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ISSUE 3/2026

AVIATION SAFETY LETTER

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Meet the Gyroplane

TP 185E

Cover photo submitted by David Hilchie, 1946 Canadian-built Cub, Glacier Lake, NWT

Canada 

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TIPS AND TOOLS

A Shared Runway: Staying Ahead of Traffic on the Water— *Practical Strategies for Float Pilots Operating in Shared Water Environments*

by Dave Bonner, co-lead, seaplane working group, and Ted Rankin, President, Ultralight Pilots Association of Canada, member of the seaplane, ultralight and amateur built working groups

When the Runway Moves: A Float Pilot's View of Boat Traffic

For most pilots, a runway is protected space. Even at an uncontrolled aerodrome, there is an expectation of order. On the water, this assumption can lead to trouble.

A seaplane does not operate in a sterile environment. It shares the surface with boats, personal watercraft, paddlers, and swimmers—many of whom are not thinking like pilots and may not understand your intentions or limitations. This difference matters. Float pilots can easily bring landplane habits into a water environment—briefing wind, glassy water, docking—but underestimating how quickly the surface picture can change.



Credit: Shutterstock

The key shift is this:

“On the water, available space is not protected space”

A Pilot's 6-Point Water Traffic Check

Before every landing or takeoff, build this into your routine:

1. Scan for movement, not just position

Don't just look at where boats are—look at where they will be.

- A slow-moving boat can become a conflict quickly
- Closure rate increases rapidly on final or during takeoff
- Small craft are harder to detect against clutter or glare

Think ahead, not just, “what do I see now?”

2. Reconfirm the lane before commitment

A clear path on downwind or taxi is not a guarantee.

- Recheck on final
- Recheck before advancing power
- Be prepared to delay or reposition

Never assume the lane has stayed clear.

3. Respect your visibility limits

Floatplanes have real blind spots:

- Nose-high attitude on takeoff reduces forward visibility
- Right-side visibility can be limited depending on aircraft
- Spray, glare, and chop reduce contrast

If you can't see clearly, you don't have the full picture.

4. Decide early—Don't salvage

If the situation is changing:

- Go around early
- Abort early
- Don't try to “make it work”

Good float pilots avoid tight situations—they don't manage them.

5. Assume others don't see or understand you

Not all water users:

- Recognize a takeoff run
- Understand your maneuvering limits
- Know your stopping distance

Plan as if you are the only one managing the risk.

6. Make yourself visible

Seeing is only half the equation—being seen matters just as much.

- Use landing lights, strobes, and recognition lights during approaches and takeoff runs
- Lights help you stand out in glare, chop, and shoreline clutter
- This is particularly important in busy or mixed-use waterways

A fast-moving boat can close the distance quickly—and if the operator doesn't see you early, your options shrink fast.

Lights won't solve everything, but they improve your chances of being recognized in time to matter.

The Takeaway

The collision regulations apply to both boats and seaplanes, but for pilots, the safer mindset is not about who has the right of way—it's about staying ahead of the situation.

Treat every water lane as temporary—and make sure you're seen.

This mindset leads to:

- Earlier decisions
- Wider margins
- Better outcomes

Because on the water, the picture is always changing—and the pilot who recognizes this first stays out of trouble. △

Submission of *Aviation Safety Letter (ASL)* articles

Do you have an aviation safety topic you are passionate about? Do you want to share your expert knowledge with others? If so, we would love to hear from you!

If you are interested in writing an article, please send it by e-mail to TC.ASL-SAN.TC@tc.gc.ca in your preferred language. Please note that all articles will be edited, translated and coordinated by the ASL team.

We look forward to receiving your articles. △

When It Gets Busy—When Everyone Is Doing Things Right

by Chris Toth CD, Program Manager, Safety Promotion & Operations Integration, Civil Aviation, Transport Canada

It was fine until it wasn't.

One minute the airspace felt open. The next—there were three calls on frequency—traffic I had not seen a moment ago—and just enough uncertainty to make me stop and reassess the picture.

Nothing had gone wrong.

But it had stopped being simple.

Most pilots know that moment. It does not announce itself. It just builds. A call that does not quite fit. Movement you cannot immediately place. Someone stepping on a transmission and having to repeat it. You find yourself leaning forward slightly, scanning more deliberately, trying to get ahead of what is developing.



Credit: Shutterstock

That moment is where a lot of real-world risk lives.

What is important to bear in mind is that most of the time, nobody has made a mistake. When you go back and look at these situations, you do not find a clear error. You find people doing reasonable things. A training flight working through a sequence. Someone transiting along a route that makes sense. An aircraft joining the circuit the way they were taught. An instrument flight rules (IFR) aircraft flying exactly as published.

Individually, it all works.

The friction arises when these actions begin to overlap.

We tend to think of risk as something that appears when a rule is broken or a bad decision is made. In practice, a lot of it shows up when everything is working the way it is supposed to, just closer together than expected. Airspace does not suddenly become unsafe. It becomes busy enough that the margin you had a few minutes ago is no longer there.

Part of the challenge is that not everyone out there is dealing with the same situation. From the outside, it is just traffic. From the inside, it is not.

A pilot passing through might be focused on navigation, weather, and staying on track. A student pilot might be trying to hold altitude, listen to instructions, and make sense of the airspace all at once. An instructor is thinking ahead and managing risks in the background. A glider pilot may be working lift and energy, moving in ways that do not line up with powered traffic. An IFR crew could be descending on a stable approach with very little room to change what they are doing.

Everyone is doing what makes sense to them.

They are just not all seeing the same picture.

That is where things start to tighten.

You really feel it when a few things line up at once. Different speeds. Different experience levels. Different equipment. A busy frequency. The phase of flight where workload is already high. On their own, none of these are a problem. Together, they change how quickly things happen and how much attention is required to stay ahead of it.

Sometimes it takes one call to make that very real.

“Traffic twelve o’clock, one-mile, opposite direction. Type and altitude unknown.”

That will get your attention in a hurry.

It is one thing to hear that when you have good forward visibility and room to manoeuvre. It is something else entirely when you are in an aircraft with limited forward visibility, already working, and in my case at the time, towing a glider.

Now your scan tightens even more. You are not just looking, you are searching. You are thinking about where that traffic could be, how quickly it could close, and what your options are if you pick it up late.

Nothing has gone wrong. Air traffic control (ATC) has done exactly what they were supposed to do.

But at that moment, the margin feels very different.

That is what busy airspace does. It takes situations that are technically normal and compresses them into something that demands more from you—and right now.

We talk about “see and avoid” as if it is simple to do. Most of the time, it is. When it gets busy, it becomes work. Now, you are not just looking; you are deciding where to look, how often to look, and how long you can afford to spend inside the cockpit. Miss a piece of sky or spend a bit too long heads down and you can fall behind without realizing it. That is not poor aviatorship. That is the system demanding more of you than it was a moment ago.

Technology helps, but it does not remove that demand. Automatic dependent surveillance–broadcast (ADS-B) or other electronic conspicuity devices can be a powerful aid. They extend what you can see and help you build a picture earlier than you otherwise could. But they only help if they are set up to support the way you are flying.

That setup should be done before you need it. What traffic do you want displayed? What range makes sense for the phase of flight? What alerts are useful and which ones just add noise? If you are sorting that out while the airspace is getting busy, you are already behind.

The same goes for how you use the device once you are airborne. It should be supporting your scan, not replacing it and not competing with it. Navigation, traffic, and weather—that is what it is there for.

If you have time to check social media, answer messages, or play a game, you have time to look outside instead. If you think the birds are angry now, they will be a lot angrier if you hit them.

When you watch pilots who are comfortable in busy airspace, they do not look busy. They look deliberate. They tend to arrive already having a sense of what is likely happening around them. They look where traffic is most likely to be, not just straight ahead. They make themselves easier to see when it counts. They speak early enough to help someone else build a picture. And they are generally where you expect them to be.

That last part matters more than it sounds. When your track, altitude, and timing make sense to someone else, they do not have to spend time figuring you out. That is one less problem for them to solve, and in a busy environment, that matters.

Even then, things will not line up perfectly. Someone will miss a call. An aircraft will appear later than you expected. You will have a moment where you wish you had a bit more space or time. That is part of it. The goal is not to eliminate those moments. It is to make sure you still have a margin when they happen.

A lot of that margin is created before you ever get airborne. Not through perfect planning, but through simple awareness. Where is traffic likely to be? When is it busiest? What kinds of operations are happening there? A small change in altitude or timing, or a slight adjustment to your route, can reduce how much you must deal with later.

One shift in thinking that seems to help is how you perceive airspace itself. Instead of assuming it is empty until you see traffic, assume the opposite. Assume someone is training. Assume someone is passing through. Assume someone is working harder than it looks from the outside. You might not see them right away, but they are probably there.

When you start from that point, the moment when things begin to build does not catch you off guard.

You are already ahead of it.

Busy airspace does not become complicated because something fails. It becomes complicated because everything keeps working at the same time, in the same place. Recognizing this early on is one of the simplest ways to always stay one step ahead. △

Not a Helicopter, Not an Aeroplane: Meet the Gyroplane

by the Rotary Wing Working Group of the General Aviation Safety Program

If you haven't already seen a gyroplane (also called an autogyro, gyrocopter or simply gyro) in the circuit at your local aerodrome, it probably won't be long before you do.

The *Canadian Aviation Regulations* call these aircraft gyroplanes. These versatile machines were first flown by Spanish inventor and engineer Juan de la Cierva in 1923. The modern-day helicopter was developed from them.

Unfortunately, after the helicopter was perfected with its vertical takeoff and landing abilities, the gyroplane fell to the fringes of aviation. Wannabe “gyronauts” would sometimes build their own aircraft and teach themselves to fly, often with unfortunate but predictable outcomes.



Figure 1: A 1934 Cierva C.30-A Autogiro

In Canada today, gyroplane pilots must have ground and flight training on this category of aircraft. They have similar knowledge, experience and skill requirements as private aeroplane or helicopter pilots. This training, design changes that make them more stable and safer to fly, and better-quality manufacturing have sparked new interest in gyroplanes. The gyroplane has been reborn as a capable, versatile, safe and fun machine to fly.

Unlike aeroplanes, balloons, gliders and helicopters, there is no internationally agreed airworthiness standard for gyroplanes. This means gyroplanes in Canada can't operate under a certificate of airworthiness (C of A).

Many modern-day gyroplanes are factory-built in Europe from carbon fibre, chromoly or stainless steel. They are powered almost exclusively by Rotax 4-stroke engines. They can come equipped with a transponder and electronic flight instrument system limited to visual flight rules use only.



*Figure 2: A line-up of modern factory-built and amateur-built gyroplanes
Credit: Experimental Aircraft Association*

These factory-built gyroplanes have been serially and commercially mass-produced as one of many essentially identical aircraft in a controlled, industrial process. Because of this, they can operate under a Special C of A—Limited. That means that these gyroplanes have similar maintenance standards as other aeronautical products. This includes needing a maintenance release by an aircraft maintenance engineer.

Other gyroplanes are constructed from raw materials or kits. They typically use either converted automotive engines or 2- or 4-stroke engines commonly found in other recreational aircraft. These gyroplanes operate under a Special C of A—amateur-built.

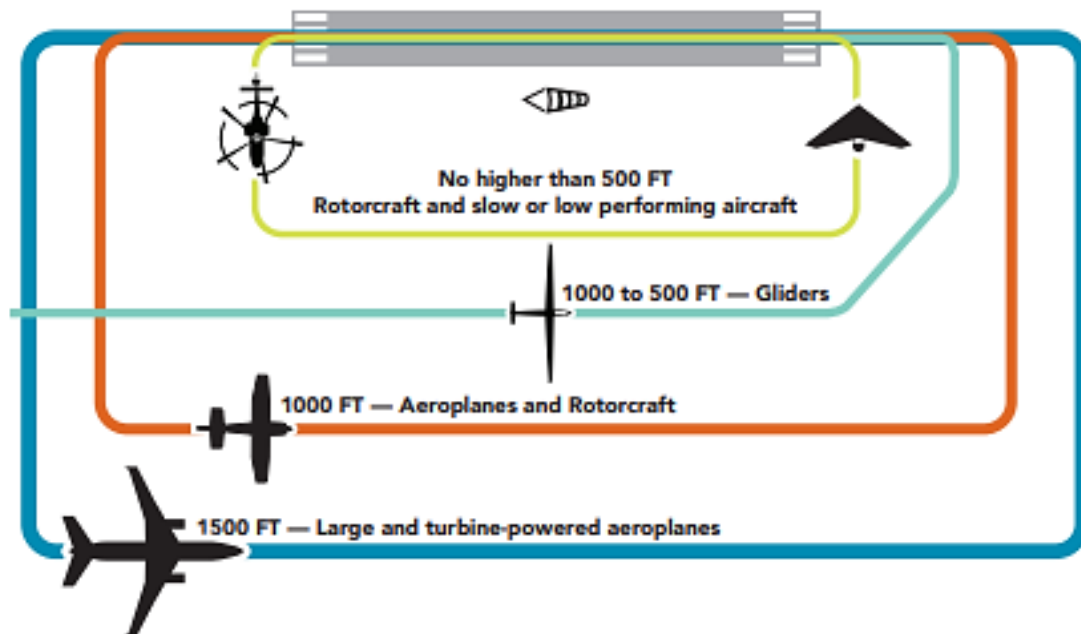


Figure 3: Gyroplanes either fly the circuit normally flown by aeroplanes or a circuit at a lower altitude and closer to the runway (Source: TC AIM-RAC)

Currently, there are about 180 gyroplanes in the Transport Canada registry, but this number is growing. If you haven't seen a gyroplane at an airport near you, it probably won't be long before you do.

Although these aircraft look like helicopters, most fit in well with the aeroplane traffic circuit at aerodromes. They're power-driven and heavier than air, so they have the same right-of-way obligations as aeroplanes and helicopters. They're slower than other fixed wing traffic, so you can treat them much like you would a Cessna 152—many will climb at 55 kt, fly the downwind at 70 to 80 kt and come over the fence at 55 kt.

Because of their lower speed, as with helicopters, gyroplanes may fly a circuit similar to aeroplanes, but at a lower altitude (500 ft AAE) and closer to the runway like helicopters do. Also, like helicopters, gyroplane pilots practise power-off landings (autorotation) with a very steep approach angle and high descent rate (1 500 to 2 000 ft per min).

This circuit may be on the opposite side of the runway from fixed-wing traffic when airspeed requires it or for practising autorotation landings (if authorized by air traffic control). Their landing and ground roll is very short, so most gyroplane pilots will land their aircraft close to a taxiway to spend less time on the runway.

You might need to give a gyroplane an allowance when lining up to takeoff. Gyroplanes need to get their rotors up to speed (known as pre-rotation) before starting their takeoff run. This takes 30 to 45 seconds. This is one of the most critical phases of flight for gyroplanes and can't be rushed. The gyroplane will be off the runway and climbing very quickly once it's rolling, so the overall delay is short.

Most modern gyroplanes have position, anti-collision and landing lights, but they can be a bit harder to see in the air than aeroplanes. If you're sharing a circuit with a gyroplane and you're unsure of where they are, ask for clarification to gain a clear understanding of that aircraft's position and intentions.

If you're lucky enough to see one of these machines on the ground, take the opportunity to ask the owner more about their aircraft. Most gyroplane pilots are used to the curiosity and are happy to tell you about their machine. You never know, you might become a gyronaut yourself! △

DID YOU KNOW? GYROPLANES CAN'T STALL OR SPIN LIKE AN AEROPLANE OR A GLIDER, BUT THEY ALSO CAN'T HOVER LIKE A HELICOPTER.

Learn more about gyroplanes:

- [Standard 421.20 Gyroplane Pilot Permit Requirements](#)
- [Search for a Gyroplane Flight Training Unit](#)
- [Study and Reference Guide–Pilot Permit – Gyroplane–TP 13975](#)
- [FAA Rotorcraft Flying Handbook–For Gyroplane Use Only–FAA-H-8083-21](#)
- [AC 507-001: Special Certificate of Airworthiness–Limited](#)
- [Special Certificate of Airworthiness–Amateur-built](#)

Submission of Instructor's Corner Articles

The purpose of the *Aviation Safety Letter* instructor's corner is for instructors to share past instructing/teaching experience with the ASL readership.

Submitted articles can be addressed to a variety of readers, instructors, student pilots, private pilots, and glider, ultralight or commercial pilots. In fact, the article is for any type of student that an instructor may encounter in the course of their career, whether it be for a licence or a rating. The most important thing is that, at the end of the article, a lesson has been learned.

If you would like to submit an article or would like more information, please send an email to the following address: TC.ASL-SAN.TC@tc.gc.ca △



Canadian and United States (U.S.) Pilots Flying and Importing Aircraft into Canada or the United States of America (USA)



Canadians Flying a Canadian Ultralight or Amateur-built in the USA

Use the [Federal Aviation Administration \(FAA\) streamlined authorization](#) to fly Canadian amateur built aircraft and advanced and basic ULs in the USA. Read the introduction and click on “I agree”. Then download the authorization for the appropriate category of aircraft.

A careful reading of the actual document allows other than private pilots to operate these aircraft in the USA. Read it, sign it and carry it with you in your plane. It is good for six months.



Canadians Flying a Canadian-Certified Plane in the USA

Certified planes can be flown in the USA without any special authorization since they meet international certification standards. The pilot must hold at least a Canadian private pilot licence with a valid category 3 medical. This is an internationally recognized ICAO pilot document.

The holder of a Canadian pilot permit—recreational aeroplane may NOT operate a certified plane in the USA because this permit is a ‘*made in Canada*’ document and there is no bilateral agreement with the FAA to recognize it.

However, a Canadian recreational pilot permit holder can operate a Canadian amateur-built, and a basic and advanced ultralight in the USA. The FAA allows this in the special flight authorization for these planes. (See the previous discussion above).

Canadians Importing a U.S. Amateur-built into Canada

The MD-RA inspection service (Minister’s delegate—recreational aviation) has been authorized by Transport Canada (TC) to inspect an amateur-built aircraft on behalf of the Minister and to issue the initial special certificate of airworthiness—amateur-built.

Canadian amateur-built aircraft require two inspections before flight authorities are issued—a pre-cover and a final inspection. An already flying US amateur-built with 100 hours of logged trouble-free flight may be exempt from the pre-cover inspection. Check with MD-RA. The U.S. builder’s log may be required. Find more information on [MD-RA’s website](#).

Canadians Importing a U.S. Light Sport Aircraft (LSA) into Canada

Canada does not have a light sport aircraft category. However, there are three categories into which the plane might fit:

1. An LSA can be registered as a basic ultralight (BULA) if its MTOW is 1 200 lb or less and stall speed is 45 mph or less in the landing configuration. No passengers are allowed in two place BULAs but two licensed pilots can fly together in a two place BULA.
2. An LSA may be registered as an advanced ultralight if:
 - The make and model are on [TC's list of accepted advanced ultralights](#) (AULA)
 - The MTOW of the plane is 1 232 lb or less with a stall speed of 45 mph or less in the landing configuration, and
 - The manufacturer will issue a statement of conformity for that particular aeroplane with that serial number

(Note: An AULA may carry one passenger if the pilot holds an appropriate licence.)

3. If an LSA cannot be registered as a basic or advanced ultralight, it can be registered in the limited category. Check [TC's recreational aircraft airworthiness](#) requirements and standards for certified and non-certified aircraft.



Credit: Shutterstock

Canadians Importing a U.S.-Certified Plane

A certified plane imported into Canada will need to establish that the aircraft conforms to its type certificate and is airworthy. This will require an import inspection by a TC inspector or anyone TC authorizes to do this. See [TC Advisory Circular \(AC\) 507-002](#) (*Subject: Certificate of airworthiness*).

Americans Flying a U.S. LSA or Experimental Amateur-built in Canada

TC has a validation that allows U.S. light sport aircraft and U.S. experimental amateur-built to operate in Canada. Download this [Canadian Validation](#).

U.S. LSAs and amateur-builts cannot be operated in Canada by the holder of a sport pilot certificate. The pilot must hold at least a private pilot licence with a third-class medical certificate. Canada does not recognize a driver's licence or basic med as a medical certificate.

Americans Flying U.S. Certified Planes in Canada

Certified U.S. planes are allowed to be flown in Canada without any special authorization. However, the pilot must hold at least a private pilot certificate with a third-class medical certificate. Canada does not recognize the sport pilot certificate with a driver's licence as a valid pilot document. Canada does not recognize basic med as a valid medical certificate.

Americans Importing a Canadian Amateur-built into the USA

Canada and the USA both have an amateur builder category, but requirements are different between the two countries. U.S. amateur-builts require a builder's log and a final inspection to get on the registry. After it is flying, annual inspections are carried out by an A&P (an aviation maintenance engineer in Canada) or since July 2025, by the owner who holds an LSR-I (light-sport repairman inspection) or LSR-M (light-sport repairman maintenance) certificate.

Amateur-builts imported into the USA are treated like a new amateur-built with an inspection, phase I flight limitations, a test period, phase II flight limitations, etc. FAA guidance can be found in *FAA AC 20-27G*. Click here to [download it](#). See Part 16 starting on page 29. Check with your local FAA flight standards district office (FSDO) before you buy! They have a lot of discretion when it comes to assessing an imported Canadian amateur-built.

Americans Importing a Canadian-Certified Plane

A Canadian plane being imported into the USA will need to follow FAA requirements. Find them on their [website](#).

Flying to Canada from TC (TP 15048)

Find the information you need in this [document](#).

FLYING TO and FROM CANADA

[2025 AirVenture presentation](#) by Ian Brown and Clark Morawetz. △

Drone/RPAS Beyond Visual Line-of-sight Operations and Detect, Alert, and Avoid Systems

by Suzanne Larida (mechanical engineering student, University of Alberta) and Jiwoong Choi (software engineering student, McGill University/McGill aerial design)

Remotely piloted aircraft system (RPAS) beyond visual line-of-sight (BVLOS) operations present different risks to traditional aviation than visual line-of-sight (VLOS) operations because the RPAS pilot-in-command (PIC) cannot directly see the aircraft they are operating. When flying a remotely piloted aircraft (RPA) during a BVLOS operation, if RPA pilots are not making use of visual observers (VOs), they require technological means for detecting and avoiding other aircraft that may be found in the airspace. Such a technological solution is known as a detect, alert, and avoid (DAA) system. A DAA system is required for all BVLOS operations, except when using VOs. DAA systems can function using radar, electro-optical/infrared (EO/IR) sensors, or a combination of several sensing technologies. They can be ground-based or onboard the RPA, or a combination.



Suzanne Larida and Jiwoong Choi

Many commercially available RPAS make use of sophisticated short-range obstacle sensing systems that fuse multiple sensing and processing technologies. These systems typically use a combination of technologies such as cameras, sensors, and LiDAR—along with advanced software algorithms to detect obstacles like walls, buildings, trees and power lines—and alert the RPA pilot. Some RPA's process the data from these systems in real time and automatically adjust their flight path to avoid obstacles, even despite environmental challenges like low light, wind, or environments with no GPS signal. Such obstacle-sensing and avoidance systems reliably allow indoor navigation and close-quarters flight.

These obstacle-sensing systems, though they may be reliable and suitable for low-risk flights near obstacles that do not move, are not considered DAA systems for BVLOS operations, nor are they a substitute for a DAA system. A DAA system must be effective at detecting a traditional aircraft operating in the vicinity of the RPA, including its position and trajectory, and giving enough time to execute a maneuver (either automatically or by the pilot-in-command) to avoid the incoming aircraft.

Drone manufacturers intending to make a safety assurance declaration that includes standard 922.10 detect, alert, and avoid systems are encouraged to consult the acceptable means of compliance (MoC) found in [Advisory Circular \(AC\) No. 922-001](#) before submitting their declaration. △

Civil Aviation Documents Published Recently

Civil Aviation Safety Alerts (CASAs)

Document N° (R-Revised)	Issue N° (Date issued)	Subject
CASA 2026-09	Issue 01 2026-06-12	Pilot documents
CASA 2026-08	Issue 02 2026-06-18	Update on risk of interference of 5G signals on radio altimeter following a voluntary 5G mitigations agreement in Canada
CASA 2026-07	Issue 01 2026-07-16	Application of LYCOMING ENGINE crankcase Parting Surface Sealants

Advisory Circulars (ACs)

Document N° (R-Revised)	Issue N° (Date issued)	Subject
AC 700-013	Issue 03 2026-07-07	Procedures and training for the preservation of aircraft recorded data
AC 500-029	Issue 03 2026-06-15	Certification of automatic dependent surveillance–broadcast (ADS-B)
AC 406-003	Issue 01 2026-06-01	Multi-crew cooperation (MCC) training
AC 700-011	Issue 02 2026-06-05	Operations on runways with unpaved surfaces
AC 900-001	Issue 01 2026-05-18	Jurisdictional issues regarding remotely piloted aircraft systems operation
AC 700-063	Issue 03 2026-05-15	North Atlantic—High level airspace operations (NAT HLA): Special authorization/specific approval and guidance



TSB FINAL REPORTS SUMMARIES

TSB Report A21P0111—Collision Between an Aircraft and a Water Taxi

Summary

On 18 October 2021 at 16:37 Pacific Daylight Time, a float-equipped de Havilland DHC-2 MK. I (Beaver) aircraft and a water taxi collided in the vicinity of the First Street dock in Tofino Harbour, British Columbia (B.C.). The aircraft was substantially damaged and, within 2 minutes and 30 seconds of the collision, was inverted with just the floats above the surface of the water. The five passengers and pilot on board the aircraft were able to safely egress. Three of the passengers sustained minor injuries. The water taxi sustained minor damage and one of its passengers sustained minor injuries. The emergency locator transmitter on the aircraft did not transmit a signal. There was no pollution.

History of the occurrence—the flight

At approximately 16:00 on 18 October 2021, the pilot of the de Havilland DHC-2 MK. I (Beaver) aircraft was preparing to depart on a local sightseeing flight from Tofino Harbour Water Aerodrome (CAB4), B.C., with five passengers on board (see Figure 1). The pilot met with the passengers (4 adults and 1 child) near the aircraft on the First Street dock and gave them a safety briefing. The briefing included the location of the exits on the aircraft and an explanation of how to use their belt-pack inflatable personal flotation devices (PFDs).

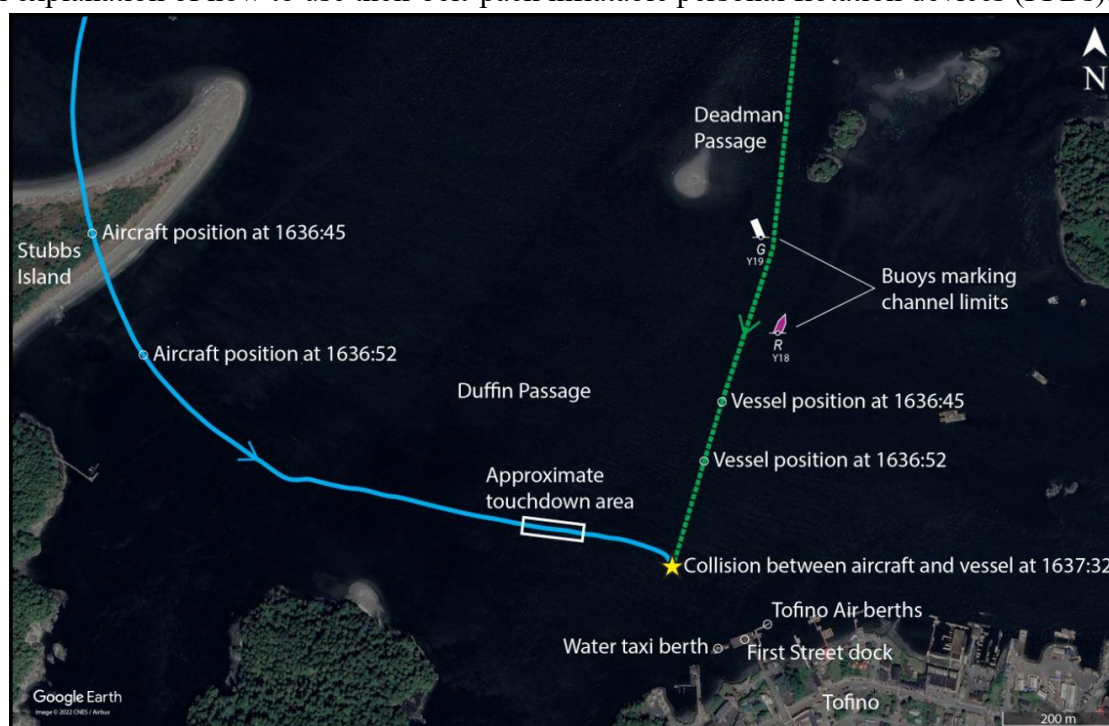


Figure 1: Map showing the approximate track of the aircraft (solid line) and vessel (dashed line)
(Source: Google Earth, with TSB annotations)

At 16:07, the aircraft departed on the round-trip flight, which would take approximately 30 minutes. The pilot was seated in the left seat and had his seat set to the full-aft position. This was his sixth round-trip flight of the day from CAB4. He had started work at 09:30 and had completed four sightseeing flights and one charter flight before the occurrence flight.

On return to CAB4 at 16:35, the aircraft was on the downwind leg of a left-hand circuit for landing at approximately 250 ft AGL. The pilot turned on the landing light, set the flaps for landing, made the appropriate arrival radio calls on the aerodrome traffic frequency, and scanned the harbour. He noted that the landing area was clear of any traffic. The aircraft then made a left turn over the northeast point of Stubbs Island and, at 16:37:03, turned on short final to land in Duffin Passage in the vicinity of the First Street dock.

On final approach, the two passengers seated next to the windows on the left side of the aircraft (middle-left and rear-left seats) observed the water taxi exiting Deadman Passage and heading toward the First Street dock.

The aircraft touched down on the water at approximately 16:37:26. The distance between the vessel and the aircraft was about 80 m. At 16:37:29, as the aircraft was decelerating, but still on the step, the pilot saw the water taxi and, realizing that a collision was imminent, turned the aircraft to the right to reduce the force of impact. At 16:37:32, the aircraft and the water taxi collided.

History of the occurrence—the voyage

As the water taxi approached the First Street dock, the operator observed that the berth was occupied by other vessels loading and offloading passengers. He started visually monitoring the vessels at the berth and monitoring the departure announcements of other vessels on the local very high frequency (VHF) radiotelephone channel to plan an approach when space became available.

When the water taxi was about 300 m off the First Street dock, the operator reduced the vessel's speed while waiting for the berth to become available. Shortly after, two other water taxis at the dock made radio calls announcing their intentions to depart, and the operator of the water taxi involved in the accident re-engaged the engines to continue his approach to the dock. At this time, the operator noticed people on the dock waving their arms and trying to warn him of something, which caused him to turn and look behind him through his starboard window. He then saw the aircraft on the water, approximately 15 m away, heading toward the vessel. The operator applied port helm to the vessel in an attempt to avoid a collision. However, within seconds (at 16:37:32), the aircraft and the vessel collided at position 49°09.34 ' N, 125°54.71 ' W. The aircraft's propeller blades and left float made contact with the vessel's starboard side.

Events following the collision

Immediately following the collision, the pilot completed the after-landing checks and shut down the engine. The aircraft's left float was damaged in the collision and began filling with water. The pilot instructed the passengers to exit the aircraft. Approximately 40 seconds after the collision, as the pilot and passengers began exiting, the aircraft began listing left and pitching forward until it briefly came to rest in a vertical position with the nose in the water and the tail straight up in the air.

The aircraft cabin then began filling with water and the aircraft continued to sink. Approximately 2 minutes and 30 seconds after the collision, the aircraft was inverted, with just the floats above the surface of the water. Once the pilot and passengers egressed, various vessels that had arrived on scene assisted in transporting the passengers to the First Street dock. The water taxi, which had remained on scene, assisted in recovering the pilot from the water and transporting him to shore.

The vessel's hull remained structurally intact and did not take on any water after the collision. The machinery also remained fully operational.

Three passengers on the aircraft sustained minor injuries while egressing and one passenger on the water taxi sustained minor injuries from the impact of the collision. The pilot, vessel operator, and remaining passengers were not injured.

Damage

The aircraft was substantially damaged, and the vessel sustained minor damage as a result of the collision.

Aircraft and vessel information

The de Havilland DHC-2 MK. I (Beaver) is a single-engine, high-wing, propeller-driven aircraft equipped with EDO 58-4580 floats (Figure 2).



Figure 2: Occurrence aircraft (Source: TSB, third party, with permission)

The occurrence aircraft underwent a 300-hr inspection on 15 September 2021. At the time of the occurrence, the aircraft had accumulated 42.6 airtime hours since that inspection.

There was no indication that an aircraft component or system malfunction played a role in this occurrence.

The water taxi (Figure 3) has an aluminum hull and an enclosed cabin that contains the conning station and a passenger seating area. The conning station has propulsion controls and navigation equipment that includes a radar, a VHF radiotelephone, a magnetic compass, and a global positioning system (GPS).



Figure 3: Photo of the water taxi (Source: TSB)

Communications

Floatplanes are equipped with VHF radios that operate on civilian aviation frequencies that range from 118.0 MHz to 136.975 MHz. Pilots in the vicinity of CAB4 typically use the aerodrome traffic frequency (122.15 MHz) to communicate with other aircraft in the area.

Vessels are equipped with VHF radios that operate on marine frequencies that range from 156.0 MHz to 162.5 MHz. Vessels in the vicinity of the First Street dock typically use VHF channel 68 (156.425 MHz) to communicate with each other.

Aerodrome and harbour information

CAB4 is a registered water aerodrome located approximately 7 NM northwest of CYAZ. Several air operators and private aircraft use the aerodrome and aircraft traffic increases in the summer months. For example, there were approximately 40 takeoffs and landings per day in July 2019 and 14 takeoffs and landings per day in October 2019.

The First Street dock is the designated water aerodrome dock for aircraft. However, there are also various other private docks in Tofino Harbour that are used by floatplanes.

There are no designated takeoff and landing areas in Tofino Harbour; however, floatplanes routinely take off and land in Duffin Passage, near the docks.

Tofino Harbour has several public and private docks that serve a variety of watercraft, including water taxis, floatplanes, whale watching vessels, tour boats, pleasure craft, and kayaks. The two busiest public docks are the First Street dock (also known as the Municipal Wharf) and the Fourth Street dock (also known as the Tofino Small Craft Harbour). The water taxi involved in the accident uses the First Street dock for its operations.

Water taxis primarily use the west side of the First Street dock and aircraft primarily use the east side. The public docks in Tofino are heavily used, especially in the summer months when the population increases significantly as a result of tourism. Water taxis share berthing space with other vessels at the dock, which means that berthing space is sometimes not available and water taxi operators must time their vessel's arrival with the departure of another vessel.

Following this occurrence, three meetings were held in October and November 2021 regarding safety in Tofino Harbour. These meetings were attended by various air and vessel operators. Topics discussed included awareness of communication between operators, best safe practices, and possible ways to improve harbour safety.

Egress

When the pilot realized there was damage to the front of the left float, he instructed the passengers to exit the aircraft. The aircraft listed left and pitched forward, briefly came to rest in a vertical position (nose-down/tail-up), and continued to sink and overturn. From the time of the collision, it took approximately 2 minutes and 30 seconds for the aircraft to be completely inverted.

The occupants all exited the aircraft before it capsized and were transported to the First Street dock by various vessels that had come to provide assistance.

Mental models

Mental models are internal representations that allow individuals to describe, explain, and predict events or situations in their environment. The formation of mental models reduces cognitive demands so that attention is freed up to be directed elsewhere. When a mental model is adopted, it generates expectations and is resistant to change. Compelling new information must be absorbed to modify a mental model.

As people make decisions—in part by building a mental model of the world—the limitations of their senses mean that a mental model is never completely accurate. If gaps or conflicts in an individual's mental model appear, the tendency is for the mind to find ways to make sense of these gaps or conflicts so that they fit within the existing mental model. Sometimes, however, these gaps or conflicts are signs that the mental model is not accurate, and actions based on it may be incorrect given the actual context.

Focused attention is a cognitive state whereby a person's attention is concentrated on a particular task or concept for a period of time. In operational settings, focused attention enables operators to actively seek out specific types of information in support of a task. When an operator is required to perform simultaneous tasks, each requiring the same level of attention, overall performance diminishes. For example, performing a visual task—such as monitoring traffic at a berth and detecting when it becomes vacant for docking—increases the demands on visual attention and reduces the available capacity for other visual tasks, such as scanning for other nearby traffic. Research has shown that stimuli in the peripheral visual field are harder to detect when the focus of attention is on a central task.

Visual detection of movement

The perception of objects moving toward a viewer is affected by the physiological differences in foveal and peripheral vision. People are sensitive to motion in their peripheral vision; however, this sensitivity diminishes when objects are stationary in the visual field. If a target is converging on the same point as the viewer, relative bearing will remain constant, and it is likely that the target will not be noticed because its position on the retina appears stationary (Figure 4). Also, although both the foveal and peripheral vision systems can detect movement, the foveal system is better at detecting slow movement, while the peripheral system is better at detecting rapid movement.

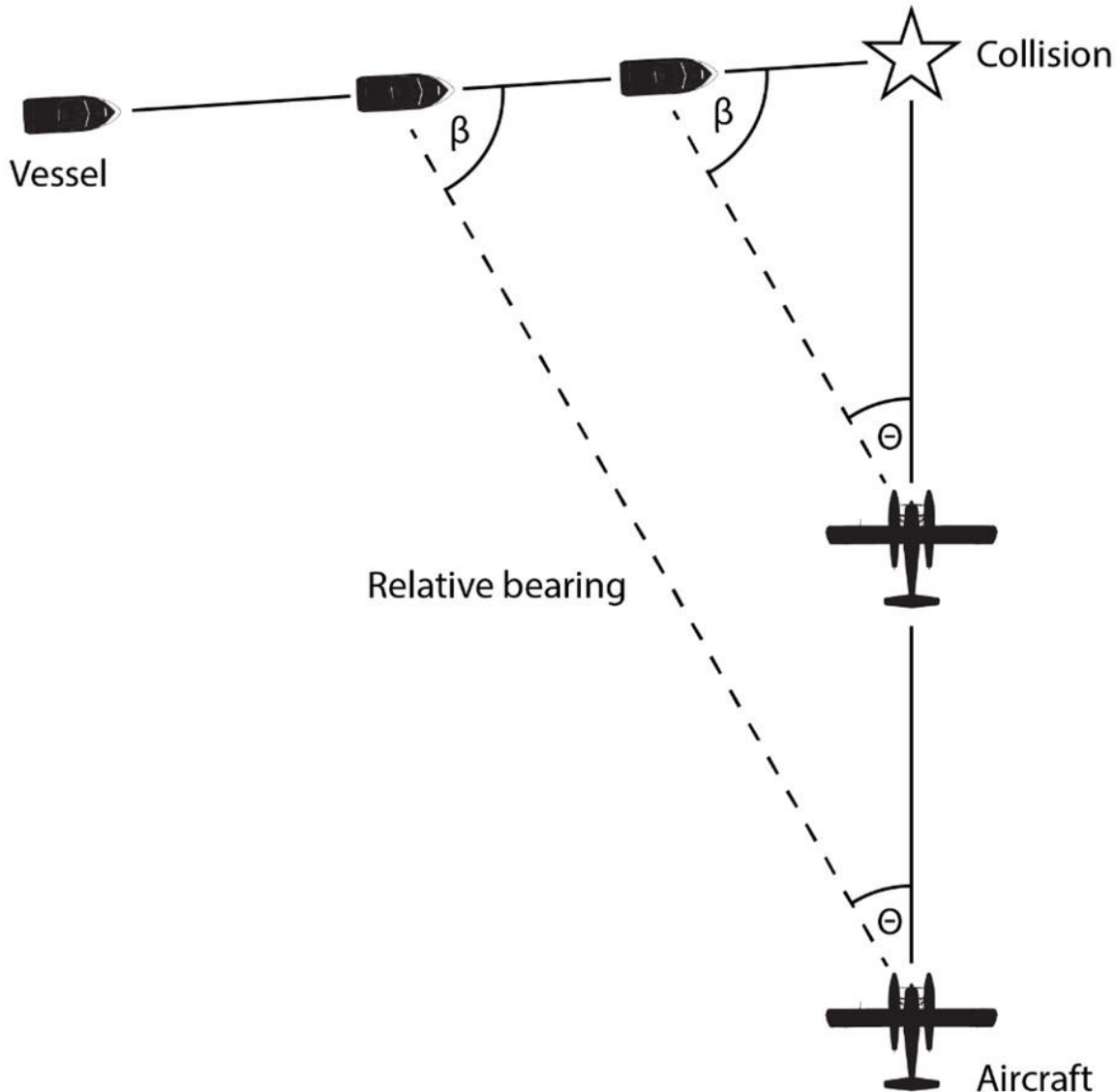


Figure 4: Diagram of a scenario where a target appears stationary (Source: TSB)

Collision avoidance and safe speed

In Canada, the *Collision Regulations* set out rules to help prevent collisions in waterways. The rules apply to vessels and to floatplanes when the floatplane is operating on the water. In accordance with the rules, floatplanes on the water are required, in general, to “keep well clear of all vessels and avoid impeding their navigation.” However, in circumstances where a risk of collision exists, the rules state that whichever craft (vessel or floatplane) has the other on its own starboard side shall keep out of the way and avoid crossing ahead of the other.

The rules also require vessels to be operated at a safe speed at all times so that proper and effective action can be taken to avoid collisions and so that vessels can be stopped within a distance appropriate to the prevailing circumstances and conditions.

Operators of passenger vessels with a gross tonnage of not more than 15 tons, such as the water taxi involved in the accident, are required to hold a small vessel operator proficiency certificate, which provides three hours of training on collision prevention.

Findings as to causes and contributing factors

The following are conditions, acts, or safety deficiencies that were found to have caused or contributed to this occurrence:

1. The aircraft’s lowered wing during the base-to-final turn coupled with the pilot’s seating position interfered with the pilot’s view out the left-side window. Therefore, the water taxi’s entry into the harbour, which was unexpected in an otherwise clear area, went undetected.
2. During the touch-down phase, the pilot’s attention, which was primarily focused straight ahead, combined with the little or no relative movement of the vessel in the left windscreen and the obstructions caused by the aircraft’s nose and left window post, reduced the likelihood of detecting the vessel.
3. The speed at which the vessel was travelling and the relatively stationary position of the aircraft in the operator’s peripheral vision likely contributed to the operator not detecting the aircraft when the water taxi was exiting Deadman Passage.
4. After exiting Deadman Passage, the vessel operator’s visual attention was primarily focused forward, toward the berth, reducing the likelihood of detecting the aircraft’s approach on the vessel’s starboard side.
5. The aircraft pilot’s and the vessel operator’s visual perception was affected by several factors and neither recognized that their routes would conflict until it was too late for evasive action to be effective. As a result, the aircraft and vessel collided, causing significant damage to the aircraft that required the occupants to conduct an emergency egress.

Findings as to risk

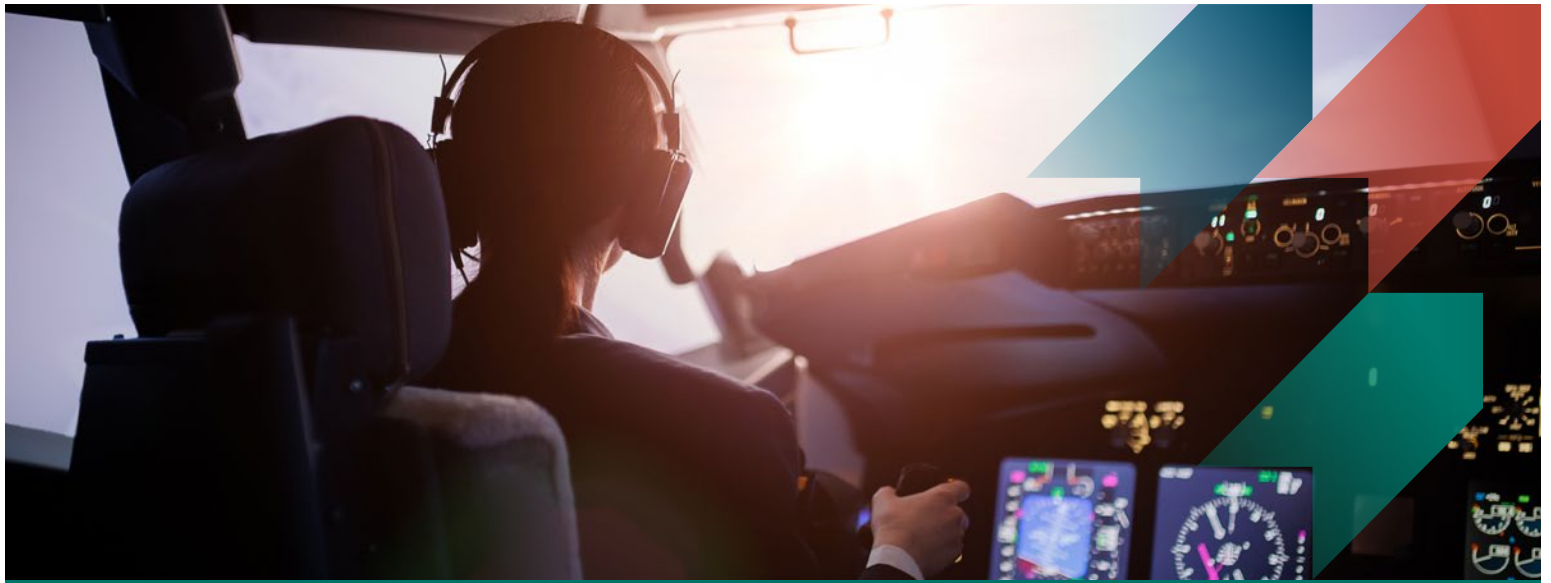
The following are conditions, unsafe acts, or safety deficiencies that were not deemed to have been a factor in this occurrence, but that could have adverse consequences in future occurrences:

1. If Transport Canada's process for implementing safe speeds in harbours relies solely on local authorities recognizing that a risk exists and proactively initiating the process for implementing a restriction, there is a risk that restrictions will not be implemented and vessels will continue to operate at speeds that pose a risk of collision.
2. If busy harbours that accommodate both vessel and aircraft traffic do not have designated aircraft landing areas, means for aircraft to signal their presence, or vessel speed limits, there is an increased risk of collision as a result of vessels and aircraft operating in close proximity at high speeds.
3. If aircraft passengers wear personal flotation devices that are not properly sized, there is a risk that the device will not function as intended, which could result in injury or death.

Other finding

The following item could enhance safety, resolve an issue of controversy, or provide a data point for future safety studies:

1. Floatplanes and vessels operate on different VHF radio frequencies. Therefore, pilots and vessel operators are not aware of any communications that the other may transmit, such as arrival or departure intentions, traffic-related communications or warnings, or collision avoidance information.



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