



Learn from the mistakes of others; you'll not live long enough to make them all yourself . . . **Issue 4/2003**

Pilot Error or Poor Management?

On October 15, 2001, a Piper PA-31 departed Yellowknife, Northwest Territories, at 20:43 on a night IFR charter flight to Fort Liard. One pilot and five passengers were on board. On arrival at Fort Liard, in conditions of moderate to heavy snow, the pilot initiated a non-directional beacon (NDB) approach with a circling procedure for Runway 02. At about 22:33, the aircraft struck a gravel bar on the west shoreline of the Liard River, 1.3 NM short of the threshold of Runway 02, and 0.3 NM to the left of the runway centreline. The aircraft sustained substantial damage, but no fire ensued. Three passengers were fatally injured, and the pilot and two passengers were seriously injured. This synopsis is based on the Transportation Safety Board of Canada (TSB) Final Report A01W0261.

The pilot called the Yellowknife FSS at 18:22 for weather and to file a flight plan. He was informed of an advancing warm front and associated snow. Significant snow was to be expected with the advancing warm front with 5 to 10 cm forecast for the Fort Nelson/Fort Liard area. An analysis of the aviation routine weather reports (METAR) shows that the advancing warm front was close to Fort Nelson at 20:28, where the clouds had lowered to 1100 ft overcast with visibilities of 1.5 SM in snow.

The pilot filed an IFR flight plan from Yellowknife direct to Fort Liard, with Fort Nelson as the alternate, and an expected departure time of 19:00. Passenger delays made him revise his departure twice, first to 19:50, and later to 20:25. On that third call, at 20:08, the pilot queried about the en-route weather. At 20:00 at Fort Nelson, the overcast cloud had rapidly gone from 8 000 ft AGL to 3 000 ft AGL, and the leading edge of the cloud associated with the advancing warm front was somewhere between Fort Nelson and Fort Simpson. It was not known whether the leading edge of the cloud had reached



the Fort Liard area at that time. The FSS briefer advised that if the flight arrived in Fort Liard soon, the weather shouldn't be too bad. The pilot and passengers discussed delaying the flight until the following day; the pilot informed the passengers that he was certified for night flying and that he felt the weather around Fort Liard would be suitable for the flight, so they decided to leave that night.

The Fort Liard weather began to deteriorate significantly at approximately 21:50. A thick cloud band moved over Fort Liard at about 22:00, producing heavy snow showers, and the visibility at the airport should have dropped to $\frac{1}{2}$ to 3 SM in snow with obscured/precipitation ceilings of 500 to 1 200 ft AGL. During the overnight period, 14 cm of wet snow fell at Fort Liard. Witnesses at Fort Liard estimated the ground visibility to be $\frac{1}{2}$ to $1\frac{1}{2}$ mi. in snow at the time of the accident. Deteriorating weather conditions at Fort Nelson were reported to the pilot at 21:52, with a ceiling of 1 100 ft overcast, $1\frac{1}{2}$ mi. visibility in snow and an altimeter setting of 29.86. The pilot's last transmission was at 21:59, when he advised he was crossing the 150° radial of the Fort Simpson VHF omnidirectional range (VOR) at 51 distance measuring equipment (DME).

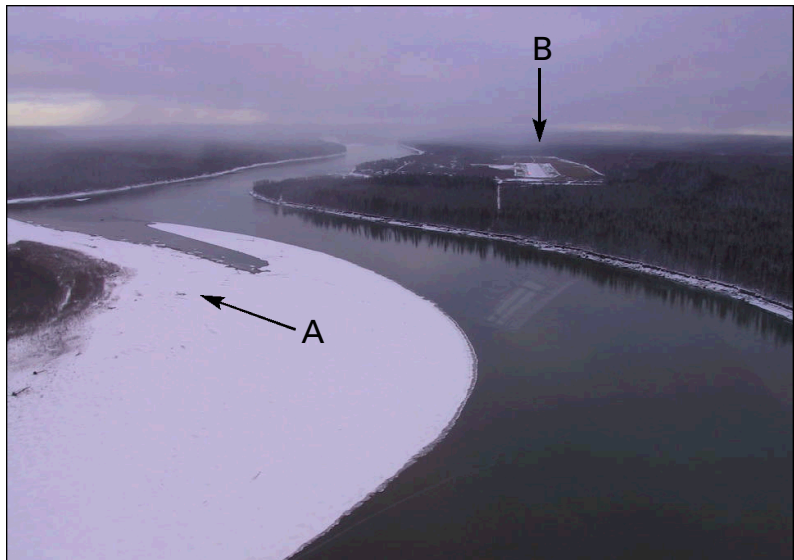
The pilot did not express any concerns and there was no warning of the impending impact. The aircraft contacted the ground in approximately a 5° nose-low and 5° to 10° left-wing low attitude, and remained upright. The impact forces did not significantly compromise the survival space in the cabin or cockpit areas. The pilot sustained severe head injuries and the right seat passenger sustained fatal head injuries due to impact forces. These injuries may have been prevented or reduced in severity had the upper torsos of these occupants been restrained by the available shoulder harnesses.

The Fort Liard Airport is served by a Community Aerodrome Radio Station (CARS), which was closed at the time of the occurrence. A call-out to have an observer could have been made for a fee of \$149.80, but the operator had never requested such a call-out and it is not known if the pilot even knew if the call-out was available to him. As there was no observer on duty, no official weather observation was taken near the time of the accident. As a result, the pilot did not have the Fort Liard altimeter setting, which was later estimated to be at 29.92 or 29.93 at the time of the accident. Both aircraft altimeters were found set at 30.12, which was the setting for Fort Simpson at 20:00. The company approach to Fort Liard did not provide for the use of a remote altimeter setting, and the unauthorized use of the Fort Simpson altimeter setting would have resulted in the altimeter reading being 200 ft too high.

The pilot was properly licensed for the flight but had not completed the required night takeoffs and landings to meet the night recency requirements necessary to carry passengers. While the operator tracked flight duty times, it did not have an adequate system in place to monitor qualifications for specific operations. The pilot was also a young new hire with little experience, and had flown single pilot on a PA-31 passenger-carrying charter only once previously, on a visual flight rules (VFR) flight.

He had logged a total of 1 157 flying hours, with 77 hr on PA-31 aircraft. While his log had 20.3 hr of PA-31 dual, his company's training record indicated he had received only 6.5 hr. Much of the dual time he had logged involved revenue flights that he had flown for familiarization. He had also logged 14 hr of similar "dual" hours with a previous employer. While this experience is valuable for familiarization and the building of local knowledge, it does not qualify as dual time, since revenue flights are not considered training. Therefore, out of a logged total of 127 hr of multi-engine experience, 28 of those hours were acquired as a non-revenue passenger with no crew status.

Several weeks before the occurrence, the pilot, flying as SIC from the left seat, had lost situational awareness during an NDB approach. He flew



Aerial view shows wreckage at arrow A, and intended landing runway at arrow B.

through the intercept for the inbound course, initiated the final descent late, and overflowed the missed approach point prior to reaching the minimum descent altitude (MDA). He continued to descend for some distance past the missed approach point, and possibly past the runway, without the runway in view. He commenced the missed approach procedure on command by the pilot-in-command (PIC). The PIC assumed control and completed another approach and the landing from the right seat. The circumstances of the incident had been related to the training pilot and the operations manager verbally, but may not have been reported at all to the chief pilot. The company took no action following the incident.

The pilot may also have suffered from fatigue after a long duty day. His authorized 14-hr duty day ended at 20:00. If the 14-hr period includes a rest period, the flight duty time can be extended by one-half the length of the rest period, up to a maximum of 3 hr. The pilot was provided with a day room in Yellowknife to rest from 14:00 to 19:00. During this 5-hr rest period, the pilot was observed eating in the hotel restaurant between 14:10 and 14:40, and he made at least two phone calls, one at 16:00 and one at 18:22. The performance of a night, non-precision, circling approach in instrument meteorological conditions (IMC) at the end of a long and extended duty day would have commanded a high degree of skill, attention, and task loading. Whether his "rest" was sufficient to offset the effects of acute fatigue remains questionable.

The company management team comprised an operations manager and a chief pilot, both of whom were on leave at the time of the occurrence. The company operations manual required that, when either the operations manager or the chief pilot was absent, another qualified person was to be appointed to the position. According to the TSB report, no other qualified person was appointed to manage the operation, and with both managers



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absent, this very inexperienced pilot was left in a self-dispatch mode.

A circling procedure is a visual manoeuvre, after completing an instrument approach, to position the aircraft for landing on a runway not suitably located for a straight-in landing. The A.I.P. Canada identifies four typical circling manoeuvres that will ensure the aircraft remains within the protected area while conducting a circling approach. The pilot is required to keep the runway in sight after initial visual contact, and to remain at the circling MDA until a normal landing is assured. However, the TSB determined that the operations manager favoured a non-typical teardrop circling procedure to Runway 02, which required the pilot to fly over the airport on a heading reciprocal to the runway heading, and then carry out a teardrop procedure and return to the airport. This effectively ensured the pilot would be unable to maintain visual reference of the runway, as required during a circling approach.

Conclusion—Although the operator's management structure appeared to have all the resources in place to provide operational guidance and support, there were deficiencies in its application and as a result did not adequately manage the operational risks. This was indicated by the absence of those responsible for operational control, who could not monitor the developing weather, and the flight being dispatched as single-pilot despite the pilot's limited experience and his demonstrated weakness in non-precision IFR skills in the recent past. The chief pilot was responsible for ensuring the pilot was qualified before being assigned to an aircraft, but the pilot was not qualified. The operator did not track qualifications for specific operations, and recommended the use of a non-typical circling procedure. The pilot was either unaware that the CARS operator could be recalled, or had learned that it was company practice not to recall the CARS operator after hours. Regulations required the pilot to obtain a current altimeter setting; on the accident night this failure resulted in a 200 ft altimeter error. He should have witnessed and been trained on how to recall the CARS operator. These deficiencies in the safety management of the company could have been identified through a more effective safety management system. This is a systemic accident that resulted in controlled flight into terrain (CFIT). This young pilot should not have been placed in a situation where he had to self-dispatch on a single-pilot night IFR flight. For this reason, the operator failed him, and failed the passengers. △

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See Fit to Make It—Another Classic

On December 31, 2001, at 13:17 mountain standard time (MST), a Cessna 172N with a pilot and three passengers on board departed Fort Good Hope, Northwest Territories, on a return flight to Tulita, via Norman Wells. The aircraft did not arrive at Norman Wells and a search was initiated at 15:00 MST. Due to environmental conditions, the wreckage was not found until the afternoon of January 2, 2002, 30 NM south of Fort Good Hope at the 1 100-ft level of a 1 400-ft mountain. The right front seat passenger was fatally injured by the impact. The pilot and rear seat passengers survived the impact with non-life-threatening injuries, but succumbed to hypothermia. This synopsis is based on the Transportation Safety Board of Canada (TSB) Final Report A01W0304.

The planned flight was from Tulita to Norman Wells, then to Fort Good Hope, and a return to Tulita via Norman Wells. There are three main routes normally flown between Norman Wells and Fort Good Hope (see illustration): a direct route along the airway with a minimum en route altitude (MEA) of 5 300 ft, a “river route” along the Mackenzie River, and a “winter road route”, which follows the road between Norman Wells and Fort Good Hope. These last two are longer and to the west of the direct route, but are preferred during marginal weather conditions. The winter road route crosses higher terrain than the river route, but it has more emergency landing areas. The river route traverses the lowest terrain of all; however, pilots frequently have problems in winter with low visibility when fog fills the valley around the open water at the Sans Sault Rapids.

The pilot checked the weather and departed Tulita at approximately 10:00 MST. On arrival to Norman Wells, the weather was below VFR conditions and the pilot requested and was approved for a special VFR (SVFR) arrival; he landed at approximately 10:20 MST. The pilot entered the Flight Service Station (FSS) for a weather update, but before the briefing was complete, he left to supervise the refueling. Meanwhile, another Cessna 172 departed Norman Wells under SVFR for Fort Good Hope. This aircraft returned after following the winter road for about 15 NM; this pilot issued a pilot weather report (PIREP) stating that the visibility and ceiling were decreasing to treetop level, and that the airframe and windshield had picked up a layer of ice. The pilot of the C-172N received the PIREP as he was departing Norman Wells, but decided to proceed anyway and left under SVFR for Fort Good Hope. The aircraft passed each other a few miles west of Norman Wells on the north side of the winter road.

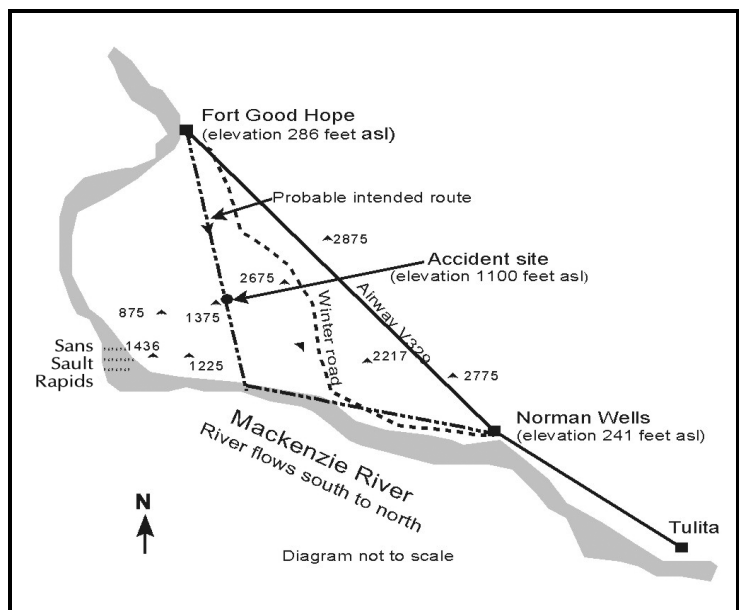
As expected, the pilot encountered marginal weather conditions en route and reportedly attempted different routes through the high ground along the winter road. He diverted to the river route, and the aircraft finally arrived in Fort Good Hope 30 min late. On landing, the air-

craft was observed to have about 1/2 to 1 in. of ice on the leading edges of the wings and tail surfaces, and about 1/2 in. of ice on the windshield.

The forecast for the period called for patchy broken stratocumulus cloud based at 1 500 to 2 500 ft ASL, topped at 6 000 ft. It also called for local ceilings of 500 ft AGL, with intermittent visibilities of 2 to 6 SM in light snow showers and local visibilities of 1 SM in mist. The icing, turbulence, and freezing level forecast predicted local moderate mixed icing in stratus, otherwise light rime icing in cloud. A cold front situated on an east-west line north of Fort Good Hope at 11:00 MST was moving southward at 10 NM per hour. The 09:00 METAR for Norman Wells included an overcast ceiling of 400 ft AGL, while the 09:00 METAR (corrected) for Fort Good Hope included light snow showers, overcast ceiling at 1 100 ft and frost on the indicator.

On arrival at Fort Good Hope, the pilot entered the CARS at the airport, but did not consult the operator or PIREPs for a weather update. He telephoned the company base at Tulita and filed a flight itinerary with another company pilot for the return trip to Tulita, remarking that the weather en route was marginal, and that his plan was to follow the river (“IFR”). The pilot was aware that another pilot had departed VFR from Fort Good Hope and returned because of adverse weather conditions, and he discussed the possibility of aborting or delaying the flight.

The pilot then removed ice from the aircraft, the three passengers boarded the aircraft, and the pilot started the engine and taxied out for departure. As he was taxiing, he received a call from the pilot of a Douglas DC4 on approach to Fort Good Hope, advising him of IFR conditions in Norman Wells and icing conditions en route. He acknowledged the information from the pilot of the DC4 and departed Fort Good Hope at approximately 13:15 MST. The aircraft was not certified for flight in known icing



conditions. Examination of the wreckage showed that the aircraft struck the mountain in straight and level flight at low speed, and fell about 50 ft down the slope where it became entangled in trees. A layer of rime ice was evident on the wing struts.

The pilot was certified and qualified for the flight and had a current instrument rating. He had a total of 650 hr flying time, with about 460 hr on type, and he had flown to Fort Good Hope 11 times in the previous months. He had completed the contaminated surfaces examination, which acknowledged the requirement for an aircraft to be equipped and certified for flight into icing conditions. The company operates on the pilot self-dispatch system. It stated that there was no urgency for the flight or pressure on the pilot to undertake any portion of the flight. The passenger from Fort Good Hope to Tulita was an entertainer who was to perform at a New Year's Eve party that evening.

Analysis—The location of the accident site suggests that the pilot had flown directly south from Fort Good Hope to intercept the river valley upstream of Sans Sault Rapids, bypassing the rapids. Based on the information gathered, it is probable that the pilot encountered icing conditions and reduced visibility in snow showers or cloud. Since the wreckage remained intact and three of the occupants survived the direct impact with non-life-threatening injuries, the pilot was most likely flying at low airspeed. Perhaps he was intentionally flying slow and low in an attempt to maintain or regain visual reference with the terrain. The cruise flight configuration and the straight and level aircraft attitude at impact are consistent with a CFIT accident.

The pilot's limited experience was adequate to understand the associated risks and implications of

operating the aircraft in these adverse weather conditions. He had flown numerous times in the area and was familiar with the terrain and the main and alternative "IFR" routes between Tulita and Fort Good Hope. Under the company's self-dispatch system, the pilot was responsible for determining whether the flight could be conducted safely. As there was no urgent requirement to complete the trip, it could not be determined why many of the decisions made by the pilot were not consistent with his training or accepted practices and airmanship, such as the following:

- he departed Norman Wells with a SVFR clearance when a current PIREP described en-route weather conditions as being below VFR limits, with known icing conditions;
- he persisted in attempting passage along the higher ground of the winter road instead of returning to Norman Wells;
- he entered the CARS but did not update weather information, despite adverse conditions;
- he disregarded information and advice from experienced pilots prior to departure from Fort Good Hope; and
- he landed at Fort Good Hope with a considerable amount of airframe icing, removed the ice, then departed back into known icing conditions.

The TSB concluded that the pilot flew into known weather and icing conditions, for which the aircraft was neither equipped nor certified, when there was virtually no chance of completing the flight safely and in accordance with associated regulations. The pilot flew into the side of a mountain for reasons related to ice accumulation and/or reduced visibility in snow showers or cloud. △

The NEW Transportation Appeal Tribunal of Canada (TATC)

The TATC was established in June 2003 and replaces the Civil Aviation Tribunal, which was established under Part IV of the *Aeronautics Act* in 1986. The TATC is a quasi-judicial body created to provide an independent review process of administrative and enforcement actions—including the suspension and cancellation of licences, certificates and other documents of entitlement, and the imposition of administrative monetary penalties—taken under various federal transportation acts. The Tribunal's jurisdiction, extending to the rail sector, is expressly provided for under the *Aeronautics Act* and the *Railway Safety Act* (section 2 of the *Transportation Appeal Tribunal of Canada Act*). The Tribunal reports to Parliament, and its key feature is its independence from any government department.

In accordance with the *TATC Act*, the Governor in Council has appointed a full-time Chairperson and a full-time Vice-Chairperson of the Tribunal. The other members of the Tribunal are drawn from across Canada and are appointed as full- or part-time members by Order in Council on the basis of their expertise in relevant transportation sectors and in medicine. The Chairperson has supervision over, and the direction of, the work of the members and staff of the Tribunal. The Tribunal provides a system within which hearings can be scheduled and conducted promptly, fairly and informally.

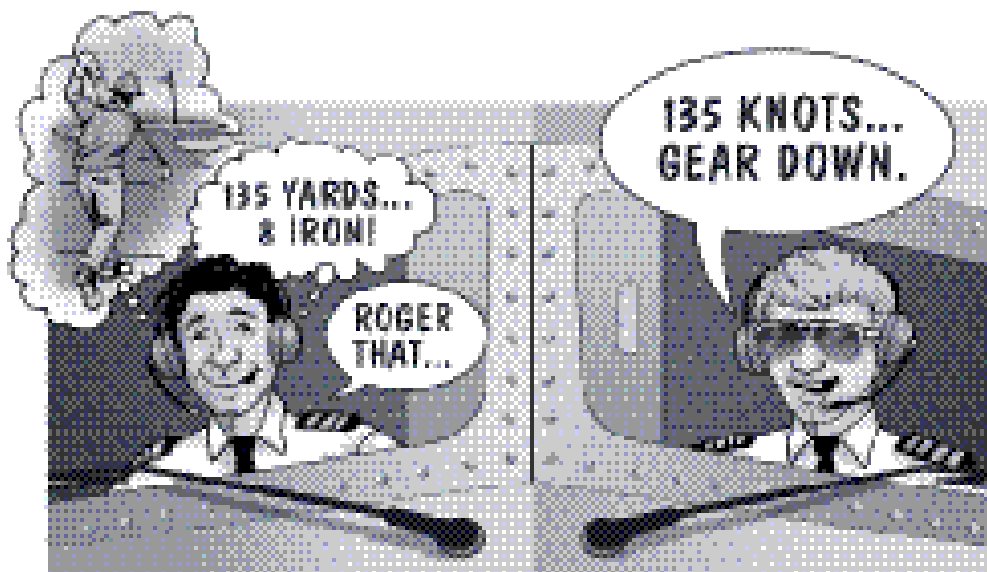
Any person who has been given notice of a decision by the Minister of Transport to suspend, cancel or refuse to issue or renew a document of entitlement, or to impose an administrative monetary penalty, may request a review hearing by the Tribunal. A request for a review must be filed in writing with the Tribunal, on or before the date specified in the notice, to arrange for a review hearing. For more details on TATC and how to submit an application, contact the TATC Registry at: The Transportation Appeal Tribunal of Canada, 333 Laurier Ave. W, Room 1201, Ottawa ON K1A 0N5; fax 613 990-9153; e-mail: cattac@smtp.gc.ca. △

Selective Hearing...Does it affect us?

I experience it from time to time...my three young kids, fastidiously absorbed in front of the tube by some second-rate cartoon show—they are experts in selective hearing. Seemingly paralysed, they somehow always manage the no-look bowl-to-mouth popcorn move. Such wasted talent, for which I feel mostly responsible, doesn't seem to agonize them as much as it does me. While ostensibly in lala-land, their little grey cells remain focused on two things: first, the business at hand (the show), and second, filtering-out superfluous voices (parents) asking for irrelevant and unimportant information (homework, cleaning-up, etc.). Detection of such a voice triggers silence and stillness—maybe it will go away...just like playing dead if you encounter a bear.

While most won't relate to the above scenario, it should come as no surprise that pilots are also experts at selective hearing. In fact anyone who has a spouse or partner—a condition that allows endless opportunities to hone one's selective hearing skills—can experience it. To simplify it, let's just say that selective hearing is the process by which we elect either to only "hear" or to conscientiously "listen." Nothing new here, right? Well, without probing further into human factor theory, let's just point out a few situations where pilots can fall victim to selective hearing in an operational setting.

- **Mission briefing.** While we pilots are allegedly smart individuals, we sometimes fall victim to complacency when hearing repetitive tasks, particularly coming from the same person or under a familiar set of circumstances. For example, if the dispatcher or chief pilot says, "...by the way the hook release is u/s..." in between routine sentences, this detail can be missed (or quickly forgotten).
- **Weather briefing.** Some pilots often tend to hear what they want to hear during a weather briefing. That is, they don't want to hear about low clouds, low visibility, icing and particularly the term "not recommended for VFR flight." If you have the attention of a bona-fide weather briefer, acknowledge it by giving him or her your full attention (including a weather briefing on the telephone), and listening attentively to what is being said. My personal experience is that you cannot effectively interpret an aerodrome forecast (TAF) or METAR with your head down, and simultaneously listen to a weather briefing.



Daydreaming can seriously affect crew communication.

- **Radio watch.** That is a huge one, and many of you have told me how difficult you find it to be an effective radio operator, whether it's talking to controllers, flight service specialists or other pilots. If you are usually nervous about radio communications, you may want to practice with a friend over the phone, or even just across the table from each other. The emphasis has to be on being attentive, and asking for clarification every time you are unsure. Minimize cockpit chitchat in or near busy areas. Exchanges between you and controllers or flight service specialists are obviously important, and nobody will ever criticize you if you ask for a repeat. Listening carefully to a taxi instruction or an IFR clearance is an integral part of having your name on that license.
- **Crew communication.** This is an essential element of Crew Resource Management (CRM). Active listening is a crucial requirement for any pilot involved in a multi-crew environment, which may include other pilots, flight attendants, flight engineers, etc. Suffice it to say that as soon as you have more than one crew aboard your aircraft, you must be ready to effectively address any communication with the rest of the crew. If you are the only crew aboard and you have passengers, you should be ready to do the same when communicating with the passengers.
- **Active listening.** This includes actively listening for things such as aircraft system malfunctions, bells, horns and simply "weird noises." In particular, many pilots who forgot to lower the landing gear handle have interpreted the landing gear horn on short final as a stall warning horn or low altitude horn, with a predictable result. Let's shoot for a season free of gear-up landings. △

Recreational Aviation

Serge Beauchamp, Section Editor

Buying an Ultralight Airplane—Part I

by Inspector Martin Buissonneau, Recreational Aviation, Flight Training Standards, Transport Canada, Quebec Region

Part I

Since certified airplanes are often prohibitively expensive, many pilots are turning to ultralight airplanes to make an old dream come true or to explore a new passion. Here is a short guide to help you if you plan to buy an ultralight airplane.

What are your needs? What will be the main purpose of the airplane? For example, for some people, the airplane will be mostly used for local flight, while others will want to use it for cross-country flights. Your answer will help you define your needs. There are different types of ultralight airplanes: three-axis flight controls, similar to those found on a conventional airplane, powered hang gliders and powered parachutes.

Powered parachutes (and powered paragliders) are included in the category of ultralight airplanes. To fly this type of aircraft, you need a valid medical certificate and at least an ultralight airplane pilot's permit [*Canadian Aviation Regulation (CAR) 401.03(1)*], which may be restricted to powered parachutes. In addition, the airplane must be registered (CAR 202.13) just like any other ultralight airplane.

These three types of airplanes are flown in very different ways, and do not all require the same amount of physical effort. If you have always flown the same type of ultralight airplane and decide to buy a different type, it is highly recommended to get some in-flight training from an instructor who is experienced on the new type of airplane.

Here are some pointers that might help if you plan to buy your first ultralight airplane. They are not necessarily arranged in order of importance, and some of them are intended to make you think and do some research before you buy. This list is not exhaustive; other items could be added to it, and the items that have been mentioned could be expanded.

Airplane characteristics: general airplane performance, particularly on takeoff and landing (on hard or grass surface, etc.); hourly fuel consumption (some manufacturers now provide a chart showing the percentage of power used and the hourly fuel consumption at a given altitude); payload; crosswind limitations (you should take into account your abil-



ity to control the airplane in a crosswind because it may be lower than the airplane's capacity); manoeuvrability in turbulence (relative to the airplane); good visibility (depending on your height); fewest possible blind spots; on-board stowage space for your personal effects; conventional or tricycle landing gear, depending on the terrain; possibility of installing floats, and availability of skis manufactured for the airplane in question (for use in snow-covered take-off and landing areas). If the ultralight airplane will be used for cross-country flights, an enclosed cockpit, or at least some protection from the elements, given Canada's climate, will increase your comfort and make it easier to use navigational charts. Also, with an airplane that has an enclosed cockpit, an adequate heating system will make it possible to fly in cold weather for a longer period of time. Another factor that should be taken into account, depending on the environment in which the flight will take place, is propeller and engine noise.


Power plant characteristics: engine reliability; ease of maintenance and availability of original parts; manufacturer-approved maintenance shop in the area where the airplane will be used; possibility of outfitting the airplane with a two- or four-stroke engine; dual ignition (and the safety it provides); a gear- or belt-driven reduction gear system; propeller (type of material used in construction, number and pitch of blades).

Other equipment: two-way radio, braking system, flaps, a strobe light that is clearly visible by other aircraft, and a ballistic parachute system.

Other considerations: You should consider storing the ultralight airplane in an enclosed hangar, protected from sunlight and bad weather. If you already have adequate shelter, check the interior dimensions to make sure that it will fit inside, before you buy the airplane. By the way, some ultralight airplanes come with folding wings. Since liability insurance is mandatory under CAR 606.02, it would be wise to read up on the terms and

conditions of this kind of insurance before you buy. If you lack experience with the type of airplane you plan to buy, it is important to get some training from an instructor who has experience with that type.

In Part II, we will discuss carrying passengers and whether to buy a new airplane or a used one. We suggest that you keep this article, as well as the second part, which will appear in the next issue of the *Aviation Safety Letter*, so that your checklist is complete.

Happy flying. 

Accident Reports

This section contains reports on accidents and incidents involving recreational aircraft. The purpose of these reports is to inform you about the circumstances that led some of our fellow pilots to deviate from their flight plan, in some cases with tragic results. The information provided here is based on reports published by the Transportation Safety Board of Canada.

British Columbia—Chinook Birdman—Always check the propeller drive belt for wear.

The aircraft appears to have stopped climbing at an altitude of about 200 ft, even though the engine throttle had been set to maximum power at takeoff. A forced landing followed, causing damage to the airframe. The pilot, who had logged only six hours of flying time since the start of the year, believes that the loss of pulling power from the propeller was caused by insufficient tension in the belt connecting it to the engine. This belt had been in service for seven years. During the pre-flight inspection, the pilot had checked this mechanism and found that he could displace this belt by about $\frac{1}{8}$ in. by applying 10 lbs of pressure at a specific point. After the forced landing, the pilot checked the belt's displacement again and found that it was between $\frac{3}{4}$ and 1 in. Rubber dust was visible under the lower pulley of the belt mechanism, indicating that the belt had been subjected to rubbing and premature wear. Once the aircraft had been brought back to the hangar and the propeller drive mechanism had cooled down, the belt tension was checked again, and the displacement had returned to $\frac{1}{8}$ in. In preceding flights, the ambient temperature had been low, which was surely what had prevented the belt from slipping in the drive pulley mechanism. Pilots of ultralight aircraft equipped with Rotax engines recommend that this belt be replaced approximately once every 8 to 10 years. The pilot in question has decided to replace this belt every two years from now on, as a safety precaution. After this incident, he said that he should have paid attention to the sound of his engine during takeoff, because the problem with the belt likely caused the engine to run louder than usual. If the pilot had noticed this noise, then cut the engine power back, he might have been able to keep flying longer and return to his departure point without incident. Inspector

Pete Firlotte, of the Prairie and Northern Region, reminds readers that belts adjust themselves when necessary and sometimes sag and weaken with age, so that they can no longer do their job as well as before—just like some pilots. It is far better to replace a belt at regular intervals than to have to make a forced landing!

Quebec—Motorized paraglider—Unapproved modification.


The student pilot had motorized his paraglider by adding an engine and propeller, but because the surface area of the paraglider wing was not designed for this additional weight, the aircraft became harder to control. An instructor who was making a pleasure flight in the area saw his student who, unbeknownst to him, was preparing to take off. A few minutes later, the instructor saw that the student had taken off and had put his aircraft into a spiral at an altitude far too low for this manoeuvre. The instructor made several attempts to contact the student by radio to advise him of the risk he was running and to tell him to land immediately, but in vain; the student pilot never responded. The aircraft crashed in a field not far from where it had taken off, and the student pilot did not survive the crash.

To build aircraft that meet very specific flight requirements, manufacturers spend thousands of hours designing and testing their components and systems. When you make modifications to your aircraft's structure or control systems, you run a high risk of compromising its structural integrity and your own safety. Your aircraft's flight characteristics are closely determined by its original components, and it can be dangerous or even fatal to modify them. If you do so, you and your aircraft become an experimental system, subject to all the difficulties that this entails. Do you really think that you are qualified to be a test pilot?

Alberta—RAF 2000 Gyroplane—Let's stick to approved manoeuvres!

The pilot had qualified as a gyroplane instructor and had logged many, many hours of flying time on this type of aircraft. He had assembled his new gyroplane himself and was about to make his first flight. The weather was clear, and the takeoff went without a hitch. After making a few manoeuvres in the airport circuit, the pilot decided to make a high-

speed pass. At that precise moment, witnesses on the ground heard a muffled noise and saw the aircraft break apart in the air. The pilot lost his life. The cause of this accident is hard to determine, but the high-speed pass may have imposed an excessive load on the airframe, causing a major failure of its components. As you can see, in some cases, one overload is all it takes to cause an accident, even with a

brand-new aircraft. So make sure to always comply with the manufacturer's specifications. How long has it been since you reviewed the flight manual for your aircraft? Can you state with assurance that you are familiar with all its contents? Do you perform a weight and balance analysis regularly, or only following a good scare? 

Stall-spin Accidents, Follow-up from ASL 1/2003

by Alain Gauthier, Engineer-Physicist and pilot


I read your publication very conscientiously and always find ample food for thought. The article *Stall-spin Accidents May Be Hazardous to Your Health* caught my attention, and I would like to stress some aspects of it. All pilots, of course, have their own store of knowledge and experience, and they have to form their opinions from their own backgrounds and broaden their performance envelopes...but, if we do not study ourselves, nature will teach us by example. *Identical aircraft? An ideal...* Certified aircraft are issued a type certificate. In theory, all such aircraft should be identical, but pilots know that every aircraft has its own personality at any given moment. In a critical flight situation, the smallest of these differences counts.

Wing condition: All industrial production tolerates a margin of error. Wings of the same type are therefore all slightly different. What is more, the average angle of incidence and dihedral are not necessarily identical on both the left and the right. Their weights also vary. And even if two aircraft were identical to begin with, their operating lives will change them in different ways (fatigue, overloads, turbulence, dirtiness of their lifting surfaces and so on).


And lift beyond — $V^2/2$: Stalling occurs on the upper wing, reducing the lift component due to the Venturi effect, but increasing the angle of attack tends to increase the pressure on the lower wing. Total lift is therefore the algebraic sum of the forces on the bottom AND the top of the wing. The top may contribute as much as three quarters of the total lift, and, without its contribution, the aircraft cannot maintain steady level flight, unless it has the necessary power (F-18), and controlled flight becomes harder and harder to sustain.

Stall and spin: The rudder can help to maintain control in slow-flight or stall situations because it can speed up one wing and slow down the other. At the stall limit, therefore, kicking in rudder can restore lift on one wing while increasing stall even more on the other. The upshot is that the pilot has given the aircraft a very effective way to turn round on itself. *Speed and spin:* Stall and spin certainly go hand in hand, but bear in mind that it is not the aircraft that stalls, but the wings. Here are two cases that are often linked.

First case: Like every Canadian pilot, I was initiated into spin. Demonstrating spin from V_S is often not clear, because the controls are ineffective in this situation. To counter this, I begin in slow flight—about $1.2 V_S$ —but I do not have to wait to stall. In the classic manoeuvre, yanking back the column and kicking in rudder produces a very clear stall on one wing while the other gains lift. The moral is that one stalled wing is enough to start to spin! So, I feel that spin is always lying in wait when turning on short final, virtually in slow flight, even if the aircraft has not stalled.

Second case: We were told again and again that you have to make shallow turns in the circuit, but...you gradually forget what you were taught about the load factor "g." I think it is important to explore our own performance envelope with our aircraft. During basic training, I learned to make 45° turns at $1.2 V_S$. The first time was somewhat daunting: it required a load factor of 1.41 g, and, at $1.2 V_S$, the limit is 1.44 g (not good at low altitude). Yet, some pilots attempt this manoeuvre at 100 m while turning on final... 

Medical Certificate—Ultralight Pilots

During recent investigations of a number of ultralight aircraft accidents, it was discovered that some pilots did not have a valid medical certificate. Ultralight pilots are required to hold a valid medical certificate when exercising the privileges of a pilot permit. Medical certificates for ultralight pilots are valid for a 60-month period and must be renewed thereafter. As a reminder, the monetary penalty for a first offence is \$1000; it increases with any subsequent offences. Holders of a pilot permit—ultralight aeroplane may renew their medical certificate by completing the medical declaration form located at the following Web site: <http://www.tc.gc.ca/civilaviation/general/personnel/26-0297.pdf> and forwarding it to the nearest Transport Canada Civil Aviation office for processing. For more details, contact your regional Transport Canada office. 

Accident Statistics: Amateur-built, Ultralight Aeroplanes and General Aviation Aircraft

Accident statistics may be thought of as a measure of our ability as pilots to use our skills to conduct safe flights. Flying last year was safe—3 730 000 hours of flying yielded an occurrence rate of only 26.9 for each 100 000 flying hours. The Transportation Safety Board (TSB) publishes yearly statistics on all modes of transportation in Canada, and it was pleased to report a decrease in occurrences for the year 2002. The level of flying activity did decrease by 3 percent, but a 1 percent drop in occurrences overall is significant. Can we do better? Yes, if we as pilots are diligent, serious, healthy, conscientious, intelligent and above all, safety-minded.

A lot of people wonder year to year about the accident rate for small aircraft. Many of them still revel at the thought of piloting their own aircraft, and who can blame them? We live in a world that allows us to leave behind all earthly bonds and enjoy the wonders

and beauty of nature from a bird's eye view. I believe that almost everyone recognizes that it is somewhat of an engineering feat to apply and coordinate the multitude of distinct physiological and intellectual abilities to carry out a flight. However, it comes with the profession.

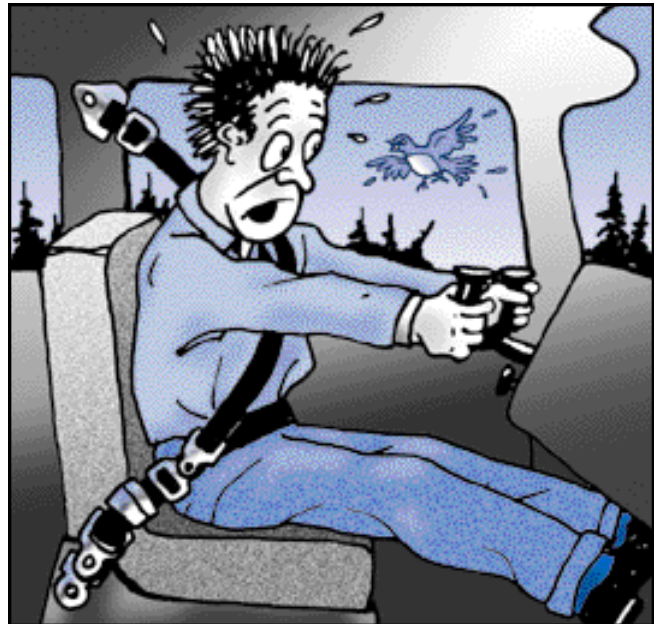
About half of the 139 occurrences involved privately operated aircraft, and of those, 13 were fatal. Flying schools and flying club aircraft are included in this calculation. Canadian-registered ultralight aircraft accidents totalled 36, and of those, 9 were fatal in which 12 lives were lost.

What is the secret to safe flight? Ask yourself these questions: Could I do better with my flight planning? Am I in a rush each time I go flying? When was the last time I took a refresher course? Am I afraid to be tested by an instructor? Remember, safety is no accident; it must involve careful planning. ✈️

Shoulder Harnesses Can Save Your Life

One third of general aviation accidents deemed survivable end in fatalities because the pilot and passengers did not wear their shoulder harness. These accidents are usually caused by a loss of power, and occur most frequently during the take-off or landing phase. In many cases, the forces created at impact are insufficient to cause death. The fatality results when the body collides with the instrument panel or other parts of the cabin. It is distressing when you think that the simple use of a shoulder- and lap-belt assembly could considerably reduce the risk of fatalities.

Most people will agree that the lap belt is important during takeoff and landing and when there is an encounter with turbulence, but few recognize the importance of wearing the shoulder belt during the most dangerous phases of flight—takeoff and landing. Wearing the shoulder belt is the best insurance against injury should there be an abrupt end to the flight. Every aircraft should have shoulder harnesses installed. It is just as important as having an airworthy aircraft. You should inspect them for wear regularly and ensure that they always function properly. Check the fabric of the belts regularly, especially where it contacts the metal guides and metal locking mechanisms, and forward the assembly to the manufacturer for repairs at the slightest hint of tear or a frayed section. Any damaged area will reduce the assembly's design strength and may be responsible for serious injury



in case of a mishap. As pilot-in-command, make sure that the preflight checklist requires that the crew and passengers have their shoulder harness fastened before takeoff and landing. If your aircraft does not have shoulder harnesses, you should have them installed as soon as possible. They do not interfere in any way with your duties, but are the best insurance policy you can have in case of an accident. Be safe—always. ✈️

COPA Corner: Why Do a Walk Around?

by Adam Hunt, Canadian Owners and Pilots Association (COPA)



I recently received a question from some low time pilots. They reported several instances where experienced pilots have jumped into their plane and flown away without doing a pre-flight inspection. They wondered if pre-flights are something worth doing, or if they are just exercises for student pilots?

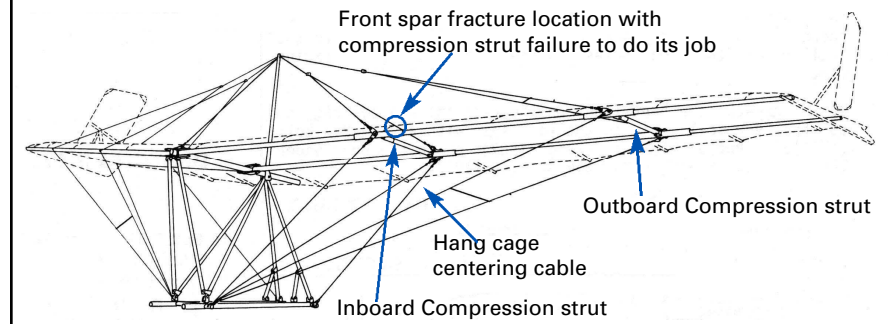
Of course most of the time the aircraft has sat, untouched, since its last flight. But an oil leak may have developed, or someone may have done some “hangar rash” to the plane. In some cases, a thief may have siphoned out all the fuel, except a few litres. That could be a surprise on take-off! Pilots have taken off with external control locks in place, or with concrete blocks tied to the tail. It is very important to do a complete pre-flight inspection before every flight.

One of the most important times to do a careful pre-flight inspection is when the aircraft has been through maintenance or when it has just been reassembled after being transported. This story shows just how wrong things can go, for lack of a pre-flight inspection. The worst thing is that the same accident has been repeated more than once, always with the same fatal results.

Even though this story involves a particular aircraft type, the Pterodactyl Ascender ultralight aircraft, the lesson learned is universal. These car-top transportable aircraft are often kept at home and then assembled prior to flight at the airport.

There were original manufacturer’s investigations following up the official investigations of several early 1980s accidents where a leading edge spar failed in flight, with no other aircraft components failing. In all cases the results were fatal.

Pterodactyl Wing Spars, Struts and Rigging



The official investigations listed these accidents as “Undetermined,” but the follow-up factory investigations found the answers. In each case the spar failed just outboard of the inboard spar sleeve junction, where the inner set of rigging cables joins the spar. The spar failed upwards and twisted as it failed, giving a very distinctive signature to the failure.

These spar failures all had the same signatures and the same causes—the inboard compression strut had failed to do its job. Each wing has two compression struts. The compression struts are designed to keep the front and rear tubular spars apart and also to take the wing’s inter-spar compressional forces. Without the inboard compression strut in place, both spars will move together until one breaks. The rear spar is prevented from moving forward by the hang cage centering cable, so the front spar is the one that fails.

There are several reasons why the compression strut can fail to do its job. The compression strut mounting brackets, the bolts or the compression strut itself could fail. There are no recorded instances of the failure of any of these parts. In all accidents investigated, the parts mentioned above were undamaged. The most likely reason for these accidents is that

the compression strut was not secured during assembly of the aircraft.

Pterodactyl Ascender ultralights are designed for quick disassembly and reassembly and the compression strut is provided in two parts, joined by a sliding bolt lock. If the two compression strut parts are not connected during assembly, or the bolt lock is not slid into place, the result will be a spar failure in flight. The requirement to check this item is clearly outlined in the *Pterodactyl Builder’s Manual*. The Pterodactyl wing sail is provided with four zippers for just this pre-flight item.

The key defence against these kinds of spar failures is a good pre-flight inspection. Special care should be taken to inspect these after the aircraft has been re-assembled or has undergone maintenance affecting the compression strut area.

Your aircraft doesn’t have to have “quick disconnect” style compression struts to have critical pre-flight inspection items. All aircraft have items related to control locks, tie-downs, fuel, oil and other fluids plus many damage-sensitive, structural and control-related areas that must be inspected before each flight.

Do you really need a pre-flight inspection before you fly any type of aircraft? You bet your life you do! △

Slush on the Runway and What it Does to Aircraft Performance

by Gerard van Es, Senior Research Engineer, Flight Testing & Safety Department, National Aerospace Laboratory NLR, The Netherlands

Analysis of accidents that occurred in the last 20 years has shown that the risk of overrunning the end of a slush- or water-covered runway is about eight times higher than on a dry runway. The hazardous effect of slush on aircraft field performance was first brought into prominence after an accident involving a BEA Airspeed Ambassador aircraft, in which 23 people were killed, in Munich in 1958. The introduction of tricycle undercarriages and higher operating speeds of modern aircraft in the late 1950's were associated with this new hazard to aircraft operations. In the early 1960's, investigations on the effects of slush were carried out in the United States, the United Kingdom and France. Tests were conducted using catapult-driven test carriages as well as full-scale aircraft. These early tests gave a clear picture of what slush does to an aircraft that takes off or lands. It was found that the acceleration during takeoff was reduced due to an increase in total drag acting on the aircraft. This increase in drag was caused by the tires displacing the slush and the impingement (interference, intrusion) of the spray of slush on the airframe thrown up by the tires. It was shown that the additional drag increased with increasing slush depth. It was also discovered that there was a considerable possibility of loss of engine power, system malfunctions and structural damage due to spray ingestion or impingement. Furthermore, the problem of very low braking friction between the tires and surface was identified in which aquaplaning of the tires plays an important role. The problem of slush is more acute for aircraft with turbine engines than for aircraft with piston engines because of the higher operating speeds and increased susceptibility to ingestion and impingement due to geometrical characteristics of aircraft with turbine engines.

Let us have a look at some typical numbers with respect to the effect of slush on take-off performance. Just 13 mm (0.5 in.) of slush can subject a large jumbo jet to a drag that is equal to approximately 35% of the thrust of all its four engines. This number increases to 65% for 25 mm (1 in.) of slush, making it impossible to take off. In general, for a multi-engine transport aircraft, just 13 mm (0.5 in.) of slush can increase the take-off distance by some 30–70%.

Slush can have an adverse effect on the landing performance. Braking friction can be low because aquaplaning is likely to occur on slush-covered runways. This will increase the landing distance compared to a dry runway. Although it sounds strange, a thicker layer of slush can be better than a thin layer because the drag from the slush helps stop the aircraft. The more slush you have on the runway, the higher the drag on the aircraft. This also applies to rejected takeoffs and can lead to



strange performance restrictions when taking off from slush-covered runways. For instance, more slush can give lower take-off weight penalties.

What about regulations for operating on slush-covered runways? In 1992, the Moshansky Commission of Inquiry into the Air Ontario crash at Dryden, made several recommendations regarding operations on contaminated runways. The commission recommended that Transport Canada should require that Aircraft Flight Manuals (AFMs) contain guidance material for operating on wet and contaminated runways and that operators provide adequate training to their crews with respect to the effects of contaminated runways on aircraft performance. At the present time, Canadian Operational Regulations do not provide for a Canadian operator of turbo-jet aircraft to have any information in the manuals for operating on contaminated runways. But on the other hand, effective August 1992, an AFM associated with a new type approval must have performance advisory material that deals with operations on contaminated runways. What is this situation elsewhere in world?

In Europe, any commercial operator whose principal place of business is in a Joint Aviation Authorities (JAA) Member State, must comply with the operational regulations, JAR-OPS 1, which formalize requirements for operational performance information. JAR-OPS 1 requires that an operator account for the effect of contaminated runways on take-off and landing performance. Several non-European countries have adopted JAR-OPS 1. At present the regulations in the United States do not address performance on contaminated runways. The Flight Test Harmonization Working Group will address harmonization of this issue with the JAA in the future. However, this is awaiting harmonization of the associated operating rules by the Airplane Performance Harmonization Working Group. Transport Canada and Canadian operators are some of the members of this last working group.

There are more problems caused by slush than described here. For instance loss of directional control when operating in crosswind and the accumulation of slush in the main landing gear bay areas that could freeze and interfere with the landing gear, just to name a few.

Remember that slush on the runway today is as big a risk to aircraft operations as it was 40 years ago. Fly safely in all upcoming winters!

You can read about some real-life occurrences in

which slush was a factor in Transportation Safety Board of Canada (TSB) accident reports with numbers A98O0034, A96A0047, A96A0050, A96C0232 (see www.tsb.gc.ca). Additional reading material can be found in NLR-TP-2001-216: "Safety aspects of aircraft performance on wet and contaminated runways" (see www.nlr.nl/public/library/2001/2001-216-dcs.html) and NLR-TP-2001-003:

"Safety aspects of tailwind operations" (see www.nlr.nl/public/library/2001/2001-003-dcs.html). △

Pilot's Automatic Telephone Weather Answering Service (PATWAS)

NAV CANADA has updated its popular PATWAS to a digital version. Accessible through one simple phone call, PATWAS is a convenient automated communications system that provides pilots with up-to-date weather information. The digital PATWAS comes with added features such as bilingual service, voice recognition capabilities (enabling pilots to spell phonetically the airport for which they would like weather information), local sunrise/sunset hours and a fax-back function.

The digital PATWAS is being progressively rolled out across the country, replacing the analog models and will be accessible via the nine Flight Information Centres (FICs) across Canada in Halifax, Québec, London, Winnipeg, Edmonton, Kamloops, Whitehorse, Yellowknife and North Bay. Once PATWAS is installed at a FIC, pilots will only need to dial 1 866 WXBRIEF for services in English, or 1 866 GOMETEO for services in French, and press #3 on the menu system to access PATWAS.

Currently, London, Québec and Kamloops FICs have digital PATWAS. The system will be installed in Edmonton, Winnipeg and Halifax FICs in 2004 and the North Bay, Yellowknife and Whitehorse FICs in 2005. The system also offers a greater selection of aviation weather information for areas surrounding 350 Canadian airports and approximately 900 American airports. Pilots are able to select pre-defined route information, local information for a group of airports in a specific area or site observations and forecasts at multiple airports. △



to the letter

VFR communication

Dear Editor,

In issue 2/2003 of the *Aviation Safety Letter*, your report of a collision between a helicopter and a Cessna 170 near Sandford Field, Ontario, illustrates a common problem for those of us flying out of private airstrips. Here in Fergus, Ontario, we frequently encounter aircraft flying over the airport or through the pattern at low altitude without calling or monitoring the recommended frequency 123.2. I once had a close encounter while descending through 600 ft AGL on short final. The other aircraft was just passing by, apparently totally oblivious to my presence or to the close proximity of the airport. As he did so, I heard him call Waterloo tower (Waterloo is 18 mi. away).

The *Ontario Flying Farmers Airstrip Charts* book lists over 300 private airstrips in Southern Ontario. Most are not marked on the charts, and it is impossible

for pilots to know the locations of all private airstrips along their route. I suggest that everyone flying at less than 1 500 ft AGL outside of controlled airspace should continuously monitor 123.2.

*Richard Ross
Fergus, Ontario*

In a perfect world, with all aircraft being equipped with two radios, pilots could monitor both 123.2 and 126.7 (the recommended frequency for "EN ROUTE VFR" in A.I.P. RAC 5.1), but we all know this is not the case. While 123.2 is recommended as a common advisory frequency for use at aerodromes that have neither a mandatory frequency (MF) nor an aerodrome traffic frequency (ATF) area (A.I.P. RAC 4.5.5), the pilot must be aware of the location of the private airstrip to begin with; local knowledge notwithstanding, infrequent flyers and transient pilots will likely be unaware of those

private, uncharted airstrips. The best solution remains through education of proper procedures for VFR flight in uncontrolled airspace, emphasis on monitoring the appropriate frequencies, and making your presence known. A vigilant combination of AIRMANSHIP, LOOKOUT, and the "SEE-AND-AVOID" VFR principle will go a long way to prevent mid-air collisions in uncontrolled airspace.—Ed.

Use of "clear" and "cleared" in ATC phraseology

Dear Editor,

After the largest air disaster ever in Tenerife in 1977, the International Civil Aviation Organization (ICAO) issued advisories on phraseology changes to avoid the use of words that could be misinterpreted. Confusion around the words "CLEAR" and "CLEARED" was fundamental to this tragic accident, so the most

important change was that the word CLEARED was to be used only where a clearance is given for takeoff or landing. A couple of years after the event, the Dutch aviation authorities mandated those changes to the ATC phraseology, but I was unable to determine if the new phraseology was implemented in Canada. Human and technical communication limitations make it easy to confuse “clear” with “cleared.” Add to this fast aviation jargon and pilots whose mother tongue is not English, and the potential for misunderstandings is “clear.”

Arthur van Maurik
Pilot & Vliegtuig magazine
The Netherlands

The ATC Manual of Operations (MANOPS) has a section pertaining to the use of the word “clear(ed).” It states, “Do not use words and terms “go ahead,” “clear” or “cleared” in radiotelephony communications for ground vehicle operations.” The purpose of a clearance is as follows: “An ATC clearance or instruction constitutes authority for an aircraft to proceed only in so far as known air traffic is concerned and is based solely on the need to safely expedite and separate air traffic. Pilots are required to comply with ATC clearances accepted by them and with ATC instructions directed to and acknowledged by them, subject to the pilot maintaining final responsibility for the

aircraft’s safety.” Canadian controllers are directed to differentiate clearly between a clearance and an instruction by using the appropriate prefix, i.e: ATC clears, cleared or ATC suggests. NAV CANADA confirmed that it has adopted all the ICAO PANS ATM Doc 4444 articles that indicate the use of the words “clear” and “cleared” when issuing a clearance. NAV CANADA is therefore in compliance with ICAO-mandated phraseology in this respect.—Ed.

He’s just a trainer, and we’re an airliner...

Dear Editor,

I run a flight school at a busy uncontrolled aerodrome, which has a mix of recreational flying, flight training and commuter traffic. One of our Class I instructors, who is also a Designated Flight Test Examiner, was flying circuits one day with a student. There were three light aircraft in the left-hand pattern for Runway 16. Typically, a commuter aircraft barged its way straight into the left base without organizing some realistic spacing ahead of two Cessnas that were established on the downwind leg. Inevitably there was a conflict between the first Cessna and the commuter aircraft at the base-to-final point. Our instructor and her student were in the second Cessna and extended their downwind slightly to stay back

from the number one Cessna/commuter entanglement.

The commuter pilot announced on the radio (in an agitated manner) that he was now doing ‘a two-seventy’ to the right from base-to-final for spacing. Obviously this turn was very wide due to the commuter’s speed—and it brought them into a conflict with the number two Cessna, which was now on left base. Although both Cessnas were making appropriate position calls, the commuter captain, distracted by having to avoid the first Cessna, forgot about the second one because his two-seventy to the right turned his back on the circuit traffic. Fortunately, our instructor in Cessna two had him visual all the way around his turn and was able to anticipate the conflict and avoid a collision.

But here’s the kicker—in his shock at meeting the second Cessna the commuter captain said on the radio (quote) “what’s that Cessna doing there? He should get out of our way—he’s just a trainer and we’re an airliner!” This comment drew a justifiable rebuff from the FSS specialist who pointed out that the “trainer” was perfectly in order—as it had been for the past hour. This event was damning evidence of the ineptitude and arrogance that we have to tolerate daily at our airport.

Name withheld on request

... to be continued.—Ed.

Call For Nominations for the 2004 TC Aviation Safety Award

Do you know someone who deserves to be recognized?

The Transport Canada Aviation Safety Award is presented annually to stimulate awareness of aviation safety in Canada by recognizing persons, groups, companies, organizations, agencies, or departments that have contributed in an exceptional manner to this objective.

You can obtain an information brochure explaining award details from your Regional System Safety Offices, or by visiting the following Web site:
<http://www.tc.gc.ca/CivilAviation/SystemSafety/brochures/tp8816/menu.htm>.

The closing date for nominations for the 2004 award is December 31, 2003. The award will be presented during the sixteenth annual Canadian Aviation Safety Seminar, which will be held in Toronto, Ontario, April 19 to 21, 2004. △

Happy 100th Birthday to Powered Flight and 30th Birthday to ASL!

Answers to Self-Paced Study Program

- | | |
|--|--|
| 22. shall | 1. 75.7 litres |
| 23. distinct rocking of the aircraft in flight; a single flash of a landing light | 2. Yes |
| 24. (a) report departure intentions on the MF of ATTF frequency before moving on to the runway. (b) ascertain by radio and by visual observation that no other aircraft or vehicle is likely to come into contact with the aircraft during takeoff. (c) report departing from the aerodrome traffic circuit, and monitor the MF or ATTF until well clear of the area | 3. Land and Hold Short Operations |
| 25. are capable of posing a risk to health, safety, property or the environment | 4. 6 |
| 26. one hour | 5. 15 |
| 27. a Canada Customs Airport of Entry (AOE) | 6. unreliable; it transmits |
| 28. 605.38; 551 | 7. NOTAM |
| 29. This is a replacing NOTAM | 8. "G" |
| 30. all standards of airworthiness | 9. hatched areas enclosed by a dashed green line |
| 31. bonding | 10. 6 |
| 32. 100 | 11. 25-50% |
| 33. 500; high | 12. 1 mile in mist, temporarily 1/2 mile in fog |
| 34. 15; within | 13. 290° True at 5 knots |
| 35. 20 | 14. 5/8 mile; 6 000 feet, unchanged; light snow and drifting snow |
| 36. the pilot not suspecting the phenomenon; the pilot is in clear air | 15. sky obscured, vertical visibility 600 feet |
| 37. an inability to concentrate; blurred thinking; dizziness; headache | 16. freezing precipitation |
| 38. 2 000 | 17. weather reports, forecasts, PIREPS, NOTAM, altimeter settings, and other operational information pertinent to the en route phase of flight |
| | 18. (a) at the request of the pilot; (b) when the controller suggests and the pilot agrees; |
| | (c) in the interest of flight safety |
| | 19. control services such as vectors or conflict resolution |
| | 20. does not |
| | 21. 1 200 |

The ASL Interview: Brian Stewart, Coordinator/Chief Flight Instructor, Sault College

continued from page 16

that the college has only scratched the surface of safety once the student is ready for the market place?

B. Stewart: I think the level of awareness is pretty good; however, we have some inconsistencies in our communication throughout the students' stay. Our internal safety newsletter is not produced regularly and our handling of incidents and occurrences is not well communicated. I would also like to expand on some areas of human factors, such as situational awareness, and what we refer to as "Threat and Error Management."

ASL: On the Actual flight line, what kinds of reporting system do you have?

B. Stewart: We have an anonymous, non-punitive occurrence/incident reporting system. A drop-off box is out of the general view so respondents can remain anonymous if they wish.

ASL: How do you give feedback to anonymous reporters?

B. Stewart: Feedback would be given in the form of minutes of the safety meetings, policies that might be changed, or through the safety newsletter. The safety committee deals with the reports. The

results and recommendations are recorded in the minutes of the meeting and posted on the safety bulletin board.

ASL: How does the non-punitive reporting work? How often is it used?

B. Stewart: It is a challenge, as many students believe they will be targeted if they come forward. Our biggest obstacle is to change that perception. We are lucky to receive a handful of incidents/hazards/occurrences per year.

ASL: Are you happy with that reporting system?

B. Stewart: I'm happy that we have a reporting system; however, I'm not happy that many students believe punitive action will result from them coming forward to report safety concerns or incidents. The perception is that the person reporting a safety concern might be blacklisted. Our biggest challenge is to change that perception.

ASL: How do you see the future vis-à-vis safety management and the aviation technology program at Sault College?

B. Stewart: In an industry where errors and omissions are so costly, I don't think you can have one without the other. △

The ASL Interview: Brian Stewart, Coordinator/Chief Flight Instructor, Sault College

by Mike Treskin, System Safety Specialist, System Safety, Ontario Region

ASL: Can you describe the school and its program? For example, how long is the course; how many instructors are there, etc.

B. Stewart: Sault College is a community college located in Sault Ste. Marie, Ontario. It offers a variety of programs in addition to Aviation Technology (Flight), such as nursing and forestry. The program is 3 years (7 semesters) in length; we have 14 instructors, some of whom also have classroom responsibilities. Students graduate with a commercial airplane license endorsed with both multi-engine and instrument privileges.

ASL: What is your official title with the College? How many aircraft do you operate, and what type are they?

B. Stewart: My title is Coordinator/Chief Flight Instructor (CFI). We operate nine Zlin 242 single-engine aircraft and two Piper Seminole multi-engine aircraft. In addition, we have two Mechtronix level 2 Flight Training Devices (FTDs) and two Elite level 2 FTDs.

ASL: On average, how many students graduate each year?

B. Stewart: The graduating class size has been about 35 for the last couple of years and I expect 36 students to graduate next year.

ASL: How do you promote safety awareness within the Aviation program?

B. Stewart: Students are briefed on the program—who the safety officer is, why safety is important to Sault College, an incident/occurrence non-punitive reporting system, safety bulletin board, a safety committee, an emergency response plan and an annual safety audit. Some of this information is in the Flight Training Operations Manual, the Training Manual and it will be in our Standard Operating Procedures (SOPs) by September.

ASL: Could you expand on the safety committee? Are students part of this committee?

B. Stewart: The safety committee meets about every second month. It is made up of two students from each of the three years, the maintenance manager, the dean, the safety officer and the CFI.

ASL: Does the aviation program have an official safety management course?

B. Stewart: Yes, we have a course entitled “Safety and Human Factors,” which includes an annual presentation on aviation safety management by Transport Canada (TC). In addition we have two other courses dealing with human factors—“Basic Flight Physiology” and “Human Factors in Flight”—

both courses strongly suggest the importance of safety in aviation.

ASL: When are the students given the TC presentation on aviation safety management?

B. Stewart: During semester 7 (the senior year).

ASL: What are your views on the TC aviation safety management

presentation? Does it help determine safety issues on the flight line?

B. Stewart: I think the TC presentation is great. It helps tie together the three human factors courses, as well as another briefing that TC provides for us on pilot decision-making issues. It is also a perfect opportunity for TC System Safety to help the industry set the tone for future aviators who some day will be managers and operators in the aviation system.

ASL: What is the student’s role in the safety program?

B. Stewart: Students are the line pilots in our safety program—they are expected to follow the program’s operating rules, which include reporting any hazards, incidents, occurrences or accidents. Their participation is necessary to make the program work.

ASL: Do you feel your current safety program at the college follows the recent Safety Management System (SMS) principles? Where do you stand in adapting such a program?

B. Stewart: From what I have gathered from the safety management presentation, and what I have been reading in the proposed SMS Regulations, we may only be missing a few items, and some items may need some minor changes. Our plan is to incorporate all items from the proposed SMS Regulations into our own safety management program by the fall of 2003.

ASL: Who manages the safety program?

B. Stewart: The safety officer—Earl Turner.

ASL: Are you satisfied with the level of safety awareness achieved after graduation, or do you feel



Brian Stewart, Coordinator/Chief Flight Instructor, Sault College

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Transport Canada Flight Crew Recency Requirements, Self-Paced Study Program

Refer to paragraph 421.05(2)(d) of the *Canadian Aviation Regulations* (CARs).
This self-paced study questionnaire is for use from October 2, 2003, to September 30, 2004.
When completed, it satisfies the 24-month recurrent training requirements of CAR 401.05(2)(a).
It is to be retained by the pilot.

Note: The answers may be found in the A.I.P. Canada; references are at the end of the questions. Amendments to this publication may result in changes to answers, references, or both.

1. Convert 20 U.S. gallons into litres. _____ (GEN 1.9.2)
2. An aeroplane has a hard landing that severely damages the nose wheel and firewall. Would this be a Reportable Aviation Accident? _____ (GEN 3.2)
3. LAHSO is the abbreviation for _____. (GEN 5.2)
4. A wind speed of ____ KT will blow a dry Transport Canada standard wind direction indicator to an angle of 30 degrees below horizontal. (AGA 5.9)
5. Control of ARCAL lights should be possible when an aircraft is within ____ NM of the aerodrome. (AGA 7.19)
6. The removal of the audio identification from NDB's, VOR's, DME's or ILS's warns pilots that the facility may be _____ even though _____. (COM 3.2)
7. Prior to using any NAVAID, pilots should check _____ for information on NAVAID outages. (COM 3.3)
8. Pilots using GPS who are filing VFR flight plans are encouraged to use the letter _____ to convey their ability to follow direct routings. (COM 3.16.4.2.2)
9. On a GFA "Clouds and Weather Chart," an area of showers or intermittent precipitation is shown as _____. (MET 3.3.11)
10. On a GFA "Clouds and Weather Chart," an area of obstruction to vision not associated with precipitation is enclosed by a dashed orange line where visibility is ____ SM or less. (MET 3.3.11)
11. On a GFA "Clouds and Weather Chart," the abbreviation "PTCHY," describing non-convective clouds and precipitation, means "patchy" with spatial coverage of _____. (MET 3.3.11)

**TAF CYXU 011035Z 011123 27005KT 1SM BR OVC005 TEMPO 1113 1/2 SM FG VV003
FM1300Z 29005KT P6SM OVC030 TEMPO 1623 BKN030
RMK NXT FCST BY 17Z=**

12. In the TAF above, the visibility forecast for 1200Z is _____. (MET 3.9.3)
 13. In the TAF above, the wind forecast for 1700Z is _____. (MET 3.9.3)
- SPECI CYSJ 221650Z 08017G24 5/8SM R23/6000FT/N -SN DRSN VV006 M03/M05
A2952 RMK SN8 VSBY VRBL 3/4 11/2**
14. In the weather report above, the prevailing visibility is ____ and the Runway Visual Range for runway 23 is _____. The visibility is obscured by _____. (MET 3.15.3)
 15. In the Special Report above, VV006 is decoded as _____. (MET 3.15.3)
 16. AWOS may sporadically report _____ at temperatures above 0°C and below +10°C during periods of wet snow, rain, drizzle or fog. (MET 3.15.5 Table)
 17. Flight Information Service Enroute (FISE) consists of information on _____
_____. (RAC 1.1.4)



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18. VFR flights may be provided with Radar Navigation Assistance:
 (a) _____;
 (b) _____; or
 (c) _____. (RAC 1.5.4)
19. Certain FSSs are equipped with radar displays to aid aircraft operating within, and in the vicinity of a mandatory frequency area. The Flight Service Specialists at these locations do not provide:
 _____. (RAC 1.5.8)
20. A minimum fuel advisory **does/does not** imply an ATC priority. (RAC 1.8.2)
21. The correct transponder code for VFR operation below 12 500 ft ASL is _____ unless otherwise assigned by ATS. (RAC 1.9.4)
22. To emphasize the protection of active runways and prevent runway incursions, taxi instructions that contain the instructions to “hold” or “hold short”, **shall/need not** be readback by the pilot. (RAC 4.2.5)
23. Visual signals may be acknowledged in daylight by _____
 or at night, by _____. (RAC 4.4.7)
24. Radio procedures by pilots of aircraft departing uncontrolled aerodromes within an MF area or with an ATF include:
 (a) _____;
 (b) _____; and
 (c) _____. (RAC 4.5.7)
25. Dangerous Goods are articles or substances that _____. (RAC Annex 1, para 3.0)
26. On flights from Canada to the U.S., at least _____ advance notice of arrival must be provided to U.S. Customs. (FAL 2.3.2)
27. On flights from the U.S. to Canada, pilots must land at _____. (FAL 2.3.2)
28. Installation of an ELT as required by CAR _____ must comply with Chapter _____ of the *Airworthiness Manual* (SAR 3.3)
29. 030008 NOTAMR 030007 CYOW ILS 07 U/S TIL APR 0311191800.
 What is the significance of the letter “R” at the end of the word NOTAM above? _____ (MAP 5.6.2)
30. Certificates of airworthiness are issued for aircraft that fully comply with _____. (LRA 2.3.2)
31. When refuelling, the aircraft and fuelling equipment all require _____. (AIR 1.3.2)
32. The effect of a mountain wave often extends as far as _____ nautical miles downwind of the mountains. (AIR 1.5.6)
33. If a pilot flies with the altimeter subscale set .50 inches Hg too high, the indicated altitude would be _____ feet too **high/low**. (AIR 1.5.3)
34. Your aircraft has a Maximum Demonstrated Crosswind component of 20 knots. If the wind were 30 degrees off the runway at 30 knots, the cross wind component would be _____ knots and would be **within/outside** the Maximum Demonstrated Crosswind capability. (AIR 2.2)
35. A pilot should avoid severe thunderstorms by at least _____ nautical miles. (AIR 2.7.2)
36. The real hazard in whiteout is _____ because _____. (AIR 2.12.7)
37. Symptoms of carbon monoxide poisoning include _____, _____, _____ and _____. (AIR 3.2.3)
38. The use of landing lights is recommended during take-off and landing phases and when flying below _____ feet AGL within terminal areas and aerodrome traffic zones. (AIR 4.5)

