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AVIATION SAFETY LETTER

In This Issue...

TP 185E

Cover photo: iStock

Canada

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Letters with comments and suggestions are invited. All correspondence should include the author's name, address and telephone number. The editor reserves the right to edit all published articles. The author's name and address will be withheld from publication upon request.

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Aviation Safety Letter survey: We want to hear from you!

Transport Canada (TC) created the *Aviation Safety Letter* (ASL) to serve the aviation community as a safety and awareness educational tool. We are looking for your feedback as a reader about whether the content is relevant, useful, and meets safety awareness expectations.

Your input is important to us so that we can continue to improve the ASL.

All responses are anonymous, and data is aggregated for reporting purposes. The survey will take 5 minutes to complete. △

Invitation to participate in the CANFLY online study

by Lead Researcher: Dr. Kathleen Van Benthem, Institute of Cognitive Science, Carleton University and Faculty Sponsor: Dr. Chris Herdman, Department of Psychology, Carleton University

You are invited to participate in an innovative online study for pilots developed by the Advanced Cognitive Engineering Laboratory (ACE Lab) at Carleton University. You can access the study here.

Study purpose & benefits: This study represents the next phase of our validation of the CANFLY, a cognitive health screening tool for pilots. The CANFLY was developed at the ACE Lab at Carleton University. The goal of this study is to examine whether cognitive factors, such as situation awareness, collected in virtual flight environments are predictive of critical incidents.

Who can participate?: Licensed/permit-holding pilots, preferably with current medical certification, may participate. There is no compensation for your participation.

Study activities and risks: You are invited to participate in an anonymous online study that should take no more than 30-40 minutes to complete. Participants will answer short questions about situation awareness after watching four short interactive video clips of flight scenarios. Due to the anonymous nature of this study and the innocuous task of watching short flight-simulation videos, it is not expected that there will be any risk of physical harm. The videos that participants will watch are of basic flight scenarios in non-turbulent good-weather conditions. You can complete this study in the comfort of your own home. Demographic questions are limited to age, gender, and flying history (i.e. years licensed, occurrence of critical incidents, type of licence, etc.).

Study Approval: The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. (Clearance #113162 expires May 2021.)
Study Access: You can access the online study here.

For further inquiries or to indicate interest in participating in the study you can send an email to CessnaStudy@gmail.com or check out the study link on the ACE Lab's website.△

RECENTLY RELEASED TSB REPORTS

The following summaries are extracted from final reports issued by the Transportation Safety Board of Canada (TSB). They have been de-identified. Unless otherwise specified, all photos and illustrations were provided by the TSB. For the benefit of our readers, all the occurrence titles are hyperlinked to the full report on the TSB Web site. —Ed.

TSB Final Report A19W0099—Mid-air collision

History of the flight

On 26 July 2019, the 182N aircraft was conducting aerotow operations at Black Diamond/Cu Nim Aerodrome (CEH2), Alta. The Schleicher ASK 21 glider was being used for instructional flights with an instructor and a student on board.

The tow plane pilot involved in the occurrence had completed two aerotow operations before the occurrence flight, the first of which had departed at 15:10.

The occurrence glider flight was the 2nd flight of the day for the student and flight instructor involved in the occurrence. The 1st instructional flight had been completed at approximately 10:30.

At 15:49, the tow plane departed Runway 07 with the glider in tow and turned to the south while climbing to the intended release altitude of 5 700 feet (ft) above sea level (ASL) (2 000 ft above ground).

Around the time the aircraft crossed the extended centreline of Runway 07, the glider flight crew radioed the tow plane pilot and requested that he carry out some medium bank turns as part of the glider towing exercise. The glider flight crew had not briefed the tow plane pilot prior to departure. At this point, the tow plane was at approximately 5 900 ft ASL. The tow plane completed a medium (approximately 30° bank) left turn of about 145°, which brought both aircraft over approximately midfield of CEH2, followed by a medium (approximately 30° bank) right turn of about 90°, which brought the aircraft to a track of 305° true (T) near the western edge of CEH2, at approximately 6 100 ft ASL. The glider released from the towline halfway through this turn.

Typically, a glider pilot will release from the towline when the two aircraft are in straight and level flight. When the tow plane reached the anticipated release point, the glider had already released; however, the tow plane pilot was not aware. Shortly after, the glider flight crew called the tow plane pilot on the radio to thank him for the tow. The tow plane pilot could not see the glider but executed a left clearing turn of approximately 80°, as is standard procedure upon glider release. He did not initiate a descent at this point, but did begin preparing the aircraft for the approach and landing at CEH2.

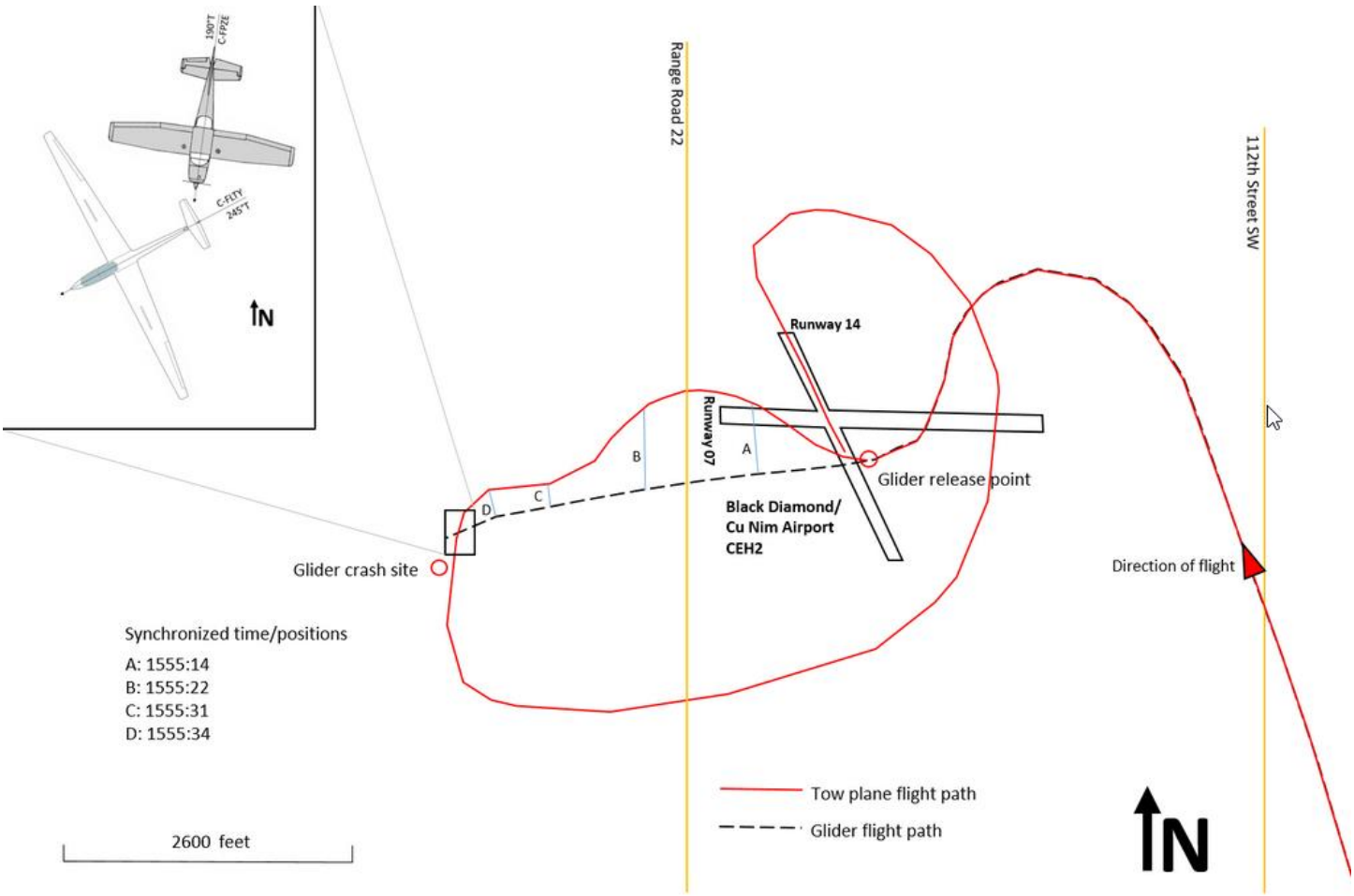


Figure 1. Overview of the tow plane and glider's flight paths, with inset diagram showing the positions of the aircraft at the time of the collision (Source: TSB)

Because the pilot of the tow plane could not see the glider, he entered a slight right turn in an effort to find the glider. This brought the tow plane to a track of 270°T. Still unable to see the glider, the tow plane pilot then proceeded to complete a 90° left turn, heading almost directly south. There was no attempt to communicate with the glider to determine its position.

When the glider released from the tow plane, halfway through the second medium turn at an altitude of approximately 6 100 ft ASL, the glider flight crew proceeded to fly more or less on a track of 270°T. By releasing in a right turn, the glider was not in a position where the tow pilot would normally expect to see it, i.e., behind and to the right of the tow plane (Figure 1).

At 15:55, when the aircraft were 0.5 nautical miles (NM) southwest of the threshold of Runway 07 and at an altitude of approximately 6 075 ft ASL, the tow plane's propeller struck the glider's empennage. The time between the glider release and the collision was 34 seconds.

When the tow plane struck the glider, the vertical and horizontal stabilizers separated from the glider. The glider entered a dive from which it was unable to recover and struck terrain in a near-vertical attitude. The student pilot and instructor were fatally injured. Both were wearing parachutes at the time of the occurrence.

The tow plane sustained substantial damage to the propeller and cowling, and minor damage to the right wing. The pilot was not injured and managed to perform a successful forced landing at idle power on Runway 14 at 15:57.

Wreckage information

The glider impacted terrain in a near-vertical attitude, 0.61 NM west-southwest of the intersection of Runways 07/25 and 14/32 at CEH2, at an elevation of 3 790 ft ASL. Both the left- and right-wing leading edges showed signs of impact damage along most of their length. The aircraft was destroyed in the collision with terrain.

The vertical stabilizer was found approximately 1 200 ft northwest of the main accident site. The horizontal stabilizer was found approximately 1 600 ft northwest of the main accident site and showed signs of paint transfer from the tow plane's propeller. The rudder and elevator were not found. Fibreglass material from the glider was found embedded in the tow plane's propeller.

Pilot information

The pilot of the tow plane held a valid private pilot licence, a valid pilot licence—glider, and a valid flight instructor rating—glider. He was a volunteer at the Gliding Club and held the position of chief tow pilot within the organization.

The instructor held a valid pilot licence—glider with a valid flight instructor rating—glider. He was also a volunteer at the Gliding Club. The last entry in the instructor's personal log was made on 01 July 2019.

The student pilot held a student pilot permit—glider and had begun his flight training in 2017. His first instructional flight was logged on 13 July 2017. His first and only solo flight was conducted on 28 October 2018, for a flight time of 0.3 hours (hr). At the time of the occurrence, the student pilot had recorded 76 dual flights, totalling 26.8 hr of dual flight time.

Aircraft information

Tow plane

The Cessna 182N is a single-engine piston, all-aluminum aircraft. The aircraft involved in this occurrence was manufactured in 1970. It was used to tow the club's gliders for both recreational and instructional flights.

The aircraft was equipped with a PowerFLARM Core airborne collision avoidance system (ACAS). (See Electronic traffic awareness systems below.) On the day of the occurrence, the PowerFLARM Core installed on the aircraft was not working. In addition, throughout the 2019 flying season, the following issues with the PowerFLARM had been recorded in the club's unofficial daily log for the aircraft:

- "Power Flarm intermittant [sic]" (22 March 2019)
- "POWER FLARM DISPLAY NOT WORKING" (31 March 2019)
- "Flarm intermittent => keeps resetting" (19 July 2019)

These defects were not recorded in the aircraft's journey log, although it was required by the regulations.

Glider

The Schleicher ASK 21 glider is an all-composite 2-seat glider used primarily for conducting instructional flights. The glider involved in this occurrence was manufactured in 2009. The student typically sits in the front

seat and the instructor typically sits in the rear seat; this was the seating configuration during this occurrence. The glider was equipped with a PowerFLARM Portable device, which was installed on the instrument panel for the pilot seated in the rear seat. It was reported as working on the day of the occurrence.

Weather information

There is no aerodrome routine meteorological report (METAR) for CEH2. The closest airport that issues METARs is Calgary/Springbank Airport (CYBW), Alta., which is located approximately 24 NM north-northwest of CEH2. The METAR issued at 16:00 indicated the following:

- winds from 180°T at 12 knots, variable between 120°T and 190°T
- visibility 9 statute miles (SM) and clear
- temperature 26 °C and dew point 12 °C

Weather and sun position were not considered to be factors in this occurrence.

Defences against a mid-air collision

Visual lookout

As stated in the *Transport Canada Aeronautical Information Manual* (TC AIM):

> When operating in accordance with VFR [visual flight rules], or in accordance with IFR [instrument flight rules] but in VMC [visual meteorological conditions], pilots have sole responsibility for seeing and avoiding other aircraft. Aural and visual alertness are required to enhance safety of flight in the vicinity of uncontrolled aerodromes.

The see-and-avoid principle has been examined in a number of other TSB investigations. It is the basic method of collision avoidance for VFR flights that is based on active scanning, and the ability to detect conflicting aircraft and take appropriate measures to avoid them. An advisory circular published by the U.S. Federal Aviation Administration states: "Pilots should remain constantly alert to all traffic movement within their field of vision, as well as periodically scanning the entire visual field outside of their aircraft to ensure detection of conflicting traffic." The most effective method of identifying potential conflicting traffic is to quickly scan small segments of the visual field (approximately 10° to 15° wide) to detect movement.

Established tow and release procedures

SOAR and learn to fly gliders, published by the Soaring Association of Canada (SAC), provides guidance to glider pilots on flying techniques. The following guidance is provided with respect to releasing from the tow:

> When you have reached the release altitude (usually 2 000 ft above ground) and before releasing, scan around the horizon for other aircraft, particularly to the right, the direction in which you will be turning. If clear to your right look back at the towrope, pull the release, and visually check that the rope releases and falls clear of the glider. Now initiate a turn to the right. This turn indicates to the towpilot that you have released. At the same time it is usual to adjust your speed to that for the lesson that will follow. More often than not this will be a reduction in speed. Footnote 1

The publication further explains that:

> The objective of the glider turning to the right after release is to quickly get clear of the towplane's slipstream and the dangling rope, but also to move to the side so that the towpilot can see you. The towpilot will not descend until he has assured himself that the glider is free. The turn need be of only a few degrees, though if in a thermal, you may wish to continue circling. However if you do this make sure that the towplane is clear and is descending as you circle around during your first complete turn. Footnote 2

The Gliding Club's Operations Manual provides the following guidance to tow plane pilots on what to do following the glider's release:

- After the Tow Pilot has confirmed that the glider has released by visual check, a descending left hand turn shall be made while the glider executes a right hand turn.

The operations manual states the club's policies and procedures with respect to various aspects of aircraft operations. The club's safety manual provides supplemental safety-related information. Both the operations manual and the safety manual state that the club will use the tow and release procedures described in the SAC's soaring instruction manual. However, the club does not have a standard procedure in place for tow plane pilots to follow if they lose sight of the glider, or if they are unsure of the glider's position relative to their own. Nor does the SAC provide any formal guidance material for the tow pilot to follow under these circumstances.

Electronic traffic awareness systems

Both aircraft were equipped with a FLARM ACAS, although this was not required by the regulations. The company describes this technology as follows:

> FLARM works by calculating and broadcasting its own future flight path to nearby aircraft. At the same time, it receives the future flight path from surrounding aircraft. An intelligent motion prediction algorithm calculates a collision risk for each aircraft based on an integrated risk model. When a collision is imminent, the pilots are alerted with the relative position of the intruder, enabling them to avoid a collision.

The PowerFLARM Core installed on the tow plane was not working during the day of the accident. As a result, the PowerFLARM Portable installed on the glider would not have provided any traffic information to the flight crew of the glider with respect to the tow plane's position.

For more information on the PowerFLARM see also: ASL Issue 1/2016

Safety messages

In this occurrence, there was no procedure to follow if visual contact was lost after the tow was released. It is important that operators have procedures in place for the safe operation of their aircraft, and that personnel follow those procedures.

Neither pilot saw the other aircraft in time to avoid a mid-air collision, partly owing to the inherent limitations of the see-and-avoid principle. Relying solely on visual detection increases the risk of collision while in uncontrolled airspace. Pilots are encouraged to broadcast their intentions to maintain the situational awareness of other aircraft.

Airborne collision avoidance systems (ACAS) offer the potential to significantly reduce the risk of mid-air collisions. If an aircraft is equipped with an ACAS, it is important that the system be maintained in a serviceable condition.

Footnote 1
Soaring Association of Canada, SOAR and learn to fly gliders: The Official Soaring Instruction Manual of the Soaring Association of Canada, Edition 9, 2nd printing (August 2011), p. 72.

Footnote2
Ibid., p. 73.

TSB Final Report A19Q0096—Collision with terrain

Background

The advanced ultralight Rans S-6ES Coyote II was making a pleasure flight in the Rougemont, Que. area with 2 people on board. The aircraft had been purchased on 09 January 2019, and its new owner planned to take the training required to obtain a pilot permit—ultralight aeroplane. The occurrence pilot, a friend of the owner, had flown the occurrence aircraft a few times since its acquisition. Moreover, some minor maintenance work had been performed on the aircraft following its acquisition.

History of the flight

On the morning of 01 July 2019, the pilot and the owner drove to St-Hyacinthe Aerodrome (CSU3), Que., where the occurrence aircraft was located. At approximately 09:50, the pilot and sole occupant took off from CSU3 and conducted a visual flight rules (VFR) flight without incident to his private runway, which was approximately 5 nautical miles (NM) east of the St-Jean Airport (CYJN), Que. Meanwhile, the owner drove to meet the pilot at his private runway, in order to make a pleasure flight.

At approximately 11:25, the pilot took off for a local VFR pleasure flight in the vicinity of Rougemont, with the owner as a passenger. At approximately 11:33, the aircraft reportedly passed over an orchard in Rougemont at low altitude (i.e. less than 200 feet [ft] above ground level [AGL]) in a counter-clockwise turn. At approximately 11:35, the aircraft changed direction and turned northeast. It lost altitude and crashed into the orchard trees (Figure 1). The 2 occupants were fatally injured. No signal was detected from the emergency locator transmitter (ELT).

An individual who was in the vicinity of the accident site quickly contacted emergency services by dialling 911. The first responders arrived at 11:49.

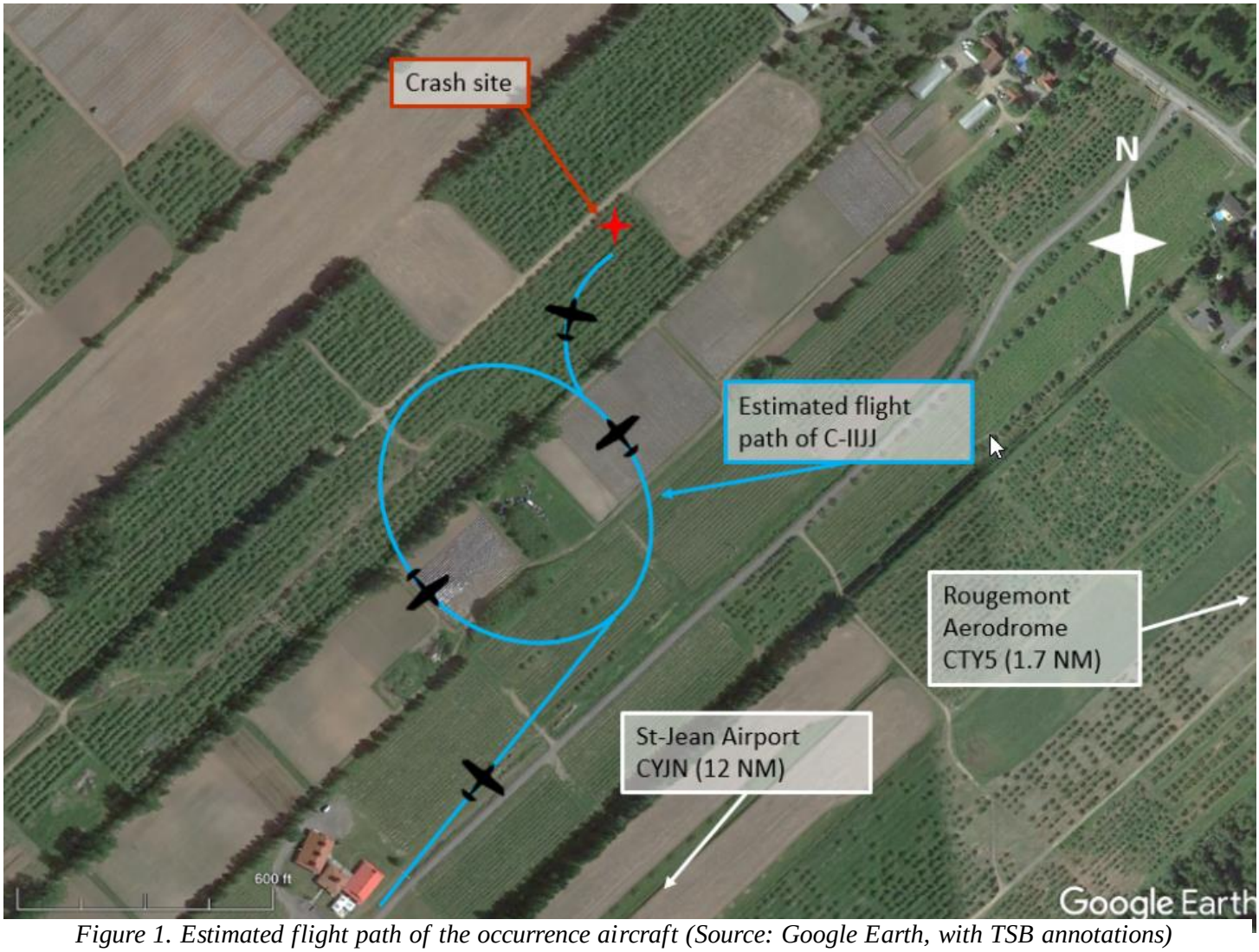


Figure 1. Estimated flight path of the occurrence aircraft (Source: Google Earth, with TSB annotations)

Weather information

According to the aerodrome routine meteorological report (METAR) issued at 11:00 for St-Hubert Airport (CYHU), Que., 15 NM northwest of the accident site, weather was favourable for this VFR flight and was not considered to have contributed to the accident.

Pilot information

The pilot had a valid pilot permit—ultralight aeroplane, issued 09 May 2016, and a valid Category 3 medical certificate. The pilot met *Canadian Aviation Regulations* (CARs) section 401.55 requirements regarding endorsements for the transportation of the passenger-carrying rating.

The pilot often conducted pleasure flights in the region. Since 2016, he had accumulated over 600 flight hours on ultralight aircraft. In the months leading up to the occurrence, he had flown the occurrence aircraft a few times. However, the investigation was unable to determine how many flight hours the pilot had accumulated on this aircraft type.

Aircraft information

The Rans S-6ES Coyote II is a 2-seat, high-wing advanced ultralight aircraft made from metallic tubes covered in fabric. The aircraft was built in the United States in 2008. It was imported into Canada in early 2009 and inspected by a Rans representative, because it had never flown. The manufacturer then issued a certificate of compliance on 04 May 2009. When the aircraft was purchased on 09 January 2019, its technical logbook indicated that the aircraft had accumulated 336 flight hours since its construction. According to the registration application submitted to Transport Canada, the aircraft had a maximum takeoff weight of 1 100 pounds (lbs), an empty weight of 600 lbs, and a stall speed of 42 mph.

The investigation was unable to determine the amount of fuel on board at takeoff. However, according to TSB calculations, the pilot had approximately 66 lbs available for fuel before reaching the maximum take-off weight, which represents a little more than half of the tanks' capacity (108 lbs).

An ultralight aircraft may be maintained by the owner, who must follow the maintenance program indicated by the manufacturer. The owner must also keep aircraft maintenance records. According to the aircraft's technical logbook, the last inspection was conducted on 01 September 2018, and the spark plugs were changed in January 2019, before the acquisition of the aircraft by the occurrence owner. According to the information gathered, minor maintenance of the carburetors was reportedly done by the new owner in the spring of 2019, but this work was not recorded in the logbook. Flights were reportedly conducted after January 2019, but they were also not recorded in the aircraft's logbook.

The aircraft had no known deficiencies before the occurrence flight.

Accident site and examination of wreckage

The aircraft struck 2 rows of trees in the orchard and came to rest facing northwest in the 3rd row, when the wings hit the trees. The aircraft's exact flight path could not be determined.

The fuel tanks in the wings were damaged, causing a small fuel spill. When the TSB investigators arrived, the tanks still contained automobile-type fuel, which was appropriate for this engine type. The fuel in the feed lines, filters, and carburetors was clear and uncontaminated. The 3 propeller blades were damaged: one was bent under the nose of the aircraft; another blade was broken and bent forward, while the 3rd was damaged but still in place and straight.

The engine was sent to the TSB Engineering Laboratory in Ottawa, Ont. For analysis. The analysis did not reveal any internal faults with the engine pre- or post-accident. Damages to the wings and structure were caused by the impact and the actions of the first responders.

Figure 2. Occurrence aircraft (Source: former owner of the aircraft)

Global positioning system

The occurrence aircraft was equipped with a portable global positioning system (GPS). It was found intact and sent to the TSB Laboratory for data extraction. Given that the flight tracking feature was not selected, it was impossible to analyze any meaningful data for the occurrence flight.

Low altitude flight

The aircraft reportedly flew over an orchard and a field at a very low altitude (less than 200 ft AGL), passing just above the trees. The CARs state that it is forbidden to fly "at a distance less than 500 feet from any person, vessel, vehicle or structure". This distance of 500 ft applies both in the horizontal and vertical planes. Therefore, flying at less than 200 ft above the ground is allowed, provided that a horizontal distance of more than 500 ft is maintained from any person, vessel, or structure.

However, it is known that intentionally flying at a low altitude increases the risk of an accident. CARs and other publications specifically mention this risk. Furthermore, the TSB has recently investigated several occurrences for which this manoeuvre was identified as a contributing factor.

Pursuant to CARs, "No person shall operate an aircraft in such a reckless or negligent manner as to endanger or be likely to endanger the life or property of any person."

The engine manufacturer provides the following warning in its user manual:

WARNING

> Under certain circumstances, a pilot may decide, for various reasons, to circle over a point of interest on the ground. If the pilot's attention is fully drawn to observing the object on the ground, the pilot may neglect to control the speed, pitch and increase in load factor. Also, the pilot's field of vision is reduced at low altitude. Consequently, the pilot has less time to take action to avoid obstacles and terrain. It is also recognized that flying at low altitude reduces the margin of safety in the event of engine failure, a loss of control or any other unexpected circumstances, while increasing the risk of an impact with the ground or an obstacle.

Safety messages

Flying an aircraft at low altitude leaves the pilot with little margin for error and increases the risk of not having enough time to manage an emergency. It is therefore important for pilots to comply with regulations and to heed any warning in the user manual regarding minimal altitude.

Best practices for test-flying an ultralight aeroplane

Is your aircraft safe to fly? Is it in good condition and does it perform as expected? These are some of the questions you should ask yourself, especially if you have just acquired an ultralight (used or new) or some maintenance has been performed on your aircraft. The test flight is an important step you should take to ensure your aircraft is fit and safe to fly. Remember that your life and your aircraft integrity may depend on this important step. Gord Dyck, Director of UPAC and member of the Ultralight Working Group, with the aid of the working group members, wrote this new Best Practices guide, the 4th developed by this Working Group (https://tc.canada.ca/en/aviation/general-operating-flight-rules/best-practices-general-aviation#best_practices). We hope that you will find the recommendations in this guide useful and make your upcoming flights safer. If you have any comments, suggestions or want to be part of one of the General Aviation Safety Program Working Groups, you can contact us at TC.GeneralAviation-AviationGenerale.TC@tc.gc.ca.

The test flight

This guide was created by and for ultralight pilots, but it is also a helpful reminder for all pilots to fly safer. In addition, it is important that you understand the specific rules and regulations related to the airspace you're flying in, as well as the limitations of your licence, your plane, and your abilities.

Let's all do our part to improve the safety culture in our community by applying these best practices. You may have spent hours building and overhauling your ultralight, or maybe you've just acquired a new one. Regardless, it is time for the next phase: the test flight to make sure your aircraft is fit for flight and performs as it should.

Planning your test flight

The goal of a test flight is to check an aircraft's controllability in different manoeuvres and flight conditions and to look for any hazardous operating characteristics. The collected data will help you tailor the flight manual to your aircraft's performance.

The following are some key considerations and criteria for your test flight:

Select an airport

The runways should be the right length, width, and orientation for your plane. There should be emergency fields within gliding distance and a nearby place with communications (such as a universal communications [UNICOM] station or a tower). If there's no UNICOM or tower near the aerodrome, advise a responsible person of your plans and give them detailed contact information for you and first responders. Access to emergency and support services from your local fixed-base operator (FBO), club, or association is important as well.

The test pilot

The test pilot should be fit (a test flight is stressful and strenuous—the IMSAFE checklist will help you assess your fitness), alert, rated, current, and competent for the category and class of aircraft being tested. The pilot should be familiar with the local area and should have flying experience in aircraft similar to the one being tested. The pilot should be current on the type of plane he or she will be flying (if it is a tail-wheel type, for example), and review the planned manoeuvres, cockpit layout, and emergency procedures.

Pilots flying basic ultralights must wear a helmet, and it is strongly encouraged for others. Test pilots should also use other safety equipment like a flight suit.

Check that your aircraft is airworthy

Use the post-assembly checklist from your aircraft's manufacturer. This usually includes the inspection of the:

- control stick
- rudder pedals
- brakes
- landing gear
- control surfaces
- instrument panel
- engine
- fuel system (clean, flushed, and calibrated with no leaks)
- static systems
- safety belts and harness
- avionics and electrical system (check for connections)
- cowl
- panels and door latches

Weight and balance

Check that the aircraft's weight and balance is correct. Understand the importance of the centre-of-gravity location and how it will affect handling, and adjust if needed. Watch the Ultralight Pilot's Association of Canada's weight and balance video for more information on this topic.

Power plant test

The objective of this test is to make sure that the engine has been correctly run-in and is safe to operate in all revolutions per minute (RPM) ranges. Engine instruments (RPM, cylinder head temperature [CHT], exhaust gas temperature [EGT], oil temperature and pressure, coolant temperature, etc.) should all read accurately. Idle speed, carb heat, and fuel flow should all be working correctly. Check the reduction drive belt's tension. Record or review run-in test data.

Inspect the propeller

Inspect for serviceability and correct torque in accordance with the manufacturer's instructions. For a wooden propeller this is usually done after first hour and every 10 hours after that. If the aircraft has been in storage for 3-6 months, make sure to check the mounting bolt torque. Check propeller tracking, too. Each blade should be within the manufacturer's specification.

Photo credit: Avery Wagg
A missing pin discovered during a pre-flight.

Low-speed taxi test

At least one other person should monitor taxi tests. Advise air traffic control (ATC) and other aircraft of your intentions to perform a taxi test. Watch for no radio (NORDO) and other air or ground traffic that is not on the radio frequency.

Monitor engine instruments while you perform 90, 180, and 360-degree turns and braking.
Check for fluid leaks after each test.

During the low-speed taxi test, the pilot should pay attention and get a feel for control sensitivity. Avoid over-controlling the airplane on the ground (tail-wheel aircraft are subject to ground loop).

Photo credit: Avery Wagg
Hydraulic brakes

High-speed taxi test

Plan this activity as if it were a flight.

Communicate your intentions.

Before conducting a high-speed taxi test, perform a full-power ground run for at least 3 minutes to check the fuel flow, EGT, RPM, CHT, oil temperature and pressure with the aircraft set to a climb attitude.

Once in a while, a high-speed taxi test will lead to an inadvertent first flight. Be ready to fly even if it is not your intention.

Increase taxi speed by increments of 5 miles per hour (mph) until you're within 80% of the aircraft's predicted stall speed.

Test aileron effectiveness with a gentle wing rock.

- **In a nose-wheel airplane:** If the nose can't be raised at this speed, check your weight and balance again.
- **In a tail-wheel airplane:** You should be able to lift the tail. If you can't, check the centre of gravity again.

Perform the test again with flaps, if equipped. Estimate your lift-off point and mark this location. This will give you a reference point for your first flight.

Determine the braking distance at 80% of the lift-off speed, then reduce to idle and apply brakes once that speed has been reached. Add 30% to this distance, then place an abort marker at this spot. The first high-speed taxi test should be done in light-wind conditions.

First flight

Your test-flight plan should call for no more than 1 hour of actual flight time. This will reduce pilot fatigue and the likelihood of an engine failure or airframe malfunction due to vibration or construction errors. Your test-flight plan should include any manufacturer's guidance from the build manual.

Determine how you'll collect data. It is difficult to fly a hands-on aircraft while recording flight data. Consider having a ground support person and giving him or her flight-data details by radio. You could also use a device that automatically records the information without distracting you from flying the aircraft.

Complete a pre-flight inspection

Before the first flight, the test pilot and at least one other experienced person should do a thorough pre-flight inspection. This other person can also help you collect data during the flight but must have access to communications to monitor the flight.

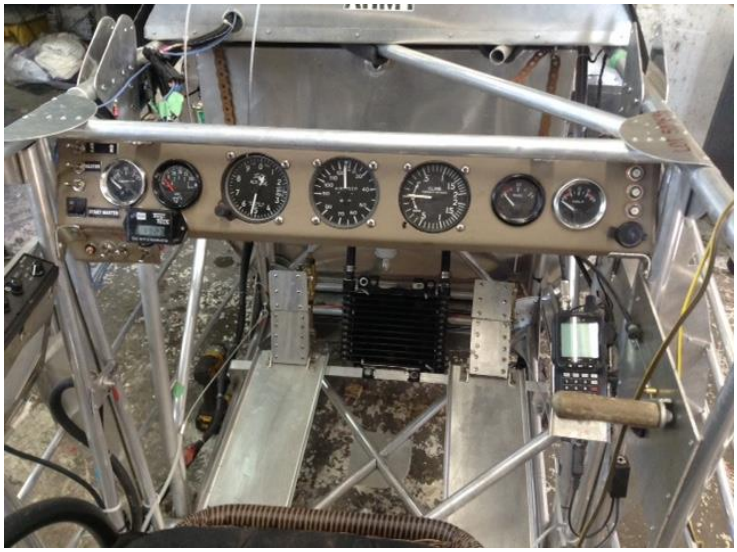


Photo credit: Avery Wagg
The instrument panel is showing the instruments.

Develop in-flight emergency procedures

Develop a complete set of in-flight emergency procedures to help you manage difficult situations. Emergency procedures could include:

- engine failure on takeoff
- engine vibration with increasing RPM
- smoke in the cockpit
- cabin door opening in-flight
- misaligned control surfaces
- engine/fuel shut-off

Wait for calm weather

Your first flight should only be done in calm conditions to remove the weather variable as much as possible.

Communicate

You should advise the tower/UNICOM and broadcast after you have completely checked each aircraft system. Transmit the aircraft registration beginning with C- (tail number), location, and intentions every 10 minutes.

Rejected takeoff criteria

Abort takeoff if your oil pressure or tachometer reads low. If there are any unusual vibrations or if the engine achieves its limits, abort the takeoff. Takeoff should be gentle. Abort takeoff if you experience unusual stick forces. Expect the torque effect depending on the aircraft's design.

- **To abort takeoff in a tail-wheel aircraft:** Keep the tail wheel on the ground until the rudder is effective. This usually happens at 35 mph.

Safe climb

Establish a safe climb. Don't make any large control inputs into the flight controls for the first 1 000 feet (ft) above ground level (AGL). Climb to a safe altitude and level off.

Determine handling characteristics

Due to the slow cruise speed and low weight of ultralights, their flight controls can feel "light" or "sensitive". Once you've made your flight control input, the response rate tends to be slower than the one for an input on a faster and heavier aircraft. The thrust and drag line coupling of many ultralights are often more pronounced. Expect a pitching reaction when applying or reducing power. Control inputs should be gentle:

- Yaw the nose left and right 5° and note how the plane responds.
- Pitch the nose 3° up and down and note how the plane responds.
- Try gentle banks of no more than 5°.
- If the plane is stable and flying smoothly, complete a 360° turn left and right with a bank angle no more than 10°.

Maintain communications

Keep the tower/UNICOM informed of what you are doing and your intentions.

Determine landing characteristics

Level off, fly a pretend landing pattern, and test the flaps. Ultralight aircraft are very lightweight. Quick power changes can take you from cruise speed to a stall in under 4 seconds. This is due to the low-mass, high-drag configuration, and the smaller speed-range characteristic of the ultra-light aircraft. When you are at a low cruise power setting and straight and level, watch how the aircraft trims out.

Determine low-speed handling

An approach to a stall check helps find the initial stall speed (vertical speed indicator [VSI]) in mph or knots (kt) so you can calculate the approach speed for landing. You will also know the aircraft's handling characteristics at low speed. Due to their high angle of dihedral, most ultralight stalls tend to be in straight-forward flight, especially during a power-off stall. These ultralights experience little airframe buffeting. The only stall indications a pilot might recognize are the ultra-light's slowed forward movement, a quick drop in altitude, and controls that are suddenly mushy and usually ineffective.

Practice approaches

You may choose to practise several approaches in altitude or low approaches to the active runway to get a solid understanding of lower airspeeds, aircraft attitude, and an overall feel of the aircraft in landing configuration (review your go-around procedure before flight).

Communicate your landing intentions

Before each low approach at the airport, advise the tower/UNICOM of your intentions. Avoid other traffic in the pattern and use the landing checklist.

Complete the landing checklist

Complete the landing checklist before entering downwind. Keep all turns at less than 20° of bank. Don't cross-control by using the rudder to move the nose—this will increase the bank angle, which most pilots will correct by using opposite aileron. If this is allowed to continue and there is backpressure on the stick, it will result in a cross-control stall and a roll to a near vertical bank attitude at the beginning of a spin with no altitude left for recovery.

Final approach

On final approach, the aircraft speed should be between 1.3 and 1.4 times the recorded first flight pre-stall speed. Homebuilt biplanes (high-drag aircraft) should use an approach speed of 1.5 times the stall speed on landings. Landings, especially the first one in an amateur-built or kit plane, are always exciting. Proceed slowly and do not over-control.

Go-around decision

If the landing conditions are not ideal, be prepared to go around.

Touchdown location

The actual touchdown should happen in the first third of a runway, with brakes applied before the red flag (abort) marker.

Debrief

After taxiing in, secure the aircraft, debrief the flight with members of the team, review the data you've collected while it is fresh in your mind, and then perform a careful post-flight inspection of the aircraft together.
The most common emergency in ultralight and amateur-built aircraft is engine failure.

When an engine fails, FLY THE ULTRA-LIGHT**!**

Push the nose down to maintain airspeed. Pick a landing field and try to land into the wind. If the pilot knows the cause of the engine failure and can easily fix it in-flight (such as failure to switch fuel tanks), he or she should do so if time and the situation permit.

Do not focus all of your attention on restarting the engine. If you do so, you could be distracted and accidentally let your airspeed bleed off and either stall or enter a spin.

The best way to be ready for an engine-out procedure is to practise and practise again until the real thing becomes a non-event. △

Related links

For more information, please see the FAA's Advisory Circular: AC 90-89B - Amateur-Built Aircraft and Ultralight Flight Testing Handbook.

2020-2021 Flight Crew Recency Requirements Self-Paced Study Program

Refer to paragraph 421.05(2)(d) of the Canadian Aviation Regulations *(CARs), which is designed for pilots to update their knowledge on subjects such as human factors, meteorology, flight planning and navigation, and aviation regulations.*

Completion of this questionnaire satisfies the 24-month recurrent training program requirements of CAR 401.05(2)(a). It is to be retained by the pilot.

All pilots are to answer questions 1 to 51. In addition:

- *aeroplane pilots are to answer questions 52 to 57;*
- *ultra-light aeroplane pilots are to answer questions 58 to 67;*
- *helicopter pilots are to answer questions 68 to 69;*
- *balloon pilots are to answer questions 70 to 71*
- *glider pilots are to answer questions 72 to 78; and*
- *gyroplane pilots are to answer questions 79 to 80.*

References are listed after each question. Amendments to these publications may result in changes to answers and/or references. Many answers may be found in the following sources:

- *Transport Canada Aeronautical Information Manual* (TC AIM)
- NAV CANADA *AIP Canada* (ICAO)
- NAV CANADA Collaborative Flight Planning Services (CFPS)
- *Canadian Aviation Regulations* (CARs)
- NAV CANADA *VFR Phraseology*
- *The Canadian NOTAM Operating Procedures*
- NAV CANADA Flight Planning
- Transportation Safety Board investigations and reports
- Weather manuals and documentation
- NAV CANADA Blog - Safety

2020-2021 Flight Crew Recency Requirements
Self-Paced Study Program

GEN–General

1. How do you subscribe to receive e-mail notifications for the *Aviation Safety Letter* Electronic Bulletin (ASL e-Bulletin) (TP185)? _____

Reference: TC AIM GEN 2.2.4 *Safety Promotion*

AGA–Aerodromes

2. At flight service stations and remote advisory services equipped with direct wind reading instruments located at the aerodrome, what does it mean when a Flight Service Specialist says "Runway 03" ?
_____

Reference: NAV CANADA Blog - Safety and TC AIM RAC 1.1.2.2

3. If you see this taxiway sign, what does it mean and where is the threshold of Runway 16?_____

Reference: TC AGA 5.8.3 *Mandatory Instruction Signs*

4. What is the wind speed when the dry standard wind direction indicator is 5º below horizontal?
_____

Reference: TC AIM AGA 5.9 *Wind Direction Indicators*

5. On approach to land, the PAPI (P1,P2, P3) indicates you are _____.

Reference: TC AIM AGA 7.6.3 *Precision Approach Path Indicator* (PAPI) and Abbreviated PAPI (APAPI)

6. How long does aircraft radio control of aerodrome lighting (ARCAL) remain illuminated once activated? How do you reset the timing cycle? _____

Reference: TC AGA 7.14 *Aircraft Radio Control of Aerodrome Lighting* (ARCAL)

7. On landing, when would you expect Aircraft Rescue and Fire Fighting (ARFF) vehicles to be in position adjacent to the landing runway? How long will they remain? _____

Reference: TC AIM AGA 8.4 *Aircraft Rescue and Fire Fighting (ARFF) Standby Request*

COM–Communications

8. Aeronautical radio communications are restricted to communications relating to: a) the safety and navigation of an aircraft; b) the general operation of the aircraft; and c) the exchange of messages on behalf of the pilot.

   Pilots should:

   a) send radio messages _____and _____using _____ _____ whenever practical;

   b) _____ the content of the message before _____; and

   c) _____ _____ before transmitting to avoid interference with other transmissions.

   Reference: TC AIM COM 1.10 *Standard Radio Telephony*

9. In communications checks, the readability scale 2 and strength scale 1 mean _____ and _____.

   Reference: TC AIM-COM 1.11 *Communications Checks*

10. In the *Canada Flight Supplement* (CFS) the abbreviations RCO, FISE, and RAAS stand for:

    _____ _____ _____ ,_____ _____ _____ _____, ,_____ _____ _____ _____, and they permit communications between _____ and either a _____ or a _____for the provision of FISE or RAAS.

    Reference: TC AIM-COM 1.9.2 *Ground Stations*

11. Can you use visual flight rules (VFR) global navigation satellite system (GNSS) receivers for primary navigation to replace current charts?

    _____

    _____.

    Reference: TC AIM-COM 5.11 *Proper Use of Global Navigation Satellite System* (GNSS)

12. Why it is not reasonable to rely on your moving map hand-held device for navigation into marginal weather? _____

    Reference: TC AIM-COM 5.11 *Proper Use of Global Navigation Satellite System* (GNSS)

13. For definitions of terminology and phraseology used in aviation in Canada, refer to the_____, which is available on TC's Web site. Another valuable resource available is NAV CANADA's VFR Phraseology Guide, which is available on NAV CANADA's Web site.

    Reference: TC AIM COM 1.3 *Language*

14. What is a "MEDEVAC" flight?

_____
_____
_____

Reference: TC AIM COM 1.9.1.4 *Medical Evacuation Flight* (MEDEVAC)

15. During visual flight rules (VFR) flight in low-level airspace, the pilot should adjust the transponder to reply on the following unless otherwise assigned by an air traffic services (ATS) unit:

a) _____

b) _____

Note: Pilots of aircraft equipped with a transponder capable of Mode C automatic altitude reporting should adjust their transponder to reply on Mode C when operating in Canadian airspace unless otherwise assigned by an ATS unit.

Reference: TC AIM COM 8.4 *Visual Flight Rules (VFR) Operations*

MET–Meteorology

16. Advisories will be disseminated through the aeronautical fixed service (AFS) if civil aviation is affected by space weather phenomena, notably with respect to GNSS positioning and navigation. Increases in the total electron content (TEC) of the ionosphere lead to an increase in the transit time of the GNSS signal, producing _____ in GNSS receivers.

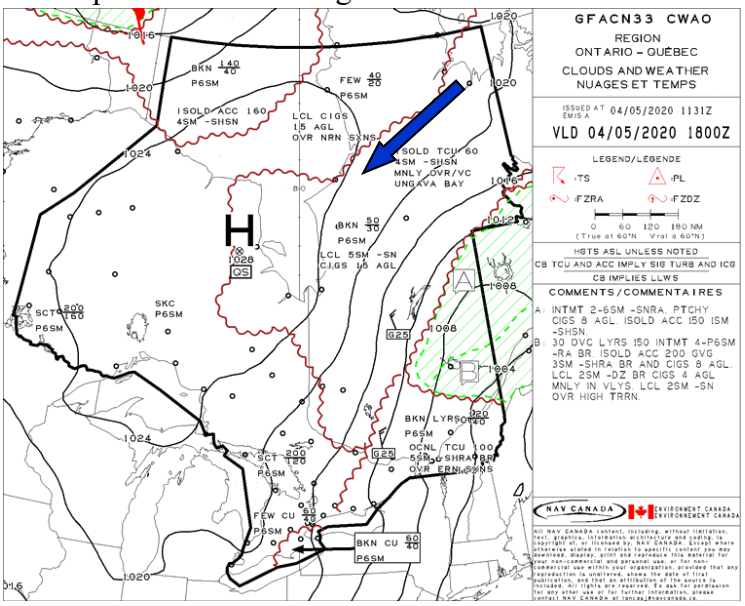
Reference: TC AIM MET 14.1 *Introduction* and 14.2 *Nature of the Disturbances*

17. When wind sensors are not functioning at a human aerodrome routine meteorological report (METAR) site, the wind speed and direction will be estimated, and which remark will be added to the report?

_____.

Reference: TC AIM MET 8.3 *Sample Message*, (f) *Wind* (iii)

18. Please provide the meaning of the abbreviation "SXSN" found in the following graphic area forecast (GFA) weather information below.



_____
_____

Reference: *Manual of Word Abbreviations* (MANAB)

19. Where can you find the suggested format for pilot weather reports (PIREPs)?
_____

Reference: TC AIM MET 1.1.6.1 *Pilot Weather Reports* (PIREPs)

20. Which regulation from the CARs requires the PIC to be familiar with the available weather information that is appropriate to the intended flight? _____

Reference: TC AIM MET 1.1.9 *Pilot Responsibility*

21. **METAR CYOW 211300Z 15006KT 6SM -SN BKN014 OVC020 01/M01 A2920 RMK SC6SC2 SLP894=**

SPECI CYOW 211246Z 18009G15KT 4SM R32/5000VP6000FT/U R07/5500VP6000FT/U -SN BKN014 OVC025 01/M01 A2921 RMK SC6SC2 SLP898

How much has the ceiling changed from the SPECI to the METAR in the sample message above? _____ feet (ft)

Reference: TC AIM MET 8.3 *Sample Message*, (k) *Sky conditions*

22. Are the winds reported as true or magnetic in a METAR? _____

Reference: TC AIM MET 8.1 *The Aerodrome Routine Meteorological Report (METAR) Code*

23. **METAR CYOW 211100Z 09013KT 15SM BKN087 00/M05 A2924 RMK AC7 PRESFR SLP908=**

In the above METAR, the abbreviation "PRESFR" means? _____

Reference: *MANAB*

24. **SPECI CYOW 211220Z 10007KT 8SM -SN OVC029 02/M05 A2923 RMK SC8 SLP902=**

Please decode the above SPECI.

_____
_____

Reference: TC AIM MET 8.3 *Sample Message*

25. **TAF CYOW 211138Z 2112/2212 09012G22KT 6SM -SHSN OVC030 TEMPO 2112/2114 11/2SM -SHSN OVC020 PROB30 2112/2114 6SM –SNPL**

Please decode the above aerodrome forecast (TAF). _____

Reference: TC AIM MET 7.4 *Sample Message*

RAC–Rules of the Air and Air Traffic Services

26. Pilots intending to fly in Class F advisory airspace are encouraged to monitor an appropriate frequency, to broadcast their intentions when _____ and _____ the area, and to communicate, as _____, with other users to ensure flight safety in the airspace. In a Class F advisory uncontrolled airspace area, _____MHz would be an appropriate frequency.

Reference: TC RAC 2.8.6 *Class F Airspace*

27. What are the three methods to compute passenger weights? 1._____ 2._____ 3._____

Reference: RAC 3.4.7 *Computation of Passenger and Baggage Weights*

28. When should you use actual passenger weights? What should the weight figure include?

_____

Reference: RAC 3.4.7 *Computation of Passenger and Baggage Weights*

29. What is the requirement to file a flight plan between Canada and the U.S.? _____

Reference: RAC 3.5.3 *Flight Plan Requirements—Flights Between Canada and a Foreign State* and RAC 3.14.3 *International Civil Aviation Organization* (ICAO)

30. Unless otherwise advised by ATC, pilots do (require/not require) permission to change from tower frequency once clear of the control zone and (should /should not) request release from this frequency or report clear of the zone when there is considerable frequency congestion.

_____

Reference: TC RAC 4.2.9 *Release from Tower Frequency*

31. Where no mandatory frequency (MF) procedures are in effect, aircraft (should/should not) approach the traffic circuit from the (upwind, downwind, base, final) side. Alternatively, once the pilot has ascertained without any doubt that there will be no _____ with other traffic entering the circuit or established within it, the pilot may join the circuit on the _____ leg.

Reference: TC RAC 4.5.2 *Traffic Circuit Procedures—Uncontrolled Aerodromes; Flight Training Manual (FTM)*, Joining the circuit, page 102

32. **METAR CYQT 281700Z 24013G22KT 20SM BKN013 OVC025 14/12 A2987 RMK SC7SC1 SLP120=**

Using the weather information provided above, determine the altitude above ground at which an aircraft should fly when joining the circuit in a control zone.

_____

Reference: CAR 602.114(c)

33. What procedures can be used to enter the circuit at an uncontrolled aerodrome not within an MF area?

_____

_____

Reference: TC AIM RAC 4.5.2 *Traffic Circuit Procedures—Uncontrolled Aerodromes*, (a) *Joining the Circuit*; and VFR Circuit Procedures at Uncontrolled Aerodromes

34. At what altitude do you enter the circuit? _____

Reference: CAR 602.114(c), TC AIM RAC 4.5.2(a), and VFR Circuit Procedures at Uncontrolled Aerodromes

35. When overflying an aerodrome at which you are not intending to land, you must be no lower than what altitude? _____.

Reference: CAR 602.96(4)

36. If it is necessary to cross over the aerodrome prior to joining the circuit, or after departure, it is recommended that the crossover be made at what altitude? _____

Reference: *VFR Circuit Procedures at Uncontrolled Aerodromes (TP11541)*

37. No person shall operate an aircraft over a forest fire area, or over any area that is located within _____ nautical miles (NM) of a forest fire area, at an altitude of less than _____ ft AGL.

Reference: CAR 601.15(a)

38. No person shall act as a crew member of an aircraft within _____hours (hr) after consuming an alcoholic beverage.

Reference: TC AIM RAC Annex and CAR 602.03

39. How long must a pilot wait after cannabis use prior to exercising duties as a crew member? _____

Reference: CAR 602.02 and 602.03 and guidance to the policy on cannabis legalization

SAR–Search & Rescue

40. What are the primary sources of information used by search and rescue (SAR) to ensure detection and rescue from an emergency locator transmitters (ELTs)? _____

Reference: TC AIM SAR 2.1 *General*

41. As soon as information is received that an aircraft is overdue, operators or owners should immediately: _____
_____.

Reference: TC AIM SAR 2.2 *Request for Search and Rescue (SAR) Assistance*

42. If an ELT signal is heard in-flight, notify the nearest ATS unit of:

a)_____
b)_____
c)_____
d)_____

Reference: TC AIM SAR 3.4 *Emergency Locator Transmitter (ELT) Operation Instructions (Normal Use)*

43. If an ELT becomes unserviceable, the aircraft may be operated according to the operator's approved minimum equipment list (MEL). Where no MEL has been approved, the aircraft may be operated for up to 30 days, provided:

    a)_____

    b)_____

    c)_____

Reference: TC AIM SAR 3.9 *Schedule of Requirements*

MAP–Aeronautical Charts & Publications

44. Where can NOTAMs be found? _____

Reference: TC AIM MAP 3.5 *NOTAM Distribution*

45.

NOTAM
CYND

```
(K1115/20 NOTAMN
A) CYND B) 2004211244 C) 2004281200
E) PAPI 27 U/S

FR:
PAPI 27 U/S)
```

In the above NOTAM, when does the PAPI lighting for runway 27 become unserviceable? When does it return to service? _____

Reference: TC AIM MAP 3.0 *NOTAM*

46.

NOTAM
CYND

```
(K0871/20 NOTAMN
A) CYND B) 2003241000 C) 2005011200EST
E) HR OF SVC 1200-2200, OTHER TIMES PNR
819-743-8883 WITH FEES

FR:
HR DE SVC 1200-2200, AUTRE TEMPS PNR
819-743-8883 AVEC FRAIS)
```

In the above NOTAM, what is meant by "EST" in line "C)"? _____

Reference: TC AIM MAP 3.0 *NOTAM*

LRA–Licensing, Registration & Airworthiness

47. A 39 year-old and a 40 year-old, who each hold a private pilot licence, both renewed their medical certificates on July 29, 2020. How long are their medical certificates valid for? By what date must they each renew? _____

Reference: TC AIM LRA 1.9.1 *Medical Validity Periods* (Table 1.8), CAR 404.04

48. The Minister shall extend the validity period of a medical certificate for a period of not more than 60 days beginning on the day on which the certificate would otherwise expire, if:

    a) _____

    b) _____

Reference: CAR 404.04(10)

Canada Flight Supplement (CFS)

49. Where can you find the crosswind chart? _____

Reference: CFS General

50. Where do you find the direction of the circuit pattern? _____

Reference: CFS

51. What is the circuit direction at Grande Prairie (CYQU), Abbottsford (CYXX), and Chilliwack (CYCW)? _____

Reference: CFS PRO

Aeroplane-specific questions

52. A VFR approach is considered stabilized if, on the final approach flight path:

- Briefings and _____ are complete;
- The aircraft is in the proper _____ _____ appropriate for the wind and runway conditions;
- The appropriate power settings are applied;
- Maximum sink rate of 1 000 ft per min;
- Speed within _____ of the reference speed;
- Only small _____ and _____ changes required;
- Stable by _____ AGL.

Reference: *TP13723—Flight Test Guide—Private Pilot Licence—Aeroplane*

53. When on a VFR stable approach, what is the lowest minimum altitude recommended for you to conduct a go-around procedure? _____

Reference: *TP13723—Flight Test Guide—Private Pilot Licence—Aeroplane*

54. When should you do your after-landing checklist? _____

Reference: FTM, Flight Instructor Guide—Aeroplane (TP 975) Exercise 18, aircraft flight manual (AFM) / pilot operating handbook (POH), checklist

55. On a VFR cross-country you become disoriented while in low visibility. You note a rapid increase in airspeed. What is the correct procedure to follow to ensure a safe recovery?

_____

_____

_____

Reference: FTM Exercise 24—Instrument Flying—Unusual Attitudes and Recoveries

56. With reference to the previous question, why is it crucial to level the wings prior to applying back elevator pressure? _____

Reference: FTM Exercise 14—Spirals

57. Complete the following flight planning, human factors and navigation exercise based on the aircraft you fly for any flight or your next flight by responding to these questions:

Plan and use appropriate and current aeronautical charts and publications including the POH/AFM and the CFS/CWAS to extract, record, and calculate pertinent information. Get a weather package from NAV CANADA Collaborative Flight Planning Services for your flight including GFAs clouds & weather, icing, TAFs, METARs, upper winds, NOTAMs, PIREPs, and significant meteorological information (SIGMETs). Individual answers will be unique to you, your aircraft, and your flight. Know your limits!

a) What are your routing, minimum visibility, and weather requirements for the flight?
_____

b) What are your personal weather limits? _____

c) What are the predominant airspace and terrain features?_____

d) When is official night on the day of your flight? _____

e) Are services available at your destination? _____

f) What contingencies should you consider for your route, destination, runways, and weather?
_____

g) What are your estimated headings, appropriate power settings, ground speed, fuel requirements, and time en route for your trip? (A navigation log or electronic flight bag [EFB], as appropriate) _____

h) Complete an ICAO VFR flight plan. _____

i) Complete weight and balance computations. _____

j) Answer the following:
   i. Normal approach speed in landing configuration? _____
   ii. What configuration/speed adjustment would you make in gusty conditions? _____
   iii. What is the aircraft's crosswind limitation? _____
   iv. What is your personal crosswind limitation? _____

k) Using the POH (aircraft flight manual), calculate the:
   i. take-off distance required to clear a 50-ft obstacle on departure _____
   ii. landing distance required to clear a 50-ft obstacle on arrival _____
   iii. Describe your aircraft configuration while conducting both of the above.
   _____

l) Describe the engine failure procedure for your aircraft?
   1. _____
   2. _____
   3. _____

m) Describe the engine fire procedure for your aircraft?
   1. _____
   2. _____
   3. _____

Ultra-light-specific questions

58. What shall every applicant for, and every holder of, a pilot permit—ultra-light maintain? _____

Reference: CAR 401.08 (1)

59. The holder of a student pilot permit—ultra-light may act as a PIC of an ultra-light if the flight is conducted under the _____ and _____of a person qualified to provide training toward the permit.

Reference: CAR 401.19(1)(d)

60. If the ultra-light aeroplane has no restrictions against carrying another person, what does the holder of a pilot permit—ultra-light have to be endorsed with to carry one other person on board an ultra-light aeroplane? _____

Reference: CAR 401.56

61. What are the three situations in which a second person may be carried on board ultra-light aeroplane?

(i) _____,

(ii) _____, or

(iii) _____.

Reference: CAR 602.29(4)(b)

62. The holder of a flight instructor rating—ultra-light aeroplane may operate an ultra-light aeroplane with one other person on board if the holder has not less than _____ hr of ultra-light time as a pilot of an ultralight aeroplane with the same control configuration and the flight is conducted for the purpose of providing _____ instruction.

Reference: CAR 401.88 (a)

63. What is the validity period of a medical certificate for a pilot permit—ultra-light if the pilot is: a) under 40 years of age? b) 40 years of age or older? _____

Reference: CAR 404.04(6)

64. What category of medical certificate is required for the student pilot permit or the pilot permit—ultra-light aeroplane? _____

Reference: CAR 404.10(4)

65. What do you need to carry for each person on board if you are conducting a takeoff or landing on water in an ultra-light aeroplane or operating an ultra-light aeroplane over water beyond a point where the ultra-light could reach shore in the event of an engine failure? _____

Reference: CAR 602.62 (1)

66. No person shall operate an ultra-light aircraft in VFR flight within uncontrolled airspace unless the aircraft is operated with _____.

Reference: CAR 602.115(a)

67. Every owner of an ultra-light aircraft who transfers title of an aircraft airframe, engine, propeller, or appliance to another person shall, at the time of transfer, also deliver to that person_____ that relate to that aeronautical product.

Reference: CAR 605.97

Helicopter-specific questions

68. TSB investigation report A19O0026 states the following concerning night visual flight rules: "Night flying over featureless terrain, such as bodies of water or remote wooded terrain, is particularly difficult. These conditions are commonly described in the aviation community as a _____ _____, which refers to not having visual reference to the ground due to the _____ ___ _____. Under these conditions, it can be difficult or impossible for a pilot to discern a horizon visually, potentially leading to spatial disorientation and _____ ____ _____."

Reference: Air Transportation Safety Investigation A19O0026 (night visual flight rules)

69. TSB investigation report A18Q0016 states the following: "Humans have the ability to discern the orientation of their body (lying down, standing, leaning, etc.) when they are in physical contact with the ground. Humans are not accustomed to the _____ environment of flight, and _____ may arise between the senses and illusions that make it difficult or impossible to maintain spatial orientation. Spatial disorientation is defined as the _____ of a pilot to correctly interpret aircraft attitude, altitude, or airspeed in relation to the Earth or other points of reference."

Reference: Air Transportation Safety Investigation A18Q0016, 1.15.1.3 *Spatial Disorientation*

Balloon-specific questions

70. What are the four qualifications and currency requirements for a balloon pilot to carry fare-paying passengers (tethered or not)?

(a) _____;
(b) _____;
(c) _____; and
(d) _____

Reference: CAR standard 623.21

71. When may a person conduct a landing in a balloon within a built-up area of a city or a town at a place that is not located in an airport, heliport, or military aerodrome? _____

Reference: CAR 602.13(4)(a)

Glider-specific questions

72. Where would you find information on the sport of soaring? _____

Reference: The Soaring Association of Canada (SAC) website

73. Where would you find safety information on soaring? _____

Reference: SAC Safety and Training Web site

74. In order to carry a passenger in a glider, CAR 401.24 requires the PIC have his or her personal log endorsed by a _____ who must specify the method of _____and have completed at least _____ previous solo flights.

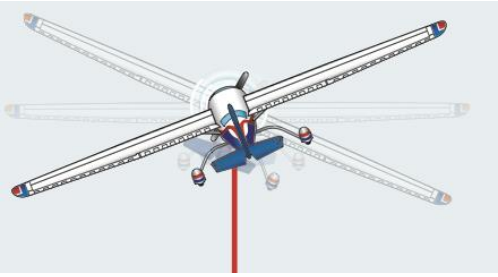
Reference: CAR 401.24

75. On takeoff, you are taking up slack and you notice a knot in the rope. What should you do?

_____

Reference: Soar and Learn to Fly Gliders

76. When on tow you see the tow aircraft waggles the wings steadily in a rolling motion. What must you do? _____



Reference: Soar and Learn to Fly Gliders—Emergency Aerotow procedures

77. What does the acronym SOAR for pilot decision making mean? _____

Reference: Soar and Learn to Fly Gliders—Pilot decision making

78. At what speed should you fly the approach to a landing? _____

Reference: Soar and Learn to Fly Gliders—Final Approach and Wind Gradients

Gyroplane-specific questions

79. If Pilot Induced Oscillation (PIO) in flight is encountered, _____ power and place the cyclic in the position for a _____.

Reference: Rotorcraft Flying Handbook—For Gyroplane Use Only (FAA-H-8083-21), page 20-12 and 20-13

80. What is the recovery manoeuvre if a high rate of descent occurs due to not having kept the flight speed above the minimum? _____

Reference: Rotorcraft Flying Handbook—For Gyroplane Use Only (FAA-H-8083-21), page 21-2

Answers can be found on page 38.

Name: _____ **Licence #:** _____ **Date:** _____

2020-2021 Remotely Piloted Aircraft System (RPAS) Recency Requirements Self-Paced Study Program

Completion of this questionnaire satisfies the 24-month recurrent training program requirements of 901.56(1)(b)(iii) or 901.65(1)(b)(iii) in the *Canadian Aviation Regulations* (CARs).

All remotely piloted aircraft system (RPAS) pilots who meet the requirements in CAR 901 are to answer general aviation questions 1 to 15 **and** the following applicable additional questions:
RPAS Basic pilots—questions 16 to 21.
RPAS Advanced pilots—questions 16 to 26.

The completed copy is to be retained by the pilot.

References are listed after each question. Many answers may be found in the *Transport Canada Aeronautical Information Manual* (TC AIM). Other answers can be found in the *AIP Canada (ICAO)*. Amendments to these publications may result in changes to answers and/or references.

The following resources are available online:

- *TC AIM*
- *AIP Canada* (ICAO)
- *Canadian Aviation Regulations* (CARs)

General Aviation Questions

TC AIM—GEN—General

1. How do you subscribe to receive e-mail notifications for the *Aviation Safety Letter* Electronic Bulletin (ASL e-Bulletin) (TP185)? _____

Reference: TC AIM GEN 2.2.4 *Safety Promotion*

TC AIM—AGA—Aerodromes

2. At flight service stations and remote advisory services equipped with direct wind reading instruments located at the aerodrome, what does it mean when a Flight Service Specialist says "Runway 03"?

_____

Reference: NAV CANADA Blog - Safety, TC AIM RAC 1.1.2.2

3. What is the wind speed when the dry standard wind direction indicator is 5º below horizontal?
_____

Reference: TC AIM AGA 5.9 *Wind Direction Indicators*

COM–Communications

4. For definitions of terminology and phraseology used in aviation in Canada, refer to the_____, which is available on TC's Web site. Another valuable resource available is NAV CANADA's VFR Phraseology Guide, which is available on NAV CANADA's Web site.

Reference: TC AIM COM 1.3 *Language*

5. Aeronautical radio communications are restricted to communications relating to: a) the safety and navigation of an aircraft; b) the general operation of the aircraft; and c) the exchange of messages on behalf of the pilot.

Pilots should:

a) send radio messages _____and _____using _____ _____ whenever practical;
b) _____ the content of the message before _____; and
c) _____ _____ before transmitting to avoid interference with other transmissions.

Reference: TC AIM COM 1.10 *Standard Radio Telephony*

6. In communications checks, the readability scale 2 and strength scale 1 mean _____ and _____.

Reference: TC AIM-COM 1.11 *Communications Checks*

MET–Meteorology

7. The Minister of Transport is responsible for the development and regulation of aeronautics and the supervision of all matters related to aeronautics. For small remotely piloted aircraft (sRPAs), the weather need only be sufficient to ensure that the aircraft can be operated in accordance with the manufacturer's instructions (i.e. temperature, wind, precipitation, etc.) and to allow the pilot or visual observer to keep the sRPA within visual line of sight (VLOS). Where can you find more information regarding the weather, including how to interpret different charts and reports and the general procedures?
_____

Reference: TC AIM MET 1.1 and RPA 3.2.22

8. With regard to weather charts, what is a GFA?
_____

Reference: TC AIM MET 4.1

9. Are the winds reported as true or magnetic in a METAR? _____

Reference: TC AIM MET 8.3 (f)

10. With regard to weather reports issued by NAV CANADA, what is a SPECI?
_____

Reference: TC AIM MET 8.4.1

RAC–Rules of the Air and Air Traffic Services

11. Pilots intending to fly in Class F advisory airspace are encouraged to monitor an appropriate frequency, to broadcast their intentions when _____ and _____ the area, and to communicate, as _____, with other users to ensure flight safety in the airspace. In a Class F advisory uncontrolled airspace area, _____MHz would be an appropriate frequency.

Reference: TC AIM RAC 2.8.6 and RPA 3.2.15.3

12. When you are operating an aircraft near an uncontrolled airfield, at what altitude would you expect a manned aircraft to enter their circuit? _____

Reference: TC AIM RAC 4.5.2(a) and TP 11541 VFR Circuit Procedures at Uncontrolled Aerodromes

13. No person shall act as a crew member of an aircraft within _____hours after consuming an alcoholic beverage.

Reference: TC AIM RAC Annex and CAR 901.19(2)

14. How long must a pilot wait after cannabis use prior to exercising duties as a crew member? _____

Reference: CAR 901.19(2) and Transport Canada Civil Aviation's (TCCA) guidance on cannabis legalization

MAP–Aeronautical Charts & Publications

15. Where can NOTAMs be found? _____

Reference: TC AIM MAP 3.5 *NOTAM Distribution*

RPAS-Specific Questions

16. The CARs state: "No holder of a pilot certificate—small remotely piloted aircraft (VLOS) […] shall operate a remotely piloted aircraft system unless the holder has, within the 24 months preceding the flight […] successfully completed:

a) _____
b) _____
c) _____

Reference: CAR 901.56 or 901.65

17. The RPA—*Remotely Piloted Aircraft* chapter in the TC AIM provides information and guidance as an example of an acceptable means of demonstrating compliance with regulations and standards. Section 3.2.8 Visual Observers provides a CAR reference regarding communication with the RPAS pilot. What shall the pilot and visual observer(s) keep doing throughout the RPAS operation*?*

_____

Reference: TC AIM RPA 3.2.8

18. Reckless or negligent operation of an RPAS is applicable to?
    a) Only small RPAS operated under the Basic Operations regulations
    b) Only to small RPAS operated under the Advanced Operations regulations
    c) Not applicable to micro RPAS operated in Canada
    d) All remotely pilot aircraft systems

Reference: CAR 900.02

19. Transport Canada provides five privacy guidelines for recreational drone operators regarding the *Privacy Act*. What are the five guidelines?
    a) _____
    b) _____
    c) _____
    d) _____
    e) _____

Reference: Drone Safety Web site

20. Personal Information for RPAS users with regard to privacy guidelines for drone users is defined as?

_____

Reference: Drone Safety Web site

21. The Drone Safety Web site names four main areas that limit the use of your drone and prohibits a pilot from flying a drone there. What are they?
    a) _____
    b) _____
    c) _____
    d) _____

Reference: Drone Safety Web site

22. With regard to control zones in Canada, what does the TC AIM highlight for the following?
    a) Control zones are designated around certain aerodromes to _____ and to _____.
    b) Control zones having a civil control tower within a terminal control area normally have a __NM radius. Others have a __NM radius, with the exception of a few which have a ___NM radius.
    c) All control zones are depicted on _____ aeronautical charts.

Reference: TC AIM RAC 2.7.3

23. Information on "Drone innovation and collaboration" can be found on the Drone Safety Web site, in the "Collaboration at home" section. What four topics received from Drone Talks: Planning for Success workshops in 2019 does it summarize?
    a) _____
    b) _____
    c) _____
    d) _____

Reference: Drone Safety Web site

24. When using your RPAS in Canada near the U.S. border, can you fly outside of Canadian airspace?
    a) Yes / No

Reference: CAR 901.13

25. How does the CARs define the word "autonomous"?

_____

Reference: CAR 900.01

26. In the CARs, what Part IX subpart regulates the requirements for special flight operations outside of those mentioned in Part IX Subpart 1—General Operating and Flight Rules?

_____

Reference: CAR 903.01

Answers can be found on page 42.

Name: _____ **Date:** _____

Answers to 2020-2021 flight crew recency requirements self-paced study program

1. Readers can subscribe to the *Aviation Safety Letter* (ASL) (TP185) e-Bulletin notification service to receive e-mails that announce the release of each new issue by going to the Transport Canada Civil Aviation e-Bulletin page and following the step-by-step instructions.
2. Runway 03 is the determined runway for use. The new Flight Service Specialist runway determination allows Flight Service Specialists to determine the runway with clearer and more concise phraseology. This change will take effect only at flight service stations and remote advisory services equipped with direct wind reading instruments located at the aerodrome. See the following chart:

✗ OLD PHRASEOLOGY	✓ NEW PHRASEOLOGY
"PREFERRED RUNWAY XX"	"RUNWAY XX"
"ACTIVE RUNWAY XX"	
"ROGER RUNWAY XX, ACTIVE RUNWAY XX"	"RUNWAY XX, [TRAFFIC]"
(PILOT ADVISES USE OF A RUNWAY, WITH ANOTHER RUNWAY MORE SUITABLE FOR OPERATIONS) "ROGER RUNWAY"	"ROGER RUNWAY XX (ADVISORY), RUNWAY XX IS AVAILABLE"

3. It identifies runway designations, holding positions, NO-ENTRY areas, and obstacle-free zones, where pilots must receive further ATC clearance to proceed. At uncontrolled aerodromes, pilots are required to hold at points marked by these signs until they have ascertained that there is no air traffic conflict. The threshold of Runway 16 is to the right.
4. 10 knots (kt).
5. slightly low
6. Each activation will start a timer to illuminate the lights for a period of approximately 15 minutes (min). The timing cycle may be restarted at any time by repeating the specified keying sequence.
7. When an emergency is declared by a pilot, the airport ARFF unit will take up emergency positions adjacent to the landing runway and stand by to provide assistance. The ARFF unit will remain at the increased state of alert until informed that the pilot-in-command (PIC) has terminated the emergency. After the landing, ARFF will intervene as necessary and, unless the PIC authorizes their release, escort the aircraft to the apron and remain in position until all engines are shut down.
8. a) clearly, concisely, standard phraseology

   b) plan, transmitting

   c) listen out
9. readable now and then; bad
10. remote communication outlet; flight information service en route; remote aerodrome advisory service; aircraft; flight service station (FSS); flight information centre (FIC)

11. No. Use VFR GNSS receivers only to supplement map reading in visual conditions, not as a replacement for current charts.
12. Resist the urge to fly into marginal weather when navigating VFR. The risk of becoming lost is small when using GNSS, but the risk of controlled flight into terrain (CFIT) increases in low visibility. VFR into IMC is dangerous and illegal.
13. *Glossary for Pilots and Air Traffic Services Personnel* (AC 100-001)
14. A MEDEVAC is a flight responding to a medical emergency for the transport of patients, organ donors, organs, or other urgently needed life-saving medical material.
15. a) Mode A, Code 1200 for operation at or below 12 500 ft above sea level (ASL); or

    b) Mode A, Code 1400 for operation above 12 500 ft ASL.
16. position errors
17. WND ESTD.
18. sections
19. The back cover of the CFS and the *Canadian Water Aerodrome Supplement* (CWAS)
20. CAR 602.72
21. 0
22. Wind direction is always given in degrees (true)
23. pressure falling rapidly
24. Aerodrome Special Meteorological Report / Ottawa airport on the 21st of the month at 12:20 UTC / Winds from 100º true at 7 kt / Visibility 8 statute miles (SM) / Light snow / Sky condition—overcast at 2 900 ft / Temperature plus 2 and dew point minus 5 / Altimeter setting 29.23 / Remarks: stratocumulus at 8 oktas / Mean sea level pressure 902 Hectopascals.
25. Aerodrome Forecast for Ottawa Airport, issued on the 21st of the month at 11:38 UTC / validity period 21st of the month at 12:00 UTC to the 22nd of the month at 12:00 UTC / Surface wind from 090º true at 12 kt, gusting to 22 kt / Visibility greater than 6 SM with light snow showers / Sky condition—overcast at 3 000 ft / Temporarily between the 21st of the month at 12:00 UTC and the 21st of the month at 14:00 UTC / Visibility one and a half miles in light snow showers / Sky condition—overcast at 2 000 ft and 30% probability between the 21st of the month at 12:00 UTC and the 21st of the month at 14:00 UTC of visibility 6 SM in light snow and ice pellets.
26. entering; leaving; necessary; 126.7
27. actual weights, standard weights, and segmented weights
28. For aircraft with a passenger seating capacity of less than five. The weight figure includes: the total of the person's weight, personal clothing, and carry-on baggage. (The use of actual weights provides the greatest accuracy in calculating the weight and balance of the aircraft; therefore, the use of standard or segmented passenger weights is not recommended.)
29. Flight plans for international flights originating in, or entering, Canada shall be filed in the ICAO format. "Advise customs" (ADCUS) notification is **no longer accepted** on flight plans for transborder flights departing from Canada to the U.S. or from the U.S. to

Canada. Pilots are required to file a flight plan to **an acceptable customs destination** in the U.S. and are also required to **contact U.S. Customs and Border Protection (CBP)** to make customs arrangements prior to their flight. Failure to do so may subject the pilot to a penalty.

30. not require; should not

31. should; upwind; conflict; downwind

32. 800 ft above ground level (AGL)

33. Aircraft should approach the traffic circuit from the upwind side. Alternatively, once the pilot has ascertained without any doubt that there will be no conflict with other traffic entering the circuit or established within it, the pilot may join the circuit on the downwind leg.

34. 1 000 AGL unless otherwise specified in the CFS and as weather permits.

35. No less than 2 000 ft over the aerodrome.

36. 500 ft above circuit altitude

37. 5; 3 000

38. 12

39. The CARs require fitness for duty. No person shall act as a crew member of an aircraft while using or under the influence of any drug that impairs the person's faculties to the extent that aviation safety is affected. The 28-day policy is based on existing CARs which require pilots, flight engineers, and air traffic controllers to be fit for duty and free of the effects of any drugs or medications.

40. Flight plan and Flight itinerary

41. Alert the nearest joint rescue coordination centre (JRCC) or any air traffic service (ATS) unit, giving all known details.

42. a) position, altitude, and time when signal was first heard;

    b) ELT signal strength;

    c) position, altitude, and time when contact was lost; and

    d) whether the ELT signal ceased suddenly or faded.

43. a) the ELT is removed at the first aerodrome at which repairs or removal can be accomplished;

    b) the ELT is promptly sent to a maintenance facility; and

    c) a placard is displayed in the cockpit stating that the ELT has been removed and including the date of removal (see CAR 605.39).

44. NAV CANADA Web site

45. Unserviceable at 1244 UTC on April 21, 2020

    Serviceable at 1200 UTC on April 28, 2020

46. EST after the date and time should be used when the end time is not known with certainty. EST means estimated or approximate. When the end time is reached, if there is no human intervention, the NOTAM will remain intact. Therefore, the NOTAM must be revised (NOTAMR) or cancelled (NOTAMC) before the time is reached.

47. 39 year-old: 60 months, August 1, 2025

    40 year-old: 24 months, August 1, 2022

48. (a) the application for extension of the certificate is made while the **certificate is still valid;** and

    (b) the applicant demonstrates that there has been no reasonable opportunity to undergo a medical examination within the 90 days before the day on which the certificate would otherwise expire.

49. CFS CROSS-WIND LANDING LIMITATIONS–LIGHT AIRCRAFT–A81

50. In the PRO section of each aerodrome/airport

51. CYQU: left circuit; CYXX: left circuit, except for right circuit on RWY 07 & 01; CYCW: left circuit on 25 and right circuit on RWY 07

52. checklists; landing configuration; +10/-5 kt; heading; pitch; 200 ft

53. If stability is not established by 200 ft AGL, an overshoot will be executed

54. after well clear of the runway

55. 1. Reduce power to prevent excessive airspeed and loss of altitude.

    2. Level the wings by applying co-ordinated aileron and rudder pressures to centre the turn needle and ball.

    3. Apply smooth back elevator pressure to return to level flight.

    4. When the airspeed stops increasing, you are at or near level flight; stop the back elevator pressure.

56. An excessive load will be placed on the aircraft, which could lead to structural damage or a high-speed stall.

57. N/A

58. a personal log

59. direction; supervision

60. A passenger-carrying rating

61. (i) the flight is conducted for the purpose of providing dual flight instruction;

    (ii) the pilot is a holder of a pilot permit—ultra-light aeroplane endorsed with a passenger-carrying rating and the aeroplane has no restrictions against carrying another person; or

    (iii) the other person is a holder of a pilot licence or permit, other than a student pilot permit, that allows them to act as pilot-in-command of an ultra-light aeroplane.

62. 10; dual

63. a) 60 months; b) 60 months

64. 1, 3, or 4

65. life preserver, individual flotation device, or personal flotation device

66. visual reference to the surface

67. all of the technical records

68. black hole; absence of lighting; loss of control

69. 3-dimensional; conflicts; inability

70. a) be at least eighteen years of age;

    b) hold a balloon pilot licence issued by the Minister;

    c) hold a medical certificate, category 1 or 3; and

    d) have accumulated a minimum of 50 hr of flight time in untethered balloons or be the holder of a Canadian balloon licence with a valid flight instructor rating—balloon category.

71. The landing is necessary to avoid endangering the safety of the persons on board.

72. The Soaring Association of Canada (SAC)

73. SAC Safety and Training Web site

74. glider flight instructor; launch; three

75. Pull the release and stop on remaining runway.

76. The glider pilot should release immediately.

77. Situation, Options, Act, Repeat.

78. The speed specified in the flight manual. If it is not specified, the speed should be 1.3Vs + wind velocity.

79. reduce, normal climb

80. Slightly lower the nose of the gyroplane, to trade altitude for airspeed.

Answers to 2020-2021 remotely piloted aircraft system (RPAS) recency requirements self-paced study program

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2. Runway 03 is the determined runway for use. The new Flight Service Specialist runway determination allows Flight Service Specialists to determine the runway with clearer and more concise phraseology. This change will take effect only at flight service stations and remote advisory services equipped with direct wind reading instruments located at the aerodrome.

3. 10 knots (kt).

4. *Glossary for Pilots and Air Traffic Services Personnel* (AC 100-001)

5. a) clearly, concisely, standard phraseology

    b) plan, transmitting

    c) listen out

6. readable now and then; bad

7. The MET—*Meteorology* chapter of the TC AIM.
8. The graphic area forecast (GFA) consists of a series of temporally adjusted weather charts, each depicting the most probable meteorological conditions expected to occur at or below 24 000 feet (ft) over a given area at a specified time.
9. True. Wind direction is always three digits, given in degrees (true) but rounded off to the nearest 10º (the third digit is always a "0").
10. Aerodrome special meteorological reports (SPECI). Special observations will be taken promptly to report changes that occur between scheduled transmission times whenever one or more elements have changed in the amount specified.
11. entering; leaving; necessary; 126.7
12. The circuit is normally flown at 1 000 ft above aerodrome elevation (AAE).
13. 12
14. 28 Days. The CARs require fitness for duty and state that no person shall act as a crew member of an aircraft while using or under the influence of any drug that impairs the person's faculties to the extent that aviation safety is affected. Transport Canada's new policy prohibits flight crews from consuming cannabis for at least 28 days before being on duty.
15. NAV CANADA's Website
16. a) either of the examinations referred to in paragraphs 901.55(b) and 901.64(b),

    b) a flight review referred to in paragraph 901.64(c), or

    c) any of the recurrent training activities set out in section 921.04 of Standard 921—*Small Remotely Piloted Aircraft in Visual Line-of-Sight (VLOS).*
17. The pilot and visual observer(s) shall remain in constant and immediate communication throughout the RPAS operation, as stated in CAR 901.20.
18. d. All remotely piloted aircraft systems.
19. a) Be accountable

    b) Limit collection

    c) Obtain consent

    d) Store information securely

    e) Be open and responsive about your activities
20. Personal information about an identifiable person. It can include a name, a picture of a person's face, or a licence plate number.
21. a) Airports, heliports, and aerodromes

    b) National parks

    c) Emergency sites

    d) Advertised events
22. a) Keep IFR aircraft within controlled airspace during approaches; facilitate the control of VFR and IFR traffic

    b) 7; 5; 3

c) VFR

23. a) Airspace and RPAS Traffic Management (RTM)
    b) Beyond Visual Line of Sight (BVLOS) operations
    c) Airworthiness and certification
    d) Pilot licensing and training
24. No
25. "Autonomous", with respect to a remotely piloted aircraft system, means that the system is not designed to allow pilot intervention in the management of a flight.
26. Subpart 3—Special Flight Operations—Remotely Piloted Aircraft Systems CAR 903.01