips*. Available at: https://tc.canada.ca/sites/default/files/migrated/asl_01_2019_en_new.pdf

⁶ Transport Canada (2020). Advisory Circular (AC) No. 603-001- *Special Authorization for Night Vision Imaging Systems Operations*. Available at: <https://tc.canada.ca/en/aviation/reference-centre/advisory-circulars/advisory-circular-ac-no-603-001>

⁷ Transport Canada (2021). NPA 2021-007 - *Minimum Visual Meteorological Conditions for VFR Flight - Sections 602.114 and 602.115 of the CARs*. 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>

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 (Satisfactory Intent)

In its response, Transport Canada (TC) reiterated that it agrees with Recommendation A16-08. Since its last update, TC has taken the following additional actions to address the safety deficiency identified in the recommendation:

- On 31 March 2020, TC published an updated version of Advisory Circular (AC) 603-001 – *Special Authorization for Night Vision Imaging Systems Operations*. This AC includes the new language that will form the basis of the Notice of Proposed Amendment (NPA) to night visual flight rules (VFR) requirements and conditions for night vision imaging system (NVIS) operations.
- On 14 May 2021, NPA 2021-007 – *Minimum Visual Meteorological Conditions for VFR Flight - Sections 602.114 and 602.115 of the Canadian Aviation Regulations* was published for consultation on the Canadian Aviation Regulation Advisory Council (CARAC) website. TC anticipates that comments on this NPA may lead to several other NPAs addressing related issues in Part IV, Part VI, and Part VII of the *Canadian Aviation Regulations*. TC anticipates that the NPAs will be published in the *Canada Gazette*, Part I in June 2022.

The Board is encouraged by TC's actions to address the safety issues associated with the need to clearly define visual references in order to reduce the risks associated with night VFR. These actions, when fully implemented, have the potential to substantially reduce the risks associated with the safety deficiency identified in Recommendation A16-08.

Therefore, the response to Recommendation A16-08 is assessed as **Satisfactory Intent**.

Latest response and assessment

October 2022: response from Transport Canada

Transport Canada (TC) agrees with the recommendation.

Since its publication in June 2016, TC has been taking steps to raise awareness of the hazards associated with night visual flight rules (VFR) flight while pursuing changes to the regulations by publishing several articles in Aviation Safety Letter highlighting issues associated with night VFR:

- In 2017, an Aviation Safety Letter article (TP185E Issue 4/2017⁸) provided a review of TSB FinalReport A1500188 - Collision with terrain at Night - Cessna 182H; and

⁸ Transport Canada (2017). Aviation Safety Letter (TP185E – Issue 4/2017) - Review of TSB Final Report A1500188 - Collision with terrain at Night - Cessna 182H - Available at: https://tc.canada.ca/sites/default/files/migrated/asl_4_2017e.pdf

- In 2019, an Aviation Safety Letter article (TP185E Issue 1/2019⁹) was published to remind pilots of certain Night Flying Tips.

In 2020, TC published an updated version of Advisory Circular (AC) 603-001 to introduce the Special Authorization for Night Vision Imaging System (NVIS)¹⁰ and published 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*¹¹ for consultation on the Canada Aviation Regulation Advisory Council (CARAC) website.

In TC's September 2021 update, the Department committed to:

- Continue the work on NPA 2021-007 that will lead to updating the night VFR requirements.

As anticipated, following the consultation in 2021, the scope of NPA 2021-007 had to expand beyond the initial goal of changes to 602.114 & 602.115 of the *Canadian Aviation Regulations* (CARs). In addition to introduce new definitions of VFR (Part VI), TC will be proposing additional equipment requirements (Part VI), instrument rating requirements for instructors who will teach night VFR, and additional flight training and checking for night / reduced vs. day VFR (Part IV, VI and VII). These changes should bring about a noted increase in safety and should dramatically reduce the risk of accidents. This NPA is set to circulate for comments by early 2023 and will be available through the CARAC website.

It is anticipated that the amendment will be published in *Canada Gazette* Part II in 2024. Once the new regulations come into force, TC intends to assist flight schools, general aviation, and commercial operators in adapting to these sweeping changes.

February 2023: TSB assessment of the response (Satisfactory Intent)

In its response, Transport Canada (TC) reaffirmed that it agrees with Recommendation A16-08.

Since 2016, TC has taken a number of initiatives to raise awareness of the hazards associated with night visual flight rules (VFR) flight while pursuing regulatory changes. The Board notes that TC has amended Advisory Circular (AC) 603-001 and continues to work on regulatory change through the Notice of Proposed Amendment (NPA) 2021-007. In its response, TC

⁹ Transport Canada (2019). Aviation Safety Letter (TP185E – Issue 1/2019) – Night Flying Tips. Available at: https://tc.canada.ca/sites/default/files/migrated/asl_01_2019_en_new.pdf

¹⁰ Transport Canada (2020). Advisory Circular (AC) No. 603-001 - Special Authorization for Night Vision Imaging Systems Operations. Available at: <https://tc.canada.ca/en/aviation/reference-centre/advisory-circulars/advisory-circular-ac-no-603-001>

¹¹ Transport Canada (2021). NPA 2021-007 - Minimum Visual Meteorological Conditions for VFR Flight - Sections 602.114 and 602.115 of the CARs. 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>

indicated that the proposed regulatory changes, which should be published in the *Canada Gazette*, Part II in 2024, have expanded beyond the initial scope to include:

- clearly defining VFR;
- additional equipment requirements (Part VI);
- instrument rating requirements for instructors who will teach night VFR; and
- additional flight training and checking for night and reduced visibility day VFR (Parts IV, VI and VII).

The Board is encouraged by TC's actions to address the safety issues associated with the need to clearly define visual references, the need for additional equipment, and the need for additional flight training, in order to reduce the risks associated with night VFR. These actions, when fully implemented, have the potential to substantially reduce the risks associated with the safety deficiency identified in Recommendation A16-08.

Therefore, the Board considers the response to the recommendation to show **Satisfactory Intent**.

File status

The TSB will continue to monitor the progress of TC's planned actions to mitigate the risks associated with the safety deficiency identified in Recommendation A16-08, and it will reassess the deficiency on an annual basis or when otherwise warranted.

This deficiency file is **Active**.