Final Assessment Report

Science and Aviation (BSc); Geography and Aviation (BES)

February 2026

Executive Summary

External reviewers were invited to review the **Science and Aviation (BSc) and Geography and Aviation (BES)** delivered by the **Faculty of Science** and the **Department of Geography and Environmental Management.**

"Both programs are strengthened by well-rounded faculty support, engaged students, and a strong partnership between [the Waterloo-Wellington Flight Centre] (WWFC) & the University of Waterloo. Some key areas of suggested improvement are program cohesiveness, transportation to and from WWFC, and institutional course scheduling constraints."

A total of 6 recommendations were provided by the reviewers, regarding restructuring of the program, sustainable transportation and future strategic planning. In response, the program created a plan outlining the specific actions proposed to address each recommendation as well as a timeline for implementation. The next cyclical review for this program is scheduled for **2029-30**

Enrollment over the past three years

	Honours Science and Aviation	Honours Geography and Aviation
2025-2026 (Fall 2025)	115	193
2024-2025 (Fall 2024)	169	198
2023-2024 (Fall 2023)	154	198

*Based on Active Student extract from Quest on 23 February 2026

Background

In accordance with the University of Waterloo's Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response of the **Science and Aviation (BSc) and Geography and Aviation (BES) programs** delivered by the Faculty of Science and Department of Geography. A self-study (Volume I, II, III) was submitted to the Associate

Vice-President, Academic and on **14 February 2025.** The self-study (Volume I) presented the program descriptions and learning outcomes, an analytical assessment of the programs, including data collected from students through focus groups and University of Waterloo Aviation Society (UWAS) and the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). The CVs for each faculty member with a key role in the delivery of the program(s) were included in Volume II of the self-study.

From Volume III, two arm's-length external reviewers were selected by the Associate Vice-President, Academic: **Mr. TJ Bradd, Program Manager, Commercial Aviation Leadership Program, University of Windsor, Ontario and Dean Kelly Williams-Whitt, Faculty of Business, Communication Studies and Aviation, Mount Royal University, Alberta.**

Reviewers appraised the self-study documentation and conducted a site visit to the University on June 19-20, 2025. An internal reviewer from the University of Waterloo, Professor Grit Liebscher, Department of German and Slavic Studies, was selected to accompany the external reviewers. The visit included interviews with the Associate Vice-President, Academic, Dean of the Faculty of Science, Associate Dean of Environment for Undergraduate Studies, Chair of the Department of Geography & Environmental Management (GEM), Associate Dean of Science (Teaching and Learning), as well as faculty members, staff, the Aviation Program Manager, liaison librarian and current undergraduate students. The Review Team also had an opportunity to visit the Waterloo Wellington Flight Centre and meet with representatives from the Centre.

Following the site visit, the external reviewers submitted a report on their findings, with recommendations. Subsequently, the program responded to each recommendation and outlined a plan for implementation of the recommendations. Finally, the Deans responded to the external reviewers' recommendations and endorsed the plans outlined by the program.

This final assessment report is based on information extracted, in many cases verbatim, from the self-study, the external reviewers' report, the program response and the Dean's response.

Program Characteristics

In the Faculty of Environment, the department of Geography and Environmental Management (GEM) offers the following undergraduate programs leading to a Bachelor of Environmental Studies (BES):

- Honours Geography and Aviation (Regular)

The Faculty of Science offers the following undergraduate programs leading to a Bachelor of Science (BSc):

- Honours Science and Aviation (Regular)

The Geography and Aviation program and the Science and Aviation program are professional programs leading to a BES or BSc degree coupled with an Integrated 'frozen' Airline Transport Pilot License from Transport Canada, with training and aviation related coursework completed at the Waterloo Wellington Flight Centre. The Geography and Aviation program does offer a specialization in Aviation to the Geography and Geomatics programs.

The Geography and Aviation program has the Department of Geography and Environmental Management as its home department. At the time of review, the Science and Aviation program does not have a home department but is housed in the Faculty of Science. The two programs work closely together and the role of the Aviation Programs Manager is to help facilitate their relationship.

Summary of Strengths, Challenges and Weaknesses based on Self-Study

Strengths

- The aviation programs at UWaterloo are unique in the Canadian landscape and are the only aviation programs paired with a Bachelor of Science degree or a Bachelor of Environmental Studies in Geography degree in Ontario. Students will graduate with an undergraduate degree and an integrated Airline Transport Pilot Licence that will become valid once the student gets sufficient work experience. Through our flight training partner students will get a minimum of 200 hours of flight training experience, as well as professional experience and real-world exposure throughout their flight training. Aviation is a tight community, the students at UWaterloo make industry connections through UWAS, as well as a variety of aviation subject matter in the curriculum. This helps foster a tight-knit student body and through industry day events held at UWaterloo and at the Flight Centre many connections are made.
- The aviation programs at UWaterloo have a high demand, with the F24 intake having over 800 applicants for 120 spots. The programs' reputation continues to grow in industry and online through our alumni. The flight training partner, WWFC, is estimated to train 20% of all commercial pilots in Canada based on Transport Canada data. UWaterloo has a strong partnership with WWFC. WWFC has grown dramatically over the past 5 years with over 35 aircraft and over 60 flight instructors, up from 22 aircraft and 30 flight instructors.

Challenges (factors that are external to the program and beyond the direct control of the program)

- While the UWaterloo aviation program has grown with increasing intake over the last five years, there is a real constraint based on flight training capacity. For the program to continue to grow, UWaterloo's flight training partner will have to continue to grow as well. This can be accomplished through several different means, either through a training satellite base or streamlining training and increasing retention of flight instructors.
- There is a pilot shortage across Canada leading to excellent opportunities for recent graduates, this is also causing a problem in the retention and recruitment of flight instructors. Because of the demand for pilots many flight companies are hiring less experienced pilots leading to very high turnover rates in flight instructors. One of the challenges our flight training partner faces is a lack of consistent long-term flight instructors. This is a challenge for UWaterloo because it hinders the ability to grow the flight training capacity while maintaining quality and therefore grow the intake numbers in the aviation program.
- The cost of flight training is currently estimated at $93,000 total; this number can be higher if the student encounters difficulties along the way and needs training above and beyond the standard flight training syllabus. Currently OSAP does not recognize flight training and so does not provide any funds. The cost of flight training is above and beyond the tuition students pay for their UWaterloo courses. Due to WWFC instructing the core AVIA courses the overall tuition at UWaterloo is lower than for other programs and is eligible for OSAP.
- Another external challenge is that the aviation program is vulnerable to federal regulations, our partner WWFC is regulated federally by Transport Canada, as well as provincially by the Ministry of Colleges and Universities under the Ontario Career Colleges Act. During the pandemic starting in March 2020 all flight training facilities were closed in Canada. To re-open, WWFC had to be compliant with Transport Canada and the Ontario Ministry of Colleges and Universities. This caused a disruption in training that greatly impacted on the period of this review. The aviation programs are vulnerable to any regulatory changes to our flight training partner as well as any audits, pandemics, or other unforeseen events.
- During this review period the pandemic caused great disruption in the ability of students to write Transport Canada exams as well as the timely processing of their aviation medicals. This has mostly gone back to normal but still can cause delays due to staffing issues at Transport Canada. The height of this delay was often over a year.
- Mental and physical health reporting has a stigma attached to it due to the students being held to the same standards as a professional commercial or airline pilot. Students are afraid to report any issues because it can lead to Transport Canada pulling the students medical certificate which ends the student's ability to train.

Weaknesses (factors that are internal to the program, and the program could directly address)

- In the review period the core AVIA courses run by WWFC consisted of several elements leading to inefficient processes between UWaterloo and WWFC. The AVIA courses had a Flight Management component, a Flight Lab component, as well as a flight training component. This led to difficulty for the UWaterloo program to track which component had been passed, which component was incomplete, and which component was unsuccessful. Currently UWaterloo is in the process of separating out all the elements into separate courses and aviation training milestones. It is hopeful this will be approved for Fall 2025, but the issue currently remains.
- WWFC teaches the AVIA courses on campus using UWaterloo's Learn system as well as facilities. Each semester WatIAM and Learn accounts need to be created for WWFC instructors to maintain security. This can lead to delays. Careful planning is needed to ensure that the courses provided by WWFC do not create a time conflict with the required courses of students at UWaterloo. What has happened in the past is that the AVIA course run by WWFC is scheduled at the same time as a course at UWaterloo that is required for degree completion.
- Currently there is lower flexibility and electives in the Science and Aviation plan. The Faculty of Science is currently in the process of reviewing and changing the plan. This process is taking place outside of the review time period and should be in place in time for Fall 2025.
- In the event of a fatal event or an accident involving an aviation student there is currently no crisis response plan at the university or in conjunction with WWFC. WWFC does currently have one in place for their organization.

Summary of Key Findings from the External Reviewers

The reviewers left the site visit with a very positive view of the two programs. Some key areas of suggested improvement are program cohesiveness, transportation to and from WWFC, and institutional course scheduling constraints.

- **Program cohesiveness:** current structure lacks cohesiveness and the lack of aviation expertise within the Faculty of Science which impacts learning and the student experience.
- **Resources:**
    - While resources related to their GEM or Science degrees are sufficient and well developed, more could be done to increase aviation-related resources.

- Access to reliable transportation between WWFC and the Waterloo campus is also a known limitation.
- No opportunity for paid work-integrated or co-op experiences.
- Lack of strategic planning for aviation/aeronautics programs.

External Reviewers' Recommendations and Program/Dean Reponses

Recommendation 1

Program cohesiveness – more aviation options should be made available to students and aviation content should be integrated in GEM & Science required courses.

Program Response

Part 1 – Expanding Aviation Course Offerings:

We are actively enhancing the breadth and depth of aviation-related academic options available to students. With the recent addition of a dedicated aviation faculty member within the Department of Geography and Environmental Management (GEM), as well as the appointment of a Pilot-in-Residence within the Faculty of Science, we have increased the active number of AVIA-designated courses from 5 to 9. These new offerings are now part of both the newly revised Aviation Specialization and the forthcoming Aviation Minor. Additionally, we are collaborating with faculty outside the aviation stream—such as those in meteorology— to develop aviation-relevant courses that enrich the interdisciplinary nature of the program.

This development occurred outside the review window.

Part 2 – Integration of Aviation Content into Core Curriculum:

Efforts are underway to embed aviation-related themes into existing courses within GEM and Science. For example, in GEM, the transportation course (GEOG351) is being redeveloped to include more aviation-focused case studies and examples. Similarly, in Science, we are exploring opportunities to incorporate aviation applications into broader topics such as electric vehicle technology and environmental systems. This is being done through consultations with the Physics Department. These integrations aim to provide students with a more cohesive and aviation-relevant academic experience across their core curriculum.

Dean's Response (Dean of Science)

The Faculty of Science is supportive of the program response, but will note that the minor, while housed in a unit, should be jointly managed by the participating Faculties.

Dean's Response (Dean of Environment)

Environment is supportive of the program evolution as detailed in Part 1 and Part 2. I also note, in alignment with the Dean of Science, that the Aviation Minor, while potentially managed in a unit, is offered UW-wide. Given that both Science and ENV are putting together a minor in Aviation, the faculties could aim to build one jointly managed minor.

Recommendation 2

The Science program should be restructured to increase flexibility for students to take more AVIA courses.

Program Response

The Science and Aviation program has recently been restructured, with changes taking effect in Fall 2025. These updates were implemented after the cyclical review period and were therefore not reflected in the reviewers' assessment. A key improvement includes increasing the number of open electives available to students, which provides greater flexibility to enroll in the new AVIA course offerings recently created alongside their core Science requirements. This change directly supports student interest in aviation and enhances the interdisciplinary nature of the program.

Dean's Response (Dean of Science)

The Faculty of Science is supportive of the program response.

Dean's Response (Dean of Environment)

This recommendation is specific to Science.

Recommendation 3

Waterloo should identify the most sustainable transportation option and implement within the next twelve months.

Program Response

The Deans of Science and Environment are committed to collaborating with the Waterloo Wellington Flight Centre (WWFC) to resolve this, and the two programs at UWaterloo have intensified their efforts to identify and implement a sustainable transportation solution for our students.

Transportation to the airport from main campus has been an issue since the inception of the programs in 2007 and the issue has only grown as the aviation programs have expanded to over 400 students who travel regularly to WWFC for flight training, with an estimated 20,000+ trips annually.

Several promising options are being actively explored as we proceed with a multi-pronged approach:

Working with Grand River Transit, potentially through WUSA or the Sustainable Transportation Office, to advocate for a dedicated city bus line connecting the ION light rail system to the airport. This will benefit not only aviation students but also the broader university community and regional travelers.

WWFC's existing relationships with local Members of Provincial Parliament will be leveraged to raise awareness and explore funding opportunities, with outreach planned to Justin Lebelle, incoming General Manager at WWFC.

Another option under consideration is a dedicated shuttle service between main campus and WWFC, potentially funded jointly by UWaterloo and WWFC, with a student subscription model to support operational costs. WWFC would manage shuttle operations, offering flexibility in staffing and responsiveness to weather-related disruptions. This option is in the very initial phase and will require coordination with WWFC.

A partnership with Computer Science is leading to research and development of a carpooling app to help facilitate ridesharing to and from the airport amongst aviation students.

Additionally, partnerships with rideshare services such as Communauto are being explored to designate the airport as a parking hub, allowing students to avoid charges during flight training.

These efforts reflect a strong commitment to improving accessibility, reducing environmental impact, and supporting student success through practical and sustainable transportation solutions.

Dean's Response (Dean of Science)

The Faculty of Science recognizes the urgency of establishing a sustainable transportation solution between main campus and the Waterloo Wellington Flight Centre (WWFC). The program's response shows strong awareness of the issue and a constructive, collaborative approach with the Faculty of Environment and WWFC. We are encouraged by the range of options being explored, particularly engagement with Grand River Transit as a long-term solution. However, given the twelve-month timeline, priority should be placed on options that can be implemented more quickly, such as a dedicated shuttle service or structured carpooling initiatives. Moving forward, the program should identify a preferred option, develop a clear implementation plan with defined responsibilities and metrics, and provide a progress update within six months. The Faculty remains committed to

supporting a practical and sustainable solution that enhances student access and reduces environmental impact.

Dean's Response (Dean of Environment)
The Faculty of Environment is supportive of the program response.

Recommendation 4

Scheduling options should be investigated to create blocks of time for student flight training.

Program Response
We agree that this recommendation could bring benefits to students and will be working closely with the Waterloo Wellington Flight Centre (WWFC) to investigate viable scheduling solutions. There is interest in implementing structured time blocks that better accommodate flight training within students' academic schedules. This initiative aims to reduce scheduling conflicts between UWaterloo and WWFC and improve overall program efficiency, while supporting student success both in the classroom and in the cockpit. We are committed to exploring flexible models that align with course timetables and flight availability and will continue to work with WWFC to align student availability. Currently we coordinate when to host AVIA flight courses that WWFC provides and instructs on Campus to minimize course conflicts and aid in creating more opportunities for flight training. A recent development is to have the flight training start in the Spring semester for 1B Sci students due to the time constraints and flexibility constraints of the labs Science and Aviation students are required to take. This move to a Spring semester start increased flexibility in flight training and reduced course and lab conflicts.

Dean's Response (Dean of Science)
The Faculty of Science is supportive of the program response.

Dean's Response (Dean of Environment)
The Faculty of Environment is supportive of the program response.

Recommendation 5

Waterloo should continue to pursue financial supports for students, including paid work- integrated learning options.**Program Response**

Please refer to section: Recommendations Not Selected for Implementation.

Recommendation 6

Aeronautics and aviation have the potential to be another flagship set of programs for Waterloo, but the inherently multi-disciplinary nature of the field necessitates a planned approach involving units from across the university. Waterloo should engage in a strategic planning/vision process to determine the future of the discipline, where to grow, and what structure will best support that growth.

Program Response

We agree that aeronautics and aviation have the potential to become flagship areas at Waterloo, and that a coordinated, multi-disciplinary approach is essential to guiding future growth. To support this, we are establishing a **Program Advisory Committee (PAC)** composed of members from the aviation industry. This outward-facing group will provide valuable insight into industry trends, workforce needs, and emerging technologies. The PAC will be advising the Aviation Programs Manager to help coordinate curriculum development. However, we recognize that the PAC may not be positioned to fully reflect Waterloo's broader academic priorities. To ensure alignment with institutional goals, we will rely on the newly formed **AVIA Management Committee (AMC, September 10th, 2024)**, which includes internal academic leadership, to guide curricular and structural program decisions. Additionally, we propose holding an **annual coordination meeting** of the AMC with Associate Deans from the Faculties of Science and Environment to ensure that aviation program goals and content remain integrated with broader program developments across campus. This dual approach—external industry insight paired with internal academic coordination—will help shape a strategic and sustainable future for aviation at Waterloo.

Dean's Response (Dean of Science)

The Faculty of Science is supportive of the program response.

Dean's Response (Dean of Environment)

While there is interest in expanding into aviation operations at both the undergraduate and graduate levels, this would be captured under "non-flight options" within aviation more broadly, and these would by definition be separate programs from the one reviewed here.

Recommendations Not Selected for Implementation

Recommendation 5

Waterloo should continue to pursue financial supports for students, including paid work-integrated learning options

While we strongly support financial accessibility for students, this recommendation is not feasible within the current structure of the Aviation programs. The programs are a non-co-op, four-year honours degree that includes substantive experiential learning year-round across all three academic terms. This structure is designed to meet both academic requirements and the rigorous Transport Canada standards for flight training. As such, integrating paid work-integrated learning would compromise the programs' ability to deliver its core outcomes within the existing timeframe

That said, the University of Waterloo offers a wide range of entrance and continuing scholarships and bursaries, and our flight training partner, the Waterloo Wellington Flight Centre (WWFC), provides additional scholarships and employs many students during their time in the program. These supports help alleviate financial pressures while maintaining the integrity and intensity of the aviation training experience. Advancement has also reached out to the growing pool of Alumni to create additional financial awards.

Dean's Response (Dean of Science)
The Faculty of Science is supportive of the program response.

Dean's Response (Dean of Environment)
I agree with the rationale provided for not implementing this recommendation.

Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	More aviation options should be made available to students and aviation content should be integrated in GEM & Science required courses.	Continue development of AVIA courses; integrate aviation examples into GEM and Science core courses.	Associate Chairs or Deans from both faculties	Ongoing; significant progress already made, with continued integration planned over the next academic year.
2.	The Science and Aviation program should be restructured to increase flexibility for students to take more AVIA courses.	Increase number of open electives; restructure curriculum to allow more AVIA course access.	Associate Dean of Science has already initialized this	Completed for Fall 2025; monitoring and refinement ongoing.
3.	Waterloo should identify the most sustainable transportation option and implement within the next twelve months.	Continue consultations with partners, evaluate range of options to maximize benefit to students, and select most appropriate sustainable transportation model for implementation.	Aviation Programs Manager, Department Chair/Associate Dean, Deans.	In progress. Target implementation date within 12 months of approval of FAR.
4.	Scheduling options should be investigated to create blocks of time for student flight training.	Collaborate with WWFC to explore and pilot scheduling models that support flight training.	Will be meeting with the upcoming GM at WWFC, Justin Labelle, and scheduling teams withing the faculties will be	Will reach out to WWFC; pilot scheduling changes targeted for next academic cycle.

			brought into exam solutions.	
5.	Waterloo should continue to pursue financial support for students, including paid work-integrated learning options.	Maintain and promote existing scholarships and bursaries; leverage WWFC employment opportunities.	Advancement teams are continuing efforts to create scholarships in the aviation programs.	Not selected for implementation due to program structure; alternative supports ongoing.
6.	Waterloo should engage in a strategic planning/vision process to determine the future of the discipline, where to grow, and what structure will best support that growth.	Establish Program Advisory Committee to guide strategic planning and interdisciplinary growth.	The advancement teams from both faculties are meeting to propel this initiative.	Committee formation beginning soon; strategic planning to begin within the next academic year.

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for the Implementation Plan.

Date of next program review **2029-30**
Date

Signatures of Approval

Please keep this document in Word version. We do require you to sign it or demonstrate your approval. If you have issues with signing a Word document, please confirm your approval by adding the following wording when you send back the document by email "I hereby approve the attached document." We will collect formal signatures at a later stage on a pdf version.

February 27, 2026

Chair/Director Date

AFIW Administrative Dean/Head (*For AFIW programs only*) Date

June 12, 2026

Faculty Dean (Science) Date

Note: AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

June 12, 2026

Faculty Dean (Environment) Date

Note: AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

February 19th, 2026

Associate Vice-President, Academic Date
(For undergraduate and augmented programs)