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Flight Comment

ISSUE 2, 2020

LESSONS LEARNED

Your Signature

FROM THE FLIGHT SURGEON

Flight Safety and COVID-19

VIEWS ON FLIGHT SAFETY

Commander of the Royal Canadian Air Force

Canada

Cover – Corporal Stephanie Patz from 12 (Vancouver) Field Ambulance flies in a CH149 Cormorant from Vancouver Airport to Victoria Airport, where members will continue on to Quebec, to deploy on Operation LASER, 9 May 2020.

Photo: Private Daniel Pereira, 39 CBG Public Affairs

Flight Comment

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Views on Flight Safety

by LGen A.D. Meinzinger, Commander Royal Canadian Air Force

The onset of COVID-19 has presented the Royal Canadian Air Force with a series of challenges these last few months that few could have ever foreseen. Without exception, CWO Gaudreault and I have witnessed, across the whole of our Air Force, personnel rising to this challenge and supporting their fellow members and Canadians at large. I could not be prouder of your response than I am now as your Commander as together we tackle this unique generational challenge.

Some areas of our Air Force have had to maintain operations throughout the COVID-19 pandemic while other areas have stood down for an extended period of time. Others have had to learn to work from home with all of the unique challenges that presents. All of us have had to manage great uncertainty both within our families and at work.

As we look to resume our full flying program in support of the Canadian Armed Forces mission, we must remain vigilant to ensure the safety of our personnel and resources. In all communities, we have had to adjust our flying operations to incorporate appropriate PPE for aircrew and passengers. Maintenance and support personnel have also had to learn to operate with the additional consideration of appropriate PPE. In the training communities we have had to pause our training operations and must now re-engage in a safe and efficient manner. This means that we must address skill erosion, or skill fade, and learn again to crawl or walk before running at full speed within our force generation and training enterprise.

Only you are best able to assess the emotional and physical burden that COVID-19 has had upon you. This has been a taxing period for all of us. CWO Gaudreault and I look to everyone, whether it is our aircrew, our maintenance and support personnel, or those within the supervisory chain of command to properly assess and lookout for each other as we ramp up our operations and training to our full potential. Understand that your proficiency may not be at the same level as it was prior to COVID-19. The time required to complete what otherwise would have been a routine task, may take you a little longer. And it's okay if you need to refer back to manuals or checklists to ensure that you don't miss a step. That's why we have them.

Keep a good lookout for your buddies around you. Do not hesitate to ask questions or challenge something that, to you, may not seem quite right. These interventions must not be regarded as challenges to authority, but rather a reflection of a healthy and respectful environment in which our primary concern is always the welfare of our personnel and the preservation of our valuable resources. And do not hesitate to seek out the advice of those around you, even if it is something with which you were normally very familiar with prior to us entering this new paradigm.

I cannot foretell the challenges that will still lie ahead of us in the coming months and/or years. I have no doubt however that going forward this new normal would have seemed completely abnormal to anyone who could have foreseen this, as recently as December of last year. My confidence in you to hold up the values of our Flight Safety system and the hard lessons learned from the generations that have come before us will position us to address and overcome the challenges that lie ahead.

Photo: LS Erica Seymour, 4 Wing Imaging

The Editor's Corner

I keep telling myself and everyone around me that maintaining a "zero accident" standard in the Royal Canadian Air Force (RCAF) is feasible. If we can do it for one year, then why can't we do it for multiple years? I don't want people to admit that crashes and fatalities are inevitable and part of this business and I don't want anyone to lower their guard or shift their focus from flight safety and risk management. However, the ugly truth is that despite having a great Flight Safety Program, with personnel who believe in the program and take safety seriously, there are still parts of the accident equation that we do not fully understand, cannot foresee or control and accidents still occur. With each mishap, however, we have an opportunity to learn so that we can keep reinforcing our program to find better ways to enhance risk management to prevent future occurrences. Our goal as an organisation will always be to maintain a zero-accident standard while continuing to enable mission success.

This issue of *Flight Comment* is dedicated to the crew of Stalker 22 and to the team member of Snowbird 11 who were fatally injured during Operation REASSURANCE and Operation INSPIRATION. It is of prime importance for the RCAF to investigate all accidents to identify effective preventive measures that will either prevent or reduce the risk of similar occurrences. The Director of Flight Safety / Airworthiness Investigative Authority (DFS / AIA) is responsible for the independent and thorough investigation of all aircraft accidents. The DFS / AIA investigations are fully independent and transparent and only have one mandate, which is to determine the cause of the accidents and make recommendations for effective preventive measures.

Since the end of World War II, DFS has developed a strong expertise in investigations. Many of our safety recommendations have been implemented and statistically resulted in a huge decrease in the loss of life or assets. To protect the gains we have made, we cannot afford to lower our guard. The many threats to aviation safety are still lurking around, hidden in every corner of our organisation, waiting for our vigilance to weaken.

This edition of *Flight Comment* is also clearly stamped with the current COVID-19 pandemic concern. The views from the RCAF Commander highlight the need for us to look out for each other and to take the time to adapt to this new operating environment. A poster realized by our DFS team of very capable image specialists is provided to remind everyone of the danger of skill erosion. If you have been away from your profession for a while, take your time to do things right.

This magazine includes several lessons learned articles and showcases outstanding actions from our personnel to prevent accidents. Congratulations to all the recipients of Flight Safety awards.

The ICP School, has produced an excellent article helping us demystify the new NOTAM system. These articles are always extremely popular as they answer questions that many pilots have related to the intricacies of flight procedures. Another article highlights the 50th anniversary of QETE. This organisation has been a key and incredibly reliable partner over the years for DFS and has contributed enormously to the success of the Flight Safety program. With a small team of highly dedicated people, they have always provided infallible support in both prevention and investigation activities.

Continuing the theme of risk management, Capt McCauley from 3 CFFTS crafted an article on Mission Acceptance Launch Authority (MALA), clearly describing its safety benefits. I also highlighted the importance of international cooperation in my article about the NATO Flight Safety Working Group and the need for standard agreements (STANAG) between our Nations. The center middle page includes a Just Culture matrix that shows how to assess individual Just Culture accountability. It is meant to be detached and posted in your Squadron or office. The CAF Flight Safety Program is based on the primacy of having a Just Culture. Hopefully, this matrix will help everyone understand the line between acceptable and unacceptable actions or activities.


Photo: Cpl Dominic Duchesne-Beaulieu

In the last edition we challenged you with our *Find the Difference* puzzle. Thanks to everyone who participated. Those who submitted their answers to us will receive a Flight Safety promotion item.

My final note is to thank Major Claire Maxwell for her numerous years of dedicated service to the cause of Flight Safety. In recent years, she was holding, often alone, the helm of the *Flight Comment* magazine and did a fantastic job. Well done Claire, we all appreciated your teamwork and we will miss your camaraderie and great ideas, except perhaps your promotional item proposal about the procurement of bandages with a Flight Safety logo!

Col (Retd) Steve Charpentier, DFS 3, Prevention, *Flight Comment*

Good Show

For Excellence in Flight Safety

Captain Darryl Dubuc and Master Warrant Officer Richard Rousseau

On the morning of 10 April 2019, Hercules aircraft Atlas 341, was on a VFR flight plan from Calgary to Rocky Mountain House and was level at 6500 feet. The mission was an Acting Aircraft Commander (AAC) training flight and the Aircraft Commander (AC), Captain Darryl Dubuc, was standing in the cockpit behind the pilot seats monitoring the flight. The crew felt a slight pressure change and the Loadmaster (LM) reported dust in the rear cargo area. The LM who had been seated at the aft LM station moved forward to locate the source of the dust. As he approached the forward area, he found the right-hand emergency exit hatch dislodged and protruding out of the aircraft.

The LM announced to the crew that a door was open and requested assistance from the Flight Engineer (FE). The tense tone of his voice put the crew on high alert. As Capt Dubuc was already unstrapped, he moved to the cargo area to assess the situation. Concurrently, the AAC began to slow the aircraft to allow the ramp to be opened if the dust needed to be dissipated. When Capt Dubuc saw the open hatch he quickly took a picture on his cell phone then immediately returned to the flight deck and ordered all crew to strap in. Since there is no emergency procedure for an open hatch, Capt Dubuc showed the picture of the door, and discussed the situation with his crew. The Squadron Lead Flight Engineer, Master Warrant Officer (MWO) Richard Rousseau, recommended the shut-down of the Number 3 engine in case the hatch or other objects departed the aircraft and struck the propeller. MWO Rousseau then donned his safety harness and monkey tail and moved back to the cargo area. He quickly assessed the situation and decided to strap down the hatch with a tie down strap which he did with the assistance of the LM. The aircraft returned to Calgary on three engines and landed safely.

Captain Darryl Dubuc

Photos: Cpl Tanner Musseau-Seaward

Master Warrant Officer Richard Rousseau

Capt Dubuc and MWO Rousseau's actions stabilized an extremely dangerous situation. Faced with an emergency with no documented emergency procedure, Capt Dubuc and MWO Rousseau demonstrated outstanding airmanship and aircraft knowledge. They have brought great credit to 435 Sqn and the RCAF and are most deserving of the Good Show award.

Good Show

For Excellence in Flight Safety

Master Corporal Steve Mayer

MCpl Steve Mayer, Lead AVN with 431 Air Display Squadron in Moose Jaw, experienced an abnormal start and control snag on Tutor CT114054 during the 2019 Snowbirds' Show Season. After numerous hung starts and absent MFC (Main Fuel Control) input, the decision was made to change the engine and so power plant SER 8047 was routed to a second line facility for repair. There, the contractor could not find any physical abnormalities so the engine was returned to service.

Several months later, Tutor CT114071 experienced a complete loss of thrust and was catastrophically damaged at the Peachtree Air Show in Georgia. Although the causes are currently unrelated, MCpl Mayer's conversation with the occurrence pilot caused him to recall his experience with Tutor 054. MCpl Mayer informed the Chain of Command that another look at engine SER 8047 should be done as a precaution to identify the cause of the issue.

Engine SER 8047 had just been installed in an aircraft and was waiting for a ground run to restore its serviceability. The engine was removed from the airframe and the MFC was sent to a contractor. After extensive bench testing and troubleshooting, the MFC's computing section (Multiplier Assembly Cavity) was found completely full of fuel. The cause was attributed to a bellows assembly O-ring that was leaking fuel. If this leak had gone unchecked, the issue would have repeated, potentially leading to a catastrophic occurrence. A modification carried out in 2009 to replace O-rings with a more resilient material was supposed to have addressed the leaking issue. The O-rings are now being verified to ensure the correct part was used. MCpl Mayer's attention to detail and his diligence to resolve the matter makes him very deserving of this Good Show.

Good Show

For Excellence in Flight Safety

Corporal Brandon Harkness

Photo: MWO Kevin Lee

On 23 Sept 2019, while preparing a CC177 Globemaster for launch, Loadmaster Cpl Brandon Harkness discovered that there was a crane in the cargo manifest whose weight was recorded as approximately 30,000 lbs less than actual.

The Globemaster was tasked to transport personnel and cargo from Thule to CFS Alert and Fort Eureka in support of OPERATION BOXTOP II 2019. The loaded aircraft had already attempted a flight to Alert but poor weather had forced its return to Thule. When Cpl Brandon Harkness arrived for his first night chalk, he completed his pre-flight checks and proceeded to gather information on the loaded cargo. The cargo manifest displayed a truck and crane with the crane weighing 31,980 lbs.

Cpl Harkness felt something was wrong with the weight considering the size of the crane. Investigating further, Cpl Harkness found a consignment and an inspection checklist in the crane vehicle that listed its weight at 60,000 lbs. After discovering this discrepancy, he advised the Aircraft Commander and engaged the mobile Air Movements Section (MAMS) to reweigh the crane. They discovered that the actual weight was 59,520 lbs as opposed to the 31,980 lbs marked on the crane manifest, a difference of 27,540 lbs. Cpl Harkness' actions led to the discovery of two more vehicle weight discrepancies, with differences of 10,420 lbs and 7,130 lbs respectively.

When operating on snow or ice covered semi-prepared airfields, specifically during the more restrictive shoulder season period, crews must maximize the capabilities of the CC177. Had they landed, the additional 45,000 lbs of unaccounted cargo would have significantly increased the required landing distance well beyond that which was available in Alert. Cpl Harkness' exceptional attention to detail clearly prevented a potential loss of aviation resource and injury to personnel. It is due to this exceptional display of professionalism and sound judgment that makes Cpl Harkness most deserving of this Good Show.

Good Show

For Excellence in Flight Safety

Mr. Kevin Hofer

On 20 March 2019, a CC-177 Globemaster was parked on the ramp at Halifax Stanfield International Airport while being loaded with personnel and equipment for transit to Tuktoyaktuk in the North West Territories. Two civilian chartered buses had transported passengers onto the ramp and were parked off the left wing of the CC-177. Once the bus passengers had disembarked, the buses were free to depart and the first one did so without incident.

As the second bus was leaving, the driver failed to maintain a safe distance from the aircraft and headed directly towards the left wing. Mr. Kevin Hofer, a Defence Technologist with DRDC was in the line-up of passengers waiting to board the aircraft. Recognizing that the bus was on a collision course with the parked aircraft, Mr. Hofer immediately jumped in front of the bus waving his arms to try and alert the driver. Seeing Mr. Hofer, the driver slammed on his brakes and stopped the bus within three feet of the wing.

The subsequent investigation determined that there were no ground guides in position to assist the bus drivers and that they were not familiar with the location in which the CC-177 was parked. The aircraft was parked in a new area because grounded Boeing 737 Max 8 aircraft were occupying a large portion of the ramp.

Without the quick thinking and situational awareness of Mr. Hofer, the CC-177 would have received extensive damage to the wing resulting in its removal from operation. For his selfless actions, well above and beyond normal duty, and his demonstration of exemplary leadership, Mr. Hofer is most deserving of this flight safety Good Show award.

For Professionalism

For commendable performance in flight safety

Master Corporal Isabelle Patenaude-Lemieux

In June 2019, while reviewing the inspections during an audit of a CF188 Hornet which had recently been transferred to 425 Tactical Fighter Squadron, MCpl Isabelle Patenaude-Lemieux discovered that the serial number for the right hand aileron outboard hinge had not been recorded in the related outer wing component history card. Further investigation revealed that the serial number had been omitted in the special inspection instruction leaflet related to this component. Consequently, the scheduled inspection of this component had not been carried out.

Photo: Cpl Dominic Duchesne-Beaulieu

In 2014, MAS Engineering Group released a special inspection instruction to manage the risk of an outboard hinge failure until the incorporation of a modification. This inspection was to be completed before every 660 air frame hours. In 2017, the inspection interval was reduced to occur at a maximum of 260 air frame hours because a crack in a hinge was discovered developing more quickly than anticipated. In the case of this aircraft, the right hand aileron outboard hinge had flown 770 airframe hours without being inspected; an interval that exceeded both current and original inspection intervals.

MCpl Patenaude-Lemieux's discovery of this undocumented component and her efforts to draw attention to the implications of its missed inspections is a testament of her outstanding perseverance, skill and knowledge. An audit review of inspections means sifting through a vast number of documents and so the ability to identify an overlooked serial number is indicative of the thoroughness MCpl Patenaude-Lemieux applies to her role. Due to MCpl Patenaude-Lemieux's actions this issue has been discovered and the inspection cycle has been reinstated greatly decreasing the risk of a hinge from failing in flight and ensuring that safety of flight is not being compromised.

Aviator Royale Gaviola

On 3 May 2019, Aviator Royale Gaviola, a newly trained Aviation technician with 423 Maritime Helicopter (MH) Squadron at 12 Wing Shearwater, was conducting a Before Flight check on a CH148 Cyclone helicopter. While inspecting the hydraulic reservoir, he observed that the #3 hydraulic system required replenishment. Since the unit's hydraulic servicing cart was unserviceable and his apprentice experience on the CH148 was limited, Aviator Gaviola elected to speak with some senior technicians to confirm what had to be done. After they instructed him to manually service the system, he reviewed the Military Specification (MIL-Spec) number for the hydraulic fluid and the replenishment procedure within the technical manuals and then went to the tool crib to request the required materials. When issued the can of hydraulic fluid, he immediately noticed that the can's locally applied white label did not match the MIL-Spec number stamped on the can. Double checking the manual to verify the correct hydraulic fluid MIL-Spec number, Avr Gaviola deduced that he had been issued a can of engine oil that had been incorrectly locally labelled as hydraulic fluid.

Suspecting the presence of other mislabeled cans at tool crib and the potential for incorrect fluid types used to replenish aircraft systems, he immediately informed his supervisors of the situation. Further investigation revealed that the labels of four cans of engine oil had been reversed with the labels of four cans of hydraulic fluid.

The technical order for fuels and lubricants states that the MIL-Specs for those hydraulic and engine oil fluids are not an acceptable substitute for one another. Although all aircraft at 423 (MH) Sqn had the potential to be topped-up with incorrect fluid, no aircraft were found incorrectly replenished. As a safety precaution, all the aircraft engines at the unit were flushed and replenished with the correct engine oil.

Aviator Gaviola's perceptive recognition of the problem and quick response resulted in the prompt identification and rectification of a potential fluid contamination issue that could have led to the loss of critical aviation resources. For someone with limited aircraft experience, his dedication and level of professionalism are highly commendable and deserving of this flight safety For Professionalism award.

From the Flight Surgeon

Flight Safety and COVID-19

by Mrs. Shannon Saunders and Major Courtney Douglass, DFS, Ottawa

As an aviation organization, we are operating under some unprecedented circumstances. COVID-19 has challenged our normal operating environment and has presented us with some unfamiliar and unique hazards as they pertain to flight safety. To raise operational awareness, these hazards, both observed and anticipated, were summarized in the DFS Debriefing Issue 4-2020. These hazards detail the increased risk of Foreign Object Debris (FOD) from the introduction of Personal Protection Equipment (PPE), mask use restricting breathing or causing an impediment to communication (real or perceived), exposure to contagion and interference to normal flight deck operations. As time passes, hazards related to COVID-19 and its impact on the flying community continue to emerge. As the RCAF prepares to re-engage in flying activity, operational vigilance will be essential. Personnel at all levels will have to continually assess how the "new normal" impacts safety.

Let's examine one of the most pertinent risks likely to affect aviation personnel when returning to full time flying operations. Skill Erosion. It is important to note that skill erosion is not a "pilot-centric" phenomenon and is likely to affect all aviation occupations including Air Traffic Control (ATC), Aerospace Control (AEC) officers and maintenance personnel.

Photo: MCpl Jennifer Kusche, 8 Wing Imaging Trenton

What is Skill Erosion?

Skill erosion, also known as skill fade, is defined as the decay of ability or adeptness over a period of inactivity or non-use. Simply put "if you don't use it, you lose it." Anyone who's ever tried to play a sport or an instrument after a period of inactivity, recognizes that it takes time and patience to return to the same level of proficiency. Flying operations are no exception.

From a human factors' perspective, it is much easier for us to recall simple automatic tasks (such as riding a bike or catching a ball) than it is to recall more complex tasks that are less predictable. Unfortunately, repairing, flying, and controlling aircraft are not predictable automatic tasks, and therefore re-engaging in these activities after some stagnation is likely to present increased risks. This is why it is so vital to identify and mitigate skill erosion when returning to flying operations after a period of inactivity.

It is also important to note that with the increased passage of time, there is a corresponding increase in the likelihood for skill erosion to affect your ability to perform both physical and

cognitive tasks. A study of piloting skills (Childs and Spears, 1986)[1] discovered that cognitive and procedural elements of flying eroded more rapidly than control-oriented skills. The biggest challenges observed were the identification of cues, classification of situations and the application of appropriate responses. Within the pilot occupation, decision making and situational awareness skill sets were observed to erode more quickly than the ability to physically fly the aircraft. One could surmise that the same skill sets would be affected within the maintenance technician, controllers, and other air operations occupational groups.

How to Identify Skill Erosion?

The question now becomes, how does one recognize skill erosion in both your own personal performance and that of your subordinates/crew? Research into this issue has found that the following signs are helpful cues in identifying the effects of skill erosion:

- Less coordinated more abrupt movements with flight control inputs instead of controlled fluid actions.
- Struggling with familiar or routine tasks compared to previous performance.
- Difficulty recalling routine memory items.
- Reverting to more familiar processes (i.e. pilots with extensive experience on one aircraft type may revert to those processes and procedures instead of applying the appropriate ones for their current airframe).

While these recommendations are particularly appropriate during COVID-19 operations, it can be assumed that after any period of inactivity (COVID-19 environment or not) that skill erosion could affect your performance.

Photo: MCpl Charles A. Stephen, CAF

Recommendations for Managing Skill Erosion

Once skill erosion has been identified, the following guidelines are recommended to minimize its effect on your performance:

- Re-familiarize yourself with procedures. Take the time to be prepared and review/brief procedures fully before flight/controlling or conducting maintenance action. Studies show that review and mental rehearsal of procedures (ie. chair flying or simulator use) prior to conducting an activity refreshes cognition and reduces the potential for skill erosion errors.
- Follow all checklists, procedures, technical orders etc. It is not recommended that you rely on memory items if you have been inactive for any period of time.
- Exercise heightened situational awareness during completion of all tasks. Remove distractions and do one thing at a time.
- Slow down and have patience with both yourself and the other professionals working around you. Remember everyone is trying to adapt to the "new normal."

In conclusion, COVID-19 has disrupted our normal operating environment. Our focus must not only be directed towards protecting ourselves and our personnel, but must be directed towards the identification and mitigation of hazards. We as an Air Force must apply sound judgement and resume flight activities in a controlled and adaptive manner as we strive towards our "New Normal."

Expect it, identify it, and manage it!

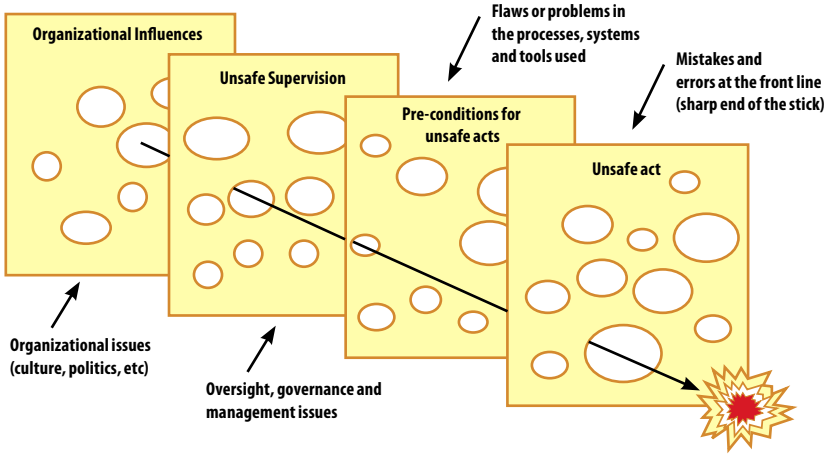
Reference

1. Childs, J.M. & Spears, W.D. (1986). Flight-skill decay and recurrent training. Perceptual and Motor Skills, 62, 235-242.

Turning Swiss Cheese into Cheddar – A Success Story

by Maj Claire Maxwell, DFS 3-3, Ottawa

In Flight Safety, one often hears of James Reason's Swiss Cheese model in regards to human factors and accident causation where "an organization's defences against failure are modelled as a series of barriers, represented as slices of the cheese. The holes in the cheese slices represent individual weaknesses in individual parts of the system, and are continually varying in size and position in all slices. The system as a whole produces failures when holes in all of the slices momentarily align, permitting "a trajectory of accident opportunity", so that a hazard passes through holes in all of the defences, leading to an accident."[1]



Swiss Cheese Model – James Reason

During an aircraft accident investigation, we spend a lot of time looking for issues at the various levels of the latent factors. In effect, we are studying the holes in each slice of Swiss cheese. One could almost equate an aircraft accident investigator to a turophile... a cheese connoisseur!

Accurately identifying our holes (our issues), is an essential requirement for us to create effective preventive measures and that's how we make our overall aviation system safer. Hence why developing our members' ability to see the holes so that they can proactively prevent flight safety issues before they become accidents is most important for aviation safety.

How do we do this? We do this via our flight safety award process and we do this, collectively, each time we file a flight safety report on something that is not right. What is sometimes overlooked, and very hard to measure, is all of the instances where things have gone well. This is the tasty part of the cheese... our defences are strong and it holds things together.

Photo: 14 Wing Greenwood Imaging Section

A recent instance to celebrate, is the case, literally, of the wrongfully labeled box of hydraulic fluid discovered at 14 Wing in Greenwood, Nova Scotia. On 29 Jun 2020, 413 Squadron borrowed a case of H-538 hydraulic fluid (Mil-PFR-87257C) from 405 Squadron. Upon opening the case, cans of H-537 hydraulic fluid (Mil-PFR-83282) were found inside. Thus the type of hydraulic fluid in the cans did not match the type of hydraulic fluid listed on the box. The issue is that while the hydraulic fluids of H-537 and H-538 are similar in nature and can be used interchangeably in many aircraft, the CC130H Hercules is only authorized to use the H-538 type. Because there was concern that the wrong hydraulic fluid had been mistakenly used in this aircraft, a flight safety investigation was initiated (FSIMS 186277). 405 Squadron quarantined 11 cases of hydraulic fluid of equivalent lot number, and a whole bunch of people from various organizations were alerted to address the potential issue.

We, here at DFS, took action to raise awareness of this issue but ultimately it was determined that the issue was under control – the appropriate people were aware, a thorough search for the offending hydraulic fluid was conducted, it was confirmed that the fluid did not get put into the aircraft and that the risk was deemed minimal even had it been used.

This is a success story! A slice of Swiss cheese was turned into Cheddar and we need to celebrate it! What was passed on in the flurry of emails alerting the various organizations of the issue was that "413 Squadron borrowed a case of H-538... hydraulic fluid from 405 Squadron. Upon opening the case, cans of H-537 hydraulic fluid... were found inside." What is not mentioned in this text, is who opened the box. This technician is the one responsible for comparing the case label to the label on the can of hydraulic fluid and for recognizing that there was an issue when the two did not match. This technician is the one who prevented the hole from forming in the cheese slice. This is the technician who started the process to raise the awareness of the issue. And the organization quickly responded... even though the event occurred shortly before a statutory holiday when many people were on leave.

This is something that we should be proud of. This technician knew that they needed to cross check the case label with the labels on the cans of fluid. That means that there is awareness out there that issues can occur in the supply chain. Our collective flight safety promotion efforts are working. Situational awareness and professionalism pride based on doing a thorough job is critical to our flight safety success. A wine and cheese function during work hours is probably not the most appropriate way to celebrate this technician's actions and our flight safety awareness raising campaign success but let's all be turophiles and recognize the efforts of our people to turn Swiss slices into Cheddar, Parmesan or Havarti. Keep up the great work out there!

Reference

1. https://www.skybrary.aero/index.php/James_Reason_HF_Model.

DFS

Commendation

The DFS Commendation recognizes outstanding professional long-term performance and dedication in the field of Flight Safety. The DFS Commendation is awarded to the following deserving individuals who, through their actions, have contributed significantly to enhance the capability of the FS Program across the CAF and who emulate the values and ethos promoted by the Program.

Photo: Capt Brad Wood

LCol Ken Bridges receiving the DFS Commendation from LCol Roberds (DFS 2).

Photo: LS Laurance Clarke

WO Daigle receiving the DFS Commendation from Col Hawthorne, 12 Wing Commander.

ON TRACK

This article is the next instalment of a continuous *Flight Comment* contribution from the Royal Canadian Air Force (RCAF) Instrument Check Pilot (ICP) School. With each 'On Track' article, an ICP School instructor will reply to a question that the school received from students or from other aviation professionals in the RCAF. If you would like your question featured in a future 'On Track' article, please contact the ICP School at : +AF_Stds_APF @AFStds@Winnipeg.

This edition of On Track will discuss the Notice to Airmen (NOTAM) system and was written by Captain Chris Filiatreault, ICP School Reservist Instructor. This will be Part One of a two-part series. Part One seeks to explain and clarify why the NOTAM system was changed and how it now functions. Part Two will conceptually discuss how the NOTAM system may be improved, its shortfalls and how we can use the system more efficiently.

Did you see it coming? Or were you pleasantly surprised when you couldn't access your NOTAMs through the AWWS website? NAV CANADA has recently (Oct 2019) changed the NOTAM system in Canada to ensure we align with ICAO standards. It's the aim of the following article to help explain a few of these changes and hopefully create better understanding, and thus, better use of the new system.

The concept of the NOTAM has not changed; as defined in the Canadian NOTAM Operating Procedure (CNOP) Manual: "*A NOTAM is a notice distributed by means of telecommunications containing information concerning the establishment, conditions or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations*". Canada changed the NOTAM system from a Canadian-specific format to the ICAO format to: 1) align with ICAO standards,[1] 2) reduce the risk of misinformation by ensuring pilots have NOTAMs that are pertinent to flight and 3) use automation and validation to create efficiencies and improvements in the quality of NOTAMs.[2] Further, the new system will provide a platform for further innovations such as the Runway Surface Condition upgrade expected in November 2020 (Transport Canada Circular AC 300-019, https://www.tc.gc.ca/en/services/aviation/reference-centre/advisory-circulars/ac-300-019.html).

Pilots must now use a website called "Collaborative Flight Planning Services" (CFPS; plan.navcanada.ca) to search and retrieve NOTAMs. Although the website directs you to the "sign-in" page initially, you can click the upper "Weather" tab to gain access to Weather and NOTAM data without signing in. Creating an account and signing in does allow the user a host of functionality, most notably the ability to complete flight plans as well as amend them without having to contact a flight service station.

So how much has changed? Substantively not much – however the format is going to take some time to get used to as any new change does. Note in Figure one below the difference in the old Canadian format (top) versus the new ICAO format (bottom).

Continued on next page

COMPARISON OF CANADIAN DOMESTIC AND ICAO NOTAM FORMAT

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180001 NOTAMN CYOW OTTAWA/MACDONALD-CARTIER INTL
CYOW RWY 07/25 CLSD
1306141230 TIL APRX 1306172000

(A0001/18 NOTAMN
Q) CZUL/QMRLC/IV/NBO/A/000/999/4519N07540W005
A) CYOW B) 1306141230 C) 1306172000EST
E) RWY 07/25 CLSD
```

Figure 1. The colours compare the information where it is the same. Base info has not changed – only position. The Q line is for the computer system and will not be present when a NOTAM is viewed in CFPS. Note that EST in red is "estimate" NOT Eastern Standard Time. Image courtesy of NAV CANADA.

Aside from the new format, and how the NOTAMs are presented in CFPS, the CNOP manual reminds NOTAM authors to ensure that NOTAMs adhere to brevity, essential facts, clarity and unambiguity in presentation.[3] Further, "Clarity shall take precedence of conciseness".[3] This would suggest that all content of NOTAMs recalled by the CFPS program would therefore be easy to skim through and add efficiency to the pre-flight planning – however recent practical experience suggests otherwise... more about that in Part Two. NOTAMs are published with enough lead time to allow any concerned party to take action. Therefore, aside from emergent issues and events, routine NOTAM lead times should not exceed 48 hours to help reduce the number of NOTAMs that are retrieved, but are published at least 24 hours in advance of the activity. All routine and planned events shall be published no less than 6 hours before it is to happen, and under no circumstances will they be published after the event has occurred. Danger, restricted or prohibited areas shall be given at least 7 days of advance notice, with 14 days advance notice at max.[4] Even with these guidelines and restrictions, why is it that CFPS gives so many NOTAMs, and why are some repeated? Well, that has to do with its programming.

So how does CFPS search for NOTAMs? First, the user is directed to a search bar where the search criteria is 'georeferenced', effectively meaning you can use: Aerodromes, FIRs, NAVAIDs, Intersections, Cameras, Upper Wind measuring site or a name in plain language[2] to search for your desired info. Following that, NOTAMs are retrieved based on your search criteria (flight path, point and desired radius) and how CFPS is programmed in 'layers' and 'georeferencing' of objects and areas. For example, how a NOTAM author enters in the georeferenced point (NOTE: CFPS does not use 'seconds') and selects the radius of the activity determines if a NOTAM will intersect with your flight path or not. Further, although discrete 'bounded' areas may be described in the NOTAM; CFPS only uses a 'radius logic' for determining if a NOTAM should be included in a search or not (see Figure 2).

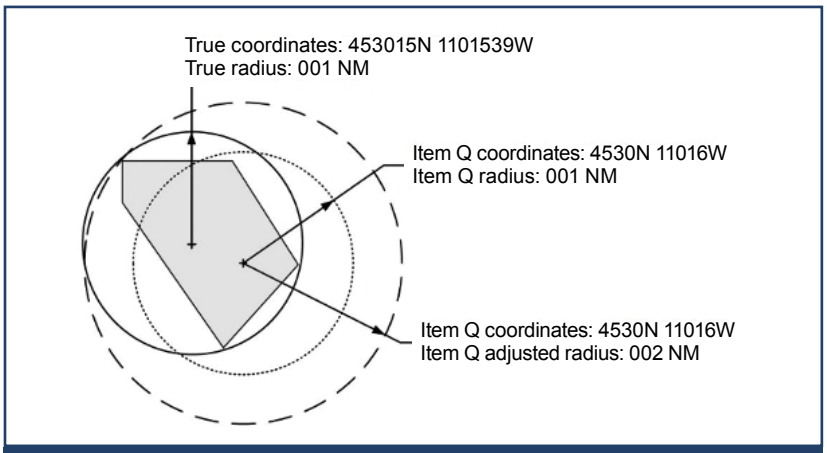

Figure 2. In the following example, the NOTAM area is represented by the smaller and darker shape. The true coordinates are rounded down resulting in the centre point displacement (smaller dotted circle). If the radius of Item Q remained 001 (1 NM), the NOTAM briefing would not contain the NOTAM. Therefore, the radius is adjusted to 002 (2 NM).[5] Image courtesy of NAV CANADA.

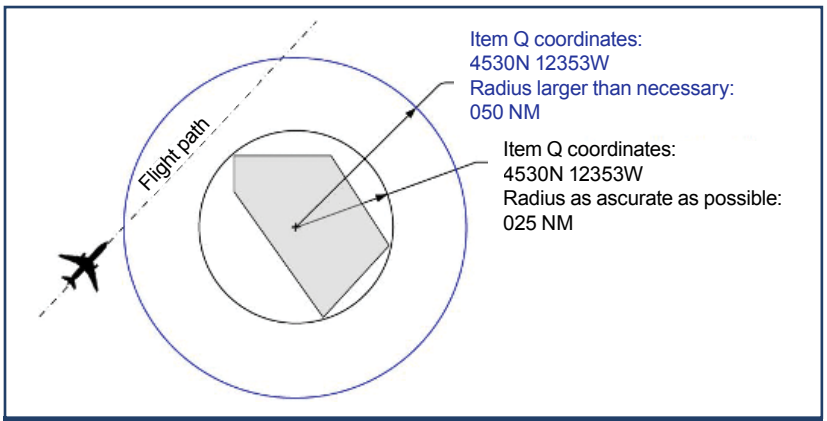

Figure 3. If a NOTAM author programs too large a radius then non-pertinent NOTAMs may be retrieved.[6] Image courtesy of NAV CANADA.

This is important according to NAV CANADAs direction to NOTAM authors – it is essential that the radius is neither too large nor too small to encompass the concerned area. Too large and the NOTAM will be retrieved for flight paths that should not be concerned with it, too small and flight crew might infract airspace without being aware (see Figure 3).

Finally, 'layering' areas combined with the radius selection (as shown in Figure 4) determines which NOTAMs will be retrieved. Note that the 'Route Data' option previously given in the AWWS program to capture enroute weather and NOTAMs is now inherent in CFPS.

Note how not only will you receive NOTAMs about the points you're requesting, but based on overlapping FIRs, National NOTAMs, nearby airports or other georeferenced activities (i.e.: Forest Fires), you'll be receiving a lot more! This is why there are duplicate NOTAMs that come up in a search. Obviously this certainly ensures that the pilot gets the required info as per regulations, however it does not effectively parse info, nor remove duplicate entries which will be discussed in the next edition of "On Track". Unfortunately CFPS does not provide a graphical representation of geographically 'bounded' NOTAMs, therefore, when dealing with points of Latitude and Longitude (such as Forest Fires), take time to draw them out!

Hopefully now you understand why the new NOTAM system was brought in and how it functions. Stay tuned to the next issue which will discuss the strong and weak points of the CFPS system and what we can do to help sort through the 'mound of info' in order to make safe and effective use of it.

References

1. ICAO Annex 15 – Aeronautical Information Services – Standards and Recommended Practices (SARPs) the Procedures for Air Navigation Services – AIM (PANS-AIM) and the ICAO Aeronautical Information Services Manual (Doc 8126).
2. "Transition to ICAO NOTAM Format – Overview Presentation" courtesy of NAV CANADA 2019.
3. CNOP Manual, Pg. 15, Para 1.1
4. CNOP Manual, Pg. 16, Para 1.5
5. CNOP Manual, Pg. 40, Figure 2
6. CNOP Manual, Pg. 39, Figure 1

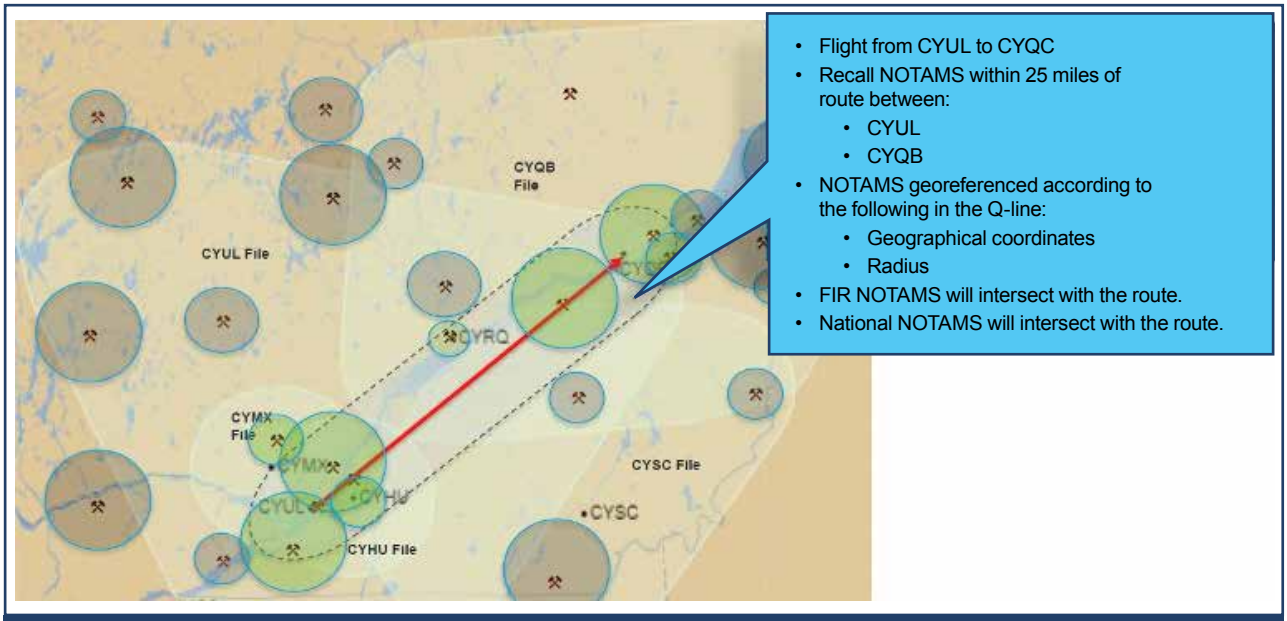

Figure 4. An example of how CFPS retrieves NOTAMs based on its programming and your search criteria. The little 'tool' icon displays a 'georeferenced' point – it's not the topographic symbol for a mine.

DOSSIER

QUALITY ENGINEERING TEST ESTABLISHMENT AT 50!

by Mr. Scott Beeston, Aircraft Accident Investigator, Quality Engineering Test Establishment Canadian Armed Forces, Ottawa

The Quality Engineering Test Establishment (QETE) is celebrating a half-century of supporting the Canadian Armed Forces.

Two CF188s conduct a surveillance flight over northern Canada to ensure the integrity of Canadian Arctic sovereignty. A CH149 helicopter rescues distressed fishermen in the Gulf of St. Lawrence. A Canadian Patrol Frigate participates in an international exercise in the Pacific. A new TAPV armored patrol vehicle patrols the Latvian countryside during NATO exercises.

What do these daily military tasks have in common? They are executed in a professional and precise manner by specially trained airmen and women, soldiers and sailors, who depend on modern and complex weapon systems. But what happens when the system or component no longer performs as required according to operational specifications? In almost all cases, a technical investigation will be initiated. When the investigation poses unique challenges and requires in-depth technical knowledge, the Canadian Armed Forces (CAF) calls upon a unique organization, little known to the general public; the Quality Engineering Test Establishment (QETE). For more than 50 years, QETE has assisted in design specification, verification of weapon system standards and investigations into equipment used by the CAF that they perform safely and meet expectations.

Over the past 50 years, QETE has evolved and been acknowledged nationally and internationally with more than 25 awards and recognitions including the prestigious System of Cooperation Amongst the Air Forces of the Americas (SICOFAA) Flight Safety Award in 2015. For QETE staff, rewards and recognitions come second. The greatest satisfaction comes from knowing that members of the Canadian Forces can count on their equipment to complete their mission safely and on time. Each project is tackled with a desire to produce findings and recommendations to the benefit of the CAF. QETE is proud to have top subject-matter experts who often come from a technical military background and bring to bear all of their knowledge and experience. Everyone in the organization recognizes the importance and impact of their work on military operations and strive to serve those who serve.

QETE is comprised of five technical sections; Mechanical & Materials Engineering, Applied Science, Electrical Engineering, Measurement Sciences and Imagery, and Munition Experimental Test Centre (METC). The QETE Failure and Accident Investigation

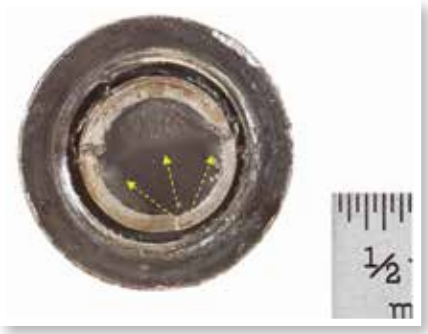

Figure 1. The fracture surface of a failed Rosan stud from position 9 displaying flow lines. The yellow arrows indicate the direction of the flow lines. (QETE Project A021812)

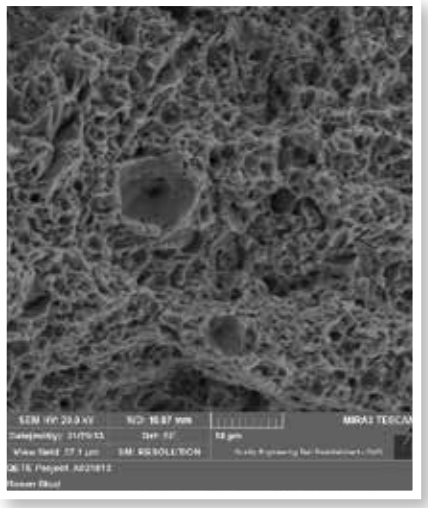

Figure 2. An SEM micrograph showing ductile dimples which are characteristic of overload. (QETE Project A021812)

Group (part of the Mechanical & Materials Engineering Section) is QETE's primary contact for technical investigative services related to Flight Safety investigations, and utilizes the expertise of other sections within QETE to conduct its work. What makes QETE a unique entity is the diverse technical capabilities required for independent system and component level failure investigation, all housed under "one roof." With the support of all the QETE laboratories, aircraft structure and systems such as engines, flight controls, avionics, and aviation fluids can be studied in detail to determine if equipment failure contributed to an accident or incident. In addition, expertise in areas such as non-destructive inspection and testing allows QETE to make recommendations on potential inspection techniques, risk mitigation, and preventative measures. The Non-Destructive Evaluation capability remains connected with the military aviation safety and the RCAF through military positions.

The QETE Failure and Accident Investigation Group is staffed with both civilian and military engineers and technologists. The civilian staff have extensive experience and expertise in aviation fields such as aviation life support equipment and aircraft engines. The military positions include one Aerospace Engineering Officer (Capt – Post Graduate in Aircraft Structures), Aerospace Engineering Officer (Lt/Capt), an Aviation Systems Non-Commissioned Member (WO) and, along with technical expertise, they bring a detailed knowledge of current military training, maintenance and operational practices.

The QETE Applied Science Section also directly supports aviation safety related accident and incident investigations in multiple technical domains, including the functions of the Tactical Aerospace Fluids Officer, with an Aerospace Engineering Officer (Capt – Post Graduate in Chemical Engineering).

Similar to the practices of civilian aircraft accident investigations, QETE's Failure and Accident Investigation Group works both in the field and laboratory settings. The Failure and Accident Investigation Group has a "crash lab" facility that permits aircraft wreckage reassembly and detailed analysis of damaged aircraft structure. In this controlled environment, features such as fracture surfaces, material deformation, the location of damaged components, debris, trace evidence, and/or soot patterns provide clues which could help in determining the sequence of events, as well as the cause of an accident or incident.

As part of an investigation, QETE investigators inform the Directorate of Flight Safety (DFS) of not only how a component failed but also the likely cause of failure. In many cases, an individual component failure results from a sequence of other system failures that interact with that component and must be fully examined and understood to find the root cause. This allows the proper recommendations and information to be put in the hands of the decision maker.

Today QETE is working simultaneously on more than 300 projects initiated by accidents or incidents ranging from minor to catastrophic, all having an impact on operations. The history of QETE does not stop at 2020. Constantly evolving, QETE continues to improve and adapt to new technology to further benefit the CAF in their operations, domestic, or deployed.

Happy 50th QETE! Thanks to the QETE staff of past and present, who provide outstanding services to the military aviation and the Royal Canadian Air Force!

DOSSIER

NATO Standardization Agreement (STANAG) and Allied Flight Safety Publications (AFSPs)

by Col (Retd) Steve Charpentier, DFS 3, Prevention

BACKGROUND

Shortly after the establishment of NATO in April 1949, it was recognized that the co-ordinated development of policies, procedures and equipment of the member nations held great potential for enhancing the military effectiveness and efficiency of the new Alliance.

As a result, the Military Office for Standardization (MAS) was established in London in January 1951 for the purpose of fostering the standardization of operational and administrative practices and war material. Today, the office name has changed, but the mission remains essentially the same. The NATO Standardization Office (NSO) is an independent NATO Office that reports to the Committee for Standardization (CS) for Standardization Policy and Management and to the Military Committee (MC) for corporate oversight and issues relating to operational standardization (Figure 1).

Standardization within NATO is the process of developing and implementing concepts, doctrines, procedures, and designs to achieve and maintain the compatibility, interchangeability and commonality which are necessary to attain the required level of interoperability between allied Nations. The primary outputs of this process and NATO's primary tools for the enhancement of interoperability between all Members Nations are NATO standards now referred to as Allied Publications, which are all covered by Standardization Agreements (STANAGs) between the member nations.

The NSO is the focal point for standardization in NATO. Each operational Branch (Joint, Naval, Army and Air) provide support to various Military Committee Standardization Boards. Under the sponsorship of each board, specialist Working Groups of experts from nations and commands develop doctrine and procedures which are ultimately published as STANAGs and Allied Publications.

The Flight Safety Working Group (FSWG) has been established since 2005 and reports directly to the Military Committee Air Standardization Board (MCASB). The Royal Canadian Air Force Directorate of Flight Safety was a member from day one and currently chairs the NATO FSWG. The FSWG is responsible for maintaining the suite of NATO FS Standards entitled "Allied Flight Safety Publications" (AFSPs) and each member nation agrees to implement AFSPs via NATO Standardization Agreements (STANAGs). The focus of the FSWG is to develop aviation safety standards and its scope includes aircraft flight safety, aviation related ground safety, air weapons/range safety, aircraft accident/incident investigation and prevention; and safety requirements for flying and static displays. There are currently 30 Member Nations in NATO of which 22 fully participate in the FSWG and meet at least once a year.

RATIFICATIONS

When a new STANAG is produced, each Nation goes through a ratification process where they can make official comments or reservations if they don't want to implement parts of it. As an example, Canada ratified implementation of STANAG 3533 Ed 9 on Flying and Static Displays with multiple reservations related to Canada's more restrictive rules. The limits indicated in the B-GA-100 National Defence Flying Orders are to be followed by the RCAF in NATO countries and also by NATO aircraft flying in Canada as they are more restrictive than what is stipulated in the STANAG 3533. Of course, the FSWG works hard in the background to minimize the need for reservations. Once ratified, each Nation agrees to implement the standards into their own documentations and procedures.

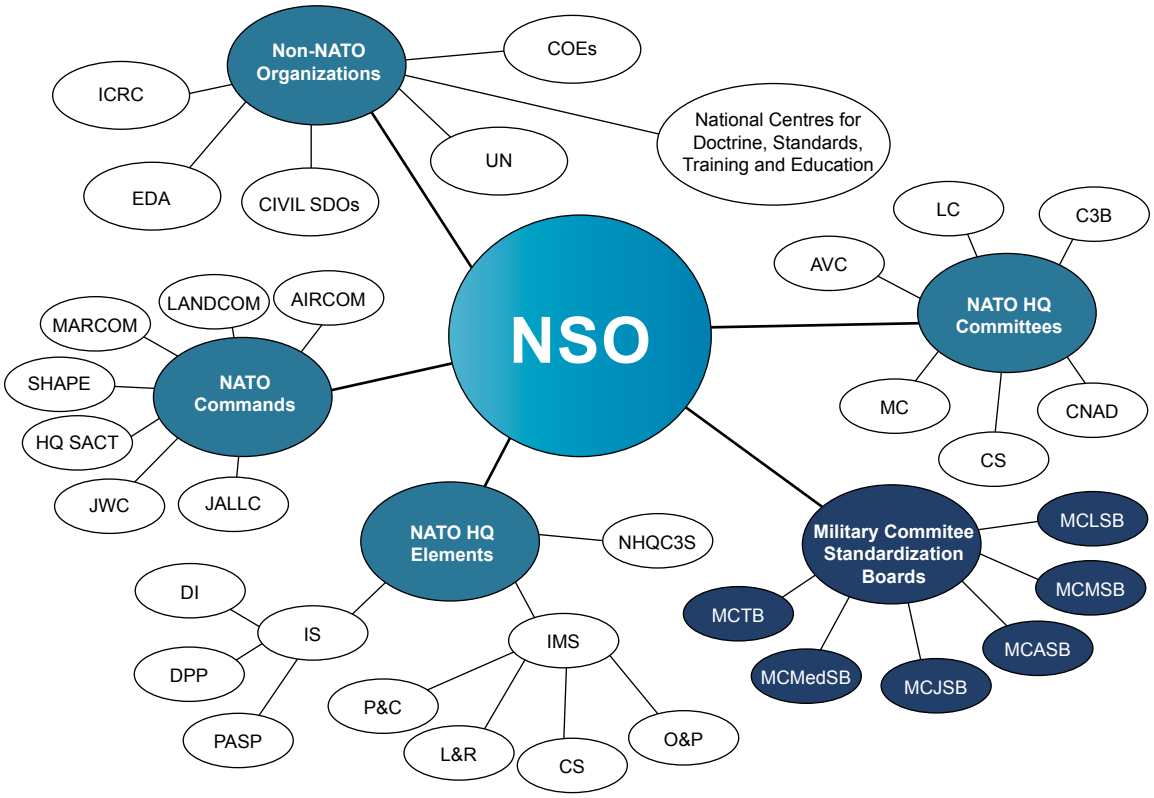

Figure 1. NATO Standardization Office (NSO) Outreach

STANAGs and AFSPs are reviewed every three years by the FSWG to ensure they remain accurate and current.

DFS is responsible for coordinating the CAF implementation of the AFSPs and STANAGs. STANAGs and related AFSPs are always available for consultation through the DFS intranet website or via the NSO website.

LIST OF CURRENT RATIFIED NATO STANDARDIZATION AGREEMENTS (STANAGs) AND ALLIED FLIGHT SAFETY PUBLICATIONS (AFSPs)

- AFSP 1.0 (Aviation Safety) / STANAG 7160 (Edition 4, promulgated 14 Jun 2018). AFSP 1.0 is the first in the AFSP suite of documents and sets out general policy and guidance on aviation safety principles, policies and procedures, in particular those aimed at accident prevention.
- AFSP 1.1 (Exchange of Flight Safety Information) / STANAG 3101 (Edition 16, promulgated 3 Nov 2016). The aim of this standard/agreement is to maintain points of contacts for flight safety organizations and establish procedures for the exchange of safety information peculiar to aircraft types, unmanned aircraft systems and missiles in current use by nations.
- AFSP 1.2 (Flight Safety Cooperation in Common Ground/Airspace) / STANAG 3102(Edition 7, promulgated 29 May 2018). The aim of this standard/agreement is to establish the requirement for coordination of accident prevention matters when a detachment of one nation operates within or over the sovereign territory of another nation for eight days or more, or when aircraft of two or more nations participate in combined/joint air operations within the sovereign territory of any NATO nation and/or "out-of-area" air operations.
- AFSP 1.3 (Safety Investigation and Reporting of Accidents/Incidents involving Military Aircraft, Missiles and/or UASs) / STANAG 3531 (Edition 9, reviewed 29 Sep 2016) (Figure 2). The aim of this standard/agreement is to establish procedures for the safety investigation and reporting of accidents/incidents of military aircraft, missiles and/or UAS

Continued on next page

which involve the equipment, property, facilities and/or personnel of two or more nations.

- AFSP 1.4 (Wildlife Strike Prevention) / STANAG 3879 (Edition 8, reviewed 29 Sep 2016). The aim of this standard/ agreement is to standardize the measures to avoid collisions between wildlife and aircraft and the formats for the exchange of information on the presence of wildlife and wildlife strike reports.
- AFSP 2 (Aircraft Marshalling Signals) / STANAG 3117 (Edition 9, reviewed 29 Sep 2016). The aim of this standard / agreement is to standardize aircraft marshalling signals and the distinctive garment to be worn by aircraft marshallers.
- AFSP 3 (Rules for Live Air Weapons Demos) / STANAG 3564 (Edition 6, promulgated 25 Mar 2019). The aim of this standard/agreement is to ensure that all factors affecting the safe conduct of any live air weapons demonstration with and without spectators are adequately studied and to specify responsibilities for the planning and conduct of such demonstrations.
- AFSP 4 (In-Flight Visual Signals) / STANAG 3379 (Edition 10, reviewed 29 Sept 2016). This aim of this standard/agreement is to establish in-flight visual signals and the essential procedures for using them.
- AFSP 5 (Flying and Static Displays) / STANAG 3533 (Edition 9, reviewed 29 Sep 2016). The aim of this standard/ agreement is to establish basic safety procedures, regulations and responsibilities for flying and static displays, which involve aircraft of two or more nations.
- AFSP 6 (NATO Flight Safety Officer (FSO) Training) / STANAG 7238 (Edition 1, under study). The aim of this standard/ agreement is to provide guidance to all NATO Nations on minimum requirements concerning the training of FSO in order to act as aviation safety advisors of a Commanding Officer in a NATO theatre of operations. This will include the development of a NATO Flight Safety Officers Course based on AFSP-1 Standard.
- AFSP 7 (Emergency Markings on Aircraft) / STANAG 3230 (Edition 8, promulgated 25 Feb 2020). The aim of this standard/ agreement is to establish parameters for emergency markings on the outside and the inside of aircraft.

Within NATO Air Forces, there is clearly a requirement for interoperability whereby Air Forces of one nation may deploy and operate with those of another. Having standardized marshalling hand signals, fuel labels and airfield lights are a requirement to operate safely and effectively when working with other countries. Imagine a situation where a maritime helicopter is on final approach to another nation's ship for refuelling and the crew receives hand signals that are unfamiliar or contrary to their own. Unless procedures are harmonised for such eventualities, there is scope for misunderstanding, which could easily lead into flight safety occurrences, possible mishaps, attrition of resources, and consequent diminution of task success.


NATO UNCLASSIFIED
OTAN SANS CLASSIFICATION

STANDARDIZATION AGREEMENT

ACCORD DE NORMALISATION

STANAG 3531

SAFETY INVESTIGATION AND REPORTING OF ACCIDENTS/INCIDENTS INVOLVING MILITARY AIRCRAFT, MISSILES, AND/OR UASs

ENQUÊTES DE SÉCURITÉ ET COMPTES RENDUS D'ACCIDENTS OU D'INCIDENTS METTANT EN CAUSE DES AÉRONEFS MILITAIRES, DES MISSILES OU DES SYSTÈMES AÉRIENS SANS PILOTE (UAS)

EDITION 9/ÉDITION 9
8 April/avril 2013
NSA(AIR)0455(2013)FS/3531

NORTH ATLANTIC TREATY ORGANIZATION

ORGANISATION DU TRAITÉ DE L'ATLANTIQUE NORD

Published by THE NATO STANDARDIZATION AGENCY (NSA)

Publié par l'AGENCE OTAN DE NORMALISATION (AON)

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Figure 2. AFSP/STANAG 3531 cover page.

Most of the standards in the AFSPs and other Allied Publications have already been integrated in many CAF publications, however it is always a good idea to review the documents when planning or working with our NATO partners.

"ANIMUS IN CONSULENDO LIBER"

DOSSIER

Photo: MCpl Jordan Lobb, Canadian Forces Combat Camera

IS THE JUICE WORTH THE SQUEEZE?

Mission Acceptance / Launch Authority (MALA) – A sanity check on risk enables safety in operations.

by Captain Dawn Macauley, Rotary Wing Flight Instructor / Flight Safety Officer, 3 Canadian Forces Flight Training School, Portage la Prairie, Manitoba

In February 2020, I had the opportunity to participate in a MALA working group at 17 Wing Winnipeg. There was representation and input from every community and a great opportunity to answer my questions about the shift in attitude, the application and the benefits of the MALA process within each of the operational communities.

Within our Flight Safety program, we attempt to identify hazards and create preventative measures to reduce errors that may lead to accidents. So, from a safety perspective, I consider MALA as a hazard identification tool to enhance the crew's awareness of the complexity of a mission and to generate discussion about safe execution. Prior to the creation of MALA, Aircraft Commanders were already conducting this analysis and leading these discussions as part of pre-flight briefings and flight planning, so in its infancy, MALA was seen as a pencil whip exercise. However, by the end of the working group, I recognized that there has been a positive cultural shift in our organization, specifically at the operational level, about our approach to risk acceptance, Aircraft Commander empowerment and overall safety of operations.

The focus of the working group was on the Launch Authority (LA) matrix, where every community had a slightly different strategy to identify hazards and assess the accumulated risk. Most communities have ironed out a risk acceptance threshold that helps to augment communication within operations. The Launch Authority matrix is, in most operational communities, seen as a tool to help empower the decision making of the Aircraft Commander. It is especially helpful for the less experienced crews where they may have been exposed to moderate risk elements during regular training, but may not have experienced the accumulation of these hazards. For example, hazards such as low weather, forecast icing, high sea states and unfamiliar airspace are reasonable for a crew to handle as isolated risk

Continued on next page

considerations. However, when all these hazards are combined, the mission gets more complex. If a crew that is at the end of a valid crew day is in a state of fatigue, this mission has possibly reached a Yellow threshold where mentorship is essential and mitigating factors should be discussed with a more experienced pilot.

As the accumulated hazards reach an even higher threshold, the crew might use the MALA as a tool to reject a mission with the support and empowerment of their Chain of Command. This is where the Aircraft Commander recognizes that hazards might be reaching an elevated risk level that may affect the safe completion of the mission, thereby prompting a sanity check, which makes them ask, “Is the juice worth the squeeze?” Perhaps the mission can be delayed until the weather improves or perhaps the mission can be conducted during daylight instead of on goggles at night. These risk assessments and decisions are supported and understood by Commanding Officers (COs) through the use of the Launch Authority process. However, if the juice is worth the squeeze, the CO (or delegate) can discuss mitigating factors, provide mentorship and encourage the Aircraft Commander to continue with the mission provided a solid plan has been prepared and approved.

The overall attitude towards unnecessary risk taking is changing within our organization. The message being relayed from higher Command is *Safe and Effective execution*, and members of our organization are buying into this philosophy. As experience levels decrease and expectations of aircrew increase, the MALA process is being accepted by the new generation of pilots and is recognized as a tool to help crews make safe decisions or seek guidance when situations surpass a level of comfort or expertise; it is used as a mentorship enabler. From a Flight Safety perspective, our progressive approach and attitude towards analyzing hazards and encouraging communication will absolutely prevent incidents, accidents and loss of life. So next time someone says, "Fly Safe," perhaps they are actually suggesting to assess and acknowledge accumulated hazards and ensure that mitigating factors have been considered!

Photo: Cpl François Charest

Two CH-147F Chinook helicopters take off for a training mission during Operation PRESENCE-Mali, March 23, 2019.

Deployed members on Operation NUNALIVUT board a CC-130J Hercules aircraft en route back to Winnipeg from Resolute airport, Nunavut on March 19, 2018.
Photo: PO2 Belinda Groves, Task Force Imagery Technician

The Most Valuable Day

Photos: Captain Rob Ofstie

by Captain R.J. Ofstie, 2 CFFTS, Moose Jaw

It was late summer 2017, and I had just finalized a deal to sell my beloved light sport aircraft. It was a factory-built kit plane – an S.G. Aviation Storm 300. It was a low wing, all metal aircraft with a bubble canopy with excellent visibility and pushrod controls which made it a sporty, fun little machine to fly. It was a great little plane. Over the previous three years, it had taken the other fractional owner and I from Moose Jaw to Toronto several times, across Ontario and Quebec, and even down to Southern Florida and back. However, with the other partner being posted to Bagotville, it was unfortunately time to let it go.

We sold the Storm to a buyer in Trois Rivières, QC and, as a part of the deal, we were to ferry the aircraft out to him at cost as soon as we were able. I decided I would take some leave and deliver the aircraft myself, in as short a time as possible to keep costs down and to minimize burning up my leave. After some flight planning, I figured I could make the roughly 1400 NM flight in three days and return home on a commercial flight. I looked at the weather, put in a leave pass, and was off that next weekend.

I departed Moose Jaw Municipal early in the morning on the first leg. The forecast for the day looked great. Sunny and a nice westerly flow aloft would push the little Storm along at roughly 100 to 105 knots ground speed. I took advantage of being the only person in the aircraft, and packed all my tools, extra survival gear for the flight over Northern Ontario, and of course, a lot of coffee. The little Rotax 912 was purring along and, before I knew it, I was halfway to my first stop of Portage La Prairie for gas.

During a quick glance at the engine instruments something caught my eye; I noticed the voltmeter was flickering – quite a lot. I reached down to the Master switch, shut it off, and flipped it back on hoping this would reset the electrical system and fix the issue. However, when I turned it back on, I quickly diagnosed that either the voltage regulator or the generator was not working. I was now solely running on battery power and would quickly drain the small aircraft battery. No problem. Electing to continue, but to avoid draining my battery, I shut off all my electrics and used my back-up handheld VHF radio for communications. I shut my IPAD down, planning to use Foreflight for course corrections and to check my engine instruments every 10 to 15 minutes. Making it to Portage for gas, I decided that I would pick up a trickle charger and to press on with my plan. I had to make it to Wawa, Ontario, by the end of the day in order to keep my plan on the rails. I fueled the plane as quick as I could and went shopping for a charger. Once I had everything sorted, I was airborne again, and continued along to Dryden, Ontario, for my next fuel stop.

Landing in Dryden at the max crosswind component was a little uncomfortable but I got the aircraft down. In the distance, I could

Continued on next page

see the weather was building and large towering cumulus and cumulonimbus clouds were quickly popping up. I decided to delay, charge my battery and wait for a hole in the weather. After fixating on the radar for what seemed like hours and watching the precious daylight slip away, I finally found my hole in the line of storms between Dryden and Wawa. I jumped in the plane, fired it up, and blasted off.

Having made it through the line of storms, I was settling in and enjoying the gorgeous views along the north side of Lake Superior when off in the distance, I noticed a large plume of dark smoke rising from the forest, with layers of smoke all around it. As I got closer, I could see it was coming from a large forest fire. At this point, daylight was slowly fading, and with all the dark smoke, and some low stratus cloud beginning to form on the backside of the front, I was starting to lose my horizon. To comply with regulations, I had to deviate north of the fire by a minimum of 5 miles, however, to maintain VMC I knew I would have to deviate almost 20 miles to get around the smoke. With darkness setting in, and 50 NM to Wawa, I started to get nervous. My horizon was quickly fading, darkness was near, and I had no electrics, lights, or instruments in the aircraft as the battery was pretty much drained down. The Storm also did not have a functional attitude indicator and was not certified for IFR flying. The uneasy feeling in my stomach started to get worse and worse, and just added to my stress level.

Once I deviated north, and got back on track, I noticed I slowly had to descend to maintain VMC as the layers of smoke and stratus were getting lower and lower. Twenty miles to go, I was down to less than 1000 feet AGL. I had lost the comfort/safety of always being visual with a highway or logging road, and found myself scud running, with little to no daylight left trying to get to my destination. After a stressful 15 minutes, the bright red rotating beacon of the Wawa airport came into sight, and I joined the circuit in almost pure darkness. I turned on the ARCAL lighting and brought the little aircraft safely down to land. I had never been happier to be on the ground.

I learned a lot that day about decision-making and perceived pressure. Get-home/get-there-it-is nearly killed me. The perceived pressure to deliver the aircraft in three days, using as few of my leave days as possible, pushed me to accept the unnecessary risk of flying without a serviceable electrical system. I allowed the pressure to influence my decision making and pushed the weather, and the daylight hours, in an aircraft not certified for IFR or night flight. Although this was not my finest or proudest moment as an aviator, it was certainly the most valuable day in terms of learning and decision-making.

Photo: Cpl Kenneth Galbraith

LOSING SITUATIONAL AWARENESS

by Corporal Erin Trudel, 425 Tactical Fighter Squadron, Bagotville

Upon graduation from the Canadian Forces School of Aerospace Technology and Engineering (CFSATE) in Borden, I was posted to an Air Maintenance Squadron. As an apprentice, I was eager to take on every challenge I could find; so I set about studying, memorizing, and training for pre-requisite courses to become a journeyman. One of the first courses CF188 Hornet fleet maintainers are required to complete is their CF188 servicing course.

At the end of this course, each student is required to perform the Launch Process of a CF188 both alone and under supervision. This is where a cascade of personal errors began. My first mistake was to think of this as an independent routine rather than an interactive process with the pilot. My excitement and nervousness about this test spurred me to over-practice the marshalling signals and memorize the process.

My turn finally approached. Heart pounding, I snapped to action and started running through each step, more concerned about getting everything right, rather than doing it safely. When both engines were running, the pilot signaled something unfamiliar to me. Out of instinct, to try and understand him, I made my second mistake and started walking towards the right leading-edge extension of the aircraft. What happened next seemed to happen inside a bubble – time slowed down, the sound of the engine intake next to me grew louder, I lost sight of the pilot, and then I felt the whisper of a hand behind me reaching towards my shirt collar. I jerked backwards, realizing that I was perilously inside the danger zone of the engine, and stumbled into my instructor who was about to pull me to safety. I became terrified after I was informed just how close I was to being sucked into the intake of a jet engine. The rest of the day was a blur.

The Launch and Recovery process of an aircraft is about vigilance and clear communication, which can only be achieved with the pilot through marshalling signals. The CF188 servicing course provides the opportunity to understand, apply, and analyze this aspect of servicing. I had learned the mechanics but had failed to understand the safety demands of the situation. My achievement-oriented personality manifested in a robotic approach to servicing, which placed me in harm's way. Fortunately, no one was injured and I walked away having learned a valuable lesson about situational awareness and safety.

Your Signature

by Sergeant James Rideout, 413 Sqn, Greenwood

Have you ever signed, inspected, and passed by on a CF349 form (Aircraft Unserviceability Record), and taken your co-workers' word that a tool board was closed and signed for? I have, and I never will again.

In the summer of 2007, I was posted to my new Squadron from 8 Air Maintenance Squadron (AMS). As a fairly fresh A Level,[1] I was still figuring out my role and learning how things were done at my new unit.

I arrived on shift one afternoon and was handed over the last remaining support work on a CC130 Hercules' Post-Wash Lube. Once the lubrication was carried out, the aircraft was going to depart for British Columbia for third line maintenance. Shortly afterwards, a second aircraft was going to go through the exact same process.

Photos: Mr. Robert Sands, IMP Aerospace, ATESS Trenton

During the handover of the first aircraft, the senior technician told me the grease gun tool board was closed and the aircraft just needed to be signed off. I asked him if the tool board was closed on the tool board register and if the Tool Control Record (DND3105) in the Maintenance Records Set (MRS) was also closed. I was assured that they were.

Being new to the unit, I did not want to question the senior technician. So, I took their word that the tool boards were closed, and I signed off on the aircraft. I mean they were the senior and arguably most respected technician in the unit. If I couldn't take their word, whose could I? Of all people to trust, they would be the one to trust the most. Right?

The first aircraft departed for British Columbia, and the second one was now in the maintenance hangar for its post-wash lube.

When I proceeded to the grease gun tool board, I found the doors were wide open and the register was still signed "open" from the first aircraft. To make matters worse, there was one missing grease gun. The ramifications of the situation were quickly adding up!

I immediately told my supervisor of the situation who then approached my Aircraft Servicing Officer (ASO). The ASO, in coordination with Operations, made the appropriate call to have the aircraft conduct an unscheduled landing in Trenton, Ontario, to carry out a Foreign Object Debris (FOD) check for the missing grease gun. Meanwhile, we scoured the hangar to try and locate it.

No grease gun was found in either the aircraft in Trenton or in our hangar.

I then found myself standing at attention in the Senior Aircraft Maintenance Superintendent (SAMS) office, trying to explain the whole situation. Standing beside me was the senior technician who, when questioned about closing the tool board registers, denied that our earlier conversation and handover had ever occurred. The senior technician also decided that this was a good time to brief me about the importance of tool control, all while both of us stood at attention in front of the SAMS.

Regardless of what conversation happened, how the handover was given, how senior that technician was, or how I wanted to make a good impression as a team player, it was still my signature on the piece of paper that said the aircraft was airworthy. As much as it all bothered me, they were right.

Thankfully, there was no incident but that day I learned a valuable lesson. I will never again allow my signature to possibly be tainted by someone else's indiscretions. Thirteen years later, I have yet to sign anything without verifying first with my own eyes, regardless of the person and their seniority. I tell this story to all my peers and subordinates with hopes that they will also take heed of my hard-earned lesson.

Reference

1. Technician authorized to do Maintenance Release.

From the Investigator

TYPE: CH148 Cyclone (CH148822)
LOCATION: Ionian Sea
DATE: 29 April 2020

On 29 April 2020, the aircrew were tasked as part of Operation REASSURANCE to conduct a routine surface reconnaissance mission in the Ionian Sea followed by flight deck evolutions for aircrew proficiency upon recovery to HMCS Fredericton. There were four crewmembers and two passengers on board the aircraft.

During the return for recovery, the aircraft made a pass on the port side of the ship, from stern to bow. The aircraft then executed a left hand turn to establish a downwind leg in preparation for approach to the ship. Astern and inside the control zone of the ship, the aircraft commenced a final left turn to set-up for the approach. During this final complex manoeuvring turn to close with the ship, the aircraft did not respond as the crew would have anticipated. This event occurred at a low altitude, was unrecoverable and the aircraft entered a high energy descent and impacted the water astern the ship.

The aircraft was destroyed and all six occupants were fatally injured.

The investigation is focusing on aircraft systems and human factors.

Photo: DND


Photo: MCpl Manuela Berger

From the Investigator

TYPE: CT114 *Tutor* (CT114161)
LOCATION: Kamloops, BC
DATE: 17 May 2020

On 17 May 2020 the Snowbirds air demonstration team was scheduled to depart Kamloops, BC to reposition to Comox, BC as part of Operation INSPIRATION, an operation undertaken by 431 (AD) Sqn to travel around multiple sites across Canada to support COVID-19 front line workers. Aircraft CT114161 was #2 of a formation of two CT114 *Tutor* aircraft. Two occupants were on board the aircraft, the pilot and the team's public affairs officer.

After take-off aircraft CT114161 was observed gaining altitude and departing the formation. Shortly thereafter, the aircraft initiated a left turn, followed shortly by an abrupt steep nose low attitude. Both occupants subsequently ejected from the aircraft.

A detailed analysis of video footage recovered for the investigation revealed one bird in very close proximity to the aircraft right engine intake (see red circle in picture below) during the critical phase of take-off.

The two occupants ejected the aircraft however one received serious injuries and the other received fatal injuries. The aircraft was destroyed on impact.

The investigation is focusing on environmental factors (birdstrike) as well as the performance of the escape system.

Photo: DFS Imaging Section

Photo: QETE

Epilogue

TYPE: Polaris CC15001
LOCATION: 8 Wing, Trenton ON
DATE: 18 October 2019

On 18 October 2019 a CC150 was towed from the North ramp to 10 Hangar at 8 Wing Trenton. 10 Hangar is not routinely used by the CC150, and the D-14 tow tractor normally used is too large for the limited space available inside 10 Hangar. Before entering the hangar, the ground crew were required to stop and swap the tow tractor from the bigger D-14 to the smaller D-12.

Once the aircraft reached a position in front of 10 Hangar, the contracted maintenance tow crew stopped the aircraft, installed chocks, set the parking brake, and disconnected the tow tractor. During the tow tractor change, the aircraft started moving forward and jumped over the chocks. Attempts to stop the aircraft by the tow crew were unsuccessful. The right engine struck the D-12 tow tractor parked inside the hangar, before the nose contacted the hangar far wall structure, finally stopping the aircraft.

The aircraft sustained serious damage ("C" category). The force of impact resulted in one minor injury.

The investigation could not positively determine the cause for the parking brake not holding the aircraft in position. However, it was found that the chocks used to secure the aircraft were not authorized in the Technical Support Arrangement and not all wheels had chocks at the time of the accident. Brakeman training was found to be informal and lacking emergency procedures and reference to aircraft publications.

The investigation recommends the use of approved chocks on all wheels and improved training for towing operations.

Photo: Cpl Bev Dunbar

Right engine damage from impact

Photo: Cpl Lisa Fenton

Nose impact with hangar structure

Epilogue

TYPE: Tutor CT114071
LOCATION: 10 NM east of Peachtree City, Georgia, USA
DATE: 13 October 2019

The accident involved a CT114 Tutor aircraft from the Canadian Armed Forces Air Demonstration Team (Snowbirds) enroute to the Atlanta Air Show being held at the Atlanta Motor Speedway in Hampton, Georgia.

Following a routine check while inverted, the pilot then rolled level and applied full power to rejoin the formation. Shortly after, the pilot experienced a loss of thrust. Losing altitude and unable to recover engine power, the pilot elected to eject as the aircraft was too low to attempt a safe recovery to an airport. The pilot successfully ejected from the aircraft however reported anomalies with the ejection sequence and the parachute opening.

The aircraft was destroyed upon impact and the pilot received minor injuries as a result of the ejection sequence.

The investigation determined that the most probable cause of the CT114071 accident was a fuel delivery system failure within the engine. The precise location of the failure could not be identified with confidence, though given the evidence of pre-existing damage to the engine oil cooler fuel inlet port, the analysis suggests a potential fuel leak at that location.

The investigation also determined that the mostly likely cause of the parachute malfunction was the result of one or more parachute pack retaining cones having been released prior to the activation of the MK10B Automatic Opening Device. Entanglement of the suspension lines with parts of the ejection seat immediately followed ultimately disrupting the proper opening of the parachute canopy. Inspection of all related Tutor Aviation Life Support Equipment was subsequently carried out to ensure fleet airworthiness.

The investigation recommends that an inspection be carried out on CT114 engines to identify any damaged oil coolers that may be at risk of leaking at the fuel ports. In addition, the investigation recommends establishing a controlled verification process on the maintenance activities involving fuel transfer tubes in an effort to identify the cause of the damage to the oil cooler ports. Further recommended measures include improving the fitment of the fuel tubes and consolidating and improving on the maintenance instructions that involve the oil cooler and its components.

Photo: Capt T. Evans

Photo: Maj P. Butzphal

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