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Flight Comment

ISSUE 1, 2021

DOSSIER
Flight Data Monitoring

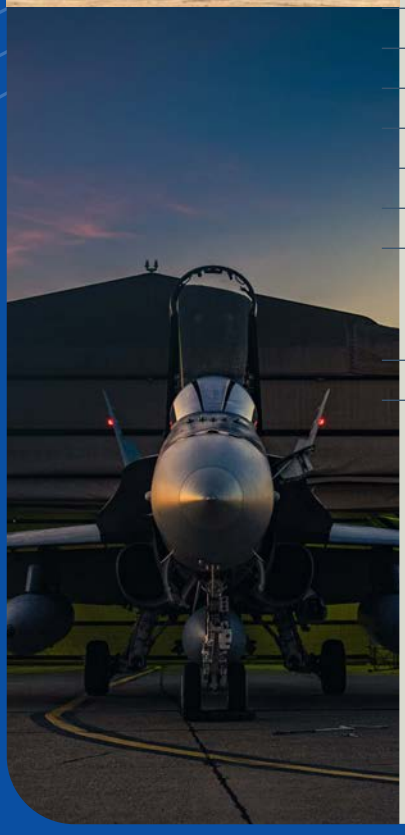
LESSONS LEARNED
Air Cadet Gliding Program

VIEWS ON FLIGHT SAFETY
Commander 1 Canadian Air Division

Canada

Cover – Members of the Royal Canadian Air Force's 436 Transport Squadron support the Public Health Agency of Canada with the delivery of special freezers from Ottawa to the northern Territories between 12 and 15 December 2020 to assist territorial health agencies with COVID-19 vaccine distribution.

Photo: MCpl Genevieve Lapointe, Canadian Forces Combat Camera



Flight Comment

TABLE OF CONTENTS

Issue 1, 2021

Regular Columns

Lessons Learned

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Photo: DND

Views on Flight Safety

by MGen E.J. Kenny, Commander 1 Canadian Air Division

Since the onset of COVID-19, the professionalism and adaptability of Royal Canadian Air Force aviators have allowed us to continue delivery of air power. The strength of our people to cope with these new challenges, adapt their professional and personal lives and continue to conduct operations is outstanding and speaks to the agility and operational commitment of our force.

I can attribute some of this professionalism to a strong Flight Safety program that was created over seventy years ago. When faced with an unfamiliar challenge such as COVID-19, the Flight Safety program was the bedrock that ensured we could continue flying operations in a safe and effective manner.

The success of the Flight Safety program is derived from its three main pillars. **Leadership support of the program**, a strong and fair "**Just Culture**," and the use of **Risk Management** tools to ensure that the level of risk is accepted by the appropriate rank. All three of these pillars require the confidence of every member of the RCAF.

We believe in a culture of constant learning and improvement. This is consistently demonstrated in our Flight Safety program. We learn from lessons and make changes to prevent recurrences of events, while assuring the continuation and enhancement of positive measures and attitudes. It is critical that we mentor our personnel at all levels, pass on learned experience, and ensure expertise is not lost. Formal and informal mentorship must be part of the Flight Safety culture. Supervisors must train their subordinates to identify hazards and encourage them to take the initiative to prevent mishaps.

We emphasize a non-punitive system which allows for reporting of Flight Safety incidents without fear of reprisal. No one will be punished for reporting an honest mistake. We must always strive for a "Just Culture", an environment which encourages open reporting of incidents and hazards, while collectively allowing us to find ever-safer avenues to conduct our operations. I consider myself privileged to be leading a highly disciplined and well-educated force. When confronted with a new and unfamiliar situation, I know I can rely on our members to stop and seek clarification. It's your responsibility to report any flight safety concern to your unit Flight Safety team. It's up to supervisors at all levels to ensure that a "Just Culture" thrives at units by building trust and understanding with subordinates.

As our capabilities are enhanced and our aircraft become more technologically advanced, it is important to respect the fact that this technology does not take the place of exercising sound judgment. Advanced avionics that incorporate increased automation do not diminish the requirement for RCAF members to adopt a comprehensive safety culture. All members should ensure that they understand acceptable risk and how maintaining the appropriate level of supervision and oversight ensures that risks are understood and taken on at the right level.

It's just as important as ever that supervisors identify, manage and mitigate risk. COVID-19 is a new risk to flying operations that we are continuously learning to manage. Ensure you consider how COVID-19 affects your members and flying operations. Supervisors must continue to use the Mission Acceptance and Launch Authority (MALA) risk management tool to ensure that the identifiable risks are accepted at their level of authority. If a new risk is discovered, reach out to your Training and Standards cells to consider this for your unit's MALA. Most importantly, flight safety can never be compromised due to pressures, real or perceived. We entrust decision-making and risk acceptance to our people. While members are always accountable for their actions, leadership will support sound decision making that respects safety of flight.

To all the members of the RCAF, your professionalism, adaptability and respect for safety in these challenging times is inspiring. I look forward to working with you in 2021.

The Editor's Corner

Welcome to the first edition of Flight Comment magazine for 2021. I think I can speak for everyone in that we are all happy to have 2020 behind us and to be starting a new year. Here at DFS we are no exception.

The other day, as I was flipping through old editions of Flight Comment magazine that date back to the 1960's, I noted how each edition captured the essence of the time. Looking over the decades, the aircraft, clothes, and writing style changed but the challenges and concerns of the time rang through. I couldn't help but wonder, what in years to come would someone say about this edition. What to tell them?

The beginning of 2020 was like the start of any other year, in that we most likely went to the same New Year's parties, packed things up after Christmas and planned to head back to work. We heard rumors of a virus in China, but the majority of us brushed it off, noting naively that China was "pretty far away." Towards the end the winter things changed when COVID-19 began to spread and the Canadian Forces activated the Contingency Plan (CONPLAN) LASER. This saw many of us begin to work from home, while others tried to service or fly aircraft and adapt to changes and restrictions that were applied. For us in the flight safety community, concerns about how restrictions, masks, and stress impacted flying operations were front and center.

Summer did give us some reprieve, as cases fell, but by the fall of 2020 we saw the onset of a second wave. The thought of tightening restrictions, and the winter ahead chilled us well before the temperature dropped.

Now in early 2021, we have encouraging news of effective vaccines, and a hope that all our lives will return to some sort of normalcy. Members of the Air Force are currently working on Operation VECTOR, which is Canadian Armed Forces' (CAF) support to the government for the distribution of COVID-19 vaccines. There is some hope and positivity in the air. It is this positivity and potential for a very different 2021 that we dedicate this issue of Flight Comment.

With the theme of moving forward, the Instrument Check Pilot School (ICP) provided us with an article on NOTAMS and how new digital technology is making it easier for pilots to sort through and prioritize them. Our Senior Investigator, LCol (Ret'd) Leblanc provided Part 2 of his article on Flight Data Monitoring (FDM) and gives us a practical example as to how there is potential to use recorded flight data to improve operational effectiveness and safety. Maj Desmarais (DFS 3-4), continued on the FDM theme, and in his article, Flight Data Monitoring CONOPS for the RCAF, looked at how a FDM program could be implemented in the RCAF.

In this edition, Col (Ret'd) Charpentier introduces us to the "Flight Safety Resilience Model." Although aptly named for these times, the model is actually an initial attempt to capture best practices and behaviours that make the RCAF successful in accident prevention. Mrs. Shannon Saunders (DFS 3-2-2) focused on the role of supervisors, and gives suggestions on how to become a better one, while Maj Shawn Duffy (8 WING FSO) and Mr. Conrad Soucy (DFS 3-2) provided Lesson Learned articles in an attempt to keep us from repeating our mistakes.

We've also included the 2021 DFS organisational diagram. Like many units, we've had new members posted-in this year that we haven't had the opportunity to get to know. The days of water-cooler chats or quick runs to the coffee shop seem far behind us. I'd like to take this opportunity on behalf of Col Alexander and the rest of the DFS staff to welcome them to the team.

Finally, nothing welcomes in a new year better than a new calendar. You will find the Official 2021 RCAF Flight Safety calendar included in the magazine.

Welcome to 2021!

Maj Courtney Douglass,
D/DFS 3

MCpl Julien Simard, Traffic Technician, and members of the Royal Canadian Air Force support the Public Health Agency of Canada with the delivery of special freezers to assist with COVID-19 vaccine distribution. December 2020.

Photo: MCpl Genevieve Lapointe, Canadian Forces Combat Camera.

For Professionalism

For commendable performance in flight safety

450 Squadron

On the evening of the 23rd of January 2020, with darkness starting to set in, Aircraft Commander Captain Jacqueline Ruis noticed an American soldier walking on a dirt path towards her CH147F Chinook helicopter as it was being shut down. Capt Ruis instructed her crew to "keep an eye on him."

While the rotor blades were spinning down, the soldier encroached upon the safety area for the blades and Capt Ruis immediately instructed her Load Master Cpl Claire Drummond, to intervene. Cpls Drummond and Kevin Leindekar ran from the back and around the side of the helicopter toward the soldier. Concurrently, First Officer Capt Alexandre Lemieux-Tremblay began banging on the side of the aircraft and yelled while Cpl Kyle Hannaford shouted out of the left cabin window and waved his arms to try to gain the soldier attention. Shortly after, the soldier looked up and stopped and Capt Ruis motioned for him to move back and away from the helicopter. Arriving at his side, Cpls Drummond and Leindekar helped escort the soldier to a safe location. Throughout this event, Flight Engineer MCpl Reid Bellamy ensured that the shutdown procedure was completed accurately.

After the aircraft was shut down the soldier thanked the crew for "saving his life." The crew released him to his post after debriefing him on airfield operations and safety precautions around helicopters.

Photos: MWO Underwood

From Left to Right: MCpl Drummond, Cpl Hannaford, Capt Ruis, Cpl Leindekar, Capt Lemeiux-Tremblay.

The rotor blades of a CH147F Chinook can droop as low as four feet three inches from the ground and each weigh approximately 350 pounds. After the incident, the crew paced the distance and determined that the soldier was approximately 12 paces from being struck by the rotor blade. Despite the noisy conditions, Capt Ruis and her crew displayed exceptional situational awareness and conducted a coordinated response that prevented a soldier from potentially losing his life. They are highly deserving of this For Professionalism award.

MCpl Bellamy

Sergeant Christopher Lamb

Photo: WO Marc Adolph

On the 17th of October 2019, door gunner Sergeant Christopher Lamb was part of a four-man crew scheduled to conduct a general currency night flight. While approaching the CH146 Griffon helicopter, Sgt Lamb began a "last chance check." During this brief visual inspection, he took a step back to check under the fuselage and, using the light from his flashlight, noticed a plastic bag hanging underneath the aircraft. Taking a closer look, he found an open panel secured by one screw. Sgt Lamb advised the rest of the crew and the aircraft was quarantined for a flight safety investigation.

Although not formally responsible for the aircraft, door gunners are strongly encouraged to be part of pre-flight procedures. Sgt Lamb's initiative and attention to detail potentially prevented a serious occurrence from taking place and he is therefore highly deserving of this For Professionalism award.

For Professionalism

For commendable performance in flight safety

Sergeant Danny Lewis

Photo: Cpl Yongku Kang

During Production Acceptance Test and Evaluation of a CP140 Aurora aircraft at a third line contracting facility, Sgt Lewis, a Flight Engineer, noticed that the weight and balance index number appeared to be outside the average normally seen on other CP140 aircraft.

While the information contained in the weight and balance calculation log looked accurate, the resulting index number was low enough to concern Sgt Lewis, and the Contractor agreed to investigate.

A re-weighing of the aircraft was performed with a newly calibrated scale that yielded a moment much more in line with historical values. The previously calculated moment was erroneous enough that under certain aft-heavy configurations of the aircraft (with external search stores and spare parts), the centre-of-gravity would have appeared within limits while in fact it would have been outside, creating a hazardous condition.

Sgt Lewis' sharp attention to detail and inquiring mind prevented a potentially unsafe situation, making him very deserving of this For Professionalism Award.

Master Corporal Dean Gurr

Photo: Cpl Joey Beaulin

Prior to a scheduled ground run on Aurora CP140112, Master Corporal Dean Gurr conducted an inspection of the number one engine's intake and exhaust system. This examination is always conducted by a technician before and after an engine operation and includes using a ladder or a stand to look for Foreign Object Debris (FOD). MCpl Gurr went beyond the mandated inspection requirements and elected to carry out an "intake crawl" in order to ensure the engine's safe condition.

By taking the extra time and effort, MCpl Gurr discovered a valve housing filler cap and its spring latching mechanism deep inside the intake of the engine. The filler cap was found wedged within an inch of the fan blades. Had the cap contacted the compressor section of the engine, it would have resulted in catastrophic damage to the engine and an emergency for the members onboard the aircraft.

MCpl Gurr's professionalism and thoroughness mitigated a significant flight safety hazard. He is very well deserving of this For Professionalism award.

For Professionalism

For commendable performance in flight safety

Master Corporal Timothy Brown

The 1 Canadian Air Division (1 CAD) Headquarters Aircraft Maintenance Standardization and Evaluation Team (AMSET) conducted an audit of 433 Tactical Fighter Squadron (TFS) at CFB Bagotville in June 2019. MCpl Tim Brown, a subject matter expert from the Canadian Forces Environmental Medicine Establishment (CFEME), augmented the team in order to provide training and mentorship to unit Aviation Life Support Equipment (ALSE) technicians. This role included the provision of support in areas such as helmet fitting, ALSE shop management and electronic records keeping.

While conducting this support, MCpl Brown was instrumental in the identification and reporting of a non-conforming Allen Head set screw installed on the parachute quick release adaptor fitting of fifteen harnesses available to aircrew. The set screw is pre-installed on the parachute quick release adaptor fitting by the Original Equipment Manufacturer (OEM) for shipping. It must be removed and replaced with a Common Head set screw when the quick release adaptor is installed onto the harness. If the approved set screw is not properly installed, there is a potential for the parachute quick release adapter fitting to detach from the harness which attaches the aircrew to their parachute.

MCpl Brown demonstrated his technical expertise when he went above and beyond his training and mentorship role to identify and report the use of a non-conforming ALSE part. His professionalism and attention to detail mitigated a serious risk. He is very well deserving of this For Professionalism Award.

Corporal Cody Osmond

On the evening of 29 June 2020, technicians from 413 Sqn borrowed a case of hydraulic fluid from 405 Sqn to service a CC130 Hercules aircraft. The case was labeled "MIL-H-87257 / H-538", which is the approved fluid for the aircraft. Upon opening the case to replenish the booster hydraulic system, Cpl Osmond noticed that the individual cans of fluid were labeled with the NATO code "H-537" and had a different specification, "MIL-H-83282". The case was immediately quarantined and 405 Sqn was notified.

Upon investigation, 405 Sqn was found to have multiple cases of mislabeled hydraulic fluid. Further liaison with the manufacturer revealed that the company had mistakenly added a number of mislabeled cans (H-537) to the production line. Consequently, all RCAF fleets were informed of the discrepancy and advised to inspect their stores.

The two types of hydraulic fluid came in cans that were nearly identical and if not for the attention to detail and situational awareness exhibited by Cpl Osmond, the Hercules aircraft could have been replenished with the wrong type of fluid. This action could have resulted in lengthy repairs and possibly significant damage to the aircraft. Cpl Osmond is highly deserving of this For Professionalism award.

Photo: Cpl Yongku Kang

For Professionalism

For commendable performance in flight safety

Corporal Miguel Lessard-Dumas

Photo: Cpl Laura Landry

On the 14 November 2018, Corporal Lessard-Dumas was tasked to work on a CH146 Griffon helicopter that had experienced problems with its number two engine during a post-maintenance ground run.

Cpl Lessard-Dumas began to troubleshoot the problem, sequentially changing components and conducting numerous ground runs until he determined that the issue had to be wire related. He then proceeded with a detailed wire verification during which he discovered damaged wires in the cable bundle located between the two windshields.

The wires, partially stripped due to friction from the fuselage, were in contact with the aircraft structure and had started to burn. Additional wires, in the same cable bundle but not in contact with the fuselage had started to darken.

The space between the two windshields was hard to access and Cpl Lessard-Dumas suspected that the problem could be present on other CH146 Griffon aircraft. Taking the initiative, he checked all the helicopters at 438 ETAH and found that half of them had the same issue.

The Chain of Command was immediately informed and a document modification CF343, 300 hour inspection was formulated to rectify what was considered a high risk of electrical fires across the CH146 fleet.

Cpl Lessard-Dumas' thoroughness and persistence, coupled with his initiative to determine whether the issue had fleet wide implications went beyond the scope of his assigned task, he is well deserving of this For Professionalism award.

Corporal Nyall Hughes

Photo: Capt Brian Robar

While carrying out a 25 Hour inspection on the tail rotor of CH146 Griffon 455, Corporal Nyall Hughes discovered that all four tail rotor blade retention bolts were loose. Since the helicopter had only flown 1.2 hours since its last inspection, Cpl Hughes was completing the 25 Hour inspection based on its scheduled due date. A torque test determined that the bolts were only torqued to 10 inch/pounds (IN/LBS) instead of the acceptable range of 500 to 550 IN/LBS as specified in the CH146 technical reference.

Further investigation revealed that the bolts had been loosened a month earlier when maintenance involving the removal of the tail rotor hub and blades had been completed.

Since the role of the four blade bolts is to fasten the tail rotor blades to the hub, loose bolts would have caused tail rotor vibration. This vibration could have caused the bolts to "back out," which could have resulted in losing the tail rotor bolt, followed by the possible loss of the tail rotor blade. A loss of a tail rotor blade would have impacted the pilot's ability to maintain directional control and could have resulted in damage or complete loss of the aircraft.

Cpl Hughes' professionalism and diligent attention to detail during the 25 Hour inspection mitigated a serious risk. She is very well deserving of this For Professionalism Award.

For Professionalism

For commendable performance in flight safety

Mr. Danny O'Brien

Photo: Chris Pitcy, PAL Aerospace

While conducting third line maintenance at PAL Aerospace in St. John's, Newfoundland, Mr. Danny O'Brien discovered an error in the CT142 Dash-8 maintenance manual. According to tables in the manual, the acceptable wear limits for a hard, corrosion resistant, steel hydraulic line were equal to the line's total wall thickness. Cross referencing his finding with the De Havilland maintenance manual, he confirmed the error.

Through PAL Aerospace, Mr. O'Brien raised the potential hazard to 402 Squadron flight safety and maintenance personnel. Upon receipt of this information, the CT142 Senior Design Engineer (SDE) conducted a review of both publications and confirmed the identified hazard.

Although a note exists in the CT142 maintenance manual directing that no more than 20% wear is allowed, this note is significantly less prominent than the wear table identified by Mr. O'Brien. As a result, the note could have been missed during routine maintenance. Compounding this issue, under normal circumstances 402 Squadron technicians do not have access to the original De Havilland manuals and would not be able to cross-reference this information. Application of the erroneous table raised the concern that the hydraulic lines could have been worn through 99% of their thickness and still be considered serviceable. This increased the risk of a hydraulic line rupture which could have resulted in damage or complete loss of the aircraft.

Mr. O'Brien's professionalism, attention to detail and diligence mitigated a significant flight safety hazard. He is very well deserving of this For Professionalism Award.

Mr. Dominic Tremblay

Mr. Dominic Tremblay, an L3 MAS technician employed as a mentor at 433 ETAC, was replacing a canopy on a CF188 Hornet when he discovered a potentially hazardous anomaly in the maintenance procedures.

Once the new canopy was installed, the last step of the procedure instructed the technician to remove the safety pins from the ejection seat. This instruction caused the ejection system to become armed and disengaged one of the safety devices that prevented the seat from ejecting after its initiation. There were no further instructions in the procedures to re-engage the safety device.

The ensuing investigation revealed that this hazardous condition was created in 2009 when the technical orders were not properly amended following the replacement of the Legacy ejection seat with the current NACES model. The technical orders were actually referring to the five maintenance pins that had to be removed during maintenance work on the Legacy ejection seat and were not related to the general ground safety pin. These maintenance pins are not used on the current NACES system and so references to remove them are not appropriate.

Cognizant of the severity of potential damage/injury related to this problem, Mr. Tremblay ensured that the chain of command's airworthiness risk analysis process was meticulously followed to correct the situation.

Greatly experienced as a technician, Mr. Tremblay's professional attitude and attention to detail went a long way to identifying and correcting this hazardous procedure. Mr. Tremblay is very deserving of this For Professionalism award.

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: S1 Laurance Clarke

From Left to Right: Col James Hawthorne, 12 Wing Commander, WO Allan Green, CWO Bruno Poirier.

ON TRACK

This article is the next installment of a continuous Flight Comment contribution from the RCAF Instrument Check Pilot 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

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This edition of On Track will discuss the Notice to Airmen (NOTAM) system and was written by Captain Chris Filiatreault, ICP School Instructor. This is Part Two of a two-part series. Part One sought 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 short-falls and how we can use the system more efficiently. Please note any opinions expressed in this article are the authors alone.

Hello again, and welcome back for NOTAMs Part 2! At the time of writing this article the new NOTAM system, and the associated on-line CFPS[1] system, has been around for about a year now. How are you finding it? A convenience survey of my fellow pilots has shown me every reaction from "It's ok..." to "How do I make sense of this?". This article will reflect on current views around NOTAMs, how can they serve us best, and what technologies we can employ to help enhance NOTAM use in the service of aviation safety and efficiency. A practical discussion concerning CFPS use and other technologies to help make NOTAMs more digestible will conclude the article.

To set the tone – what are NOTAMs used for? I mean, what are they *really* used for? As I quoted in the last article, Nav Canada defines NOTAMs as: *"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"*. The key word here is **essential**. What is essential to you as a pilot? Many pilots would suggest this is a factor of what type of aircraft you fly, where you're going and what altitude etc. you may be flying at. Therefore, what is essential to the bush pilot, helicopter pilot, military pilot, transport pilot or glider pilot (to name a few) can be very different. That being said, a NOTAM system showing all essential notices to these various pilots would inevitably deliver huge amounts of information. This is very much how many pilots that I've spoken to feel about the current system in Canada, not to mention those DND pilots who fly internationally – too much information and not a very efficient way of sorting through it. These feelings have also been shared in the United States. During a hearing on 7th July 2017 into the Air Canada Airbus A320 that almost landed on a San Francisco (SFO) taxiway, the NTSB chairman called the U.S. NOTAM system "messed up." The pilots had failed to catch a NOTAM on page 8 of 27 at SFO showing that runway 28L was closed and assumed that the taxiway was 28R (their cleared runway).[2]

So, what should NOTAMs report that is truly essential? Would it be runway closures? How about full or partial unserviceable lighting? Tower lights U/S? Birds in the area when we know its migratory season? Nav Canada's "Promulgation Requirements"[3] have 27 'criteria' for which NOTAMs will be published – which I will not list here as it is very large. However, in this list there are certain components that could be argued to be somewhat nonessential. A particularly good article which I suggest you read is written by "Eddie" on the website: code7700.com/notams.htm. Eddie explains that there is so much information

Location	Number	Class	Start Date UTC	End Date UTC	Condition
JFK	N/A	Aerodrome	10/16/2013 1655		ON AIRPORT - SEE CONSTRUCTION GRAPHIC
JFK	12/676	Aerodrome	12/25/2019 0916	PERM	TWY C4 DECOMMISSIONED 1912250916-PERM
JFK	5/6744	Procedure	01/26/2015 1320	PERM	STAR KENNEDY INTERNATIONAL, JAMAICA, NY LENDY ARRIVAL...UNUSABLE BELOW 4000FT 1501261320-PERM
JFK	0/0990	Procedure	06/12/2020 1342	06/12/2022 1342EST	IAP JOHN F KENNEDY INTL, NEW YORK, NY. ILS OR LOC RWY 4L, AMDT 11D... AUTO COUPLED APPROACHES NA BELOW 500FT MSL. 2006121342-2206121342EST
JFK	0/2669	Procedure	05/21/2020 1153	01/31/2022 1153EST	IAP JOHN F KENNEDY INTL, NEW YORK, NY. VOR RWY 31L, ORIG-A... CIRCLING CATS C/D MDA 680/HAA 667. 2005211153-2201311153EST
JFK	08/635	Aerodrome	08/29/2020 1820	10/31/2021 0300	TWY Y HLDG PSN SIGN FOR ILS NORTH SIDE FOR RWY 13L/31R LGT U/S 2008291820-2110310300
JFK	9/9713	Procedure	10/22/2019 1130	10/22/2021 1130EST	IAP JOHN F KENNEDY INTL, New York, NY. ILS OR LOC RWY 13L, AMDT 18B... UXHUB FIX MINIMUMS: CIRCLING CATS C/D MDA 680/HAA 667. 1910221130-2110221130EST
JFK	09/312	Aerodrome	09/24/2020 1247	09/24/2021 1100	TWY A CLR BAR LGT AT TWY G NOT STD 2009241247-2109241100
JFK	9/3379	Procedure	09/20/2019 1400	09/20/2021 1400EST	SID JOHN F KENNEDY INTL, New York, NY. GREKI SIX DEPARTURE... JUDDS TRANSITION NA EXCEPT FOR ACFT EQUIPPED WITH SUITABLE RNAV SYSTEM WITH GPS. CMK VOR/DME R-057 UNUSABLE. 1909201400-2109201400EST
JFK	9/5926	Procedure	08/22/2019 1100	08/22/2021 1100	SPECIAL JOHN F KENNEDY INTL,NEW YORK, NY. SPECIAL RNAV VISUAL RWY 13L, AMDT 2... SPECIAL RNAV VISUAL RWY 13R, AMDT 2... PROCEDURE NA 1908221100-2108221100
JFK	09/259	Aerodrome	09/22/2020 1623	04/02/2021 1100	TWY TB BTN TERMINAL 8 RAMP AND TWY A CLSD 2009221623-2104021100
JFK	09/069	Aerodrome	09/08/2020 1244	03/08/2021 2111EST	RWY 04L RWY END ID LGT U/S 2009081244-2103082111EST
JFK	09/481	Obstruction	09/25/2020 1100	02/15/2021 2000EST	OBST CRANE (ASN 2020-AEA-628-OE) 403956N0734838W (2.1NM NW JFK) 259FT (240FT AGL) FLAGGED AND LGTD DLY 1100-2000 2009251100-2102152000EST
JFK	09/359	Aerodrome	09/27/2020 1241	01/11/2021 2000	TWY U SHOULDER MARKINGS BTN TWY B AND TWY U3 NORTH SIDE NOT STD 2009271241-2101112000
JFK	09/361	Aerodrome	09/27/2020 1628	01/11/2021 2000	TWY W SHOULDER MARKINGS AT RWY 13L/31R SOUTHWEST SIDE NOT STD 2009271628-2101112000
JFK	9/3359	Procedure	01/11/2019 1513	01/11/2021 1512EST	VFP JOHN F KENNEDY INTL, New York, NY. BELMONT VISUAL RWY 22L, ORIG... PROCEDURE NA EXCEPT FOR AIRCRAFT EQUIPPED WITH SUITABLE RNAV SYSTEM WITH GPS. CRI R-068 UNUSABLE. 1901111513-2101111512EST
JFK	07/335	Aerodrome	07/20/2020 1512	12/31/2020 2300	APRON HANGARS 345 NORTH RAMP CLSD 2007201512-2012312300
JFK	09/381	Navaid	10/05/2020 1200	12/18/2020 1200	NAV VOR/DME U/S 2010051200-2012181200
JFK	0/1220	Procedure	09/11/2020 1632	12/05/2020 1631EST	IAP JOHN F KENNEDY INTL, NEW YORK, NY. ILS OR LOC RWY 22R, AMDT 3A... S-LOC 22R MDA 600/HAT 587 ALL CATS. VISIBILITY CATS C/D 1 3/4. TEMPORARY CRANE 346FT MSL 4.03 NM NORTHEAST OF RWY 22R (2019-AEA-1...
JFK	09/311	Aerodrome	09/24/2020 1242	11/27/2020 1100	TWY J CL MARKINGS BTN RWY 04L/22R AND TWY B REMOVED 2009241242-2011271100
JFK	09/271	Aerodrome	09/23/2020 0718	10/31/2020 2359	TWY K ELEVATED GUARD LGT FOR RWY 13R/31L SW U/S 2009230718-2010312359
JFK	09/150	Aerodrome	09/13/2020 1658	10/31/2020 2200	RWY 04R/22L CL MARKINGS OBSC 2009131658-2010312200
JFK	07/319	Aerodrome	07/29/2019 1228	10/30/2020 2200	TWY Z BTN RWY 04L/22R AND TWY Y CLSD 1907291228-2010302200
JFK	09/337	Aerodrome	09/25/2020 1435	10/30/2020 1900	TWY V SFC PAINTED HLDG PSN SIGNS FOR RWY 13L/31R NORTH SIDE REMOVED 2009251435-2010301900

Figure 1. An example of an FAA NOTAM search I conducted for JFK on 28 Sept 20. This picture shows only 24 of the 40 returns the FAA NOTAM system brought up. Where are the closed runways located? Trick question, they're down at item 35...

published at various airports, that much of the essential information is lost in the folds of the nonessential which is the problem (see Figure 1). In fact Eddie found that there were 500,000 NOTAMs issued world-wide during 2006 and then in 2013 we surpassed one million NOTAMs issued in one year. He postulates that the likely culprit is airport operators or various creators who do this to avoid any blame or fault. He certainly brings up an interesting point. For example: do you really need to know about a taxiway closed for maintenance at a controlled airport when the controller will issue you taxi instructions along the serviceable taxiways? The point made by Eddie is that many NOTAMs can be described as, "See! I warned you" instead of being substantive and providing critical information. If the NOTAM system is to truly achieve its aim of delivering essential information to pilots, then it is necessary that this information is not lost between the nonessential. From a Flight Safety and HPMA point of view we can absolutely understand that when inundated with vast amounts of information that is layered in no apparent order, it's understandable why many pilots 'skim' the information and may miss critical parts.

Aside from conceptually and organizationally overhauling the NOTAM system, what are some techniques we as pilots can use to help us process these piles of notices and do so to achieve a safe flight? I'll refer to "Eddie's" article where he talks about his method of searching with a highlighter. Simply put, as you scan the list of NOTAMs do so actively rather than passively. Look at line E (See Figure 2) of the Canadian NOTAM and ask yourself what key terms are you concerned with for your flight? How about altitude blocks? Airspace? Navaids U/S?

For example, a Tactical Helicopter pilot may be scanning for unserviceable tower lights and will keep that key word in mind (OBST LGT U/S TOWER) but they may not care for terms such as AUTO WX SYSTEM U/S if they're out in the middle of the field. This

```
(D2796/20 NOTAMN
A) CYWG B) 2009281230 C) 2009282300
E) RWY 18/36 CLSD AVBL AS TWY.)
```

Figure 2. Line E shows the content the pilot is concerned with.

is a good basic method for capturing what matters and ignoring what does not. A reminder though – airspace restrictions give LAT/LONGS and sometimes a direction and distance from an aerodrome, ex: Forest Fires. It would be prudent to take the time and map those out.

How about this idea, many ops rooms keep a map that spans a local training area or an area of operations and is usually updated regularly by the Duty Operations Officer. A possible purpose of the map could be to graphically depict the concerned NOTAMs in the area to help pilots decide what is important or not depending on their flight (ie: long term known NOTAMs). For example, a map like this would have NOTAM's related to U/S tower lights shown,

airspaces delineated and coloured in showing the altitudes and times they are in effect, as well as any PIREPs passed back to OPS. Any new NOTAMs could be drawn on the board and a "NEW" tag would be put next to it to draw pilots' eyes to what is new versus old. This is just an example of how we came make NOTAMs more manageable, and more importantly – graphical.

Let's go back to Nav Canada's CFPS program for a moment. Remember from NOTAMs Part 1 that each NOTAM has been assigned an "area" or radius by the originator (Figure 3).

When calling up individual points, airports or other criteria in the search box and not having the "Route Radius" box checked off, the CFPS program will return a NOTAM as many times as its radius intersects with the searched criteria. For example: if a NOTAM's radius intersects with Regina and Winnipeg and you search both these airports without the "Route Radius" box checked, then you will get the NOTAM twice under each airport return. However, if you use the "Route Radius" box, then you will only see the concerned NOTAM once. Also, and I'm sure this is transparent to many pilots, adjusting your route radius smaller (set nominally at 50NM) may also help reduce unwanted NOTAM returns while enroute.

Let's move to some examples of off the shelf solutions and privately made software. ForeFlight allows a certain amount of control over NOTAM information, and I will discuss a few interesting functions below, although this is not an exhaustive list. Primarily, entering in a route and 'packing' for the flight will allow you to see the NOTAMs concerned with your route much like CFPS. ForeFlight will even have a red exclamation mark (as an exponent to an airport in the "route" window) which has a critical NOTAM associated to it. Simply tap on the airport bubble and select "View Alert NOTAM" (Figure 4).

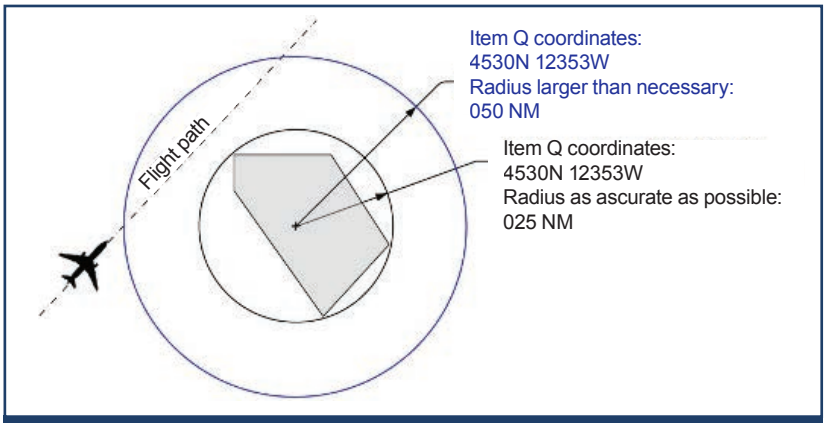

Figure 3. The radius of the NOTAMs area of influence is controlled by the originator.

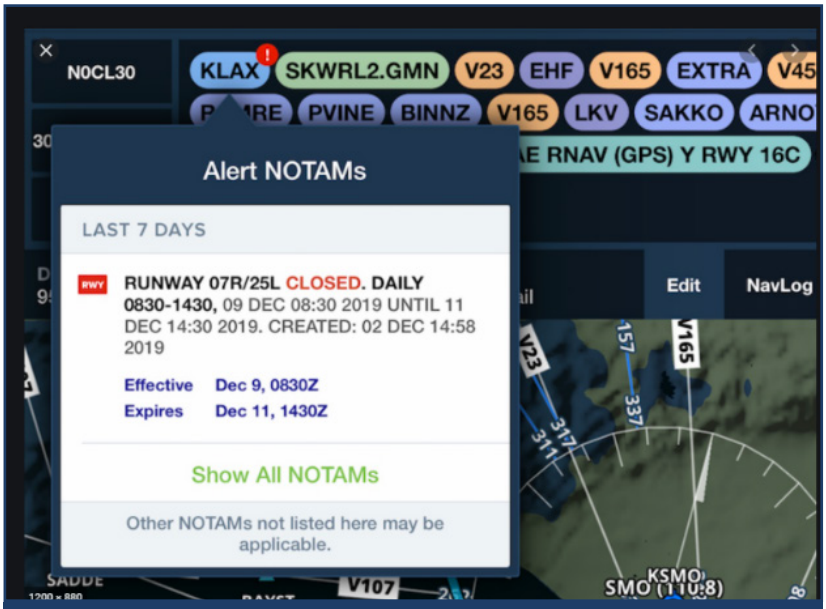

Figure 4. ForeFlight Alert NOTAM.

ForeFlight also has a handy feature for approaches that is available to you when you create a route. First, create the route and then touch the "Procedure" box to the right of the route box. There will be a window that pops up which will show you a list of runway closures and other NOTAMs affection airports in your route – and although this is not an exhaustive list of NOTAMs that will affect your flight, it does help you gain better situational awareness for airports you are concerned with. Another way to see NOTAMs affecting an airport, or its surrounding area, is to simply look up an airport and by touching the NOTAM tab associated with the airport you can view NOTAMs in three distinct categories – Airport, TFR/ARTCC, and Obstacle. This allows you to 'chunk' NOTAMs into categories which can help alleviate looking for particular

NOTAMs in a long list you might find on CFPS. A feature that I personally like in this view is that ForeFlight will also order these NOTAMs by time. At a glance you can see which is more recent versus older, which over consecutive flights allows you to be more aware of what might affect you or what can be ignored. Finally, and unfortunately this is only available for Europe, is that ForeFlight has the ability to display NOTAMs graphically – that is, showing a map with the NOTAMs overlaid where they are active. This also gives you drawings of areas that have discreet boundaries or shapes (Figure 5).

You can see how powerful a graphic representation of NOTAMs can be! Right from the start you can tell, based on your planned track, which NOTAMs you should be concerned with or not. If you see a NOTAM that intersects your route, or any you want more information from, you simply tap it and it will give you the NOTAM information in a small bubble.

With respect to private software, there are various homemade and company solutions I have seen which allow pilots to sift through NOTAM content and include some nice features to help reduce overload. I'll write briefly about a couple of these features to help better inform you about what might be out there. First, I have seen a program which "knows" where you're signing in from and automatically only shows you NOTAMs from around your area (done by province). This helps reduce

Figure 5. ForeFlight Europe has NOTAMs displayed graphically.

NOTAMs that may come from areas that you're not concerned with, and if you do wish to include the other NOTAMs, then you simply check off each province you desire. Also, a feature of a program which I have worked with allows you to select what type of NOTAMs you would like to see. As an example you can check off certain "discreet" selectors such as "Runway Surface Condition", "VOR Airways", or "U/S OBST LGTS" to name a few, so that you may tailor your search results (which come from Nav Canada raw data) to a more digestible size. Another key feature of the private software I have been discussing is that it also "translates" the NOTAM from code into plain text. When the selection of NOTAMs are requested they are automatically "cleaned" by the program which then puts them into a standard, but much more readable format, making the time/date group as well as validity, location and description into a much more reader friendly format. Finally, and the best feature of this program, is that you can ask it to create a ForeFlight overlay that you can bring up on your map and it shows all the various NOTAMs in the area in a graphical format.

Jeppesen offers a "NOTAM Management Tool" which allows the user to "search, filter, sort, edit and create NOTAMs based on user-defined parameters".[4] Although I have not used this tool, it does seem to have the basic characteristics of other NOTAM services which seek to resolve the volume of NOTAM information into a mission applicable format and reduce extraneous information. These are only a few innovations which I have seen and many more are being produced and available to the public as a way to help make NOTAMs easier to read, digest and understand.

As NOTAMs are a necessary component of our flight planning and operation, I hope the above information may help you become more efficient in working through NOTAM searches and contribute to a safe flight. Further, I hope the discussion concerning other software may help spur an idea or venture that the Air Force could adopt to help our pilots become more efficient in mission planning. Please reach out to me at Christopher.filiatreault@forces.gc.ca should you have any further suggestions, ideas or products you think might help progress NOTAM technologies and delivery, I look forward to keeping this discussion alive with the hopes of making our system better. Thank you for your time.

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Photo: Cpl Laura Landry, 438 SQN

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FLIGHT DATA MONITORING – the next logical step (Part II)

by LCol (Retd) Martin Leblanc, D/DFS 2 Senior Investigator

Photo: Pte Daniel Chiasson

Introduction

In Flight Comment Issue 1, 2020, we exposed you to the concept of Flight Data Monitoring (FDM). What it is... and what it is not, and what it can do for you. This present article is the sequel to this dossier. My intent with Part II of this article is to showcase a practical case where FDM "could" have saved the day. It is important to say "could" because we can't really prove something that did not happen. As well, as Flight Safety specialists, we have to be careful not to fall into the trap of playing armchair quarterback when looking at events retroactively.

The case I want to use to demonstrate how FDM could have helped is the CH146 Multiple aircraft limitations exceedances (ref A), which occurred in 2009 during our deployment in Afghanistan (Op ATHENA).

In the early days of Op ATHENA it was recognized that the CH146 usage spectrum did not account for Close Combat Attack (CCA) and Escort operations. Additionally the requirement for rapid deployment of the M134D weapon and C6 Spent Casings and Link Discharge Assembly (SCLDA) into theatre did not allow for the conduct of a flight load survey test program prior to fielding the weapon systems. This situation motivated staff within the CH146 Weapon System Manager (WSM) office in Ottawa to start looking closely at flight data in order to fill the flight dynamic loads knowledge void.

Finding the needle in the hay stack... by accident!

The CH146 Griffon Flight Data Recorder (FDR) records 107 parameters, while the Health and Usage Monitoring System (HUMS) records 107 parameters. And this is true for every flight, and each parameter is recorded multiple times each and every minute. So, both the FDR and the HUMS generated lines and lines of data for the WSM staff to sift through in their effort to assess the dynamic loads. On 2 Feb 2009, the WSM staff noticed an Inlet Turbine Temperature (ITT) exceedance. Intrigued, the WSM staff investigated further. In the end, this flight data analysis identified that, from Dec 2008 to Nov 2009, there were a total of 1,322 exceedances in Afghanistan. These included main rotor (Nr), gas generator (Ng) and power turbine (Nf) overspeeds; mast (Qm) overtorques; angle of bank exceedances, and 1,120 occurrences of ITT exceedances.

The operational impact

Simply put, the operational impact could have been that all dynamic components on all aircraft involved would have to be removed, overhauled or replaced. Can you see the aircraft unserviceability go way up? The operational and monetary impacts would have been significant.

Because all those exceedances have an impact on component fatigue, a penalty factor (acceleration in usage) had to be assessed and applied against these components. In one specific aircraft case the tail rotor blades penalty factor was 1:33.227. Let me drive this home a little more. The aircraft had only flown 51.5 hrs. With the penalty factor applied, 1659.7 hrs were counted against the components' life ((penalty factor – 1) x actual hrs = total hrs against component life). It is worth noting that in 2345 hours of operations

Photo: DND

in-theatre up until 15 Jul 2009 there were **12 553 additional penalty hours** accumulated for the affected components.

The flight safety impact

Although no visual aircraft damage was noted from any of the exceedances, various components were affected by fatigue. It cannot be overstated that had the exceedances not been detected and stopped early several components would have been severely compromised with potentially catastrophic results.

When the CH146 Griffon first entered theatre in Dec 2008 the aircraft would likely have been Mast Torque (Qm) or All-up-weight (AUW) limited. With the onset of the hot summer season and with elevated OATs, the aircraft would have become temperature limited or ITT limited. However, with the historical expectation that the aircraft was Qm limited it would have been difficult for aircrew to anticipate that ITT would become the limiting factor. This bias towards Qm precluded the crews from focussing on the actual/real limiting factor. This bias caused the crews to operate with reduced safety margins, unbeknownst to them.

Conclusion

If you remember Part I of this article it stated that if you don't measure it, you won't know about it and if you don't know about it you can't fix it. If you don't fix it, it is a matter of time before it evolves into a costly and unfortunate accident. The practical case explained here is a key indicator that exploiting recorded flight data will not only improve safety but also minimize operational impacts. This is the true value of a FDM programme.

FDM is just another reporting mechanism in the big scheme of things, but more importantly it is a "proactive" reporting mechanism. Reporting trends over time which could indicate decreased safety margins and/or which areas of your operation is riskier. It is absolutely unrealistic to expect our crews to be able to effectively monitor hundreds of parameters and report where/when required. The impact of unreported exceedances is significant. FDM, in addition to voluntary reporting by aircrew, can make your operation not only safer, but more efficient as well.

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C. RARM – CH146 Cumulative Effect of VNE Exceedances – Deployed Operations (RARM-CH146-2009-008).

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Photo: Cpl Djalma Vuong-De Ramos

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Photo: Cpl Jerome Lessard

Flight Data Monitoring CONOPS for the RCAF

by Major Jean-Sébastien Desmarais, DFS 3 Flight Data Monitoring

In the Issue 1, 2020 of *Flight Comment* Magazine, you were introduced to what Flight Data Monitoring (FDM) programmes are and what benefits they can offer. And although it is clear that any major air operator can profit from such programmes, the mechanisms that drive the desired outcomes can vary greatly based on the scope of operations of a given organisation. More specifically, the air forces around the world face specific challenges and operate differently than their civilian counterparts, and militaries often have to adapt common processes and best practices to their size and type of operation. Exactly how the RCAF could implement an FDM capability to augment our current reporting system is going to be further examined in this article, as we delve deeper into RCAF FDM concepts and processes.

As we are paving the way for this upcoming capability, we must establish the baseline concept of operations (CONOPS) that will help us achieve the aim of the Flight Safety Programme (FSP): "to prevent accidental loss of aviation resources while accomplishing the mission at an accepted level of safety."[1] In doing so, we must **ensure that the FDM CONOPS upholds one key element of the FSP: Just Culture**. Without it, the RCAF risks losing its members' trust in the programme, and consequently, the programme risks losing its credibility and effectiveness. The only way to safeguard our Just Culture is to **create an FDM programme that is established for the single purpose of mishap prevention**. It then follows that that RCAF capability shall reside within the Directorate of Flight Safety (DFS), and that the Airworthiness Investigation

Authority (AIA) shall maintain oversight of the programme. In essence, FDM is the next logical step in occurrence reporting, in complement with having people reporting freely without fear of punishment. Placing FDM under the Just Culture umbrella enables aircraft reporting without fear of data being manipulated or members being punished.

But the capacity to build an FDM capability that is indigenous to the RCAF does not currently exist, and it is very likely that the programme would require a third-party vendor (or *provider*) to offer their system – consisting of servers, analytical software and user interface – as well as their expertise to the RCAF. Such programme using a commercially available solution will require three main entities to work hand in hand for the best chances of success, as shown in Figure 1.

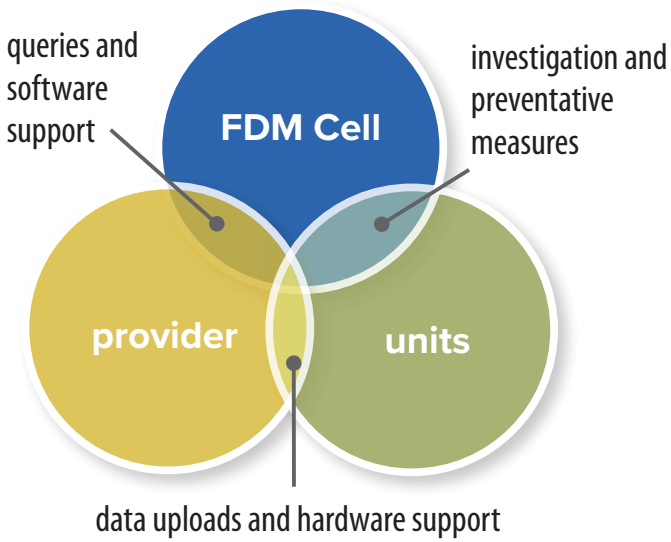

Figure 1. Entities involved with FDM.

1. The **FDM cell** will be the focal point of daily FDM operation, and will reside within DFS. Similar to the duties of a desk officer, the FDM cell will maintain watch on the FDM interface and validate any flagged events. The FDM cell will be required to interact with the provider for system support, and with the units for normal flight safety processes such as investigations;
2. The **provider** will be required to establish the necessary infrastructure and system to conduct FDM – which entails turning raw flight data into human-usable FDM product – and will be required to work closely with the FDM cell to ensure the aim of the programme is being met. The provider may also be required to liaise with the units for data upload support and other hardware requirements;
3. The **units** are primarily involved with FDM for two specific tasks: the first being to upload the flight data on a regular basis; and the second being to implement the preventative measures (PM), as they already do when PMs originate from conventional flight safety investigation methods.

The RCAF FDM model is an action-feedback loop – derived from the OODA loop concept[2] – designed to present specific corrective actions and measure its effects, thus providing the ability to be self-critical. It is represented at Figure 2. The RCAF FDM model has four domains:

Data Collection

This domain involves all activities and hardware required to acquire and safeguard the flight data in a systemic manner. That data is then uploaded on the dedicated FDM server to be analyze for FDM output through the user interface. When a gate is triggered, the event is automatically flagged for review by the FDM cell.

Context Analysis

This domain is where initial qualitative and quantitative investigation is conducted to determine the validity, reliability, and relevance of the event. If necessary, further probing can be conducted by direct interaction with aircrew or any other means available. Note that this is not yet a FS investigation in the traditional sense, but simply a preliminary look at the facts to determine whether an official flight safety investigation is needed or not.

Intervention

Once an intervention has been deemed necessary, this domain serves to focus on root cause analysis and development of effective PMs. Even though the intervention domain is an integral part of the FDM cycle, it serves the same purpose as a conventional FS investigation and leverages existing processes.

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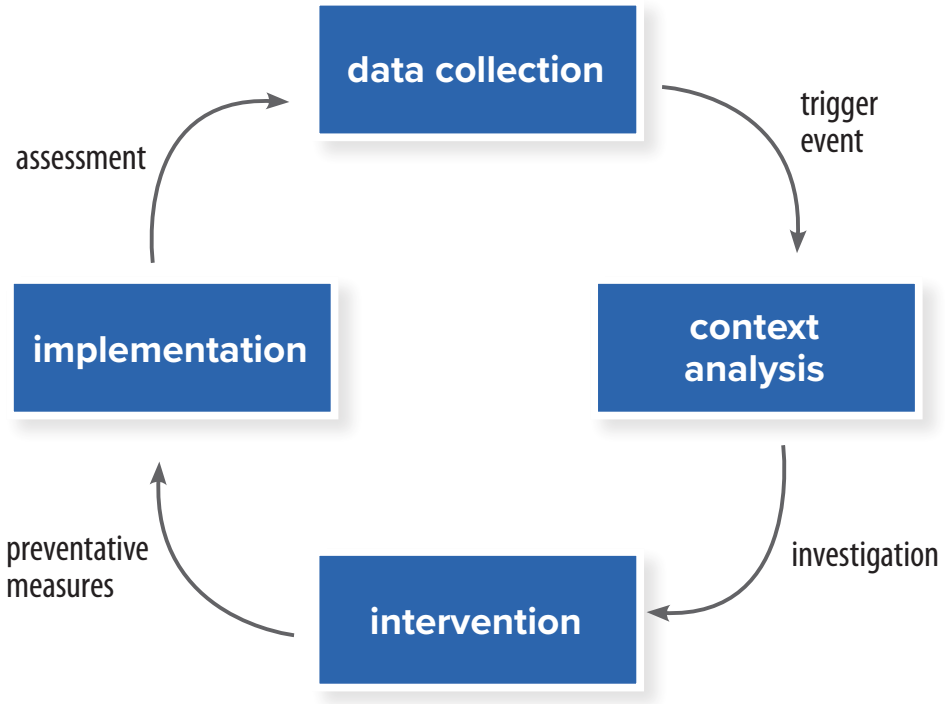

Figure 2. Cycle of RCAF FDM Execution.

Implementation

This domain is often the responsibility of the Chain of Command at the echelon appropriate for the change required, once the PMs have been developed and accepted by the leadership. However, implementation can also take the form of educational briefings or extra training, at the lowest echelon possible which can address the root cause. Still, the FS team will guarantee the same level of protection for all members. Like the intervention domain, implementation also leverages existing FS processes.

Closing the Loop

The completion of the cycle ends with a measure of success. The merit of using a feedback loop model lies in that FDM itself can be used as a quality control measure, through the analysis of new evidence gathered after the PMs were implemented and a full cycle was completed. When change is inadequate or an event keeps occurring, any domain within the cycle can be reassessed and modified until effective results are observed.

Conclusion

While FDM offers an excellent complement to our reporting system, it has its own limitations. Accordingly, the RCAF FSP will continue to rely on open, honest reporting to investigate occurrences, and will add the additional information gathered from FDM that may have been omitted or unobserved. But FDM offers the additional advantage of being able to detect persistent latent conditions, which may go unreported when they are not followed by the mishap.

In practice, an FDM capability coupled with our existing self-reporting will enhance reporting in general, thus reducing mishaps while preserving our Just Culture. As we embark onto this new programme, we expect to see important progress in the world of flight safety, and as a result, an increase in operational effectiveness.

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Photo: Cpl Laura Landry, 438 ETAH

THE FLIGHT SAFETY RESILIENCE MODEL

by Col (Retd) Steve Charpentier, DFS 3

What makes us more resilient to aviation accidents?

The manual, Flight Safety for the Canadian Armed Forces[1] provides a good overview of the strategic flight safety framework and describes the processes involved in the Flight Safety Program. These include: **Resilience Management**, **Program Management** and **Risk Management**.

In this article we will discuss **Resilience Management**, which is the process of making the equipment, procedures and personnel resilient to accident-causing conditions, thus protecting operations from unknown hazards and accidents.

To strengthen "human factor" resilience to accidents, personnel are trained to be capable of dealing with known and unknown threats to flight safety. Occurrences, hazards, trends, and many other forms of flight safety information are disseminated to all personnel involved in the support or conduct of air operations so they can better understand the situations and circumstances that can compromise safety. These lessons learned are briefed locally and further transmitted through various media such as emails, posters and *Flight Comment* magazine. To reinforce best practices and to highlight professionalism, a comprehensive awards program has been setup to encourage safe behaviour throughout the organization.

The Flight Safety Resilience Model (figure 1) is an attempt to capture responsibilities and behaviours expected of both individuals and supervisors. These sets of lessons learned and best practices are derived from multiple observations and discussions within units and are deemed the most effective in accident prevention.

Using James Reason's Swiss Cheese Model of Accident Causation[2], we can derive our own accident prevention model to improve flight safety resilience and promote optimal behaviours. Accidents occur because of existing weaknesses or "holes" in our defences, thus allowing a chain of events to cause an accident. Accidents can be prevented by

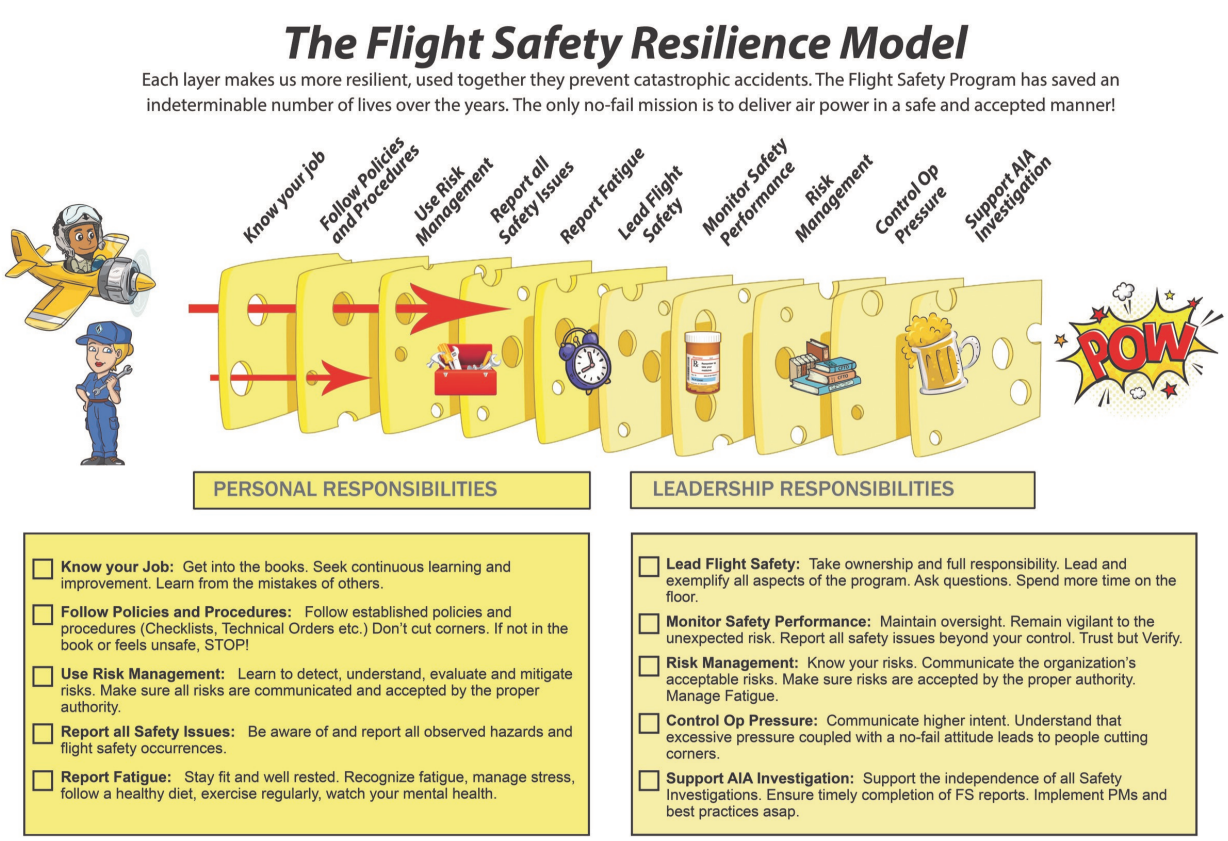

Figure 1. The Flight Safety Resilience Model.

adding layers of defences and patching existing holes in these defences. Each layer of defence is not perfect, but used together they make us more resilient and prevent catastrophic accidents.

In this adapted model, each layer of defence may not have the same weight or priority and emphasis must be placed on understanding the existing local conditions. For the personal side, knowing your job and following policies and procedures are pretty basic responsibilities. Learning to understand the risk, watching fatigue and reporting all events also contribute to strengthening our program. For supervisors, it is first and foremost about taking ownership of the program, managing the risks and controlling the negative effects of operational pressure. Supporting the independence of all safety investigations enables a strong safety culture, which permits us to learn and prevent reoccurrence.

This model should be seen as an initial attempt to capture best practices and behaviours that make the CAF successful in accident prevention. It is open for improvement and refinement and as always your comments are most welcome at dfs.dsv@forces.gc.ca.

The Flight Safety Program has saved an indeterminable number of lives over the years. Perhaps it saved your life or prevented you from a serious injury. It is clearly a success. The Flight Safety Resilience Model is the result of continuous learning from multiple mishaps and series of catastrophic accidents over the years. Use it, so you don't have to repeat those mishaps. Also keep in mind that **the only no-fail mission is to deliver air power in a safe and accepted manner!**

References

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Photo: S1 Zach Barr, Air Task Force Romania

Supervision Influence

by Mrs. Shannon Saunders, DFS 3-2-2 FSIMS Analyst

"Being a first-level supervisor is one of the most difficult, demanding, and challenging jobs in any organization. Buried in an organizational web, this person must be adroit at administering a unit and at perceiving which, among all the daily tasks delegated downward, are the most important to accomplish. Through such administrative competence, he or she must be able to link the unit's accomplishments to the functioning of other organizational subunits."[1]

The importance and influence of the supervisor on any organization cannot be too strenuously emphasized. Sasser and Leonard, writing in 1980 for the Harvard Business Review articulated well the balancing act a supervisor must play between meeting an organization's objectives with managing and caring for personnel under their leadership. To the authors, it "is like walking the circus high wire."

It should not come as a surprise when reviewing the statistics of Flight Safety incidents, we see the influence of supervisors as a recurrent factors in many reports. Considering that human factors are attributed to the vast majority of accident/incident causation, it is logical to use these particular statistical findings to raise awareness within the community. The graph below is representative of the occurrence rate for each human factors category and their related subcategories. While it does not break down the HFACS structure to the lowest level, it does provide us with a mid-level breakdown of the distribution of HFACS categories.

While analysis of Human Factors related occurrences has demonstrated improvement over the previous four years in most classifications, there appears to be marginal increases across the board within the Latent Condition/ Supervision Influence category (Figure 1). The HFACS table rate values shown in Figure 1, as published in the DFS 2019 Annual Report and normalized using the # of flight hours, are as follows:

For all intents and purposes, the Supervision Influence Group of conditions relates to an organization's policies and procedures (generally speaking) and how they are ultimately used and applied by supervisory personnel during the course of their duties. It goes without saying that supervisors have

a substantial influence on the Unsafe Acts committed by the personnel involved in an occurrence. Personnel in a supervisory role are instrumental in setting the stage for a healthy safety culture and their role as supervisors is instrumental to the success of the Flight Safety Program.

It is well known within our operations that personnel resources, experience and operational tempo are issues that have the potential to affect the conduct of flight activities in all areas. So how do we do more with less and how can we effectively exercise supervisory duties when these challenges continue to affect our operations? The following suggestions may assist supervisors in maximizing their supervisory success:

> The word *supervisor* has conflicting connotations. A supervisor not only commands, directs, controls, and inspects but also takes responsibility for, leads, shepherds, administers, guides, consults, and cares for. Just how the connotation varies from situation to situation and from person to person is in itself a reason for the ambiguity—and the decline—of the first-level supervisor's role.[2]

1. Be aware that supervision does not just apply to the actual conduct of an activity (i.e., maintenance actions, in flight activities, control of aircraft in ATC) but also applies to all phases of flight activities including pre-and post-flight preparation and briefings, mission planning, maintenance task preparation.
2. Be aware of the potential for fatigue in your personnel. As fatigue increases so does the potential for error. If you recognize that fatigue is affecting the performance of one or more of your personnel, it is reasonable to increase your oversight as a Supervisor/Manager, etc. Double-check the work conducted to mitigate the risk of undetected errors.
3. Ensure personnel are provided timely feedback to correct problems or fill knowledge gaps when they are observed.
4. Follow generic supervisory/managerial best practices such as:
   - Provide personnel with the tools they need to do their jobs
   - Provide personnel with the training they need to do their jobs

Cause Factor Rate (per 10,000 Flight Hrs)

	HFACS Group	Cause Factor	2016	2017	2018	2019
Active Failures	HFACS – Unsafe acts	Deviation	11.5	11.2	8.2	6.8
		Error	230.6	228.1	204.3	196.2
Latent Conditions	HFACS – ORGANIZATIONAL INFLUENCE	Management	11.1	10.4	8.1	6.6
		Resource	6.8	7.6	6.3	5.4
	HFACS – PERSONNEL INFLUENCE	Personnel Condition	121.2	119.5	102.9	96.7
		Team Practice	18.8	12.8	13.3	10.6
		Work Environment	20.1	23.5	20.2	22.3
	HFACS – SUPERVISION INFLUENCE	Level of Supervision	14.5	9.1	8.7	9.2
		Planned Activity	5.9	6.3	5.3	5.8
		Problem Correction	6.1	6.4	3.6	7.2
		Supervisory Deviation	2.0	1.6	1.0	1.2

Figure 1.

- Help personnel set goals to improve their performance
- Become a resource
- Hold personnel accountable

5. When you deviate, THEY deviate. Cultivate safety culture with your personnel. Do not encourage (or demonstrate) procedural deviations to "get the job done." You set the stage for compliance and safe behaviours.
6. Do not plan beyond your capability. This will quickly set the stage for personnel to cut corners and may eventually contribute to normalize procedural deviations (normalization of deviance).

In conclusion, while we all have a role to play in the flight safety system. As a supervisor, your leadership is fundamental in managing the challenges we are currently experiencing in the CAF. The real key is the ability to understand, influence, and merge the two worlds of management [chain of command] and workers [subordinates]. Your actions and mentorship skills go a long way in making our flight safety program the most successful it can be.

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2. https://hbr.org/1980/03/let-first-level-supervisors-do-their-job, (Sasser and Leonard 1980).

Photo: S1 Zach Barr, Air Task Force Romania

A CF-18 Hornet pilot conducts post flight shut down procedures during Op REASSURANCE – Air Task Force Romania, on October 21, 2020 at Mihail Kogălniceanu Air Base, Romania.

Photo: Cpl Bryan Carter

Enroute Weather

by Major Shawn Duffy, 8 Wing Flight Safety Officer

In early December 2000 I was a recently minted utility Aircraft Commander (AC) of a CH146 Griffon from 417 Combat Support (CS) Squadron, Cold Lake. I was building up experience and hours before becoming a Search and Rescue (SAR) AC. At the time, we were a mixed squadron of T-33 T-Birds and Griffons. Our helicopter flight consisted of 6 pilots. I was approaching the famous "1000 hour wonder" achievement with 900 hours total time and 600 hours on Type. I was scheduled with a relatively new First Officer (FO) with roughly half the hours I had to do a night proficiency flight in VFR (Visual Flight Rules) weather on night vision goggles (NVGs). Our flight was planned as an "out and back" with a short stop for fuel and food at the old CYXD (Edmonton City Centre) Airport.

After we had done the standard pre-flight checks, weather checks and looked at the NOTAMS, we donned the NVGs and off we went for an uneventful 1.5 hour flight to Edmonton. After a nice meal at the airport restaurant we began planning for our return flight back to Cold Lake. In this case, I looked at our weather in Edmonton and Cold Lake and both airports were calling for clear VFR weather for the duration of our trip.

At this time it may be important for me to expand on what is required for VFR flying. To conduct VFR flight in the early 2000's you required weather that permitted a 1500 foot ceiling and 3 mile flight visibility. The other weather limits that I was familiar and comfortable with was weather suitable for Rotary Wing (RW) SAR operations. While conducting real world SAR flying we are permitted to fly as low as 300 feet and ½ mile visibility. Those limits are meant to be used to save lives and are not something you want to fly in over extended periods of time.

So with the weather check complete I decided to fuel the aircraft. Knowing it was only a 1.5 hour flight with good weather I elected to put only 1500 lbs of fuel on board. As we flew with an auxiliary fuel tank at 417 Sqn, I could have easily taken more fuel but elected not to. (some foreshadowing here!)

All fueled and with NVGs on we departed fat, dumb and happy for what we thought would be a benign flight back to "Cool Pool" Alberta. However, just over halfway between Edmonton

and Cold Lake there is an area of rising terrain near St Paul, Alberta. Rising terrain coupled with a wind in the right direction and saturated air can cause weather that you may not expect. The ceiling and visibility began to lower and since I was not planning on an Instrument Flight Rules (IFR) trip and we are not supposed to fly in "known icing" conditions in the Griffon, I elected to ask the FO to slow down and try to get under the weather.

Well, the weather didn't improve and the next thing I knew we were flying lower and slower than I really wanted to. In fact we were approaching my SAR weather limits that I had no authority to continue flying in. At that very moment as I was about to consider turning around and heading out of the weather my FO told me with a little concern in his voice that he could no longer see outside! I was perplexed, as I could see, so I quickly took control of the aircraft. As things seemed to be adding up against me at this point, I quickly advised the Flight Engineer (FE) that we were going to land straight ahead and into the field that we were over. On short final we made some friends with a variety of cows and conducted a slope landing into the field.

Now that I had a chance to start breathing again and confirm my shorts were free of contamination we started to converse about how we got ourselves into this situation. While doing so, I reached out of my window and felt the surface of the aircraft and found that the weather we experienced that night was ripe for freezing fog and drizzle and we had picked up some ice in those final moments before landing. My FOs windshield defogger was apparently not working and as a result his windscreen had "froze up" where mine had thankfully remained clear.

So now I'm in the middle of a field considering my options. Option 1 was to shut down and look for place to sleep. Those cows likely would lead to a barn or a house so that was an option. Option 2 was to try and skirt the weather? I had little fuel so that was a risky one. Plus, I had no idea where or if the weather would clear. Option 3 I considered was to turn around and high tail it out of there and return to Edmonton. I ended up choosing Option 3. I picked up into the hover and we slowly made our way back to Edmonton. As quickly as I had entered the unsuitable weather we found glorious clear sky.

We shared a few beverages as a crew that night and discussed the lessons we learned. The first big one we learned was that just because you have great weather at the point of departure and the airport of destination doesn't mean your enroute weather will also be suitable. In this case, we had flown over the same terrain only hours before, yet the weather had changed dramatically. Adding to the difficulty was that there was no enroute airports in which I could have used to check the weather. The second major lesson I learned, which has been learned by many pilots before me, is that fuel in the bowser is no help at all. Just like runway behind you and altitude above you.

I have since flown a variety of types, both fixed and rotary wing, in the SAR and Air Mobility communities, but I'll always remember that night of "lessons learned" that I still carry in my back pocket to this day. I hope by sharing this event, that you will learn something as well.

Photo: MCpl Brandon O'Connell

AIR CADET GLIDING PROGRAM

(Glider destroyed with serious injuries, September 2008)

by Mr. Conrad Soucy, DFS 3-2 FSIMS Manager

This accident occurred during a 60 day currency check ride for a glider pilot flying as part of the Air Cadet Gliding Program. The aircraft was crewed by a check pilot in the rear seat and a qualified pilot in the front. Climbing through approximately 80 feet above ground level (AGL) the front seat pilot thought he heard a metallic clunking noise similar to what may occur during a rope release. Assuming the check pilot had initiated the rope break scenario, the pilot carried out the first actions of the emergency checklist by pulling the release knob twice.

The check pilot in the rear seat, caught unaware, immediately took control of the glider and, after confirming the loss of the tow rope, initiated a steep right turn in an attempt to recover back to the launch area.

The right wing tip contacted the ground, cartwheeling the glider, causing Category A damage and seriously injuring both occupants.

ANALYSIS OF THE EVENT:

Due to the design of the glider it was impossible for the rear seat pilot to prevent the front seat pilot from pulling the release knob. The front seat pilot, having been forewarned, reacted by following the checklist based on the assumption that the emergency scenario had been initiated. The check pilot, whose plan had always been to release the glider at an altitude high enough to conduct a downwind recovery, continued to carry out the maneuver despite the fact that the glider was at a lower altitude than expected.

The Flight Safety investigation focused on emergency handling procedures, human factors and safe training practices.

The investigation found that emergency training scenarios were not being prompted with the verbal term "simulated." This was standard practice on other fleets and ensured that all crew members understood whether the emergency situation was real or not. A recommendation was made to incorporate the term "simulated" into emergency procedure training practices.

Immediate preventive measures focused on the emergency response procedure to a rope break or premature rope release scenario. The need to prioritize controlling the aircraft and selecting a landing area prior to pulling the release knob was highlighted.

The investigation looked into the human factor aspect of this incident, and noted that the pilots were in two different mindsets. The flying pilot was in a possible high stress check ride (or testing) environment and had the potential to overreact without confirmation. The check ride pilot had no physical ability to prevent the flying pilot from pulling the quick release knob and had a preconceived plan as to how the emergency situation was going to occur. The check pilot then reacted on how it was briefed/planned and perhaps was done many times before, instead of assessing and reacting to the current situation (and altitude) at hand.

The investigation also looked at the Air Cadet Gliding Program Manual. Recommendations were made to add additional details on safe training methods and practice limitations for emergency scenarios.

With changes to how pilots are trained and simulated emergency situations are handled, this "lesson learned" led to improvements in the Air Cadet Gliding Program. These changes ultimately made the program better and safer for pilots.

DFS COMMENT

As demonstrated by this occurrence, instruction is one of the most demanding roles in the flying profession.

Instructor pilots need to be constantly aware of any changes to the flight profile, and the actions of their student. They must be situationally aware and ready to react in an unusual situation quickly and with appropriate decision making skills.

This event generated important changes to the Air Cadet Gliding Program with respect to the conduct of simulated emergencies.

From the Investigator

TYPE: CT156 Harvard II
LOCATION: Moose Jaw, SK
DATE: 3 September 2020

All aircraft involved in this occurrence were part of the NATO Flying Training in Canada program in Moose Jaw, Saskatchewan. A Near Mid Air Collision (NMAC) occurred between a CT156 Harvard II on a simulated minimum fuel Precision Approach Radar (PAR) and a formation of two CT155 Hawk aircraft on visual flight rules (VFR) downwind leg.

The Harvard student trip aircraft was guided by a student PAR controller for a simulated minimum fuel PAR to runway 29R during Visual Meterological Conditions (VMC). Concurrently, a formation of Hawk aircraft were on an extended downwind to set up for a 10 nautical mile straight in approach with the Tower controller. The student PAR controller cleared the Harvard to descend from 5000 feet to 3400 feet ASL while on a base leg. The Instructor Pilot at the controls of the Harvard noticed the Hawk formation on an intercept at the same altitude to their relative 2 o'clock position. A 4g pull was immediately initiated in order to avoid the Hawk formation, resulting in a separation of approximately 300 feet distance. Once clear of the Hawk traffic, the Harvard resumed a glide slope capture to continue with the PAR approach. All aircraft returned to the airfield without further incident.

No aircraft damage or crew injuries resulted from this event.

The investigation did not reveal any evidence of technical issues with the aircraft or Air Traffic Controller equipment. The investigation is now focusing on human factors, procedures, and training of both aircrew and air traffic personnel.

Photo: MCpl Pierre Thériault

Photo: DND

From the Investigator

TYPE: CH148 *Cyclone* (CH148805)
LOCATION: Shearwater, NS
DATE: 30 November 2020

Traditionally, CH148 *Cyclone* aircraft delivery from the final assembly plant to 12 Wing Shearwater has been accomplished via contractor crewed ferry flights. Due to the COVID-19 environment, the ferry flight has been split between contractor and DND crews, changing crews at Bangor, ME. Once the DND crew and aircraft arrives in Shearwater, an aircraft acceptance check is carried out.

During the aircraft acceptance check for aircraft CH148805, avionics technicians inspected the #1 Power Distribution Unit as per the Fleet Work Instructions. Terminal wire lugs T1, T2 & T3 were found unsecured. T1 was missing its securing nut, washer and lockwasher but was still contacting its terminal stud. T2 & T3 were found hand tight (see picture). A Foreign Object Damage (FOD) check was carried out and all missing hardware for T1 lug was located just below in its cover panel.

There was no damage or injury resulting from this occurrence.

The investigation is working collaboratively of with the manufacturer to assess the root cause(s) of the occurrence. It is also reviewing the DND acceptance check for CH148 *Cyclone* aircraft.

Photo: Cpl Stefan Bielecki

Photo: MCpl Sean Fanning

HERE WE GO AGAIN

Cold, snowy, blowy winter is here... the season when the pre-flight walk-around tends to become the pre-flight run-around. Taxiing becomes more hazardous and airframe icing becomes a dangerous threat to flight.

An awareness of the hazards and the use of caution will reduce the problems of winter operations.

***Flight Comment*, Issue 6, 1960**

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