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ISSUE 3/2021

AVIATION SAFETY

ETTER

In This Issue....

Competent vs Proficient—Which are You? The Dangerous Power of Power Lines: Tips for Avoiding Collisions and Close Encounters The Elements of a Successful Training Program 2021-2022 TC Recency Requirements Self-Paced Study Program

Canada

Cover photo: Andrew Larsen

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Transport Canada Toll-free number (North America): 1-888-830-4911 Local number: 613-991-4071 E-mail: MPS1@tc.gc.ca

Sécurité aérienne — Nouvelles est la version française de cette publication.

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ISSN: 0709-8103 TP 185E

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TIPS AND TOOLS

Competent vs proficient—Which are you?

Chris Horsten, Director, Canadian Light Sport Aircraft Association

Pilots are often known for their egos, but in a more positive light, it could be said that pride of accomplishment and attention to detail drives a pilot's proficiency. Who wouldn't want to be considered proficient amongst their peers? The dark side of this is arrogance and complacency, and these are the dire enemies of every pilot.

What's the difference?

S

Proficiency and competency are both words that pertain to the application of learned skills, to perform a certain task. However, there is a value difference between the two. So if competency refers to the essential skills required, then proficiency implies a certain mastery of them. Training curriculums and standards use the word "proficient"



Photo credit: iStock

routinely, and it's certainly possible that in the training environment some level of short-term proficiency is achieved. However, it would also be fair to say that much of the proficiency will be lost in the weeks following a successful flight test. Studies have shown that there is a significant loss of skill or learning immediately after an intense period of training, which isn't recovered for a substantially longer period of time. Further reinforcing activities must continue, with corrective input to maintain accuracy.

How to tell which you are

Passing a checkride is a huge confidence booster, but it would be naive to assume you have mastered anything yet. Proficiency is developed over an extended period of time, possibly a lifetime. There simply hasn't been enough of it to accumulate sufficient experiences to be equipped for every possible scenario. Repetition builds muscle memory and fine-tunes the senses. So at what point can we honestly proclaim proficiency?

In the world of light aircraft, proficiency might be claimed when specific manoeuvres can be executed perfectly every time. In other words, it means that one's reaction is immediate and correct given the information available, and the execution is successful. You might be super proficient if a second complication is introduced without impacting the end result. But proficiency isn't only about handling emergencies. Routine flying can be the place where minor errors add up to disaster. But what about decision-making? There have been many instances when a fresh pilot who can ace a forced approach still hasn't gained enough wisdom to be safe, never mind proficient.

Take for example this relatively new pilot who we'll call John. John has a high-end, newly built amphibious aircraft in the amateur-built category. It's equipped with all the options, including an electronic flight instrument system (EFIS), autopilot, dual radios, and more. John's ambitious plan is to be able to use the plane to get to and

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from his cottage in less than favourable weather. He's planning to get an IFR rating, but for now, he plans to fall back on the autopilot and synthetic vision in the EFIS. Since John didn't build the plane and wasn't part of the avionics installation, he has little experience operating it. The stage is set for disaster. On his first weekend away, the weather deteriorates close to the destination airport. With the sun still shining at the cottage, John thinks it will clear by the time he arrives. The opposite happens and as he flies along, the haze turns to cloud and he is unable to descend below it. He begins to look at the EFIS for help, but things don't feel right and he's sure the plane is descending despite what the instruments tell him. He doesn't know how to work the autopilot other than to make it fly straight and level, so he cycles it on and off, making heading corrections and then re-engaging it. Fear begins to take over and he doesn't know what to do. Since he trained at a non-towered airport, he's too afraid to try calling for help. As he approaches his destination, he suddenly, miraculously, sees the ground. He manages to fly a circuit about 500 ft below circuit height and lands the plane successfully. John has learned a hard lesson and has given himself a good scare. Unfortunately, it's enough of a scare that his airplane has not flown since. This is an extreme example, but it actually happened. It isn't until decision-making and technique reach a level of maturity that proficiency can truly be claimed. The school of hard knocks is an effective learning tool, but not always survivable.

So the best answer lies in your flying habits. What does your typical mission look like and is it the same or almost the same every time you fly? When was the last time you practised a forced approach? Do you regularly engage an instructor to hone your skills and identify any bad habits you might have picked up? Have you outgrown your checklist? Some pilots do the same thing every time they fly: a 30-min flight to the coffee shop at a nearby airport, and then home again. If you never add other experiences, can you really ever be considered proficient?

How to get there

Proficiency begins with having the right attitude. Good pilots are always learning and seek out opportunities to build their skills. That might mean investing in an hour or two of instruction every year. Some pilots opt for unusual attitude training and recovery, or aerobatics. Obtaining an ultralight permit does not require much in the way of navigation skills, but learning them might cause you to appreciate fuel management better, improve your map reading skills, or interpret weather reports better. For a pilot who flies an aircraft with more than one seat, weight and balance becomes a chore when you think you know your aircraft's limits and the numbers don't seem to ever change. But can you still perform a weight and balance properly without learning the procedure over? Would you recognize a potential problem with density altitude before taxying out onto the runway?

My instructor taught me to consider the worst case and be prepared for it at all times. That means more than just keeping an eye out for the next suitable farm field. There are many stories of pilots who have been taken by surprise, but my instructor taught me to never find myself in that position, and that in fact doing so might even be considered a failure on her part to train me properly. Since I have no idea what scenario might develop, it's up to me to be able to respond to anything that might happen without panicking or having a plan to manage the situation. A good place to start is simulating any situation that has an emergency checklist in your pilot operating handbook (POH). Knowing those checklists by heart could make the difference.

When I first got my tailwheel checkout, I spent about 7 hr total with the instructor. I was deemed competent, although I knew in my gut that I did not have the confidence to manage anything more than a 2–3 kt crosswind. It wasn't until I could execute a landing without breathing a sigh of relief on touchdown that I knew I had attained a level of mastery that could be called "proficiency." That day came on my way to Oshkosh in 2019. I reluctantly enjoyed three days in Port Huron—just 1.5 hours from home—before the weather allowed me to resume my flight. The final leg of that journey culminated in a sunset landing at Oshkosh with 7 kt right down the runway, just in time to beat the AirVenture rush. But it wasn't the greaser landing that I pulled off in front of hundreds of onlookers that made me feel like I had finally nailed it, it was the absence of terror on my passenger's face. \triangle

The dangerous power of power lines: Tips for avoiding collisions and close encounters

by Adam Magee, US FAA commercial hot air balloon pilot/flight instructor, a representative at the FAA Safety Team (FAASTeam)

A popular saying is that "Flying is the second greatest thrill known to man, landing is the first." That certainly rings true for the lighter-than-air community, as nearly every balloon landing involves the need to navigate obstacles. Power lines are a big one—contact with power lines is the number-one cause of fatal balloon accidents.

Pre-flight prep

The first step in accident prevention is the critical "go/no go" decision, which includes use of preflight checklists and decision-making tools as part of a proactive strategy. I am an avid believer in the PAVE and IM SAFE checklists. PAVE stands for **P**ilot, Aircraft, enVironment, and External pressure. You can consider the IM SAFE checklist as a branch of the Pilot part of PAVE. It stands for Illness, Medication, Stress, Alcohol, Fatigue, and



Photo credit: iStock

Eating. These items combine to determine your personal level of risk for a flight, and they could prompt you to cancel or reschedule the flight. Many factors can elevate the risk of a flight, so you need to carefully consider what it's going to take for you to cancel your flight. One thing? Two things? Three? I often tell pilots in training that PAVE and IM SAFE are there for you to "be aware of your unawareness." These elements represent things that might cause you to second-guess some of your decisions had an accident occurred. For example, you might say, "If I had known [fill-in-the-blank], I wouldn't have flown" or, "If I had known there weren't many landing options downwind, I would have rescheduled my flight." In essence, PAVE and IM SAFE offer an opportunity to review factors and risks that you might be unaware of. I also tell students to "Always set up your flight for success!" Use PAVE and IM SAFE, use checklists, plan your flight, and follow the balloon flying rule of thumb for 100 ft of downwind distance from obstacles for each knot of wind during takeoff. Give yourself the best opportunity to succeed. Don't cut corners or allow hurrying, complacency, or laziness to ruin your day.

Distractions

A balloon flight can provide many distractions that break a normal flow and disrupt standard procedures. One such distraction is coordinating with a chase crew. I will always remember a time when I was a child watching several balloons take off in a field. There were power lines downwind but during takeoff, one pilot was searching for his handheld radio. Thus distracted, the pilot flew right into the power lines. Thankfully, the pilot survived by turning off the fuel and pulling the top to allow the balloon to drape over the power lines. Passengers can create distractions. It's normal for passengers to use mobile phones and social media during a flight, but don't let that be a distraction to you. Among other things, a balloon pilot should not take any passenger photos during a flight unless the situation is deemed safe and there is no threat of power lines. Spectators can also become a distraction. Waving and talking

to friendly landowners can be fun, but one vital lesson that I teach all students is to fly the balloon first, and always! The rest can wait.

During flight

Even while in compliance with minimum safe altitudes, balloons fly in close proximity to power lines during contour flying or on approach to landings. I tell students to fly the power poles. Here's what I mean. It is difficult and sometimes impossible to see the power line itself. It is much easier to look for power poles, but that too comes with a caveat: "flying the poles" can be difficult in places where aesthetically pleasing power poles blend in with the environment. The smartest strategy is to expect a power line to every building-even barns or outhouses, as well as just about every road or driveway. Count on their existence until you are absolutely sure the area is clear. If you are contour flying, be careful when operating below tree height as power lines may be hiding. Similarly, if there is a gap in the trees on approach to landing, be aware that power poles could be in those trees with a line going right between the trees you are planning to "split." I once decided to have a student practise an approach to landing over power lines. I told the student to assume the trees were power lines and to make the approach over them. As it turned out, there were power lines hidden in those trees. The key takeaway is to maintain a healthy respect for power lines. A balloon should always be at an appropriate height above power lines. It should be level or ascending when approaching and crossing power lines. The pilot must be aware of wind shear that could put the aircraft into a "false heavy" situation that pushes it down into a power line. To avoid the dangers created by wind shear, keep an appropriate height above power lines and maintain control while in the descent. Precision is especially important in order to maintain control while transitioning the wind layer upon approach to landing.

Upon landing

Again, expect power lines everywhere. Scan the area multiple times and ask the ground crew to do the same. The crew use radio or hand signals to identify power lines on approach. Avoiding power lines and other obstacles requires the pilot to plan the approach based on winds. One helpful technique is to have the ground crew release a pibal (helium balloon) to identify wind directions above the ground. I carry shaving cream onboard to help me see the winds below. Be mindful of obstacles 360° around the balloon and maintain awareness of the balloon's movement on approach. A pilot should pick a point of no return that leaves plenty of space before obstacles. When looking for an appropriate landing spot and while on approach, use the GPS to keep track of speed.



Photo credit: iStock

What if a power line strike is imminent?

"When in doubt rip it out!" If a power line strike is imminent, the safest decision is to turn off all fuel, bleed all remaining fuel from the lines, and "rip out" (i.e., open wide) the deflation port. Cooling and descending is a much quicker action, which allows for greater chance of survival in this situation.

Making contact with a power line at the basket or flying wires level is extremely dangerous. It is considered less dangerous to hit at the envelope level and drape the balloon over the power lines. If a pilot "rips out," there is a better chance of contacting the lines with the envelope. Attempting to operate the burners to overfly power lines too often results in contacting the lines at the flying wires or basket, which increases the risk of fatalities. As all balloonists should know, initiating an ascent in a balloon can be slow due to the time it takes the burners to raise the balloon's internal temperature.

Summing it up

Nearly every balloon landing involves the need to navigate obstacles, including power lines. Keep these tips in mind to avoid the dangerous power of power lines.

Adam Magee is a US FAA commercial hot air balloon pilot/flight instructor, a representative at the FAA Safety Team (FAASTeam), and was named the 2019 District and Regional FAA Certificated Flight Instructor of the Year. He is co-founder/president of The Balloon Training Academy, a non-profit organization and an appointed training provider of the FAASTeam. Δ



INSTRUCTOR'S CORNER

The elements of a successful training program

by Michael Schuster, Chief Instructor, Aviation Solutions

Many things go into a quality training program. But executing them effectively relies on the flight instructor. The challenge is that there is a huge variety in skill and ability amongst instructors. Here are some key elements that instructors can consider when they implement their training programs.

Why is this important to the student?

Training can often seem like a series of unrelated tasks. For example, stall training is often covered as independent, unrelated sequences and we usually start against primacy by training students to take the aircraft to a full stall instead of recovering at the first sign of a stall. Another aspect to good stall training is to explain when each type might be encountered. Are you climbing with full power and starting a turn? Departure stall! Reduced power descending turn? Base to final! By associating the training event with the real world, learning is much more effective.

Use scenario-based training

If our goal is to train competent aviators, we need to teach people how to fly—and stop training them to just pass a flight test. All too often, instructors find themselves in the habit of training a student how to carry out a series of technical flight manoeuvres. They forgo the many opportunities flight training presents that allow students to learn to think for themselves.

For example, rather than simply asking the student to recite the procedure in the event of an electrical fire, have them complete the entire event to conclusion. The electrical master switch goes off and the



Photo credit: iStock

smoke ceases. Now the intercom is lost, the pilot must join a circuit using uncontrolled procedures, and fly the circuit with slipping turns and forward slips to landing, as the flaps will no longer function. We have now covered at least three exercises in one sequence, we've incorporated the learning factors of effect, exercise, and intensity, and we've added no time to the flight. Plus, during all this, the student has developed decision-making abilities.

Train them to be pilots

As the mantra goes, "don't teach to the flight test, train in accordance with the flight test standards." What this means is that the student needs the skills listed in the flight test guide, not just having been taught the manoeuvres that will be on the flight test. Remember the stall training discussed above? We mistakenly go to full stall training right away against primacy. Why? Because the stall on the flight test will be a full stall!

Here is another instance. Instead of focusing exclusively on the precision steep turn, have the student regularly practise collision avoidance, steep descending, and canyon turns. The most common weaknesses with steep turn performance are poor visual scanning and the ability to modify the manoeuvre to various airspeeds. Practising other types of steep turns will build the same skills, meaning no more time spent on training—but a wider range of abilities is achieved.

Incorporate threat and error management

Threat and error management (TEM) is the foundation of everything we have discussed so far. The number-one theme in general aviation accidents that we see over and over is poor pilot decision-making and disregard for the severity of potential threats to the flight. Perhaps one reason airline operations have such a good safety record is that TEM is integrated in decision-making processes. Many times, before and during flight, pilots pause to consider what threats could play a role in the upcoming sequence and what errors or undesired aircraft states could possibly result. The identified risks then have a mitigation strategy developed for use by the crew. For example, a black-hole

approach with an unserviceable precision approach path indicators (PAPI) represents a serious threat. However, if the runway has a functioning precision approach, the crew may choose to mitigate that risk by following an ILS glideslope or GPS vertical path to the runway. Incorporating the process of TEM in flight training would set a solid foundation for low-time pilots to make better decisions.

Going forward

The above practices should be integrated into the training of new Class 4 flight instructors, with our collective challenge being that our Class 1 flight instructors are well versed in these aspects. It also falls upon the shoulders of our chief flight instructors to ensure that they are training and encouraging our existing flight instructors to incorporate these elements. It's something that we all need to be part of.

A version of this article originally appeared on aviationsolutions.net. Mike Schuster is an experienced Class 1 flight instructor who has taught at all levels, from ab initio to airline. He is the chief instructor at Aviation Solutions, which is an authorized Flight Instructor Refresher Course provider for rating renewal \triangle

ASL instructor's corner

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

Submitted articles can be geared towards a variety of readers, instructors, student pilots, private pilots, and glider, ultra-light or commercial pilots. In fact, this issues's 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.

Your submissions can be as basic as attitude and movement for private pilot training, to night rating, multi-IFR or seaplane rating, or teaching tips for instructors. It can also be tips to increase aviation safety or to be better prepared for a flight.

It's up to you, as long as your instructor's hat is on when you're writing your piece.

If you would like to submit an article or would like more information, please send an email to the following address: jim.mulligan@tc.gc.ca \triangle



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 A20W0072—Collision with power line

History of the flight

At about 1317 on 26 September 2020, the Harmon Rocket II amateur-built aircraft departed from Rocky Mountain House Aerodrome (CYRM), Alberta, for a flight to Hugget/Goodwood Field Aerodrome (CGF5), with two people on board. The aircraft arrived overhead of CGF5 at 1337 and proceeded to do two circuits around the field given that the pilot had never been to this location.

After the second circuit, the aircraft turned left, descended to approximately 25 ft above ground level (AGL) and

flew over the racetrack straightaway from north to south. Based on videos recorded by observers on the ground, at the south end of the straightaway, the aircraft initiated a climb and struck the upper of two wires of an unmarked power line on the north side of Township Road 504 at between 32 and 35 ft AGL (Figure 1). The aircraft pitched up steeply, climbed to approximately 700 ft while rolling right to an almost inverted attitude and changing heading to the west. When the aircraft began to descend, it rolled left to a wings-level attitude and continued to descend until it struck the ground in a 40° nose-down attitude.

There was a post-impact fire, which consumed most of the aircraft. The two occupants were fatally injured.



Figure 1: Map showing the occurrence aircraft's flight path, the power line and the accident site (Source: Google Earth, with TSB annotations)

Weather information

The 1300 aerodrome routine meteorological report for Edmonton International Airport (CYEG), 21 NM to the east of CGF5, was:

- wind from 320° true at 19 kt, with gusts to 26 kt
- visibility: 20 statute mi.
- broken ceiling at 6 000 ft AGL, with additional broken layers at 8 000 and 23 000 ft AGL
- temperature: 16°C, dew point -1°C
- altimeter setting: 29.66 in. of mercury

Weather was not considered a factor in this accident.

Aircraft information

The Harmon Rocket II is an amateur-built aircraft that is created by modifying a Van's Aircraft RV-4. The Harmon kit provides for the installation of a larger engine by widening the fuselage and lengthening the RV-4 by 18 in. The wing is modified, and the landing gear material and placement is also changed to accommodate the larger engine. The aircraft has a relatively high power-to-weight ratio that leads to performance suitable for advanced aerobatic flight.

The occurrence aircraft was equipped with a Textron/Lycoming IO-540 engine and dual control sticks; however, all other engine and flight controls were installed for the forward seat only. The aircraft was used regularly at air shows across Canada, the U.S., and Mexico.

Occupant information

The pilot held an airline transport pilot licence (ATPL)—aeroplane, endorsed for single and multi-engine aircraft, and for gliders. He had also obtained a type rating for the Harmon Rocket II. His medical certificate was valid for the personal type of flight undertaken. The pilot's personal logbook was partially destroyed in the post-impact fire; however, the last legible entry recorded that he had accumulated 4 568.1 total flight hours, as of 21 February 2020. The pilot was a well-known air show performer and held a Level 1 Statement of Aerobatic Competency (SAC),¹ which authorized him to perform unrestricted aerobatic manoeuvres at any altitude.

The passenger held a private licence (PPL)—aeroplane, endorsed for single-engine land aircraft with a night rating.

Wreckage analysis

When the aircraft collided with the power line, the aircraft contacted the upper wire just over the nose, and then it slid up the cowl until it struck the leading edge of the canopy. The canopy fractured and immediately separated

¹ In Canada, a Statement of Aerobatic Competency (SAC) is issued by Transport Canada to pilots after they successfully complete the Aerobatic Competency Evaluation (ACE) Program administered by the International Council of Airshows. Pilots are awarded SAC levels as follows: Level 4 (800 ft AGL minimum), Level 3 (500 ft AGL minimum), Level 2 (250 ft AGL minimum), Level 1 (Unrestricted).

from the airframe, landing in the field south of Township Road 504. The remainder of the airframe struck the ground in a high-energy state, approximately 2 000 ft to the southwest of the power-line strike. The fuselage, from the instrument panel to the tail, was consumed by fire. The outer portions of the wings, flaps and ailerons remained outside of the burn area. The rudder, horizontal stabilizer and elevator were mostly consumed by fire but still recognizable. Because the cables connecting the rudder were made out of stainless steel and withstood the fire, control continuity to the rudder was established. However, control continuity to the flaps, ailerons and elevator could not be determined given that the aluminum push/pull tubes were all destroyed by fire. A video of the flypast just before the wire strike showed the aircraft responding to flight control inputs.

Power transmission lines and marking

The power transmission line north of Township Road 504 consisted of a two-wire, 14.4 kV rural supply line. In general, rural power poles stand approximately 35 ft (10.6 m) tall once placed in position. The top (high-voltage) wire is mounted on insulators on the top of the pole. The lower (ground potential or neutral) wire is attached via insulators approximately 4.5 ft below the top of the pole. The approximate 400-ft span between the poles allows the top wire to hang at a height of 32 ft (9.7 m) at the midpoint.

Section 601.23 of the CARs states that:

any building, structure or object, including any addition to it, constitutes an obstacle to air navigation if [...] it is higher than 90 m AGL and is located within 6 km of the geographical centre of an aerodrome.

In addition, subsection 601.25(1) of the CARs states:

If the Minister determines that a building, structure or object, other than a building, structure or object described in section 601.23, is hazardous to air navigation because of its height or location, the Minister shall require the person who has responsibility for or control over the building, structure or object to mark and light it in accordance with the requirements of Standard 621.²

Although the wire that the occurrence aircraft struck was within 6 km (actual distance was 0.88 km) of the geographical centre of CGF5, there was no requirement for marking the wires because the highest point of the power line was only 10.6 m.

Low-height wire crossings are very common in Canada, and as part of a previous investigation,³ TC has stated that it would not be reasonable to require lighting or marking for all of them.

Low flying

The CARs state that "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."⁴

 $^{^2}$ Transport Canada has stated that, in some instances, it may identify objects having a height of less than that specified in section 601.23 of the *Canadian Aviation Regulations* as obstacles requiring lighting or marking, based on safety factors such as exposure to a known air traffic route or aviation activities.

³ TSB Aviation Investigation Report A16A0084.

⁴ Transport Canada, SOR/96-433, Canadian Aviation Regulations, section 602.01.

In some cases, low-level flight is required for certain activities such as aerial work, external load operations, wildlife surveys, pipeline or power line inspections and air shows. However, regarding minimum altitudes and distances to be flown over non-built-up areas, the CARs state:

Except where conducting a take-off, approach or landing or where permitted under section 602.15, no person shall operate an aircraft [...] at a distance [vertical or lateral] less than 500 feet from any person, vessel, vehicle or structure.

The *Transport Canada Aeronautical Information Manual* (TC AIM) contains the following warning in bold font regarding low flying:

Warning—Intentional low flying is hazardous. Transport Canada advises

all pilots that low flying for weather avoidance or operational

requirements is a high-risk activity.

The TC AIM section on permissible low flying also contains the following note:

The hazards of low flying cannot be over-emphasized. In addition to the normal hazards of low flying, such as impact with the ground, two issues regarding man-made structures should be stressed [...]

Wire-strikes [sic] account for a significant number of low flying accidents. A number of these accidents occur over level terrain, in good weather and at very low altitudes.

The regulations governing low-level flight are located in several areas of the CARs. It is the responsibility of the pilots to ensure that all regulations are strictly adhered to.

The TSB has completed a number of investigations into low flying in the recent past. The investigation into a similar accident in which a Bell 206B helicopter collided with power transmission lines near Flatlands, New Brunswick, in 2016, determined that low-altitude flying was risky, particularly if appropriate pre-flight planning and reconnaissance were not conducted, and that it may result in a collision with wires or other obstacles, increasing the risk of injury or death.

Safety message

Low-level flight is a high-risk activity as not all hazards, such as power transmission lines, are physically marked or can be seen in time to avoid a collision.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 24 February 2021. It was officially released on 03 March 2021.

TSB Final Report A20P0060—Collision with power line

History of the flight

On 06 June 2020, a Cessna 172M aircraft was conducting a visual flight rules (VFR) training flight from Vancouver/Boundary Bay Airport (CZBB), British Columbia (B.C.), with one student and one instructor on board.

At 1257 the aircraft departed CZBB and turned east-northeast while climbing to an altitude of 2 400 ft above sea level (ASL).

At 1304, the instructor contacted the tower controller at Pitt Meadows Airport (CYPK), B.C., for permission to enter the control zone for circuits. The CYPK tower controller responded that additional aircraft could not be accommodated in the circuit and the pilot should try Langley Regional Airport (CYNJ), B.C., as an alternate. At 1305, the instructor contacted the CYNJ tower controller to request transit through the CYNJ control zone, and was cleared as requested.

At 1309, the aircraft began a descent from 2 200 ft ASL, flying over the Fraser River near Fort Langley Water Aerodrome (CAS4), B.C., levelling briefly at 1 500 ft ASL and 300 ft ASL before it levelled at 200 ft ASL over the river when radar contact was lost at 1312:29. The aircraft's last recorded position was approximately 9.7 nautical miles (NM) north-northwest of Abbotsford Airport (CYXX), B.C., travelling eastbound at 200 ft ASL, with a groundspeed of 80 kt. At approximately 1313, the aircraft flew into a power transmission line that was strung across the Fraser River, approximately 125 ft above the water (Figure 1).



Figure 1: Occurrence aircraft's flight path and site of collision with power line (Source: Google Earth, with TSB annotations)

Observers in the area reported seeing a low-flying aircraft, and then seeing a splash in the river. They then saw the aircraft partially submerged.

When local RCMP (Royal Canadian Mounted Police) and emergency responders arrived on scene, the aircraft could no longer be seen. Over the next several months, the RCMP used boats, helicopters, divers, and underwater imaging equipment in an attempt to locate the aircraft. However, the water level in the river was high at the time of the occurrence, which hampered the first few months of the search.

At the time of report writing, the occurrence aircraft and the occupants have not been found.

Weather information

According to the aerodrome routine meteorological report issued at 1300 for CYXX, the closest aerodrome to the site of the occurrence, the weather was favourable for VFR flight, with a reported temperature and dew point of 15°C and 7°C respectively.

Pilot information

Instructor

The instructor was licensed and rated to provide flight instruction. He held a Class 4 instructor rating and was therefore required to be under the supervision of a Class 1 or 2 instructor. In this case, the instructor was being supervised by the flight training unit's (FTU's) chief flight instructor, a Class 2 instructor.

Student

The investigation determined that the student had accumulated approximately 80 flight hours at an FTU in the United States. The training at that FTU had concluded in May 2019. The student's flight instruction in Canada began in February 2020, and he had accumulated approximately 10 additional flight hours at the time of the occurrence.

Aircraft information

The occurrence aircraft was manufactured in 1972 and had accumulated approximately 3 407 hours of total airtime. Records indicate that the aircraft was certified, equipped, and maintained in accordance with existing regulations. The aircraft had no known deficiencies before the occurrence flight.

Power transmission lines and markings

At the occurrence site, there are two 69 kilovolt (kV) power transmission circuits, consisting of three phase conductors each, for a total of six conductors (power transmission lines), spanning the Fraser river. These lines are approximately 10 ft apart vertically and 22 ft apart horizontally. Three suspension towers support the power transmission lines that span across the river (Table 1).

Table 1. Heights of the suspension towers that support the power transmission lines				
Name of tower	Height above sea level	Height above ground level		
North suspension tower	84 m (276 ft)	57 m (187 ft)		
Middle suspension tower	63 m (207 ft)	57 m (187 ft)		
South suspension tower	50 m (164 ft)	44 m (144 ft)		

The aircraft collided with the span between the north and the middle suspension towers, which is 2 077 ft long and was approximately 125 ft above the river at the time of the occurrence. The lowest line was damaged and was disabled by circuit protection (Figure 2).



Figure 2: South-facing view of middle suspension tower with inset image of damaged transmission line (Main image source: TSB. Inset image source: BC Hydro)

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Section 601.23 of the Canadian Aviation Regulations (CARs) states that:

[...] any building, structure or object, including any addition to it, constitutes an obstacle to air navigation if [...] in the case of any catenary wires crossing over a river, any portion of the wires or supporting structures is higher than 90 m [about 300 ft] $AGL^{1/2}$

Therefore, given their height above the water, the power transmission lines did not constitute an obstacle to air navigation according to that regulation; however, at an undetermined date prior to 2008, Transport Canada (TC) deemed the crossing to be an obstacle to navigation as the power lines were in close proximity to the VFR route through the Glen Valley practice area. As a result of this determination, lights were installed on the suspension towers, and the power transmission lines were depicted on the VFR navigational chart for the area (Figure 3).



Figure 3: Visual flight rules navigational chart for the area. The power lines crossing the Fraser River are circled. (Source: NAV CANADA, with TSB annotations)

In October 2015, BC Hydro submitted a request to TC to upgrade the suspension tower lights. TC approved the request shortly after the submission.

Medium-intensity (CL-866) white lights for daytime use were installed on the north and middle suspension tower in 2019; however, at the time of the occurrence, the lights had not been activated.

¹ Transport Canada, SOR/96-433, Canadian Aviation Regulations (last amended 27 June 2018), paragraph 601.23(1)(e).

² Standard 621 of the *Canadian Aviation Regulations* defines a catenary as "the curved span of overhead wires hung freely between two supporting structures, normally with regard to exceptionally long elevated spans over canyons, rivers and deep valleys." (Source: Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, Standard 621: Obstruction Marking and Lighting.)

As a result of the inactive suspension tower lighting, a recurring NOTAM was issued in 2015, indicating that the cable crossing was unmarked. This NOTAM was still valid at the time of occurrence.

Low flight

The CARs stipulate that no person shall operate an aircraft "at a distance less than 500 ft from any person, vessel, vehicle or structure." This distance of 500 ft applies both vertically and horizontally. The CARs do allow for flight training aircraft to operate below 500 ft, but only when operated outside of a built-up area, when operated without creating a hazard to persons or property on the surface, and when operated for the purpose of flight training by or under the supervision of a qualified flight instructor. The Transport Canada *Aeronautical Information Manual* provides good airmanship advice on low flying.

Intentionally flying at a low altitude increases the risk of an accident. At heights below 90 m (about 300 ft) AGL, obstacles can be difficult to see as they might not be physically marked, or indicated on navigational charts. Flying at low altitude also reduces the margin of safety in the event of engine failure, a loss of control, or any other unexpected circumstances, and increases the risk of an impact with the ground or an obstacle.

The flight training unit training program

Flight training at International Flight Centre Inc. was being conducted with reference to the lesson plans contained in TC's *Flight Instructor Guide–Aeroplane* (TP 975). The instructor was conducting flight training, for the student, in accordance with the regulations for initial issuance of a licence.

The flight training program outline provided to the student did not contain a policy on acceptable minimum altitudes for low-level flying activity, nor was it required under the CARs. The Chief Flight Instructor had, however, verbally directed his instructors to not go below 500 ft during flight instruction. A review of the student pilot's training record provided no indication that low-level manoeuvres had been previously practised (i.e., precautionary landings, low-level diversions), or that such manoeuvres were planned for the occurrence flight. The investigation was unable to determine what, if any, purpose there was to operate the aircraft at less than 500 ft above the Fraser River.

Safety action taken

BC Hydro has prioritized the schedule for the commissioning of the daytime strobe lights, which should be completed in 2021. Once this work has been completed, the NOTAM will be rescinded.

Safety message

Low-altitude flight always presents higher risks. Not all hazards, such as power transmission lines, are physically marked or can be seen in time to avoid collision.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 16 December 2020. It was officially released on 07 January 2021.

TSB Final Report A20P0071—Loss of control during takeoff

History of the flight

On 27 July 2020, a privately registered Cessna 140 aircraft was flying from Ross Creek Aerodrome (CRC3), British Columbia (B.C.), to Pitt Meadows Airport (CYPK), B.C., with an intermediate stop at Vernon Airport (CYVK), B.C. The pilot-in-command (PIC) was the owner of the aircraft and was accompanied by another pilot. The pilots were taking turns performing the role of pilot flying.

At 1042, the aircraft departed CRC3 for CYVK, where the pilots had planned to take a lunch break. They landed in CYVK at 1127, had lunch, and fuelled the aircraft to its maximum capacity. The pilots departed CYVK at 1259. Approximately 10 minutes into the flight, the pilots detected an abnormal vibration in the aircraft, noting that the engine appeared to be running rough. They diverted to Kelowna



Figure 1: Wreckage site (Source: TSB)

Airport (CYLW), B.C., which was approximately 7 nautical miles (NM) to the southeast, where the aircraft landed uneventfully at 1315. After closing the flight plan, the pilots conducted an engine run-up and observed an abnormal drop in engine RPM while operating on the right-hand magneto. They shut down the aircraft and, after consulting with an aircraft maintenance engineer by phone, restarted it. The pilots repeated the engine run-up procedure three times with normal results. They departed CYLW at 1333 for the flight to CYPK.

En route to CYPK, the pilots made an impromptu stop at a gravel airstrip on a golf course located 5.9 NM north of the Chilliwack Airport (CYCW), B.C. The aircraft arrived at approximately 1524, and departed again at 1639.

When the pilots were approaching Mission, B.C., they decided to make a second impromptu stop at an abandoned aerodrome with a gravel airstrip at the north end of Stave Lake, BC. The aircraft landed on the airstrip at 1704, with the pilot in the left seat performing the landing and the PIC in the right seat.

Following a brief time on the ground, the aircraft was restarted and taxied to the northern end of the runway where the pilots performed another engine run-up with normal results. The aircraft flaps were set to 10° and the take-off roll was commenced at 1717, with the PIC flying from the right seat.

The aircraft did not become airborne. When the aircraft was approximately 200 ft from the end of the runway and at approximately 40 mph, the takeoff was rejected. While braking, the aircraft rapidly nosed over and came to rest inverted on the runway. The pilot in the left seat sustained minor injuries and the PIC, who was the pilot flying, was fatally injured. The aircraft sustained substantial damage (Figure 1). There was no post-impact fire.

Aerodrome information

The Stave Lake abandoned aerodrome is located 20 NM north of Mission, at an elevation of 350 ft above sea level (ASL). The gravel airstrip is approximately 2 375 ft long and 50 ft wide, with a usable length of approximately 1 750 ft oriented in a north-south direction (Figure 2). The first 450 ft of the northern end of the runway cannot be used because of vegetation overgrowth, and the last 175 ft of the southern end of the runway is rough ground. There is a line of trees approximately 80 ft high located 300 ft beyond the southern end of the runway. For aircraft departing southbound, the runway slopes up at 1.4° for 770 ft, remains level for 280 ft, and then slopes down at 1.0° for 700 ft.

On the day of the accident, there were numerous areas of grass covering more than half of the runway's width, with much of the grass taller than 8 in. The remaining width, approximately 20 ft of the eastern side of the runway, was rough, loose gravel.



Figure 2: Diagram of the gravel airstrip at the Stave Lake abandoned aerodrome (Source: TSB)

Pilot information

The PIC held a private pilot licence with a valid Category 3 medical certificate and had accumulated approximately 1 200 total flight hours. The accompanying pilot held both a private pilot and a glider pilot licence with a valid Category 1 medical certificate and had accumulated approximately 400 flight hours.

The PIC had been to the Stave Lake abandoned aerodrome at least four times in the two months preceding the occurrence, including three times with the accompanying pilot. Both of them had conducted a successful takeoff and landing on the airstrip 29 days earlier. The investigation determined that it was routine for the PIC to fly this aircraft from the right seat.

Weather information

There is no aviation weather information specific to the accident location. The nearest aviation weather reporting station to the occurrence site is the Abbotsford Airport (CYXX), B.C., which is approximately 27 NM south-southwest of Stave Lake. The aerodrome routine meteorological report (METAR) at the time of the occurrence for CYXX was as follows:

- Winds: 220° true (T), varying from 200°T to 260°T, at 8 kt
- Visibility: 30 statute miles
- Clouds: few at 24 000 ft
- Temperature: 32°C
- Dew point: 16°C
- Altimeter setting: 29.82 in. of mercury

Aircraft information

The occurrence aircraft was manufactured by the Cessna Aircraft Company. At the time of the occurrence, the aircraft had accumulated approximately 4 268 total air time hours. The engine had 40.1 hours' time since overhaul.

On 23 June 2020, an engine compression check and oil change were completed, and no anomalies were noted.

The pilots were carrying a SPOT personal global positioning system (GPS) tracking device on board. Following the accident, the accompanying pilot transmitted a distress message, which was received at 1755.

Aircraft performance

Cellphone videos taken from on board the aircraft recorded the successful takeoff from the Stave Lake abandoned aerodrome 29 days earlier, as well as the rejected takeoff on the day of the occurrence.

The TSB determined that the aircraft was being operated within its weight and balance and centre of gravity limits.

The aircraft's operation manual provides a single performance chart for take-off data, indicating that the take-off distance required with a temperature of 32° C, with the flaps up, and on a hard-surface, level runway would be approximately 1 050 ft. The manual indicates that the shortest take-off roll can be obtained by keeping the aircraft's tail wheel low, but off the ground. The video of the occurrence indicates that the tail wheel remained on the ground throughout the take-off attempt. This is consistent with ground scars on the runway observed by investigators.

The investigation determined that during the previous successful takeoff from Stave Lake, which took place when the density altitude was approximately 1 550 ft ASL, the occurrence aircraft required approximately 1 000 ft to become airborne. During that take-off roll, the aircraft's position on the runway was further to the left (eastern side of the runway) than during the occurrence take-off roll, thus largely remaining on the gravel surface and avoiding the grassy areas.

In the absence of detailed performance data in an aircraft's operation manual, pilots may also use a number of ruleof-thumb calculations to assist in deriving take-off performance data. For example, *From the Ground Up*¹ indicates that on rough, rocky, or short grass (up to 4 in.) runways, aircraft may require an additional 10% of take-off roll. If the grass is taller than 4 in., the performance penalty can be as much as 30%. Additionally, for every 1° of upslope in the runway, a pilot should add 10% to the take-off roll, and at 2° of upslope, the pilot can expect significant penalties to take-off rolls. The investigation determined that take-off performance or calculations were not discussed between the two pilots before takeoff.

The performance criteria for pilots during recreational pilot permit, private pilot licence, and commercial pilot licence flight tests include assessment of the candidate's proficiency to specify a GO/NO-GO decision point to the examiner before the attempted takeoff. Guidance material suggests:

- At 25% of the ground roll to takeoff, the airplane should have achieved 50% of its lift-off speed.
- At 50% of the ground roll, it should have achieved 70% of its lift-off speed.
- At 80% of the ground roll, it should have achieved 90% of its lift-off speed.

Lift-off speed should be reached within the first 75% of the usable runway. If lift-off has not been achieved in this distance, the takeoff should be aborted.

Examination of wreckage

The aircraft systems were examined to the degree possible at the accident site and no indication of a malfunction was found.

Lap belt centre bracket

In July 2011, the occurrence aircraft was fitted with a shoulder harness for each cockpit seat in accordance with supplemental type certificate SA1429GL.² The shoulder harnesses attach to the aircraft's lap belts, which are

¹ S.A F. Mac Donald and Isabel L. Peppler, From the Ground Up (Aviation Publishers Co., Millennium Edition [2000]), p. 274.

² Federal Aviation Administration, Supplemental Type Certificate SA1429GL, Install Aero Fabricators shoulder harness and seat belt assembly as per Aero Fabricators Installation Instructions AF-25, no revision, dated 5 October 1989, or later Federal Aviation Administration Approved Revisions (31 October 1989).

anchored at two locations for each seated position: on the sloped side of the aircraft fuselage and to a common centre bracket (Figure 3) with individual attachment points for each of the two seated positions.

At the time of the occurrence, both occupants were wearing their safety belts. The lap belt and shoulder harness used by the pilot in the left seat were intact and secure. However, the inboard portion of the lap belt for the pilot in the right seat was found detached from the lap belt's centre bracket, which was found broken (Figure 4). The broken centre bracket allowed the PIC to



Figure 3: Lap belt centre bracket on the occurrence aircraft (Source: TSB)

become unrestrained during the accident. During the examination of the wreckage, the investigation noted that the lap belt worn by the pilot in the left seat was twisted where it attached to the bracket, indicating that the pilot in the left seat had been using a portion of the lap belt intended for the right seat occupant.

The lap belt centre bracket was removed from the aircraft and sent to the TSB Engineering Laboratory in Ottawa, Ontario. It was determined that the bracket failed due to shearing overstress during the accident.

This lap belt centre bracket was used in both Cessna 120 and 140 aircraft. During the manufacturing life of both aircraft, the Cessna Aircraft Company issued an engineering drawing change notice in which the bracket material was changed from aluminum alloy to steel alloy, increasing the yield strength of the component by approximately 40%.

Following a 2014 accident of a Cessna 140 aircraft in Parma, New York, U.S., the investigation conducted by the National Transportation Safety Board³ found that the aluminum alloy lap belt centre bracket failed due to shearing overstress during the nose-over accident. This resulted in the pilot flying becoming unrestrained during the accident sequence. The pilot's head contacted the overhead area of the cockpit interior and, as a result, the pilot was fatally injured.



Figure 4: Fracture surfaces on the lap belt centre bracket (Source: TSB)

³ National Transportation Safety Board, Aviation Accident Factual Report of accident ERA14FA327, at http://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/89607/pdf (last accessed 15 January 2021).

Safety messages

In this occurrence, the aircraft was departing from a short runway at an abandoned aerodrome in environmental conditions that would have decreased the performance of the aircraft. This highlights the importance of proactively identifying factors (i.e., runway conditions and density altitude) that can negatively affect aircraft performance, as well as the importance of establishing and committing to appropriate GO/NO-GO points during the take-off run. Similarly, pilots must exercise additional caution when planning to operate an aircraft from surfaces or in conditions not represented in aircraft operation manuals.

Similar to the 2014 accident in the United States, this occurrence shows that without the incorporation of the steel lap belt centre bracket in Cessna 120 and 140 aircraft, failure of the aluminum lap belt centre bracket during accidents may continue, potentially resulting in serious or fatal injuries.

Finally, baggage that is not properly secured may contribute to the severity of injuries sustained by occupants during an accident.

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2021-2022 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
- Canadian NOTAM Operating Procedures
- NAV CANADA Flight Planning
- Transportation Safety Board investigations and reports
- Weather manuals and documentation
- NAV CANADA Blog—Safety

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 5° 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 a 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)

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

Reference: CFS PRO

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

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) Ansv	ver 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) Usin	g the POH (aircraft flight manual), calculate the:
i. ii. iii.	take-off distance required to clear a 50-ft obstacle on departure landing distance required to clear a 50-ft obstacle on arrival Describe your aircraft configuration while conducting both of the above.
l) Desc	ribe the engine failure procedure for your aircraft.
i.	
ii.	
iii.	
m) Desc	ribe the engine fire procedure for your aircraft.
i.	
ii.	
iii.	
Ultra-light-specific 58. What shall every	questions applicant for, and every holder of, a pilot permit—ultra-light maintain?
	Reference: CAR 401.08 (1)
59. The holder of a stude under the permit.	ent pilot permit—ultra-light may act as a PIC of an ultra-light if the flight is conducted and of a person qualified to provide training toward the

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 an 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 A1900026 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 A1900026 (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

2021-2022 Self-Paced Recency Study Program with respect to paragraph 421.05(2)(d) of the *Canadian Aviation Regulations* (CARs).

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 39.

Name: _____

Licence #: _____ Date: _____

Answers to 2021-2022 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	\checkmark	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 XX (ADVISORY), RUNWAY XX IS AVAILABLE"	
"ROGER RUNWAY"			

- 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 100° 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 090° 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 passengercarrying 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.