FLIGHT COMMENT

THE FLIGHT SAFETY DIGEST OF THE CANADIAN ARMED FORCES

EDITION 1 1979

Comments

"Newton's Law: What goes up must come down. Suds' Law: what comes down must go up again." Several years ago when I was BFSO in Moose Jaw, a rather unique BAMEO, known as "SUDS" Sutherland, dropped this pearl on me one day at the bar. He was in the habit of continually dazzling me with profound things, and this was no exception. Upon reading my Director's words for this issue, I couldn't help but recall it. It was the most positive air-ops attitude I had ever heard — its bluntness commanded respect and its innuendo generated more rapport and teamwork than even Suds ever hoped for.

Talking about innuendo, he also said once that some people crash around in their own haven of Selective Blindness. Think about it! If you don't understand what it means, perhaps my (not original) pearl might help. Someone once said that every organization has four kinds of bones:

— the WISHBONES — who spend their time wishing someone else would do the work;
— the JAWBONES — who do a lot of talking but little work;
— the KNUCKLEBONES — who knock all the work anyone else tries to do;
— and finally the BACKBONES — who get under the load and do the work.

Which one would you select?

Ab Lamoureux, Captain

CONVERSION TO METRES

In Editions 1 and 2 of 1978, we cautioned readers, without getting specific, that certain maps in current use now had spot heights in METRES vice FEET. We received not only queries from some of you on the subject, but, in addition, an incident report from a concerned CF-5 pilot who received target elevation in metres from a FAC (Forward Air Controller) during a training mission at Shilo.

We'd like to clear the air by stating that only one series of maps is involved i.e. the 1:50,000 National Topographic Series (N.T.S.) and that the maps have spot heights in METRES and grids in 1,000 metre squares. Aeronautical charts are *not* affected, and will not be for quite some time. Those most likely to be affected by the N.T.S. conversion are tactical helicopter, CF5 and CF104 operators.

Incidentally, the common rule of thumb we recommend to convert metres to feet, as used in 1 CAG, is: *MULTIPLY BY 3 AND ADD 10%*. For example 100 metres (328.087 feet) becomes 330 feet, which is close enough for government work.

COVER

Visions of summer

Our thanks to MCpl Ross Butterfield, Base Photo CFB Summerside, for his excellent photo of VP 415 "Swordfish" Squadron's Argus 736 over world famous Malpeque Bay, P.E.I. The drivers were Capt Mert Rose and Lt. (now Capt) Merl Preuss. MCpl Butterfield took the picture from Argus 738, piloted by Capt Mike Sparks, using a HASSELBLAD with an 80mm lens.

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Whatever happened to team spirit? Whether your problem is simply a transient aircraft to be serviced or a matter of policy involving several levels of command, you can't resolve it very easily without cooperation and support. As the saying goes I sometimes wonder if we are all on the same side. My aim in life is to try to prevent unnecessary accidents without restricting our operational capability. What is yours? Perhaps more of us need to ask ourselves that question. Certainly there are lots of problems in the air side of the Canadian Forces, but I don't remember the Air Force being much different in the so-called good old days. None of these problems is so overwhelming that it can't be overcome if we work together. That's not only the secret of flight safety but also of any successful military operation.

In the recent survey conducted by DFS concerning the value and format of the annual flight safety briefings the volume of response from you was a bit overwhelming. We are grateful to all of you who took the time to complete the questionnaire. The results show that our efforts in conducting these briefings are appreciated and considered necessary. Consequently, the briefings will continue in 1979 but with some changes in format.

For some reason the number of aircraft being damaged on the ground is rising at an alarming rate. Our statistics show that the towing and loading activities are the most destructive. What to do about that is another matter. The answers to this question probably won't be found in the files at NDHQ or Air Command but rather in the hangars and on the flight line. Whether it be shortage of trained personnel, excessive workload or inadequate supervision can best be determined by those who are responsible for ground support activities. Most ground accidents are preventable if people are safety conscious. That takes training, motivation and leadership — as well as teamwork!

COL J.R. CHISHOLM
DIRECTOR OF FLIGHT SAFETY

Mixed traffic in Maple Flag includes fighters, helicopters and transports. Hercules aircraft from 435 squadron, Namao, took part for the first time. The mixture demanded extra care from pilots and tower controllers.

(Base photo by MCpl Vic Cousineau)

MAPLE FLAG

by Maj W. J. McWilliams
BFSO Cold Lake

A four week tactical air exercise has become a regular feature at CFB Cold Lake. Maple Flag will fly twice a year. The exercise, because of its size, complexity and realism, requires special emphasis on Flight Safety.

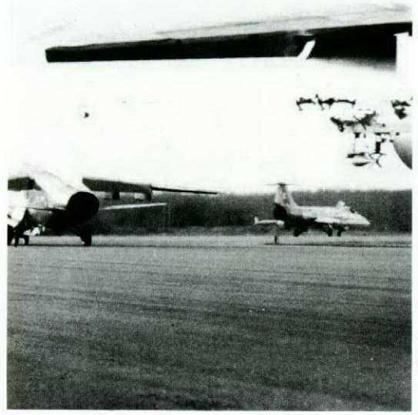
What is it, who's in it and who wins? The latter question is easy: everyone wins! The realistic training is very useful, even to the 'losers'.

Maple Flag is really Red Flag, North. Red Flag is a tactical air exercise run ten times a year normally at Nellis AFB, Nevada. The Red Flag organization is a cell of about four dozen people commanded by a Colonel. This staff organizes and administers the wars for squadrons and units which are deployed to Nellis for four week periods. Aircraft and groundcrew normally stay for the whole time while aircrew participate for the first two weeks and then are replaced by fresh faces as the scenarios are repeated for the latter two weeks.

The object of Red Flag is realistic tactical air warfare training with all the facets of such operations, including: air-to-ground, battlefield search and rescue, troop and resupply escort and air-to-air combat. The Nellis range is equipped with battlefield deployments, simulated surface to air missiles and an instrumented air to air combat range. The instrumented range which allows a three dimensional playback of 'who got who', is used to umpire results and, most important, why and how.

Maple Flag crews come from all 4 US Forces and various outfits from the CF. Local traffic procedures are briefed and followed.

(McWilliams photo)



CF-104 and A7 aircraft arming. There are 2 Maple Flag launches and recoveries daily. Normally base flying training is scheduled around these periods when possible.

(McWilliams photo)

Most of the Maple Flag fighter aircraft shared 417 Squadron's ramp, a space which normally accommodates twenty CF 104s. Phantom, Harrier and Corsair aircraft more than doubled this number; extra ramp sweeping and FOD control was required.

(McWilliams photo)

Personnel from all four American services train at Red Flag, and limited numbers from other airforces have taken part.

There are two reasons for holding sessions of Red Flag at Cold Lake. Firstly, although the weapons ranges are roughly the same size, Nellis' location permits VFR operations only in the range itself. There is more free airspace around Cold Lake, permitting more scope for realistic entry and exit to the range. Secondly, the desert terrain of the Nevada range doesn't simulate much more than desert, Cold Lake's range is much more like the European environment, an obvious advantage in the pursuit of realism.

Cold Lake has hosted two Maple Flags now, and Flight Safety problems unique to the exercise have emerged; additionally, all the other problems inherent in high-speed low-level fighter operations remain.

The varied types of aircraft participating, with their varied performance and requirements pose special problems for ATC and other base sections. There are two launches per day: helicopters, transports, interceptors and fighters compete for the runways with Cold Lake's two training squadrons and other units. As much as possible this is solved by reserving one of the parallel runways for Maple Flag and scheduling student flying around the launch and recovery cycles. There is no room for carelessness or complacency in the circuit with variances sometimes exceeding 100 knots on final approach speeds between different aircraft. **Awareness** and **airmanship** are the keys to a safe operation in this situation.

Participants come from several different services and from all over the continent. Local and CF procedures have to be thoroughly briefed with each intake of aircrews, to ensure each knows what to expect during the operation. For instance, US Navy practice for stream landing is to alternate left and right on the landing roll. This becomes a hazard when relatively slow Skyhawks are followed by CF-104s, given the possibility of drag chute failure. All crews are briefed to pull to the departure side of the runway on landing, avoiding the need to impose unworkably long landing intervals and the chance of a high-speed rear-ender.

The Fall version of Maple Flag runs into mid-November when Cold Lake's balmy climate can produce temperatures as low as -30°C. Winter survival, life-support equipment and rescue procedures are included in the comprehensive briefing given to each group of aircrew participants on their arrival. Cold weather briefings are also given to the groundcrews, some of whom, have never before been concerned with temperatures other than extremely high ones.

With an additional 50 to 60 or so extra aircraft on the base, ramp space can be a problem. All participants would like to be in the same location, naturally, but care has to be taken to avoid not only overcrowding but incompatibility of operation. Departing helicopters are kept away from jets to avoid blowing FOD into intakes; armed aircraft have to be pointed in safe directions; and stringent control of tarmac vehicular traffic has to be practiced.

A US Marine corps AV-8 Harrier taxis out demonstrating why ramp FOD is unacceptable.
(McWilliams photo)

USAF practice is to have a Supervisor of Flying (SOF) in the tower during all flying. The SOF, a pilot from the "Principal Unit" deployed to Maple Flag is provided with checklists and AOIs. He has UHF communications to give assistance when required during emergencies.
(Base Photo)

A daily debriefing is held; the debrief involves all participatihg crews. Video tape ensures lessons learned are not lost. An edited tape is produced and used as part of the briefing for the subsequent Red Flag/ Maple Flag exercises.
(Base Photo)

Cold Lake lies in the centre of a bird flyway. The two Maple Flags have, as much as possible, been scheduled outside of known high intensity migratory periods (which occur most often at night and early morning). If the birds are not cooperative, adherance to bird-avoidance procedures is practiced. (CFB Cold Lake has a very successful bird avoidance program. The key to its success has been the Base's ability to very accurately predict bird migration, as a result of several years of study involving highly competant weather forecasting and long range radar analysis. Avoidance techniques may involve the use of landing lights, restrictions on altitude, airspeed, mission and circuit procedures, and ultimately cessation of flying operations).

The greatest potential for disaster lies in the Air Combat Manoeuvering (ACM) arena, normally part of every daily scenario. ACM, by its nature, is very competitive. It is also fun. Strict adherance to the rules of engagement, the practice of good airmanship and air discipline have resulted in a safe and effective ACM program.

An exhaustive debriefing at the end of each day relives every aspect of the exercise. There is a lot of pressure to do well. Each aircrew's performance is exposed, good or bad, to his peers. Winning, by taking shortcuts or using dangerous techniques is never applauded; in this case of practice war, how you play the game is also an important point.

To date, the self-discipline, airmanship and common sense shown by Maple Flag participants has demonstrated that a professional approach can result in realistic, satisfying and very useful tactical flying training.

ABOUT THE AUTHOR — Maj W.J. (Bill) McWilliams

Major W.J. (Bill) McWilliams was born in Moose Jaw, Saskatchewan. He joined the RCAF Auxiliary in 1954 and the regular force a year later. Following NAV/AI qualification in 1956 he had tours on CF100's with 432 and 413 Squadrons Bagotville and CF101's with 409 Squadron Comox. A tour as GCI came between the above.

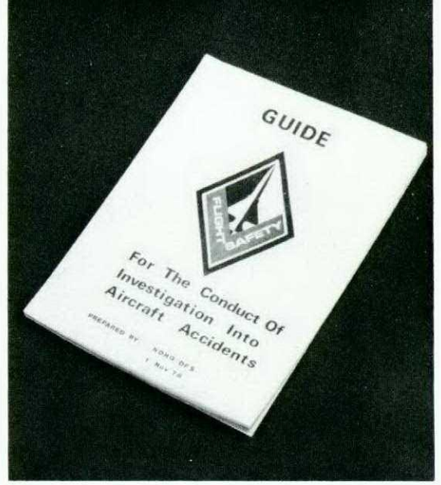
He cross-trained to pilot at Moose Jaw and Gimli, receiving, in 1970, his pilot wings along with higher pay and increased status (his own words).

He then spent five years in Europe on CF104's prior to moving to Cold Lake and 419 Squadron as an instructor. On April Fools Day 1978 he was promoted and appointed BFSO.

GUIDE TO INVESTIGATION

by Capt Ab Lamoureux

In response to your request, DFS has produced a Guide to assist personnel involved in the investigation of aircraft accidents. Copies have been sent to all flying bases for **BFSO retention**. Spare copies will be available at SSOFS AIRCOM and DFS. We suggest that BFSOs maintain rigid control of these Guides to ensure they are available to members of a Board of Inquiry when required. We also suggest that personnel, when appointed to a Board, procure a copy from their local BFSO to read enroute.



ALTIMETER SETTING – *pay attention*

by Mr. R. B. Saunders, NDHQ–DMetOc

ABOUT THE AUTHOR

Bob Saunders, a native of VICTORIA B.C., graduated from the University of Victoria in 1967 with a BSC in mathematics. He undertook meteorological training in that year and was awarded his crystal ball in 1968. Since then he served as a forecaster at MARPAC HQ Esquimalt ('68-'69), CFB Winnipeg ('69-'72) and Met. Instructor at CFB Moose Jaw ('72-'75) before he joined the staff of NDHQ Director Meteorology and Oceanography as SO MET PROJECTS in 1976. Bob is a regular contributor to Flight Comment — this being his third submission.

Have you ever queried an altimeter setting received in-flight? Could you recognize one which was incorrect? In the past year there were two separate incidents involving high performance aircraft where military aircrew accepted altimeter settings which were almost one inch too high.

In one case the aircraft captain had been given the correct altimeter setting of 29.18 on initial contact with the destination base. This setting was then verified a second time and acknowledged. However, when subsequently cleared to descend to 10,000 feet, the captain accepted, without question, a setting of 30.18 from terminal control. This error was not detected until after the aircraft was passed to the precision approach controller who immediately saw that the aircraft was dangerously low. By this time the aircraft altitude was approximately 1,000 feet lower than indicated on its altimeter!

The second incident also involved the passing and acceptance of an erroneous altimeter setting which similarly resulted in an aircraft being passed to the precision approach controller while at a dangerously low altitude.

Despite precautions taken to prevent the transmission of erroneous altimeter settings, a few, in accordance with Murphy's law, occasionally slip through. Errors which could result in serious discrepancies between indicated and actual altitude are most likely to occur under conditions of low atmospheric pressure — especially under those conditions which cause the altimeter setting to fall below 29 inches. For example, it is not unheard of for an abnormally low altimeter setting such as 28.98 inches, to be transmitted as 29.89 inches which, being close to Standard, occurs more frequently. If an altimeter were to be set using such an erroneous report, an approximate altitude error at ground level of 900 feet lower than indicated would result. When coupled with the fact that low surface pressure is most frequently associated with low ceilings and poor visibility, it is evident that such an error could have very serious consequences.

HOW CAN LARGE ERRORS IN ALTIMETER SETTINGS BE DETECTED?

The key to the detection of significant and potentially dangerous altimeter setting errors of the type cited above lies in the fact that surface pressure and the related altimeter setting change relatively slowly. While hourly changes in the order of 0.01 to 0.03 inches in altimeter settings are common, only rarely does the rate of change approach 0.20 inches per hour. Thus a variation of the order of one inch, as was implied in the incidents mentioned above, would be completely unrealistic.

For flights involving high performance aircraft, destination and alternate altimeter setting reports are usually available at the pre-flight weather briefing. As part of his responsibility to obtain and apply all essential weather information, the pilot should note the latest altimeter setting report for destination, received at the briefing, and compare it with the subsequent reports received in-flight. Any reports which indicate a rate of change of altimeter setting in excess of 0.20 inches per hour should be considered suspect and immediately questioned. Even if the altimeter setting reports for destination are not available at the point of departure, the same technique can be applied to altimeter settings received in-flight, to confirm that variations between successive reports are realistic.

By following this simple procedure of utilizing altimeter information effectively, potentially dangerous situations caused by accepting highly erroneous altimeter settings can be avoided.

Why am I G2 02 if he's G1 01

by Maj J. R. Popplow
Flight Surgeon CFB Portage La Prairie

431 313 915 Major Jim R. Popplow

Major J. Popplow joined the RCAF in 1961 and served as Air/RN/RO from 1962 to 1965, and at CFS Moosonee in 1965 until 1966. He received his BSc Physiology and BEd as a civilian then he attended Queen's Medical School with CAF. He is presently the Base and Flight Surgeon at CFB Portage La Prairie.

Is a G1 01 pilot:

a. better than a G1 01 infanteer?
b. worse than a G1 01 infanteer?
c. different than a G1 01 infanteer but equally fit for his own role?
d. all of the above?
e. none of the above?

As Base Surgeon of the C.A.F.'s initial flying training base at CFB Portage la Prairie I get asked some variation of the above by each course, as well as our regular staff.

I will attempt to answer the more common questions as I understand them, and encourage all aircrew to drop in for a chat with their friendly flight surgeon if they have others.

What does the (111/11/1) mean on my 2084? This is your medical classification and normally includes the year of birth and six factors, expressed as:

V – Visual acuity
CV – Colour vision
H – Hearing
G – Geographical limitation
O – Occupational limitation
A – Aircrew standards

Their purpose is to communicate to our admin. and employment managers a concise medical opinion of your capabilities. Before I discuss the "G" and "O" factors let me dispose of V, CV, H, and A. The number range from normal (no limitations) assigned 1 to V6, CV3, H5, A7, which roughly translates to almost blind without specs, colour blind, almost deaf, and stay out of airplanes except as tourists! The in-between factors are assigned from objective data which you will readily understand if and when your number's up!

However, what about the old "GO" factor, especially the "walk on water "GO – 1s".

The Geographical factor is designed to delineate areas and conditions in which the individual may be expected to live and work.

The three subsections are:

Climate – hot, cold, damp, dry, etc.
Accommodation – both housing and messing
Medical Care Availability – from nil to NDMC

The numbers range from G1 to G6 as follows:

G6 – you've just retired with a gold watch
G5 – NDMC has to be handy
G4 – Warm barracks, with live-in Nurse!
G3 – May go to sea or to the field but day V.F.R. only
G2 – Now we're getting to it! A "G2" person may have some minor medical disability which does not limit his postings or employment in *any* climate or environment, or for any employment within his classification. This, quite clearly is most of us ordinary folk except for *the G1* person.
G1 – This guy is free from any mental or physical disabilities and may go and fight anywhere in the world where climate and accommodations are the pits and the nearest "Med A" is back in "R & R". Minor physical or mental disabilities must be regarded as unacceptable since they might be aggravated by the rigorous conditions you've just flown or been dropped into!

So are you a G1? Then how about the Occupational factor. It delineates both physical stress and activity together with mental stress and activity.

Naturally the demands on a given individual will vary with his job, and this is the question to be considered in the latter part of this article. The "0" numbers again range from 01 to 06 as follows:

06 – They may help you from the retirement speech podium.
05 – You can do your thing if you lay down a lot.
04 – (a) You can do your own thing, very slowly
(b) Your nerves are fine, as long as no one speaks to loudly!
03 – Most things in moderation, but no front line stuff.
02 – I don't think I can improve on the CFP 154 paragraph so here it is: "This grade will be assigned to the individual who is mentally stable and free from physical disabilities, except those minimal conditions that do not impair his ability to perform heavy physical work. Such personnel are capable of being trained to a state of physical and mental fitness compatible with full employment except for those special employment areas that demand above average fitness as envisaged in 01."

Note that it says that you must only be capable of being trained to full employment levels, so again, that is most of us ordinary folk. Then what, pray, is an "01".

01 – and I quote: "This grade will be assigned to the individual who is free from mental or physical disabilities and trained to ensure sustained, hard muscular work or activity at a rapid rate under severe stress. Such personnel will excel in individual combat and front line fighting or physically demanding functions. They may be exposed to variable physical hazards and psychological stress and must be capable of accepting considerable physical and mental punishment. Strength and stamina are the prime requisites. Grade 01 will be assigned to personnel who meet this standard as well as recruits and service personnel whose medical assessment indicates they have the potential to be trained to this standard. If, in spite of training, they fail to measure up to standard envisaged by 01, they should be downgraded."

Note again, that your medical assessor has only to indicate that you have the *potential* to be trained to this super fit level. If you train and train and don't make it, then 02 it is. But, if you have a job that is mentally and physically demanding in a different or unique way, such as piloting, yet are not required to run back to back 10 milers, or daily 5 miles before breakfast with full combat gear, are you just as valid a 01? Read that CFP 154 F1 definition again; it says free from mental or physical disabilities and trained for severe stress of strength and stamina.

It seems to me, that if you wish to retain or attain an 01 then you must present some hard evidence of fitness to your flight surgeon.

(i) You must be in the ideal weight range for your height.
(ii) You must have achieved an excellent in the physical fitness testing whether or not you agree with running as a test of fitness.
(iii) You must be recognized by your formation supervisor as excelling in the physical and mental aspects of your job, be it Pilot or Combat Arms.

If that is you, then you're an 01.

Note that the "G" and "0" factors are separately considered and written. It is quite possible to be a G1 02 which I personally believe we should be using more to denote a person free to go anywhere in the world with a normal or average fitness level.

But are these fitness categories applied equally by all M.O.s and flight surgeons or are they susceptible to individual interpretation? All changes in aircrew categories are reviewed and approved by the Air Command Surgeon or his deputies, who do provide the equality of category assignment necessary in such a large Command.

After Command review, any reduction in category which may affect a pilot's career is further reviewed by the Central Medical Board at DCIEM Toronto, and the Director of Medical Treatment Services at NDHQ Surgeon General's shop.

Category *retentions*, on the other hand, are not reviewed. A G1 01 or G2 02 person may remain that unless a valid reason appears to change it and then the medical file is forwarded.

In closing, I would like to reassure all our C.A.F. pilots that your medical category will never be changed on a whim without firm logical evidence which is able to be reviewed by a senior independent Command Flight Surgeon.

The change from G1 01 to G2 02 has *NO* career implications for aircrew. Career managers are well aware that G2 02 is quite within classification medical standards and that in real terms there is *no* restriction on the individual's employment.

I have further been assured that our N.F.A. aircraft pilots will not be selected on the basis of G1 01 or G2 02 but on a multiplicity of factors which we already know must go into the making of a high performance pilot.

If you still have a hankering to be "1s" across the board, go see your Flight Surgeon while you run, not just walk, on water!

GOOD SHOW

MCpl N. Lyon

Cpl B.K. Haines

Cpl G.P. Money

MCPL N. LYON

On the early evening of 27 October 1977, a series of untimely events occurred that might well have resulted in the loss of an aircraft had it not been for the high degree of competence and professionalism demonstrated by CFB Trenton approach control; and more particularly Controller 11, Master Corporal Nelson Lyon.

An inbound CF5D aircraft was not notified in a timely manner of a special weather observation that had been issued indicating low ceiling, reduced visibility and fog. Instead, it was directed by Toronto Center to descend. The first notification of the deteriorating weather conditions was as it levelled at 5,000 feet, approximately 15 miles from the base and contacted Trenton approach control. At that time the observation was ceiling 100 feet, visibility 1/8 mile and fog. Although sufficient fuel existed for a normal approach, it was not sufficient to divert to an alternate. During the first approach, the observation was amended to WOXOF, and although MCpl Lyon did a superb job of controlling the approach, and although the CF5 was on course and glide path at decision height, the pilot was unable to acquire sufficient visual references with which to accomplish a landing.

The fuel state became more critical after the missed approach and MCpl Lyon indicated a complete awareness of the situation. In addition, he was aware of the complexities of a night, low visibility, low fuel GCA approach and the implications that another missed approach might have. With these added pressures, compounded by controlling a high speed fighter whose turn rate, approach speed, and rate of descent are greater than those of the transport aircraft with which he is more familiar, he offered unsolicited suggestions in a timely manner that reflected a great deal of professional judgement and initiative on his part, and without question contributed to the safe recovery of the aircraft.

Recognizing that these suggestions would significantly increase his own workload, and accelerate the already difficult job of controlling an unfamiliar aircraft, MCpl Lyon suggested a tighter pattern to conserve fuel, and a modified 2 1/2 degree glide path which improved visual acquisition of the approach lights. His directive commentary throughout the approach was immediate and consistent, and reflected a high degree of expertise, judgement and professional poise. The second approach was terminated successfully. Anything less than perfect performance on the part of Controller 11 would almost certainly have meant another missed approach and an emergency fuel situation.

The pilot involved, a USAF pilot on exchange duty with the Canadian Forces, has been in a position to evaluate the relative performance of GCA controllers in many countries. He states that "Without question MCpl Lyon is the finest example of his profession I have worked with in many years of flying. I extend to him my personal appreciation".

The Canadian Forces, in recognition of Master Corporal Lyons superior performance awards this "Good Show".

CPL B.K. HAINES

On October 21, 1977 while performing an airframe Daily Inspection on Hercules aircraft C130326, Corporal Haines noticed what appeared to be a slight tear in the cargo air conditioning inlet duct. His discovery of this tear indicates keen initiative and superior mental attitude in the performance of duty as the area in which the tear occurred is difficult to inspect.

Removal of the inspection panel adjacent to the unserviceable ducting revealed that the unit was torn over a large area. The aircraft was subsequently grounded until a new duct was installed.

The large tear in the air conditioning duct would have allowed high velocity ram air to strike a flat surface perpendicular to the air stream in the wheel well area. This situation may have caused aircraft structural damage and consequent loss of pressurization. In this respect, Corporal Haines most certainly prevented a possible in-flight emergency.

Corporal Haines' professional attitude and dedication to duty are hereby recognized through the award of a "Good Show".

CPL G.P. MONEY

While carrying out an AB check on a transient T-33 aircraft, Corporal Money detected an odour of fuel in the upper plenum area. Experience alerted him that this was not a normal situation and he proceeded to investigate.

He discovered that the air line from the number 8 expansion chamber to the acceleration control unit had a broken seal and was deteriorated at the expansion chamber. The snag crew was notified, the problem confirmed and repair action was initiated.

This air line provides pneumatic feedback to the fuel control system. While the engine would have started with the air line leaking, when the throttle was advanced, particularly during a rapid advance for take-off power, then the fuel control would have only atmospheric pressure on one side of the differential pressure controller. As the pressure increased in the plenum chamber the fuel flow would normally be reduced. The correct pressure could not be transmitted by the faulty line and excessive fuel would be metered to the engine, resulting in an overly rich mixture leading to overspeed or overtemperature conditions.

The broken seal was discovered when Corporal Money opened the right hand trunnion access door on his investigation. To check in this area is not called for on any servicing level inspection, therefore Corporal Money obviously went well beyond the depth of inspection normally expected on an AB check in order to discover the cause of the odour.

Corporal Money is to be commended for his perseverance and professional approach in uncovering this unserviceability, which could have led to a serious in flight problem.

Pte R. Bauer

Cpl G.A. Sasvery
Cpl R.D. Veeder

Capt Rohrer
Sgt Vienneau

PTE R. BAUER

On 30 December 1977, during a two monthly inspection of a Tutor man carrying parachute, a problem was discovered with a MK10B release mechanism by Private Bauer which, should it have gone unnoticed, could have resulted in loss of life under certain circumstances.

The release mechanism had been checked for servicability on its two monthly inspection in the altimeter chamber for altitude setting and on the timer for a timing check. Everything functioned normally.

While Private Bauer was installing the release mechanism into a parachute, he heard a faint rattle on the inside of the mechanism. He immediately brought this to the attention of his supervisor. The release mechanism was dismantled and the supervisor found that the screw for the timing piece was missing from its normal position. A further investigation revealed the screw was lying loose inside the mechanism amongst the gear train. The possibility exists that the timing screw came ajar during the final timing check. When the mechanism is fired, it creates a severe jar on the whole unit. With the timing screw lying loose amongst the gear train, it could have presented a hazard by jamming the mechanism preventing it from operating normally and opening the parachute.

Private Bauer in paying conscientious attention to this "faint rattle" possibly prevented the loss of a life. His professional attitude and alertness are highly commendable.

CPL G.A. SASVERY CPL R.D. VEEDER

On October 1977, while conducting their normal trade duties, Corporal Sasvery and Corporal Veeder observed an excessive amount of smoke being produced by a BRUTE power unit which was connected to a Boeing aircraft. The aircraft was parked in the congested "slot" area between number 10 and number 4 hangars at CFB Trenton.

The two technicians proceeded immediately to the aircraft and noted that the ground power unit was arcing and that the wiring was smouldering. They quickly pulled the power cord from the aircraft and towed the power unit to a safe area. After shutting down the GPU, the smoke dissipated but Corporals Sasvery and Veeder continued to stand by with fire extinguishers until firehall personnel arrived on the scene.

A fire involving a Boeing aircraft parked in the "slot" could have disasterous consequences with the possibility of widespread destruction. The prompt and effective response by these two technicians may well have prevented such an occurrence.

CAPT ROHRER SGT VIENNEAU

During a Squadron winter exercise deployment Captain Rohrer and his observer Sergeant Vienneau were flying in the vicinity of the heliport and passing a PIREP to Petawawa Metro.

Shortly after passing the PIREP and descending through 2,800 feet AGL the master caution light illuminated, accompanied by the engine-out light — the engine-out tone was not heard. Captain Rohrer immediately established an autorotative glide and attempted a re-light while Sergeant Vienneau sent out a Mayday call. The first re-light attempt passing through 1,500 feet was unsuccessful and while rolling out onto final for the touchdown area, a second attempt was made. The second attempt proved to be successful, however, due to the close proximity of the ground Captain Rohrer was forced to carry out a full autorotative landing prior to regaining full power. The aircraft was landed safely without any damage to either the aircraft or its crew.

Captain Rohrer's immediate and professional reaction to this hazardous situation averted any serious accident or injuries. He and Sergeant Vienneau are commended for their alertness and professionalism.

cont'd on next page

PTE S.J. BRIAND

Private Briand was involved in the rotor-running refuelling of a Sea King helicopter. After the fuelling operation had been completed and the aircraft departed, Private Briand discovered a pool of hydraulic fluid where the aircraft had been positioned for fuelling. He immediately notified his superiors who initiated a recall of the aircraft for an inspection of its hydraulic system. During the subsequent shut down and inspection, the aircraft auxiliary hydraulic pump was discovered to be leaking.

Private Briand's reaction to this incident was above and beyond normal attention to duty. His initiative in discovering and reporting the pool of fluid prevented a potential in-flight emergency.

CAPTAIN J.R. GALASHAN
CAPTAIN J.P.M. PELOQUIN

During take off for an Air Defence Exercise Mission in a CF101 Voodoo Captain Peloquin and Captain Galashan heard an explosion and experienced severe airframe vibrations just after afterburners were terminated. The tower controller advised the rear of the aircraft had been engulfed in flames and that debris was seen falling from the aircraft to the runway. During the explosion the port EPR gauge had dropped to zero and the starboard EPR flickered. The right engine also appeared to compressor stall. The crew immediately checked for signs of fire both in and out of the cockpit. The pilot quickly analyzed the situation and found that the starboard engine throttle was stuck in full military power. The engine was shut down by means of the engine master switch and an emergency declared.

The runway was cleared of debris and a chase aircraft confirmed that the starboard tank and several panels had been blown off. There was also a hole punctured in the upper starboard fuselage as a result of the explosion. A single engine GCA recovery was initiated and the pilot experienced a flap failure on short final. The Voodoo sustained B category damage.

Because the aircraft was saved by the quick professional actions of both crew members, the investigating team was able to determine the cause and institute preventative measures to preclude reoccurrence. Captain Peloquin and Captain Galashan well deserve a "Good Show".

PTE.T.J. GALE

On 14 February 1978, during a night Air Defence Group exercise, Private Gale was assigned to a "Last Chance" inspection crew. His duties were to pull all aircraft safetying pins, to ensure that there was no external evidence of fuel, oil or hydraulic leaks and to confirm that all access panels were properly secured.

While carrying out a "Last Chance" inspection on a CF-104 aircraft, Private Gale looked up through the ground cooling doors and observed hydraulic fluid dripping from the number two generator. Unsure if the generator was hydraulically operated or not, he informed his supervisor. An Aero Engine technician examined the aircraft and after ascertaining the nature and severity of the problem, had the aircraft ground aborted. Had this hydraulic leak gone unnoticed, it could possibly have caused a serious inflight emergency.

This particular area of the CF-104 is not normally part of the "Last Chance" inspection. The fact that Private Gale discovered this leak, especially at night, under adverse lighting conditions demonstrates his initiative and his conscientious approach to the performance of his duties.

Pte S.J. Briand

Pte T.J. Gale

Captain J.R. Galashan
Captain J.P.M. Peloquin

Cpl J.A. Murdoch

CPL. J.A. MURDOCH

While carrying out the functional testing phase following a No. 4 periodic inspection on Snow Bird Tutor CT114118, at the AMDU, Corporal Murdoch detected a peculiar odour in the cockpit. He immediately ordered ground power shut down and switched off the battery. The odour very quickly disappeared. All circuit breakers were pulled and the testing was stopped.

On investigation Corporal Murdoch found that the smoke generator circuit wiring had shorted in an inaccessible area. It was discovered that this wiring circuit was peculiar to Snow Bird aircraft and was not listed in any of the technical orders available at AMDU. However, further investigation revealed this circuit was wired directly to the battery bus bar with no circuit breaker in the system.

National Defence Headquarters was immediately notified. An investigation of the remaining Snow Bird aircraft revealed that all aircraft had been improperly modified. A modification was initiated immediately by National Defence to correct this situation.

Corporal Murdoch's quick and positive action certainly saved a valuable aircraft from major damage.

Without question his positive action in detecting and eliminating this serious flight safety hazard is a very significant contribution to the flight safety program.

POINTS TO PONDER

choppers as chainsaws

Here's a question for you helo drivers: How large a tree do you think your machine can fell without hurting the blades? If you played it safe and said that you wouldn't cut anything with a rotor blade, you'd be right! Recently, a Twin Huey SAR crew made a different decision with expensive results. As they let down into a confined area near a crash site, they discovered several small trees — up to one inch in diameter — inside the rotor disk. *The captain had heard somewhere that the Huey could negotiate foliage this size and continued the landing.* How did it work? Fine — the trees were all cut. What did it cost? Two rotor blades — the trees had made several quarter inch grooves in the honeycomb material and they had to be returned to the contractor for repair. Remember that your blades are designed to displace nothing heavier than air; they'll harvest small trees for you, but only once.

Maj J. Maxwell DFS

by the book

The U.S. NTSB (National Transportation Safety Board) recently pointed out that the pilot involved in a B-727 wind-shear accident at Tucsin, Arizona in June 1977, was flying his aircraft "by the book". It also stated that, as in every other wind shear accident it has examined, **if the pilot had been trained to take full advantage of his aircraft's performance there would have been no accident.** The point being that there is a substantial margin between V2 (minimum climb speed) and the stall and that companies are not training their pilots to the outer limits of the equipment.

courtesy, Pilot

the pause that refreshes

While working on an aircraft, a technician left his Pepsi can inside the aircraft while he performed some maintenance outside. When he returned, he took a drink of his Pepsi and discovered it was not Pepsi but engine oil. He induced vomiting, then went to see the doctor.

We were sorry to hear his break was ruined but perhaps he was taking it in the wrong area. In addition, the adage about not putting non-edible substances into containers designed for edible goodies applies equally as well around aircraft as it does around the house.

adapted from Flight Fax

FEEDBACK

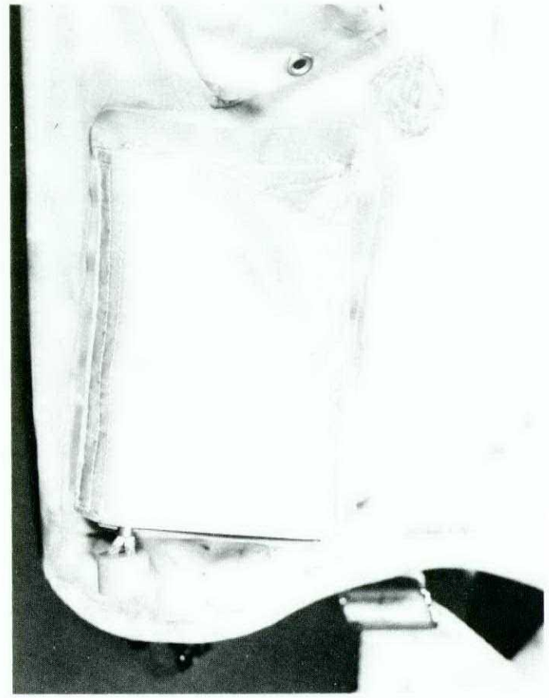
INADVERTENT INFLATION OF MAE WEST

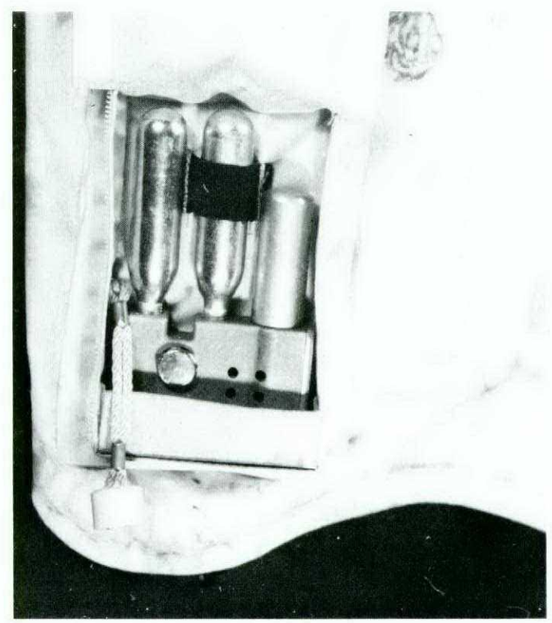
Capt Ab Lamoureux DFS

OCCURRENCE

In July 1977, a routine training mission nearly blew out of all proportion for a CF101 crew when the pilot's Mae West suddenly did just that! They were at 30,000 feet when committed on a front attack — the target was an F-106 at 18,000 feet. The Nav. got a short lock-on, requiring an aggressive manoeuvre by the pilot to "centre the dot". The aircraft was at approximately 23,000 feet (cabin pressure 8,000 feet) in a dive with 90 degrees of bank and 3G, and the Nav. had just called five seconds to fire when the pilot's Mae West inflated. The instantaneous effect on the pilot was the feeling that 6 or 7G's had been applied. He immediately attempted to break off the attack and take evasive action from the target, while trying to deflate the Mae West using the oral inflation tube. The deflation attempt was unsuccessful, in spite of the fact that the tube was in the recommended accessible position and was unlocked! The break away attempt was severely complicated by the fact that the pilot was experiencing tunnel vision, restricted vision (the inflated neck portion of the Mae West had forced his head forward and down, causing his oxygen mask to be displaced up above his eyes), difficulty in breathing, inability to talk and impairment of arm movement (his arms were forced outward). The Nav. was yelling at him to break away and getting no response. In spite of all these pucker-factors (all of which took place in less than 10 seconds) the pilot was able to avoid the target - barely! The F-106 pilot called it a Near Miss!

He finally stabbed his Mae West with his rescue knife and felt immediate relief. Following a short period of "Composure readjustment", the crew returned to base with no further difficulties. Post flight inspection confirmed that the manual inflation lever was in place (witness wired). The pilot added that the Mae West had been exposed to heavy rain for 10 to 15 minutes prior to flight.





INVESTIGATION

Investigation of the Mae West revealed that moisture had entered the water ports, triggering the automatic device, and that the 3G loading may have contributed, by forcing moisture into the electrical contacts. A modification project was initiated to deal with the problem.

The failure of the oral inflation tube to operate remains a mystery. There is no question that the pilot had some difficulty finding enough hands to fly the aircraft, cope with his physiological problems and attempt to depress the valve at the same time.

PREVENTIVE MEASURES

a. As an interim fix, the Mae West was modified, with the installation of a protective plastic bag over the automatic valve to prevent the collection of water.
b. DAES has developed a permanent fix which involves fabrication of a new pocket for the automatic valve (see photos). The pocket will solve two problems — the collection of water and a chafing/wear problem due to the weight of the automatic valve. The fix has been tested and approved by DCIEM and a user trial has just been completed at CFB Chatham. MOD leaflets will be issued shortly.
c. Although the automatic valve was designed to withstand great amounts of rainfall under high wind conditions, it would probably be astute to avoid exposing the Mae West to rainfall unnecessarily even once the new pocket is incorporated.
d. Although this incident is not a prime example, the necessity of having the oral inflation tube accessible and unlocked (see photo) in flight is still valid. The HARA-KIRI technique is not recommended (except as a last resort).
e. It is difficult to "expect the unexpected", but the cardinal rule still applies, as commendably demonstrated by this Voodoo crew, "Fly the airplane first — then solve the problems"!

Take The Air Young Man

Take the air young man
And climb these clouded stairs to face the foe,
Heed not the mortal dangers lurking here
For God will save protectors of His sky.

Take the air young man
And use the sun to hide your presence, then
Like an avenging knight charge straight and true
To cleanse the heavens of these vultures wheeling 'round.

Take the air young man
And should you meet Him face to face some day,
Remember us who've gone before and not returned
Then intercede for those who live and pray for Peace.

R.C. Rickerd

BRIEFING! WHY?

by Capt P. Blanchard
403 Tactical Sqn CFB Valcartier

What the hell has happened to the art of briefing prior to flying a mission? This question is being asked because it appears to me that the old, well-known adage, "kick the tires (skids), light the fires and brief on guard", is becoming more and more prevalent. It shows itself in many forms and in many situations. For instance:

Why does there appear to be no need to sit down as a crew wherever and whenever it is possible to be briefed?
Why, when a briefing is given, does it tend to be at best mediocre because no standard format is followed? Good old memory replaces the standard format!
Why have we built briefing rooms with blackboards, theater-type seats, podiums, overhead projectors, etc only to be used a mere one percent of the time available during the squadron's stay in garrison?
Why do we compress the briefing into a few minutes just prior to manning the aircraft when, with a little bit of planning, the majority of our flying missions allows ample time for a proper briefing?
Why can we not develop the habit of briefing one hour or at least 30 minutes prior to the mission?
Why do we not take advantage of this unique occasion to review SOP's, Standard Manoeuvre Guide, AOI's, emergencies, etc?
Why do we have to witness so often crews running in all directions like "chicken with their heads chopped off" in order to meet the take-off time? — a very unprofessional sight!
Why does the flying schedule not show a briefing time?
You may add your own "Why?" to this list.

Believe me, I do not raise this question of briefing because I am in possession of an expert or magic formula and wish to spill it out. I really do believe in a thorough briefing prior to each mission or training flight. What a fine opportunity for crew members to exchange points of view about certain tactical or flying procedures. Also, once airborne such briefing will definitely add to the crew's cooperation and ease the stress of flying in a very rapidly changing environment. One may wonder if our present casual attitude toward briefing induces the new squadron pilots to think that briefings can be compressed, shortened, streamlined to one's own likes or done without whenever the situation warrants it. Surely, there will be many times when, on the spur of the moment, a quick, concise brief will do. But, such situations should not become the criteria for determining the content of a briefing. On the contrary, if a well-designed standard format were applied at all times, providing for a thorough briefing, one would be able to learn through habit the necessary points for an effective, quick, concise brief and to complete the mission successfully.

I am fully aware that most CF pilots think of themselves as aggressive tactical pilots. Who am I to say they should not? But, are we not short-changing ourselves when we go charging into the blue (brown) yonder after a mediocre briefing or, at times, with no briefing at all? Certainly, we can learn something from our land-walking confreres who dare not move 100 meters on foot without first making an appreciation of the tactical situation; and, who do not start their advance before all the troops are briefed. A study on our part of that approach would be beneficial since we cover not only 100 meters but 100 kilometers of God's land and sky.

May some very recent experiences become a plea for putting more emphasis on the practice of a thorough briefing and debriefing which I believe to be an integral part of a flying mission.

Recently, within four days, I saw two situations where, if a thorough briefing had been given, it would have meant flying as usual. The first case was nothing but a bit of confusion arising from a well-intended move to add an extra aircraft for retrieving troops and cargo. In order to expedite the completion of the mission, an extra aircraft went on task without first briefing the formation leader that additional help was forthcoming. Confusion arose when the extra aircraft joined two others already in the process of picking up chalks.

In the second incident, much more than confusion resulted. A detail of seven aircraft in formation, a Section of four and another of three, was to deploy to a field several miles away. At the stand-up briefing only minutes prior to manning the aircraft, at which not all crew members were present, the following points were covered: (a briefing room was available one floor up)

a. aim of the mission
b. ACs/crews allocation
c. pickup location
d. time separations between sections
e. radio frequencies for the mission

Unfortunately, important points were omitted, i.e. the weather sequences, the procedures for inadvertently entering IFR weather, emergencies, and formation airspeed. Once airborne, the formation leader decided to cut down the separation time between Sections One and Two from five minutes to thirty seconds. At approximately six miles from the airport, Number 3 in the first section, lost sight of Number 2 as he entered stratus cloud and heavy snowshowers. He hesitantly turned left 30° and queried the flight engineer if Number 4 was still in sight. He reported negative! Lead was informed of his intentions and he started a climb. The co-pilot started to complain about the strange behavior of his attitude gyro — maybe a slight case of vertigo. During the slow climb the aircraft captain became reluctant to go too high since he was not aware of the icing conditions. Also, to what altitude should he climb? Should he turn 180°? What about the other aircraft — where the hell could they be? What could they be doing? He decided to broadcast his intentions of turning left 30°, climbing from 500' to 2500', and continuing his 180° turn. Some of the transmissions were cut off by other aircraft in their attempt to get the air picture. Then, he realized as he completed this 180° turn that Section Two would be coming toward him. At that point, he had no idea where any of the six other aircraft were in relation to him. Luckily, he picked up visual contact with the ground and started a slow descent. Number 3 was the first to land at the airport which meant he had flown blind! Yes, above, below, or through six other aircraft! Only the radar operator knows — if he dared to watch his scope!

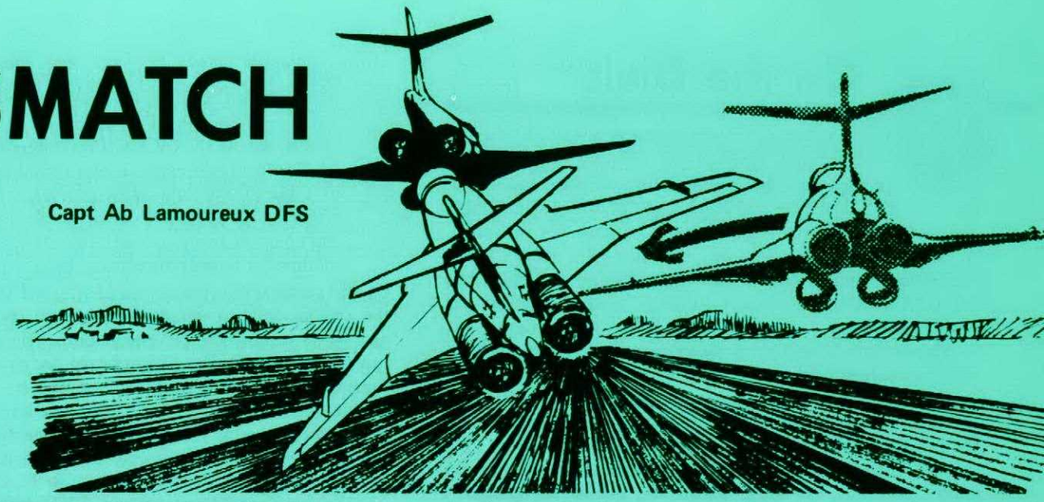
No one can deny the fact that, as a conclusion to these two "grey-hair" experiences, it is a concern of all of us to put more emphasis on the importance of a thorough briefing and debriefing.

THE AUTHOR

A native of Waterloo, Quebec, Capt P. Blanchard joined the Royal Canadian Navy in 1954. Upon completion of his navy and military courses on HMCS Venture, he undertook his pilot training with the RCAF. He then served in naval helicopter squadrons until 1968 when he was posted to CFB St Hubert with 450 Helicopter Squadron. He is now stationed with 430 Tactical Helicopter Squadron at Valcartier.

MISMATCH

Capt Ab Lamoureux DFS



The adverse consequences of attempting a *Dissimilar-Type* formation takeoff were demonstrated in 1976 when a T-33, leading a TUTOR, suffered B category damage after settling back onto the runway following premature lift-off and gear retraction. The accident occurred because the pilots inadequately briefed and improperly performed the manoeuvre — and probably didn't understand it either. Regulations were introduced as a positive preventive measure to specify the emergency or operational conditions authorizing *Dissimilar-Type* formation takeoffs.

Now, while we are on the subject, how fully aware are we of the inherent dangers associated with a formation takeoff involving aircraft of *Dissimilar Configuration* or "Mismatch"? There is no question that we do it all the time but read on for a recent account of an American Voodoo crew who did it for their last time.

The mission was planned as a cross-country navigation/formation proficiency flight, to include initial formation training for the wing pilot (front seat). Two aircraft with double-tanks were requested: an F-101B (lead) and an F-101F (dual control-wing). Because of an unrelated ground mishap, the F-101B received was a "single-tanker". The crews elected to proceed with the mission as intended; therefore the single-tanker remained as lead.

The wing IP (instructor-pilot) conducted what proved to be an inadequate briefing. Several items were missed, i.e. differences in aircraft performance, minimum go speed, emergency procedures and environmental factors (the crews were operating out of an unfamiliar base, with a field elevation of over 5,000' ASL and an OAT of 75°F). In addition, computed takeoff data was incorrect (speeds and distance computed by the wing front-seater were too low but were not checked by the IP nor the lead. He had apparently used the clean configuration gross weight in his calculations.)

On taxi-out, ground control called the winds left-to-right at 4 mph, and tower subsequently called them calm. On line-up, lead noticed a windsock indicating a right-to-left crosswind, so he placed the wingman on the right side. After run-up, lead called the flight to departure frequency but there was no check-in and lead did not want to interrupt other transmissions to request a check-in. (Post-crash investigation revealed that the wingman's radios were on the wrong frequency). On the roll, the WSO (Weapons Systems Operator) informed the pilot that the wingman was dropping back. The wingman had not called for power, but lead reduced power to minimum burner on his own. The wingman regained position then dropped back again. This time the WSO lost visual contact and advised the pilot to proceed on his own. The pilot applied full burner (at 170 to 175kts) and took off. Both aircraft became airborne after 8,000 to 9,000 feet of roll (2,500 to 3,500) feet beyond computed distance). The wingman scraped his tailpipes on the runway at lift-off and once airborne, crossed behind the lead to the left and pitched-up. The IP attempted to eject unsuccessfully, and the aircraft crashed. Both pilots were fatally injured.

Investigation revealed, among other things, that:

a. The IP elected to conduct initial formation takeoff training at a high density altitude airfield, using high gross weight, dissimilar-configured aircraft, with aircrews having minimum proficiency in close formation takeoffs.
b. The IP elected to use the double-tanked aircraft in the wing rather than lead position.
c. The takeoff data was incorrectly computed and was not checked.
d. The pre-flight briefing was incomplete.
e. The lead deviated from the briefed formation procedures: he placed the wingman on the downwind side, neglecting the departure winds; he failed to ensure the formation was on departure frequency; he reduced power to minimum burner instead of the mid-burner briefed; he advanced power to full burner at a critical point without consideration for the wingman.
f. The wingman, because of his concern for maintaining position, did not recognize that his aircraft had not reached a speed adequate for flight.
g. The aircraft became airborne in a semi-stalled, out of control condition. The left wing stalled, causing the wingman to turn left and enter the lead's jet wash/engine exhaust with subsequent pitch-up.
h. The IP had raised the seat handgrips, jettisoning the canopy, but did not squeeze the triggers.

To appreciate some of the other things involved in this tragic mishap, you may have to re-read the article, do some thinking and if you have access, consult the Voodoo AOIs. If you can spare the time, you may find the task worthwhile.

Our gratitude to the USAF Safety Centre for their permission to use this material in the interests of Flight Safety.

On the Dials

In our travels we're often faced with "Hey you're an ICP, what about such-and-such?" "Usually, these questions cannot be answered out of hand; if it were that easy the question wouldn't have been asked in the first place. Questions, suggestions, or rebuttals will be happily entertained and if not answered in print we shall attempt to give a personal answer. Please direct any communication to: Commandant, CFB Winnipeg, Westwin, Man. Attn: ICPS.

ALTIMETER TEMPERATURE ERROR (Ref: GPH 205 Page B6, GPH 200 Page XV, GPH 201 Page 15, and CFP 148 Art 408)

Altimeters will read correctly only when International Standard Atmosphere (ISA) conditions exist or a correction factor is applied. Since ISA conditions seldom actually exist, the altimeter is usually providing an erroneous indication. The error is greater, with greater temperature deviation from ISA. As the temperature *increases from ISA*, the air becomes less dense, therefore, one must change true altitude by more feet to achieve the same static pressure change as in air at ISA. As the temperature *decreases*, the air becomes more dense, and a shallower column of air will give the same static pressure as air at ISA. Thus, the aircraft will be lower in cold air than in air at ISA temperature if no corrective factor is applied.

The amount of temperature or density error is approximately 4 feet per 1000 feet of altitude for each degree Celsius of difference from ISA. For instance, flying at 10,000 feet, temperature -10°C, the altimeter error would be calculated as follows:

ISA temperature at 10,000 feet = -5°C
Deviation from ISA = -5°C
4 x 10 x (-5) = -200

The altimeter would be in error by 200 feet. Because the temperature is colder than ISA, the aircraft would be flying at 9800 feet true altitude but indicating 10,000 feet.

The problem with temperature induced altimeter error is most significant when temperatures are very cold and terrain clearance is a paramount consideration. The altimeter setting will correct for density error at the point of the pressure source, i.e., the altimeter will read correctly at the point where the pressure is taken and corrected for field evaluation. However, if the altimeter is raised above the altimeter setting pressure source, density error will again come into play because as explained earlier, pressure decrease is more rapid in air colder than ISA. This will again cause the altimeter to have an error even though it was corrected for temperature at field elevation.

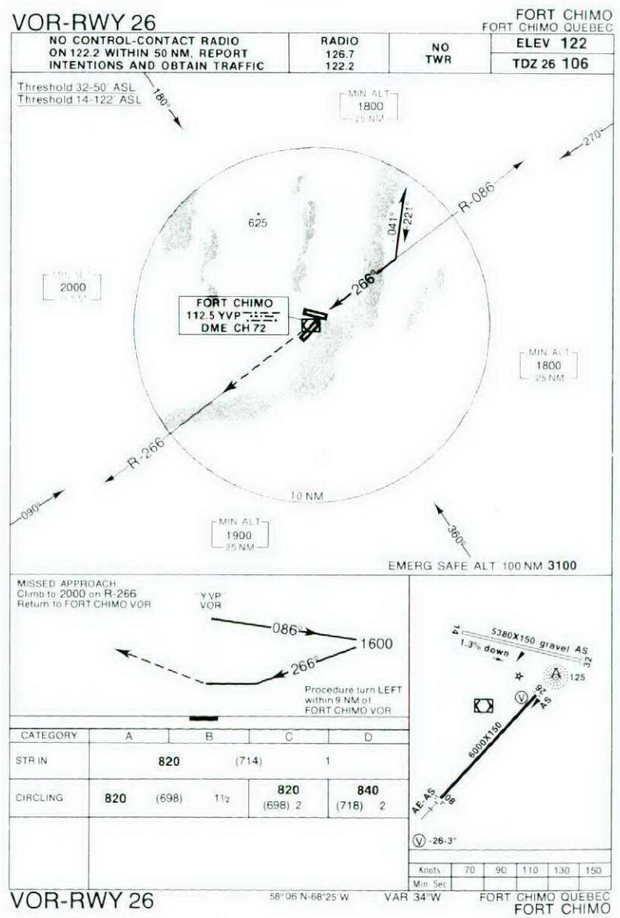
There are two main areas where the temperature or "density error" can cause a pilot grief:

a. **Enroute**, especially over precipitous terrain, when the air temperature is much colder than ISA. In such cases, the guidance in GPH 204, 704.3 suggests that pilots should fly at least 1000' higher than the published MEA/MOCA. Pilots are required to fly at least 2000' above the highest obstacle within 10 miles of track when not flying airways (GPH 204, 704.2). MOCAs on airways provide only 1000' obstacle clearance, even over mountainous terrain;

b. **Conducting Instrument Approaches Under Extremely Cold Conditions.** Until June 76, Canadian Forces approach procedures had a temperature consideration built into all obstacle clearance limits except MDA/DH. The corrections to adjust MDA/DH were found in the temperature error chart in the front of GPH 200/201. The sad fact of life is that approaches in the U.S.A. and MOT as well as new CF approaches do not have any compensation for colder than ISA conditions. This means that a pilot will not have the designed obstacle clearance while flying any portion of an approach in colder than ISA conditions. At the CICP/GICP Conference in Halifax this problem was addressed. It was agreed that the next issue of GPH 209 should again provide a temperature consideration in approach design. In the meantime we have the chart in front of GPH 200/201 to adjust approach minima for temperature below ISA.

The temperature correction charts in FLIPs are based on the aerodrome temperature for field elevations of zero (MSL) and do not allow for ISA temperature change as a result of increased field altitude. For example, let us assume the actual temperature at an airport 2,000 feet MSL is -30°C. Uncorrected the altimeter would have a relatively large error, however, the altimeter setting will correct for temperature (density) and the altimeter will read correctly on the ground at the altimeter setting source. The correction chart in FLIPs instructs us to use the aerodrome temperature (-30°C) and move across the chart to the HAT or HAA to find the correction. Let us assume an 800 feet HAA. The altimeter error from the chart is 140 feet which would be added to the MDA.

Figure 1



A more accurate method of calculating altimeter density error would be to first find what the ISA temperature is at 2,000 feet MSL, then calculate the difference between ISA and actual temperature. (The correct adjustment for this Example is 131.2 feet).

A joint MOT/DND chart is being proposed for use in the Canada Air Pilot (CAP) as well as GPH 200/201. The proposed chart is based on an average elevation of 2500' ASL instead of sea level. The result would be to average the minor discrepancies noted in the Example above.

LOW ALTITUDE BEACON-ON-THE-FIELD APPROACHES (Ref CFP 148, Pages 33-8 and 33-18).

CFP 148 advises pilots to add one minute to the outbound timing for all beacon-on-the-field procedures. Basically, this sounds like good advice since it will get you further from the beacon and allow you a longer final approach, thus ensuring that sufficient time will be available for descent to MDA. In the Canadian Forces, the "Manual of Criteria for Instrument Approach Procedures" (GPH 209) stipulates that the approach protected airspace is designed to protect sufficient airspace to accommodate a maximum TRUE AIRSPEED of 165K and a wind speed of 60K from any direction. This criteria is valid; however, under the worst circumstances of strong wind and high TAS, the aircraft may fly beyond the "remain within" distance specified for the procedure turn. Also, you will note that CFP 148 states a maximum letdown speed of 165 INDICATED AIRSPEED which is incorrect and will be amended.

If we now examine Figure 1, it may be seen that it is a beacon-on-the-field VOR but *the procedure turn must be completed within 9 NM.* If the pilot allowed an extra minute outbound timing, assuming 165 KTAS and a 60K tailwind, he would fly 7.5 NM prior to commencing the procedure turn. He would then fly the procedure turn heading for an additional minute which would put him 10.75 NM from the VOR. His turn radius on the 180° procedure turn would add another 2 NM so as to put him 12.75 NM from the nav aid. Put another way, he would have violated his "remain within" distance by 3.75 NM.

On the other hand, let's see what can happen if you are flying a slow aircraft with a 60K headwind. Let's assume a 90KTAS, outbound for two minutes. This would place you 1 NM from the facility prior to starting the procedure turn. The track made good in the procedure turn would be 80° off instead of 45° because the drift angle would be 35°. Groundspeed during the procedure turn outbound portion would be 65K, therefore in one minute the aircraft would diverge from the outbound track at 80° for a distance of 1.1 NM. The distance from the nav aid would now be 1.6 NM. After completion of the 180° procedure turn, the aircraft would be roughly 40° off the inbound track at approximately 1.6 NM. Now, while attempting to intercept the inbound course the aircraft will continue drifting toward the nav aid. You can see that track interception will occur very close to the facility which will not provide sufficient time to establish any tracking or descent to MDA and will likely result in an ineffective approach.

The point to be made is that the pilot should not blindly follow the advice contained in CFP 148, but should temper that information with sound judgement and airmanship. In flying these types of approaches, the pilot must adjust his timing outbound so as to stay within the distance specified for the procedure turn while at the same time ensuring he is sufficiently far away from the nav aid to accomplish the procedure turn and then track inbound and descend. Also, if flying the procedure at a TAS higher than 165K, timing must be adjusted, based on known or anticipated groundspeed, so as to stay within the distance specified on the approach plate.

Finally, we are re-writing CFP 148 to illustrate the techniques that should be used to achieve the objective of placing the aircraft in a suitable position to carry out tracking and descent in an orderly manner.

Reckless Operation

An OH-58 was being used as an aggressor aircraft in a training exercise. Personnel of the forward recon element saw the aircraft make a very low, high speed pass over their position at an altitude estimated at 50 feet or lower. Visual contact was lost behind a hill mass for several minutes and then the aircraft was seen approaching from the northeast, flying very low and fast. As the aircraft approached the top of the hill mass, it banked to the right in an attempt to fly between a tank and an armored personnel carrier (APC). The distance between the tank and the APC was 50 feet. While in the right bank, the main rotor hit the gun tube muzzle of the tank and separated from the aircraft. The OH-58 continued down slope and crashed.

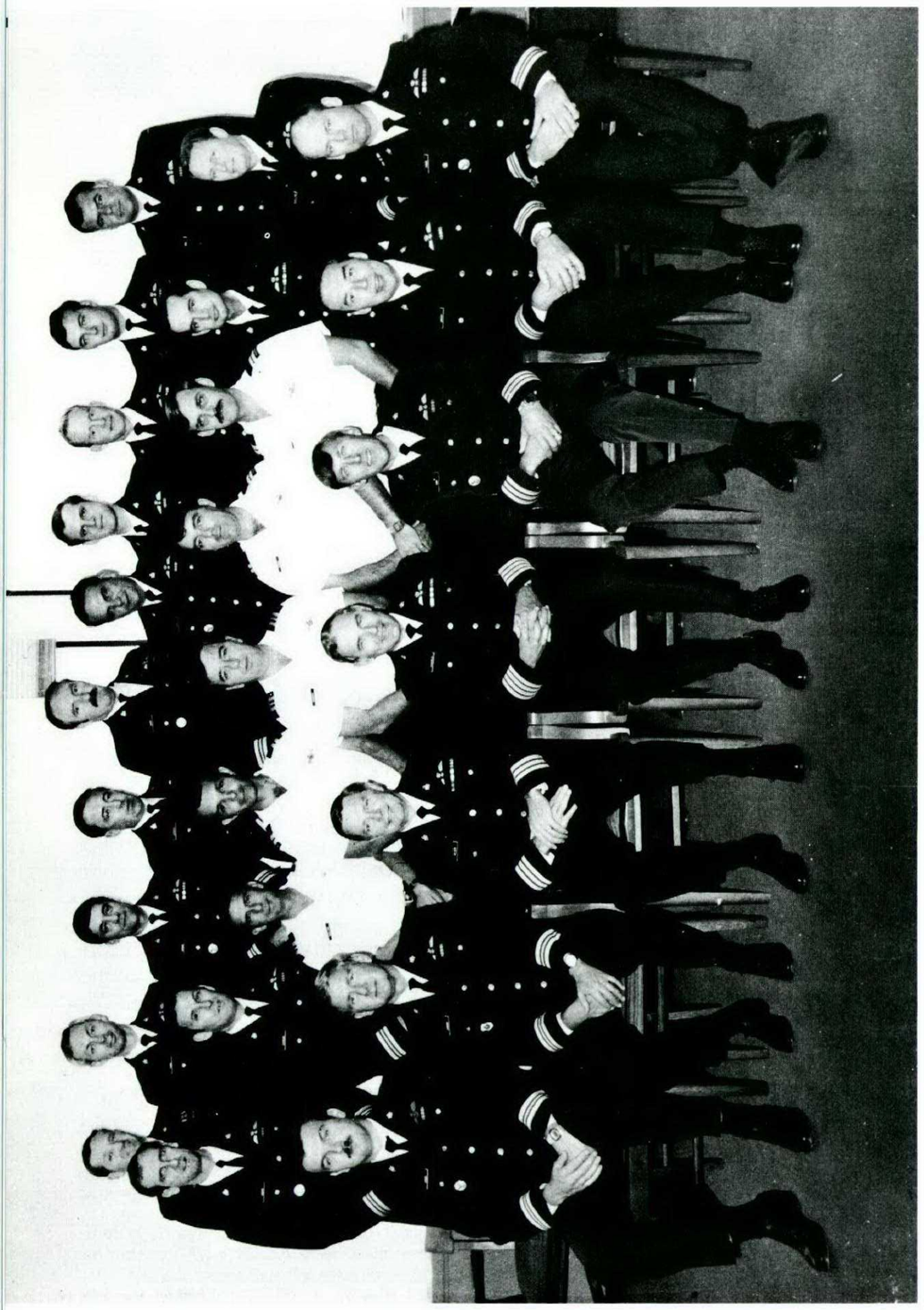
This accident was caused by the pilot's lack of discipline and reckless operation of the aircraft. Supervision also played a part. Tactical mission planning was inadequate and there was no written guidance or procedures for mission operation when detached from the parent unit.

A Screeching Halt

The single-seat fighter jock had returned from a routine mission and decided to get in a few practice approaches before calling it quits. On outside downwind after his first low approach, the pilot advised the tower of his intention to fly an overhead pattern for another low approach and then a closed pattern for a full stop. But, prior to turning initial for the overhead, he changed his mind and advised tower that the overhead approach would terminate in a full stop. He was absolutely right.

The gear was lowered normally on downwind, and the mobile control officer verified gear down and locked and speed brakes extended. Touchdown was normal—but shortly thereafter, all three gear retracted and the big fighter slid to an ignominious halt on its fuselage and external fuel tanks.

Apparently, habit pattern interference was the culprit. The pilot had every intention of making a full stop—but his mind was still programmed for a low approach. So, just after touchdown, he did what he would have done on any low approach: he raised the gear.



1978 DFS Annual Flight Safety Conference

BOTTOM ROW L to R, Maj Nick Stoss, BFSO, Portage La Prairie; Maj Clive Loubser, SFSO 1 CAG Baden; LCol Ron Holden, DFS 2; Col Bob Chisholm, DFS; LCol Les East, SSOFS AIRCOM; Maj Don Gregory, DFS 3; Maj Chris Hanson, BFSO Moose Jaw.

CENTRE ROW L to R, Maj Ray Cowper, SOFS MAG; Maj Don Cockburn, DFS 2-2-3; Maj "Pogo" Hamilton, DFS 2-2; Capt "Robbie" Robertson, SOFS-3 AIRCOM; Maj Jim MacIntosh,SOFS ATG; Capt Ian Gordon, SOFS-5 AIRCOM; Capt Ab Lamoureux, DFS 3-3 Editor-Flight Comment; Maj Bill Monkhouse, DFS 2-3-3; Maj Bill McWilliams, BFSO Cold Lake.

TOP ROW L to R, Capt Earl Hewison, UFSO AMDU Trenton; Maj Denny Thomas, DFS 2-3-2; Maj Syd Rennick, SOFS ADG; Capt Lloyd Gernack, UFSO AETE; Maj Al Cooper, SOFS 10 TAG; Maj Stu Cooper, SOFS-2 MAG; Maj John Maxwell, DFS 2-2-4; Maj Bob Worbets, DFS 2-3-5; Maj Fred Kenney, DFS 2-3.

GEN FROM 210

Lucky Strike

By Maj John L. Maxwell
DFS Operations Safety

A recent CF210 tells the story of what should have been a straightforward Kiowa communications flight that ended with a wire strike and near catastrophe. Can you pinpoint the reasons why this strike occurred?

The relatively inexperienced pilot was called in from leave at short notice and briefed to pick up VIP's at a remote landing zone. Weather and the machine were fine, but the briefing contained a crucial error: - the destination grid reference was wrong. The lone pilot reached this first reference with time to spare, only to lose over an hour searching for his passengers, making inquiries with the locals and telephoning base. Finally provided with the correct map reference, our pilot, now well behind schedule, proceeded post haste at low altitude (200 to 300 feet) to the new destination. There he commenced his recce of the landing area, descending still lower in the downwind portion of his landing approach. Suddenly, unmarked power lines appeared directly in front. The pilot flared abruptly, but couldn't avoid a strike on the underside of the fuselage. The wire slid back to the skid crosstube where it snapped. The pilot was able to regain control of the aircraft and land, understandably shaken. At flight idle, he could detect superficial damage to the crosstube assembly which he considered acceptable for continued flight. What he did not know was that his collision with the wire had flexed a rotor blade down to strike the tail rotor drive shaft. Miraculously, the drive shaft was not severed, nor were gear boxes damaged by the shock, and the mission was completed without further incident. No doubt your list of reasons why the flight went wrong is getting lengthy and you won't be surprised to learn that many of them are common to other wire strikes. The U.S. army has a growing problem with wire strikes, (nearly three per month this year) and their analysis produced the following list of most common factors:

*** Human error is almost always involved in wire strike mishaps (There have been rare incidents that occurred after an inflight mechanical failure).**

*** Pilots in units with strong command supervision and good flight discipline are less likely to be involved in wire strikes.**

*** Most wire strikes occur below 50 feet AGL, with only a few above 150 feet, and none above 300 feet AGL.**

***Most wire strikes happen during cruise flight.**

*** Aerial reconnaissance over unfamiliar terrain is only partly effective in locating wires. For all practical purposes it's virtually impossible to insure all wires are found during an air search.**

*** Wire strikes seldom occur at takeoff and landing areas where nearby wires are marked.**

*** Even though no wires are visible they should be suspected along roads and railroad tracks; between hills, poles and structures; and between any pole and a nearby building. Even if there is only a single pole in open country the possibility of wires exists.**

*** The position of the sun, type of wires, time of day, and atmospheric conditions (dust, haze, etc.) can drastically affect a pilot's ability to see wires.**

*** Naturally, the possibility of a wire strike is greatest where there is only a single pilot. The more crewmembers trying to spot wires, the better the chance of seeing them.**

Do conditions exist in your operations that are conducive to strikes? Much work is being done to provide pilots with wire detectors and cutters to minimize damage, but these are only partial answers and at the moment, the best way to avoid strikes is to *fly where the wires aren't.* Of course, we all must fly occasionally below 300 feet, so here are some positive steps you can take to reduce the strike potential:

1. **Review unit SOPs related to low-level flying to make certain they reflect the safest procedures possible for the types of missions being flown.**
2. **Provide adequate supervision to ensure pilots adhere to established policies.**
3. **When low-level flights are required, provide pilots with current maps that show wire obstacles, and make certain crews receive thorough briefings.**
4. **Where possible, mark all wires around potential takeoff and landing sites and airfields.**
5. **Unless required by missions, avoid low-level flight over areas known to contain wires and over firing ranges where fine missile wire can pose a potential threat.**
6. **Use all crewmembers in searching for wire obstructions during all low-level flights, and ensure maximum coordination between them.**
7. **Keep in mind, the closer to the ground that low-level flight must be conducted, the slower the airspeed should be.**

Whatever you do, don't ignore the risk and trust your luck — our Kiowa pilot has used up the luck quota for quite a while.

With acknowledgements to: THE MAC Flyer Oct 78 and U.S. Army Aviation Digest Mar 78

ACCIDENT RESUMÉS

CF5

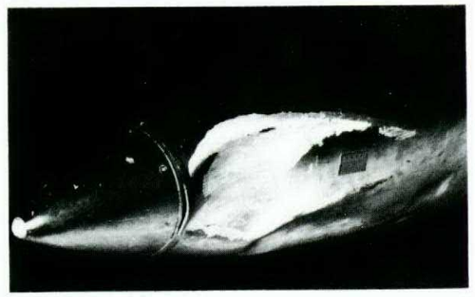
On 1 Nov 1978 at approximately 2000Z, a flight of four CF5 aircraft were conducting a low level tactical attack mission in the Cold Lake Range area. The lead aircraft of the section inadvertently allowed his aircraft to descend and contact the trees. Fortunately the damage was superficial and the aircraft returned to base without further incident. The aircraft sustained "C" category damage.

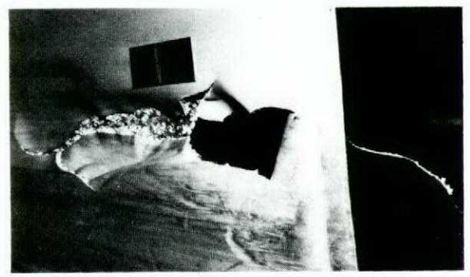
Investigation revealed that there were no related technical problems. As a result, efforts were directed towards determining what caused the pilot's attention to be diverted allowing the aircraft to strike the trees. From statements made, it becomes rather obvious that the pilot had become pre-occupied with locating the Red Baron (attacking aircraft) and did not pay enough attention to his altitude. Leading a section of four aircraft at low level is an extremely demanding task — the pilot is not only responsible for accurately navigating the section to the target but must also make decisions vital to all aspects of the mission. Being alert to the possibility of attack is important but must never be at the expense of jeopardizing the safety of his, or for that matter, any aircraft in the section. At the risk of stating the obvious: terrain/obstacle avoidance must always be the leader's primary concern.

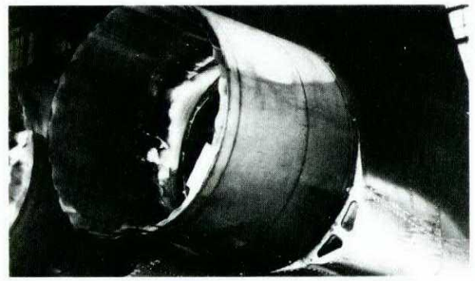
Human factors were involved in that the pilot had been previously criticized for his lookout and was obviously not about to allow this to happen again. Fortunately in this case he was lucky and an accident was avoided.

Hopefully the lessons learned will be obvious to instructors and students alike. Mission briefings must emphasize the mission priorities (i.e. terrain avoidance, navigation, weapons parameters etc.) Criticism of individual performance, while certainly a necessary part of learning, must be controlled and restricted to debriefing environments that avoid undue embarrassment to an individual.

MORAL: Don't let false pride lead to tragedy.



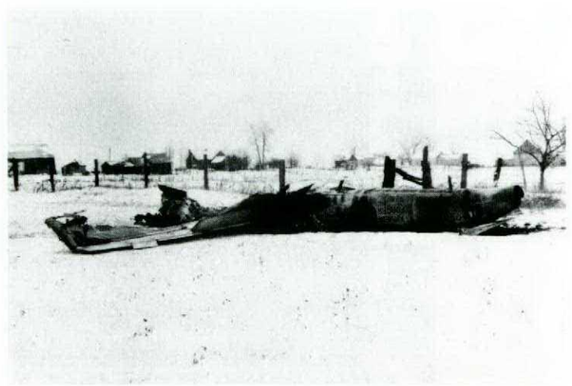




Tutor engine seizure

On 24 Nov. 78 a QFI and his student departed St. Hubert on the first return leg (to Ottawa) of a cross-country training mission. At approximately 30 miles west of Montreal at a cruise altitude of 10,000 feet ASL, the crew felt a vibration and heard a low frequency noise. Upon throttle reduction, the vibration ceased but soon returned. It increased greatly in intensity and was accompanied by a loud noise leading to eventual loss of engine rotation. Attempts to restart the engine were unsuccessful. The crew ejected successfully at 6,800 feet ASL in cloud. All life support systems functioned normally and the pilots were uninjured.

The aircraft crashed in a farmer's field, 65 miles east of Ottawa. Fortunately, the engine suffered almost no impact damaged, and preliminary investigation has revealed that a main bearing failed. Investigation into the cause of the failure is continuing.



RÉSUMÉS D'ACCIDENT

CF5

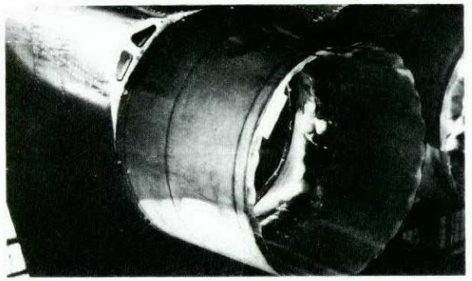
Le 1 novembre 1978, vers 2000, une patrouille formée de quatre CF5 effectuait une mission d'attaque tactique au sol, à basse altitude, à l'intérieur du polygone de tir de Cold Lake. Le leader de la patrouille est, par inadvertance, descendu trop bas, jusqu'à heurter les arbres. Heureusement, l'avion n'a subi que des dégâts de catégorie "C" et le pilote a pu rentrer à la base sans plus de problèmes.

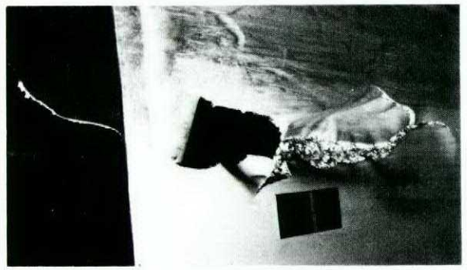
L'enquête a révélé que l'accident n'avait pas été causé par un problème technique. On a alors essayé de trouver ce qui avait provoqué l'inattention du pilote, inattention qui a débouché sur ce que nous savons. Des déclarations ont permis d'établir que, selon toute vraisemblance, le pilote, occupé à repérer "Red Baron" (avion assaillant), n'a pas surveillé son altitude. Conduire une patrouille de quatre appareils en basse altitude est une des tâches les plus exigeantes; le pilote, en plus de diriger la formation de façon précise jusqu'à l'objectif, doit prendre d'importantes décisions concernant les autres aspects de la mission. Certes, il faut être sur le qui-vive pour parer à toute attaque, mais jamais en mettant la sécurité en jeu, que ce soit celle de son avion ou, comme dans ce cas, d'une patrouille. Quitte à faire une lapalissade, nous nous devons d'affirmer que tout pilote doit d'abord se soucier d'éviter les obstacles . . . qu'ils soient naturels ou artificiels.

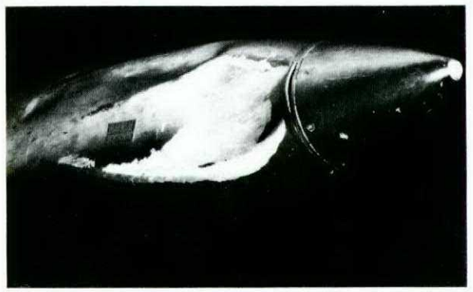
Certains facteurs humains sont venus se greffer aux causes de cet accident: le pilote avait fait l'objet de critiques au sujet de sa vigilance et il n'avait sûrement pas l'intention que cela se reproduise. Heureusement pour cette fois, sa chance lui a permis d'éviter un accident.

Espérons donc que cette leçon servira tant aux instructeurs qu'aux pilotes. Souvenez-vous que les exposés avant-vol doivent faire ressortir certains aspects importants de la mission: le relief, la navigation, les paramètres de tir, etc. Les critiques sur le travail individuel en vol, bien que nécessaires à l'entraînement doivent être judicieuses et faites en tête à tête, après la mission, pour éviter d'embarrasser inutilement l'intéressé.

MORALE: Ne succombez pas à la fierté. Amen!







Panne réacteur sur Tutor

Le 24 novembre 1978, un pilote-instructeur qualifié et son élève décollaient de l'aéroport de St. Hubert pour effectuer la première branche d'un exercice de navigation aller-retour à Ottawa. À environ 30 milles à l'ouest de Montréal, à une altitude de croisière de 10,000 pi/mer, l'équipage a ressenti une vibration et a entendu un bruit à basse fréquence. À la réduction de puissance, la vibration a cessé, mais a vite repris par la suite. L'intensité a augmenté considérablement, suivie d'un grand bruit et de l'arrêt complet du réacteur. Les tentatives pour relancer le moteur ont été vaines. L'équipage s'est éjecté sans problème à 6,800 pi/mer, dans les nuages. Tous les équipements de survie ont rempli parfaitement leur rôle et les pilotes s'en sont sortis indemnes.

L'appareil s'est écrasé dans un champ à 65 milles à l'est d'Ottawa. Heureusement, le moteur n'a pas été endommagé à l'impact et une enquête préliminaire a révélé qu'un des paliers principaux avait cédé. L'enquête sur les causes de ce problème mécanique est toujours en cours.