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FLIGHT COMMENT

3/1996

HERCULES (CC130341)

from 435 Squadron 17 Wing Winnipeg

Canada

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FLIGHT COMMENT

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Photo by: MCpl M. Legros

ON THE COVER:

Part of the AETE Flight Test Program of the CC130 Electronic Warfare Self-Protection Suite where the Jettison Mode is being tested and evaluated. Release of the 300 (30 Mark 46 Flares per dispenser in 10 dispensers) flares! The flares are designed to decoy heat-seeking missiles away from the aircraft.

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AS I SEE IT

by Col D.C. Matthews, Commanding Officer AETE

Orange wire, miles of orange wire, is a visible and well known symbol of the airworthiness mission of the Aerospace Engineering Test Establishment (AETE) at CFB Cold Lake. Another facet of the operation not so readily seen is the risk management process we use to ensure that our people and our equipment are kept as safe as possible in the always tricky and sometimes risky business of flight test.

I welcomed the term risk management into our vocabulary because it captures the essence of much that we do in the aerospace business. The term flight safety, as positive and as useful as it is, sometimes suffers from a lack of clarity. For example, safety concerns all facets of the operation, flight and non flight. Furthermore, not all of our work can be safe, combat operations quickly come to mind.

Risk Management

All 240 of us at AETE, whether we reduce data in the processing centre, build sensors in the flight test instrumentation laboratory, maintain the aircraft, determine the engineering test points, fly the platforms or manage the business, are part of the risk management process. Everyone is involved, in one way or another, during the phases of that process: the test plan technical review, the test aircraft airworthiness review, the risk assessment and the test plan safety review.

The purpose of the project risk assessment is to identify test unique hazards and to assign a level of risk to each hazard. Then we devise procedures to minimize the risk and assign a project risk factor based on the identified hazards and their associated risks (taking into account the anticipated effectiveness of the minimizing procedures). Now we have a detailed assessment of the level of risk associated with a particular evaluation and a basis upon which to make our decisions. Although this process is designed to manage the risk of test flying, it is not unique to test flying. We used similar processes in Haiti flying the Twin Huey and in the Persian Gulf flying the Hornet.

Combat Operations, Peace Operations, Operations at Home Base

That is another reason that I prefer the term risk management. Simply stated, neither combat nor many of our UN operations are safe. However, that does not mean that we are not concerned with safety. Everyone in the air wants to come home alive and everyone on the ground wants to be part of the team that brings them home in one piece. Whether you are bombing tank convoys in Iraq or flying a night vision goggle mission in the mountains of Haiti to save election officials from a lynch mob, you use your knowledge and experience to identify the hazards, minimize the risks, and get the job done. That is risk management, and it is valid whether we are flying at home or in an operational theatre.

However, today at AETE, and elsewhere I believe, we require two ingredients in all of us if we are to be successful in this venture—Energy and Discipline. Needless to say, we had the same requirements during our operational deployments in the Persian Gulf and Haiti. You can have the best flour on the market but without a little yeast and water you will not eat bread. So it is with risk management and operations, they will not be effective without personal energy and personal discipline. Each and every one of us must apply energy and discipline to the job. That may seem difficult in an era of rapid change and uncertainty; nonetheless, we are trained to handle change and uncertainty, because they are our constant foes during any difficult operation—combat or otherwise.

We must continue to build teams that are full of energy and discipline, focused on the given mission. With that foundation, we can use our experience and knowledge to identify the hazards, minimize the risks and successfully meet the challenges in the same brave manner that the Air Force has for the last 72 years. **As I See It.**

G-LOC, DOING THE RUBBER CHICKEN

by Sonia Latchman and Lieutenant Richard Gower

What is G? **G represents the unit of measurement used to measure the force of acceleration being experienced by an object in Earth's gravitational field. For our purposes, the object is the pilot, and if that pilot is standing on the ground, he or she is experiencing +1G of acceleration. A steep, 60 degree banked turn subjects a pilot to about +2Gs, while a hard turn or dive recovery manœuvre might generate G forces of up to +10Gs. A manœuvre like an outside loop will typically expose the pilot to a negative G force of -3 or -4Gs.**

Pilots flying fighter aircraft seldom remain in a state of rest or of uniform motion for very long. To do their jobs, their bodies are subjected to rapid changes in direction and velocity. The high and sustained forces that these motions create, can result in a pilot suffering a highly undesirable condition called G-LOC. Recent studies have determined that G-LOC is not just a nemesis of fighter pilots. It is a condition that can occur in any pilot given the right (or wrong) situation.

G-LOC! The very word invites query. For a non-pilot, the first question is, what is G-LOC? For people who fly, the questions are more pressing. Why does it happen? Who is susceptible? What type of aircraft can it occur in? When is it most likely to take place? How dangerous is it? What can a pilot do to increase his or her tolerance?

G-LOC is an acronym for G-induced Loss Of Consciousness. G-LOC occurs when G loading robs the brain of the flow of blood which carries the necessary sugar and oxygen to keep it functioning. Prior to G-LOC, the pilot may experience a loss of peripheral vision (called Greyout) or a complete loss of vision (called Blackout). However, if the G rate onset is high, the pilot will quickly pass from full capability to complete unconsciousness with no visual warning symptoms. Recovery takes approximately 30 seconds, during which time the pilot will be 'completely incapacitated' for approximately 15 seconds, and then disoriented and generally unaware of the situation for an additional 15 seconds. Amnesia of the G-LOC is common; upon reviving, the pilot often doesn't remember the episode. Some pilots experience convulsive-like flailing movements during recovery after G-LOC—hence the term 'rubber chicken'.

A look at the past

According to a 1990 report published by the Advisory Group for Aerospace Research and Development (AGARD), the first documented case of G-induced Loss Of Consciousness appeared to have occurred in 1903 when a Dr. A. P. Thurston tested a "Captive Flying Machine" built by Sir Hiram Maxim as an attraction at fairs. Dr. Thurston, 'became unconscious at 6.87G and regained consciousness only after the machine had slowed to 3G.'

Pilots have experienced G-LOC, at that time called "fainting in the air", as far back as World War One. During the 1920's contestants in various air races in the U.S. reported suffering from blackout and loss of consciousness. During World War Two, blackout, and to some extent, G-LOC were considered a major problem for Allied fighter pilots. Centrifuges were built and research into the physiological effects of G resulted in the development of an anti-G suit and an anti-G straining manœuvre (AGSM). (An AGSM involves isometric muscle contraction and regulated breathing routines.) These two methods are still the principal means of increasing G tolerance for pilots of high performance aircraft.

Interest in studying G-LOC subsided shortly after WWII and then re-emerged again in the 1970s "as higher performance aircraft continued to evolve." In 1972, F-4 pilots assigned to the Fighter Weapons Instructor Course at Nellis AFB, Nevada began high-G centrifuge training (a centrifuge reproduces the accelerations produced by aircraft, and is used to teach pilots how to safely perform an effective AGSM) at the USAF School of Aerospace Medicine (USAFSAM). Ninety-four F-4 aircrews were trained in performing the AGSM before the program was terminated in 1973. Training of fighter pilots on a centrifuge on a regular basis was resumed at USAFSAM in 1983 after it was recognized that fatal USAF aircraft mishaps were being caused by G-LOC.

Centrifuge training for CF pilots began in 1989, with the introduction of the Canadian Forces High Sustained G (CF HSG) Course. This one day course, developed by DCIEM, teaches CF pilots about the hazards of G-exposure (such as G-LOC), and strategies for G-protection. It includes training sessions in DCIEM's human centrifuge, which provides the pilots with an opportunity to experience high G and practise their AGSM in a controlled centrifuge environment. Many countries now use a centrifuge for pilot training of the AGSM.

G-Tolerance

The AGARD report states that an individual's basic G level tolerance seated upright and relaxed is approximately +4Gs at normal acceleration rates. Factors considered important in maintaining G tolerance include practise at pulling G, good general health and physical condition, adequate rest, a proper diet, and keeping lifestyle stressors (such as illness, smoking, alcohol and medications) to a minimum. An anti-G suit increases an individual's G- tolerance by about 1G. The AGSM is capable of increasing G-level tolerance by 4Gs, bringing a pilot's tolerance to about +9Gs if he or she is wearing an anti-G suit and is performing the AGSM. This amount of increase in G tolerance is only possible however, if the pilot is well trained in performing the AGSM manoeuvre, has adequate strength and performs it optimally.

While most sources acknowledge that G-LOC tends to occur in unprotected individuals at approximately +4Gs, it has been shown to happen to individuals exposed to only +2Gs. The body's tolerance to G is a function of the peak G level, as well as G onset rate, duration of G, and a newly discovered phenomena, the initial or starting G level. Recent research at DCIEM and the US Navy lab in Pensacola, Florida has shown that G-tolerance is significantly reduced if the pilot starts from less than +1G. This reduced tolerance is worse with more negative G (-G) and more time exposed to the -G. This loss of tolerance has been coined the "push-pull effect". A video describing this "push-pull effect" has been produced by the Directorate of Flight Safety (DFS) in concert with DCIEM, and is available through DFS.

So How Often and In What Situations do Pilots G-LOC?

The first in-depth survey on G-LOC was conducted for the USAF in 1983. The survey had a 30% response rate with 12% of the respondents indicating that they had experienced a G-LOC episode. In 1986, the Directorate of Flight Safety conducted a survey on G-LOC in the Canadian Forces. Unlike the USAF survey, the CF survey was sent to all pilots, and was not restricted to pilots currently flying high performance jets. The CF survey found that G-LOC had been experienced at least once by 27% of the respondents, with the majority of the G-LOC episodes occurring at 4.5 to 7G. Although 78% of the G-LOC episodes occurred when the respondent was not at the flight controls, 22% were flying the aircraft, with almost half of those incidents occurring during a solo flight. When asked to what they would attribute the LOC episode, 55% of the respondents responded that the lack of warning of imminent G was a contributing factor.

1986 SURVEY OF CF PILOTS

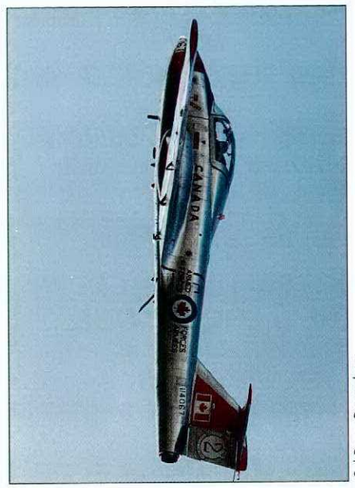
Distributed questionnaires:	**2016**
Returned questionnaires:	**1058 (52%)**
Respondents with at least 1 G-LOC episode:	**282 (27%)**
Total G-LOC episodes reported:	**376**

INTERESTING FACTS REGARDING THE G-LOC EPISODES

- **55% of the G-LOC episodes cited lack of warning of imminent G as a predisposing factor.**
- **22% of episodes occurred to pilot at flight controls.**
- **10% of episodes occurred during solo flight.**
- **66% of episodes occurred in the Tutor.**
- **17% of the Tutor episodes occurred with a student at the controls (11% of all episodes), almost half of which (44%) were solo flights.**
- **5% involved forces in excess of 7.5 G, with the great majority being between 4.5 and 7 G.**
- **34% of episodes occurred during vertical aerobatics.**
- **13% occurred to the individual not at the controls during the execution of Closed Patterns (a much tighter circuit pattern than usual).**
- **5% occurred during air combat manœuvres (ACM).**
- **Three of the five G-LOC episodes which occurred on CF-18 were due to inadvertent G-suit disconnections, a problem which has since been resolved.**

In order to update information on G-LOC in the CF, the Operational Research Division at Air Command is sending an anonymous questionnaire to all CF pilots who in the last 10 years have flown a Tutor (i.e. completed BFT), F5, T33, CF-18 or high performance aircraft of other nations. The questionnaire asks the pilots to specify the flying hours in each of the targeted aircraft since 1986, whether he/she has had a G-LOC episode during this time, and if yes, about the incident. The answers to these questions will provide the data needed to determine the current risk of G-LOC (i.e. the number of G-LOC incidents per 1000 flying hours) for each of these aircraft types, the circumstances under which G-LOC occurs, and how the rate of G-LOC has changed since the previous survey in 1986 (remember, centrifuge training was introduced in 1989). It is essential to have an accurate picture of the incidence of G-LOC in order to direct appropriate changes in the life support field and to focus on more effective preventive measures.

In recent years a number of military aircraft accidents have been officially and unofficially attributed to G-LOC. An article by LCol Kurt Dittmer entitled, "What Kills Viper Drivers?", in the January 1996 issue of the *The Combat Edge*, cites that from 1975 to 1995, there have been 10 USAF F-16 Class A crashes which were due to G-LOC. Of these 10, 9 were fatal. Closer to home, in July 1995, a CF-18 crashed during an air combat training mission. Although the accident is still under investigation, it is probable that the pilot became incapacitated due to G-LOC. In summarizing as to why Canada's Air Force has a keen interest in G-LOC, one only has to refer to the final paragraph of LCol Dittmer's article. "So the answer to 'What Kills F-16 pilots' is: We kill ourselves. That's why we brief the special subjects and that's why they're important."



Cpl Doug Desrochers

MCpl M. Legros

The Operational Research Division at Air Command encourages all CF pilots polled in the 1996 G-LOC survey to respond in the interests of finding out more about this hazardous phenomenon. Respondents may be assured that the survey is completely anonymous. If you have questions regarding the G-LOC survey, please contact:

Sonia Latchman, SO OP RSCH, at Air Command, Winnipeg. CSN: 257-2130

or by E-mail, DND or Internet at latchman@ora.dnd.ca.

Operational Research uses rigorous scientific analysis to examine problems —thereby ensuring confidence in the results—in order to help management determine its policy and actions scientifically. Operational Research was first conceived as a conscious activity and a new branch of applied science during WWII in response to the need of the British to conduct research into the operational—vs the technical—aspects of their newly developed radar system developed to detect approaching German aircraft. The Operational Research team assembled to examine this problem was very successful, and by 1941, each of the 3 Wings of the British Armed Forces had Operational Research sections. Although analysis which could be considered Operational Research was carried out prior to this, it was during WWII that Operational Research was practised on an appreciable scale and the term "Operational Research" was coined. Other projects of the Operational Research Division at AIRCOM include the CF-18 Estimated Life Expectancy (ELE) and OPRAM models. ◆

THE DEVIL IN THE DETAILS

by Capt Stephane Fortier DFS Media 2 AIRCOM HQ

OR 3 INCHES SHORT OF DISASTER?

How can overlooking a detail cause a situation that creates unacceptable risks? Here's an example. It provides an opportunity for all of us (not just the maintenance folks) to consider our approach to maintenance and take precautions to avoid similar situations. In keeping with the Flight Safety policy, the information is presented solely for educational purposes.

Remember last December, the story about the Sea King crew that saved 30-odd lives? They hoisted sailors off a sinking ore freighter, during a storm, somewhere out in the Atlantic.

A MWO at AIRCOM had finished reading the Roundel article about the rescue and proceeded to get back to work, which in this case consisted of reading a pile of Air Weapons Occurrence Reports (AWOR). One in particular was a CH124 ground incident where a tech found the rescue hoist cartridge wiring broken. Interestingly, this was the same helo that carried out the rescue. The incident was discovered after the rescue.

The AWOR stated: "The tech was removing the connector from the rescue hoist shear cartridge when he noticed that the environmental boot was in two pieces. As he was unscrewing the connector, the wires inside separated from the pins and fell out of the back of the connector."

An AMMIS search "revealed that no work had been carried out (or documented) on the rescue hoist shear cartridge wiring since the last periodic".

"It is therefore suspected that prior to, or during the last periodic, a repair was carried out on the rescue hoist system cartridge wiring harness. The repair left the cable cutter cartridge portion of the harness 3 inches shorter than specs. As a result, there was insufficient slack to allow for the full lateral movement of the rescue hoist cable guide without putting sideways tension on the wire and boot." (The assembly moves from side to side to spool the cable while the drum rotates. With not enough slack in the wiring harness, this motion pulls the harness tight, and something has to give). "The insulation boot on the rescue hoist cartridge connector was already brittle from the exposure to heat from the engine exhaust." All this caused the boot to crack.

"Some time after that, somebody made a temporary repair, wrapping the boot in black electrical tape. The boot eventually separated in 2 pieces, resulting in the degradation of the wires. The wire strands began to break" (because of the tension). "It is likely that some wire strands were still connected to the contacts at the time the connector was being removed".

For those who wonder what this is all about, this rescue hoist cable cutter gizmo is the system that will cut the hoist cable, in the unfortunate event

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SEEING IS BELIEVING

by Maj E.C. Ukrainetz Aircom HQ DFS Desk Officer Rotary Wing

NIGHT VISION GOGGLES (NVG)

Users of NVG, take note! You no doubt already know that depending on goggle design, you only have a 30-40 degree field of view and a visual acuity under ideal conditions of 20/35 to 20/50.

Do you know that if you do not position and focus your NVG as precisely as possible you are more susceptible to virtually all the misrepresentations and illusions characteristic of NVG operations? In short, you could be a flight safety hazard. Studies have shown the following:

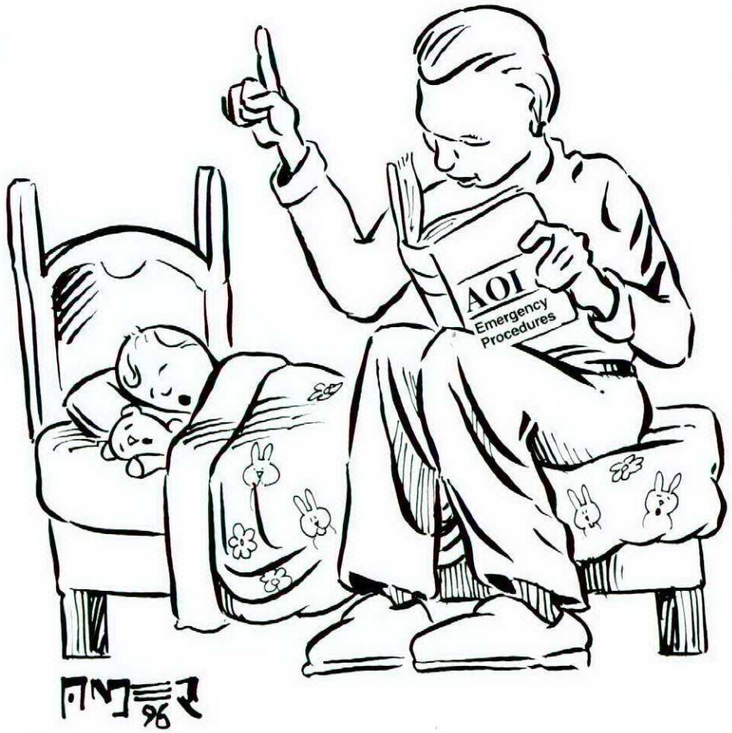
- Aircrew who adjusted the goggles with their "usual" adjustment methods obtained less than optimum acuity levels—average between 20/50 and 20/55;
- Personnel who used the NVG Resolution Chart improved average acuity to an average of 20/45; and,
- Those who participated in instruction on proper NVG adjustment procedures in a NVG Test Lane improved acuity to between 20/35 and 20/40.

Therefore, it is reasonable to conclude that aircrew who are able to adjust their NVG for best possible performance prior to flight will obtain the best possible goggle performance under the widely varying flight conditions. ◆

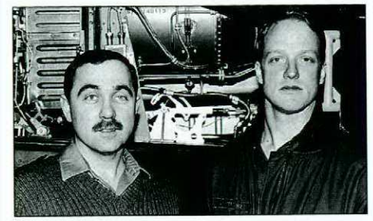
KEEPING YOUR SENSE OF HUMOUR

Prior to departure from Norfolk the crew was unable to locate the Volume 2 of the Aircraft Operating Instructions (AOI Emergency procedures). Upon receipt of the Initial Report (IR) at 14 Wing Greenwood, a complete search of the air and groundcrew areas was conducted. It was determined the aircraft AOI copy was still back at the home base. The aircrew obtained a copy of the missing AOI, continued the mission and upon their return the original AOI was installed. Why the AOI was removed and not returned to the aircraft could not be determined. Steps (Unsatisfactory Condition Report/UCR) have been taken to ensure this incident does not reoccur.

NOTE:
Last line of the Initial Report para 8: "Could only happen on a checkride!" ◆



FOR PROFESSIONALISM



MASTER CORPORAL MIKE CROOK
CORPORAL ANDY ARMSTRONG

MCpl Crook and Cpl Armstrong, technicians at 403 (Hel) Operational Training Squadron, were briefed by a Griffon pilot that there was binding in the collective control.

A functional check was carried out and a grinding noise was detected coming from the number one engine compartment. Upon further investigation they found that the bearing inside the track on the droop compensator was missing, causing the arm to wear in the track. The difficulty in finding the problem is that a missing bearing in the cambox assembly is a very unlikely cause for this inserviceability. It was later discovered that the bearing was not installed at the factory during assembly. As a result of MCpl Crook and Cpl Armstrong's discovery a Special Investigation of the Griffon fleet was conducted.

MCpl Crook and Cpl Armstrong's perseverance and attention to detail prevented a possible serious occurrence. ◆

CORPORAL DANA HULAN

Cpl Hulan, an Air Frame Tech at 14 Air Maintenance Squadron Greenwood, was tasked to carry out a Consolidated Corrosion Inspection on an Aurora.

During the inspection he discovered the left-hand elevator trim cable improperly routed. He recalled that this defect had been the subject of a Special Investigation (SI) and he immediately reported his finding to his supervisor. Further investigation revealed that the SI had been carried out in June 1994 and this fault had gone undetected. As a result of the misrouting, both left-hand elevator trim control cables were worn beyond limits and had to be replaced.

Cpl Hulan's professionalism, diligence and astute observation outside the scope of his assigned duties prevented a possible serious flight control malfunction and safety occurrence. ◆

CORPORAL KEN GARDNER

As part of the Avionics Systems "B Check" on a CF18, Cpl Gardner, a 4 Wing Instrument Electrical Tech, was conducting an inspection of the Maintenance Signal Data Recording System tape for proper installation.

Before closing panel 14R, he inspected the area and noticed that the mechanical mode control cable to the horizontal stabilizer was off its pulley and the retaining pin was partially unseated. Upon further investigation, it was also found that the middle throttle cable retaining clamp was improperly positioned causing the mechanical mode cable retaining pin to be dislodged. This could have resulted in the possible loss of aircraft control in the event of Flight Control Systems or hydraulic problems. A squadron Special Inspection was carried out, which subsequently became fleetwide.

Due to Cpl Gardner's dedication, professionalism and attention to detail, the possible loss of aircraft control from a flight control system or hydraulic problem was averted. ◆

LIEUTENANT BRIAN DEKKER

Lt Dekker, an Air Traffic Controller on unit checkout at 19 Wing Comox, was conducting a runway inspection prior to his shift.

Prior to his inspection, contractors had been painting the centreline and used nails with a string attached in order to keep the centreline painting straight. Even though the contractors had twice informed the tower that all the nails had been removed, Lt Dekker discovered a two inch nail sticking up on the centreline. Painted white it was very difficult to see from a moving vehicle. The possibility existed that this nail could have caused a blown tire endangering both aircraft and crew.

Lt Dekker's dedication and extra effort in carrying out his duties prevented a possible serious flight safety occurrence. ◆

TIMBERRRRRRR

If you conduct flight operations below 2000 feet AGL: Read this!

With the recent increase in timber prices, prized lumber is becoming rarer and rarer. As the trees become harder to harvest, more companies are utilizing skyline logging techniques to pluck trees from valley sides.

Skyline logging is becoming one of the preferred methods of extracting timber from the side of BC's mountainous valleys. It is basically a pulley and winch system that hoists logs from the top of a hill, down to the trucks below. Cables can span valleys up to *8000* feet across and up to *2000* feet high. The cables are unmarked, blend into the surrounding terrain and are very difficult to see. One operation recently claimed one of the RCMP helicopters.

So what are the facts?

Who: More than 40 companies are utilizing this technique on the Vancouver Island alone!

Why: Big $$$$ obviously!

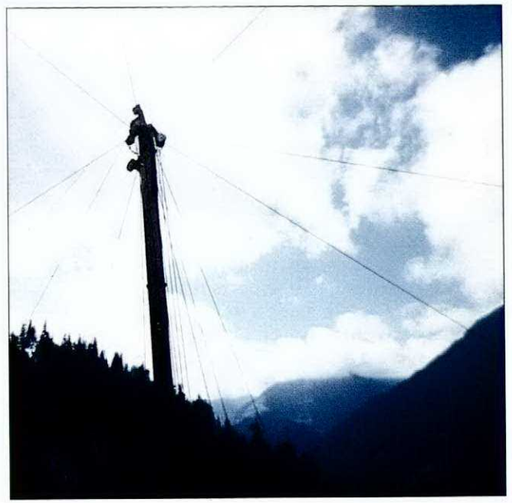
Where: All over Vancouver Island, the mainland of BC, Washington and Oregon. The operations are highly mobile and there are presently no requirements to NOTAM these sights.

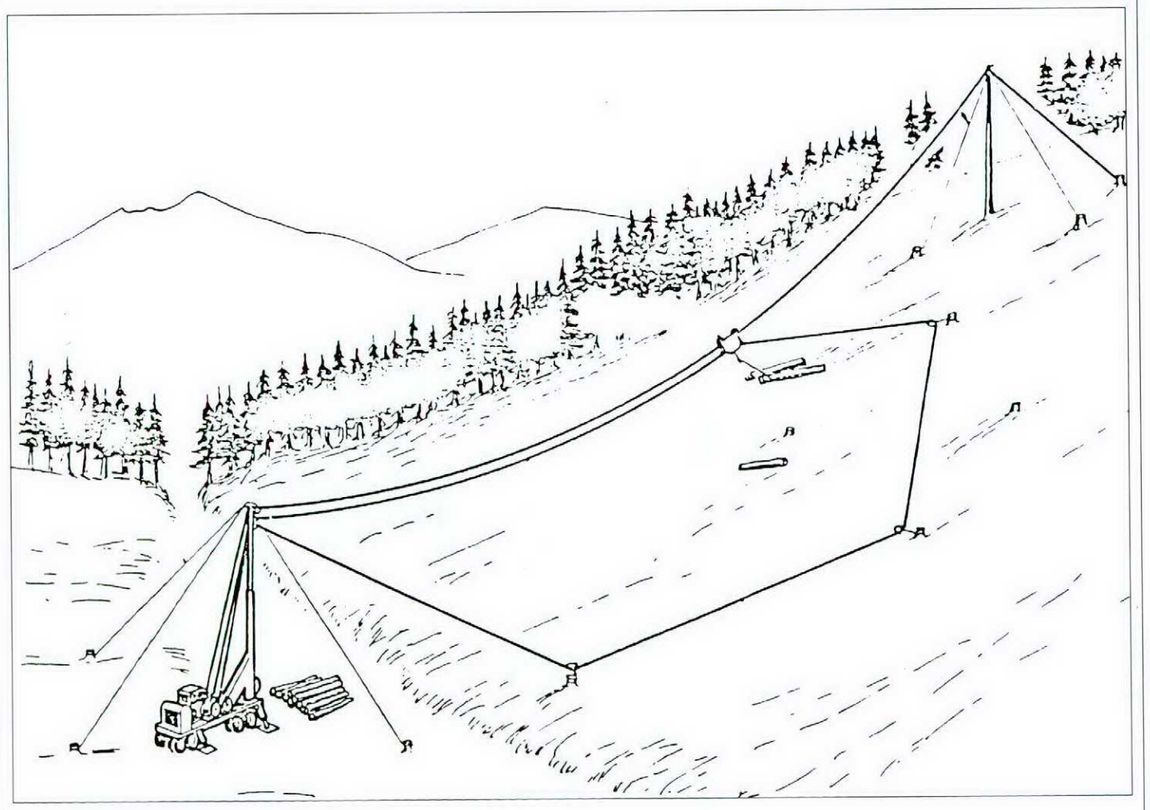
What does it look like? See below.

What is being done?

Wing Flight Safety Teams are presently working with the BC Aviation Council and Transport Canada to counter this threat to our aircrews. Safety guidelines are being developed to set an industry standard for the marking of the operations. These include a strobe light on top of the skyline rig, painting the carriage a non natural colour, and a recorded message on 131.2. There are also plans for each sight to be located on the Jeppison flight plan system and for all locations to NOTAM their operations with a GPS location.

Look out, listen out and live ◆





QUESTIONING MY DECISION MAKING PROCESS

by Capt F.R. Wade/Staff Officer Professional Development 2/Aircom HQ

I read with interest the article in *Flight Comment* 4/95 regarding the CT 142 Captain who cancelled a student night astro navigation mission for a combination of factors which included weather, serviceability, crew duty time, and criticality of the mission. It appears that the Aircraft Captain made a sound and rational decision. However, his decision was questioned and that in itself, while not inappropriate, if not handled properly, could create a negative decision making environment.

Before being upgraded to Aircraft Captain or Crew Commander, a pilot has gone through a fairly rigorous screening process. By appointing an individual to that position, the Commanding Officer is stating that he has faith in the ability of the individual to safely and effectively conduct assigned missions. Implicit in that is the trust that the Commanding Officer places in the individual's ability to make sound and rational decisions.

I consider myself fortunate to have worked for bosses who, although they may not have always agreed with my decisions, at least gave me the benefit of the doubt. Being human with, although I don't like to admit it, human failings, not all of my decisions have been good ones. However, with the rare exception I have received the unqualified support of my superiors. It is critical that supervisors at all ranks foster an environment in which personnel feel empowered to make decisions, good and bad without always looking over their shoulders or second guessing their boss.

I learned a valuable lesson many years ago as a young aircraft captain. Unsure of how I should conduct a mission, I asked my operations officer what he would do. He responded that what he would do was irrelevant, that it was my decision and that I would have to make it. In doing so he fostered my professional development. I learned that the decision and the responsibility for the decision rested with me and that I could not abdicate it. As long as that same type of supportive environment is fostered, personnel will invariably make decisions based on their own judgement rather than what they perceive to be the wishes of others. They will look to themselves and learn to trust their own judgements. The Squadron will be better served and the job will get done.

As supervisors it is important that we foster an environment that gives latitude to our personnel to make decisions without wondering if the boss would approve. We need to ensure that the aircraft captain receives the authority commensurate with the responsibility engendered in his or her position.

A centrist policy manifested by being constantly "in the face" of our aircraft commanders will only squelch individual initiative.

A final point is the effect that peers can have upon decisions made in the cockpit. My last flying tour was on Auroras. I had five two bell emergencies on my last seven trips in the Aurora. My nickname was variously, "Black Cloud" and "No Fly Fletch". Some suggested that I wear a bag over my head, cover my name tag, and don't speak until airborne so that the aircraft wouldn't know I was on board. I had a bad run of unserviceable aircraft, airborne emergencies, trips cancelled by ops, or freezing rain. If a water spout, extreme turbulence or tropical storm was going to occur it would wait until my crew was on-station. I was astounded and not a little vexed. Initially, we made a joke about it. If we deployed to a good location, people wanted to come with me because they knew they would get a few extra days of 'TD'. If we deployed to a less desirable location the inverse was true. "Go to Goose Bay with Wade? Are you kidding?" "You will learn how to handle weird and wonderful emergencies." "Forget it! I want to be home by Christmas." I took a lot of good natured ribbing. In truth, in the six month period in early 1994 when I earned my reputation, I lost only three more trips than the average for the period. It is true that I was a regular at the 349 desk and that I had the fire trucks following me on a regular basis, however, as a third flying tour pilot pushing five thousand hours, even I started to be affected. The ribbing from my friends and supervisors did not roll off my back as it appeared to. I did start to question some of my own decisions and only my experience and the strength of my convictions kept me on track. What about the young aircraft captain who lacks experience? Would he stay the course and answer to himself or would he make inappropriate decisions? If he did, and you were his buddy or his supervisor, would you be culpable? Think about it! ◆

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that it gets tangled in something like a tree, a power line, or a sinking ship. Real useful piece of gear, if you don't intend to go down with the ship, literally. But it's just dead weight if the wires are so damaged that you can't cut the cable.

We don't know if there were sufficient strands of wire left to carry the current to fire the cable cutter cartridge. Maybe it would have fired, maybe not. The point is that "maybe" is not good enough, especially in this case. If your carcass was at stake, would you take "maybe" as an answer? As our MAG guys like to remind us, the maritime environment is not very forgiving, at least not in December during a storm. The potential for very serious consequences was there.

The point I am trying to make is that even seemingly minor or trivial tasks on an aircraft can have serious effects if not carried out properly. Alright, maybe somebody needed to do a quick fix when the boot was patched up with electrical tape. It would have been nice to document it, so it could be fixed properly later.

We have to look at the whole operation to get a feel for how this happened. The Chief here did some nice digging around to supplement that first AMMIS search. What you got is a helo out of periodic that deploys on a ship. Said ship goes out on a 4 month deployment to Europe and middle east. The helo is approaching the 400 hour mark and only had 4 days of down time thanks to some minor miracles of maintenance. Can we assume that in these circumstances, operational pressure is a factor? Dirty words, but we all know it can happen. Perceived or real, the result is the same at the coal face.

In any case, during the deployment, and months before the rescue, the hoist breaks (Cable kinked 2 1/2" from the hook), so it is replaced. (You should know that the electrical harness stays with the helo, and is not changed with the hoist.) During this maintenance, the cable cutter cartridge is removed and reinstalled. Somebody got real close to that electrical harness and environmental boot. We could assume that this is where the black electrical tape comes from... Or it was already there and should have alerted the technician... Either way, it is expected signs of deterioration of the boot, or the tape covering the boot would/should have been noticed. Was a splice done, explaining the harness being 3" short? And where was it done, on the ship or on the beach somewhere?

In the rush of operational tempo, long term vision gets lost. Was there a case of "we don't need this thing for the next mission, we'll fix it later"? It certainly was a case of a quickie repair that turned around to bite us in the butt.

When those situations arise where you feel the pressure to cut corners or do a quick fix, stop and assess the risks. If you still feel that a nonstandard procedure is required, at least document it so it can be reviewed and properly repaired later on. Nobody needs to fly so bad that they want to risk getting stuck like a bug on flypaper. We see a lot of cases where taking 15 minutes longer for a job would have saved us some serious bucks.

If you think this message is solely for the techs, think again. The days where the last guy that touched the plane is guilty are over. Cpl Bloggins doesn't run the show, doesn't schedule maintenance and doesn't manage air assets.

A corny epilogue? Decisions made at all levels of the pointy end will affect people's lives. If not immediately, later on down the line. Those lives affected might not all belong to CF personnel. Do it right, and write it up. ◆

A FLIGHT SAFETY PARTNER

QUALITY ENGINEERING AND TEST ESTABLISHMENT (QETE)

Quality Engineering and Test Establishment (QETE) is a field unit of the Director General Equipment Program Services (DGEPS) under ADM (EPM). Located in Hull, QETE has ready access to the majority of the Equipment Program Manager Directorates (DGEPM) and regularly provides these Directorates with specialist advice. QETE has dedicated the Failure Investigation team as the focal point for mechanical and materials failures. In the context of Flight Safety this team is considered the "911" service.

QETE covers the full spectrum of technical fields and is organized into four major clusters: Mechanical & Materials Engineering, Applied Chemistry, Electrical & Electronic Systems Engineering and Quality Management/ Standards & Metrological services. A portion of the Failure Investigations team is dedicated to Flight Safety issues, its direct access within QETE to a full range of technical expertise and knowledge base provides this team with the technical depth and flexibility to adapt these fields of expertise to the resolution of Flight Safety issues. The majority of the work undertaken by QETE is done within its facilities in Hull, Québec but QETE also possesses portable equipment if field evaluation is required.

The QETE staff of approximately 130 is mainly civilian with a small military component which provides continuity and corporate knowledge to maintain itself at the cutting edge of the technology while maintaining the focus and perspective on DND requirements.

QETE has historically demonstrated itself as a valuable partner in the resolution of Flight Safety technical problems. Some recent examples of this activity include the CT114079 snowbird accident (Mar 94) where the investigation centered on the engine flameout and the inability to restart. The fault was caused by the fatigue failure of the engine variable geometry system feedback cable. This discovery and the assessment of the cables' condition on the Tutor and CF-5 fleet (at the time) led to the replacement of all feedback cables on the J-85 type engines to eliminate a Flight Safety hazard. In the case of CH12425 (Apr 94), QETE was also instrumental in determining the root cause of the fire that fatally injured several of the crew and destroyed the aircraft. QETE's assistance to the CC144613 Board of Inquiry (Apr 95) confirmed that no progressive failure had taken place prior to the hard landing. Finally, upon the FSII's recommendation to have QETE further investigate the cause of CF188928 landing gear failure (Aug 95), QETE was able to prove that the cause that had initially been identified was an effect rather then a cause, and that the actual cause originated from the unlocking of the planing link mechanism.

The above examples highlight the value added by QETE's involvement in the resolution of Flight Safety technical issues and re-emphasizes the beneficial relationship that QETE and DFS have enjoyed over the years. The independent position of QETE within the overall Departmental structure, coupled with the wide range of scientific specialties available, make QETE an ideal Flight Safety partner. ◆

CH12425 Seaking crash site St John, N.B.

CF188928 Hornet landing gear accident in Cold Lake

CT 114079 Tutor engine at crash site in Moose Jaw

CC144613 Challenger final resting position in Shearwater

AVIATE, NAVIGATE, COMMUNICATE

The Herc was returning home from a two-day mission. No. 4 engine had been secured due to a RPM malfunction 40 NM from base.

Approximately 15NM back, the Aircraft Commander (AC) in the left seat called for the landing checklist. The co-pilot (CP), flying the aircraft from the right seat, began incrementally increasing power to the three operating engines anticipating a loss of airspeed due to lowering the flaps and landing gear.

Soon after the flap and gear extension, the CP attempted to retrieve a checklist from his publication bag. At this moment, the AC was involved in ATC communications in preparation for the emergency landing and the flight engineer (FE) was reviewing his checklist. Unmonitored, the airspeed increased from 142 KIAS to 210 KIAS thus overspeeding the gear and flaps. The AC took control and landed the aircraft without further incident.

All three crew members were simultaneously concentrating on tasks not directly related to flying the aircraft during a critical phase of flight. Safe, successful **CRM** depends on individuals performing their primary tasks **and** monitoring each others actions. ◆

FOR PROFESSIONALISM

CORPORAL MITCHELL KAIN

Cpl Kain, an Air Weapons System Tech, was conducting routine maintenance on CF18 fire extinguisher bottle firing squibs when he noticed several poorly lockwired fittings. Upon closer examination he found the firing squibs were not properly secured to the bottle. As this situation could cause improper firing of the extinguisher, he immediately notified his supervisor and reported the problem to the trade personnel responsible for the fire extinguisher bottle.

As a result of Cpl Kain's findings, a Special Inspection was issued by the Aircraft Engineering Officer and the manufacturer to correct the problem. Cpl Kain is commended for his keen attention to detail and ongoing concern for flight safety. ◆

CORPORAL GRANT LUCAS
CORPORAL LINDA MCDONALD

Cpl Lucas and Cpl McDonald, Air Frame Techs at 4 Wing Cold Lake, noticed hydraulic fluid seeping from a drain port below panel 71R of a CF18.

They removed the panel to investigate suspected residual hydraulic fluid from the R/H rudder switching valve. While carrying out a leak inspection on the servo they noticed there was no spacer, nut and cotter pin installed on the bolt securing the backup mechanical FCS connecting link to the servo cylinder input lever. The supervisor was immediately informed and a Flight Safety Occurence Report was initiated.

Cpl Lucas and Cpl McDonald's professionalism and dedication prevented a potential failure of the R/H horizontal stab mechanical mode averting a possible serious aircraft incident. ◆

FOR PROFESSIONALISM

MASTER CORPORAL PAT NEVETT

MCpl Nevett was the assigned Flight Engineer (FE) for a night Instructor Pilot training mission on the Griffon.

On an earlier flight that day he was the FE when a flight safety incident occurred involving the uncommanded release of a slung load due to the rigging of the cargo hook being out of tolerances. Not satisfied that this was an isolated incident, he conducted an inspection of the cargo hook of the aircraft scheduled for the night mission. Under limited available light and in an extremely cramped area of the aircraft, MCpl Nevett found that this aircraft cargo hook was also not correctly rigged. He immediately informed the servicing supervisor. A local inspection of the remaining aircraft revealed others with incorrectly rigged cargo hooks.

MCpl Nevett's professional approach to his job led directly to the identification of a problem that could have resulted in further flight safety occurrences and the potential for injury to personnel or damage to equipment. ◆

MASTER CORPORAL DON JACKSON
CORPORAL DARRELL FOURNIER
CORPORAL MIKE JOHANSEN

MCpl Jackson, an Instrument Tech, Cpl Fournier and Cpl Johansen, Aero Engine Techs, installed a serviceable spare propeller an a 442 (T&R) Sqn Buffalo to rectify a burnt propeller de-icer boot.

On their own initiative, they carried out a resistance check on the prop assembly and found it to be unserviceable. Pre-installation resistance checks are not required by CFTOs. Further investigation by the individuals of the remaining five squadron aircraft found all to be unserviceable. In addition, clear deficiencies in established prop build-up and pre-installation checks for the Buffalo were identified.

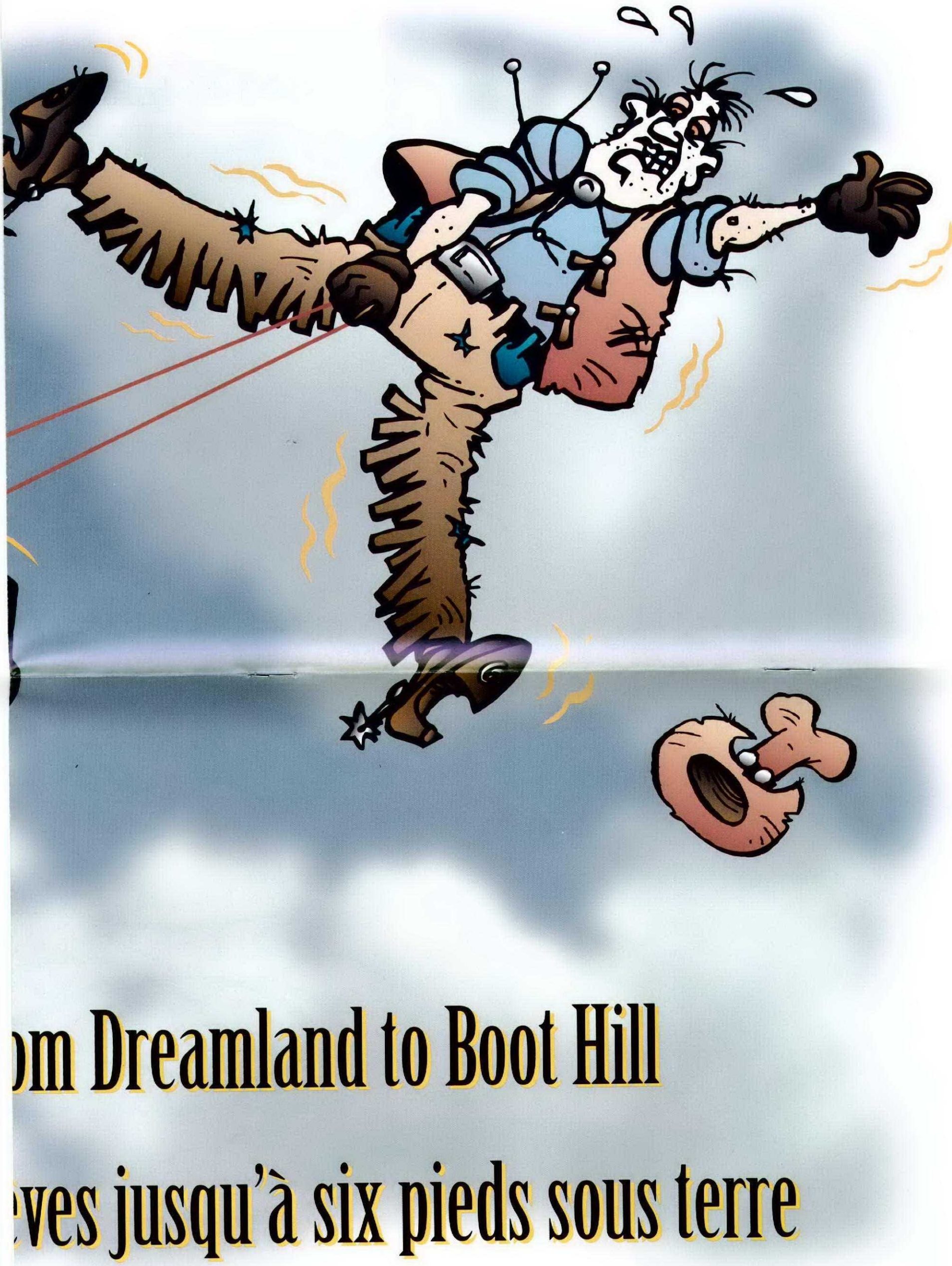
MCpl Jackson, Cpl Fournier and Cpl Johansen clearly demonstrated a high degree of initiative, professionalism and concern for flight safety, averting possible disastrous consequences of aircraft entering severe icing conditions with an unserviceable prop de-ice system. ◆

CANADAIR NORTH STAR

artist: John Matthews

Canadair North Star Mk 1 17502 of No. 426 Squadron Royal Canadian Air Force at Dorval, Quebec during the time of the Korean conflict.

During the Korean airlift 426 squadron distinguished itself by carrying 13,000 personnel and 7,000,000 pounds of freight between Vancouver and Tokyo without loss. ◆



om Dreamland to Boot Hill

ves jusqu'à six pieds sous terre

n artistique par D Admin M 2-6

Canadä