FLIGHT COMMENT

MARCH • APRIL 1972

Comments

The circumstances leading to a Good Show for two air traffic controllers (page 4) also demonstrated that DF equipment continues to retain a high degree of usefulness in terminal approach control.

Instances have been reported where a bright-coloured flight recorder was overlooked at an accident scene because searchers thought they were looking for a "black box". Evidently, that familiar expression is becoming increasingly less accurate as a description for mysterious electrical packages in aircraft. CF flight recorders for example, are painted "international orange".

Training Command's Transient Service Recognition Program inspired 2805 reports during the last half of 1971, the majority of which were submitted by personnel from other Commands. We're happy to pass along the appreciation of the SOFS to those who have participated, and to encourage continued use of these reports.

CFP 140(1), Canadian Forces Film Catalogue (1200 of which are distributed throughout the Canadian Forces), contains an extensive list of flight safety films that can be obtained through the nearest regional film library. Request forms (CF 244) are available through normal channels.

Two Squadron Reunions are planned for 1971. 441 Squadron will assemble at CFB Moose Jaw on the weekend of 26 – 28 May. Maj B.R. Arnott of Moose Jaw is the reunion chairman. In November, 434 Squadron is planning a reunion at CFB Cold Lake for all officers who have served with the squadron since its inception during WWII. The squadron would appreciate receiving names and addresses of former squadron members. The address: 434 Squadron, CFB Cold Lake, Medley Alberta.

FRONT COVER The newest aircraft on the CF inventory, the COH58A Kiowa. This aircraft will be used in several roles, including transport, air reconnaissance, airborne command post, visual search and recce, and air observation and control of indirect fire. When delivery is completed in late 1972, the aircraft will be based at Lahr, Gagetown, Valcartier, Petawawa, London, Portage La Prairie, Shilo, Edmonton, Cold Lake and Victoria. Photo courtesy Capt G.E. Mayer, CFB Portage La Prairie.

CANADIAN FORCES HEADQUARTERS — DIRECTORATE OF FLIGHT SAFETY

COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

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Education and analysis

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Investigation and prevention

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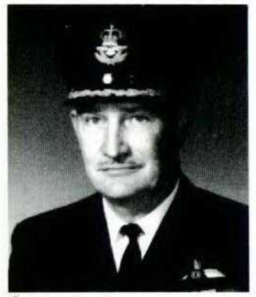
Taken for Granted — But?

Since powered flight became a reality, an unwritten maxim of air operations has been, "the difficult we'll do now and the impossible will take just a little longer and/or a little extra effort". This admirable if somewhat unreasonable attitude demanded a great deal of everyone concerned yet for many many reasons the team met the challenge most of the time. Is this true today? My impression is that we can no longer give an unequivocal answer.

Very rapid sociological change is one of the reasons, or excuses, given for today's more obvious problems, reflected in increased crime rates, drug usage and so on. Moreover, there is support for the contention that these sociological changes result in problems that are less obvious but more insidious, such as, a decreased sense of responsibility, and lower productivity and quality of work. I submit that consciously or unconsciously military personnel adopt to some degree most of the attitudes exhibited by the population as a whole. Therefore, even though outward signs of the effects of these changes may not be evident, dare we take for granted that in a given situation, the same or similar people will produce the results accepted as normal two – or ten years ago?

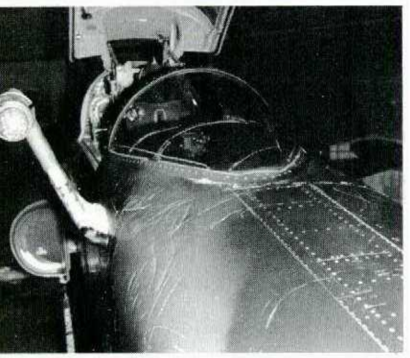


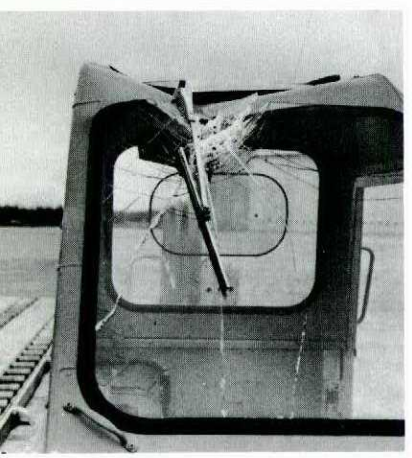
In no way am I questioning the dedication and professionalism of individuals but I am suggesting that we are vulnerable to the influences and pressure surrounding us. This means that people question old values and even adopt new ones without realizing it; or the consequences. If we face facts we will allow for this human factor in our daily operations and more important, give it due consideration in the planning and setting of goals for future air operations.

COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

the '71 story

The highlights of our 1971 accident and incident record are presented here. A more detailed analysis has been completed and will appear in the Annual Aircraft Accident Analysis which should be off the press in mid March.





Milestones

- ★ For the second year in a row all attempted ejections were successful. These included the escape of a CF104 pilot at supersonic speed and a CF5 pilot's ejection from an extremely low and slow situation.
- ★ There were no fatal accidents involving jet aircraft – for the first time since the introduction of jet aircraft into Canadian military aviation in 1948.

Air Accidents

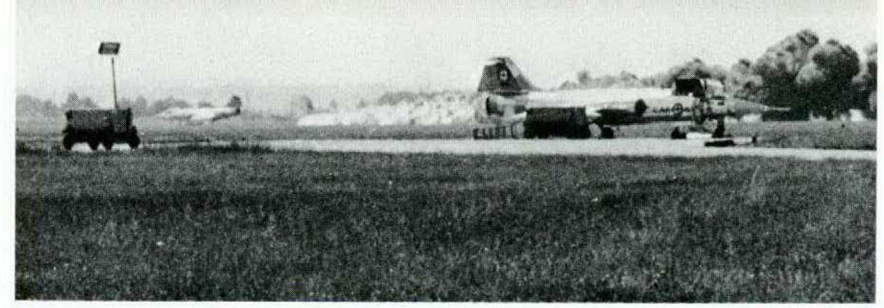
The chart shows a total of 39 accidents – two more than in 1970. Our accident rate was 1.17 per 10,000 hours, up from 0.99 in 1970. During 1971 there was a significant reduction in the total number of flying hours – a continuation of the general downward trend over the past 16 years.

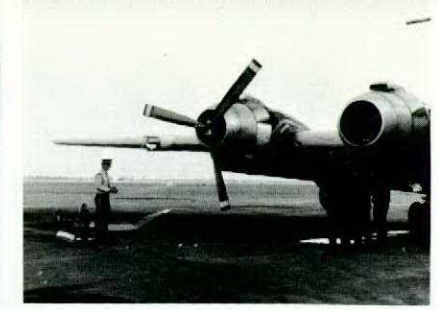
Aircraft Destroyed

Keeping pace with the trend of recent years, more than one-third of all accidents resulted in a writeoff – 39%. The total of 15 aircraft destroyed was two less than in 1970.

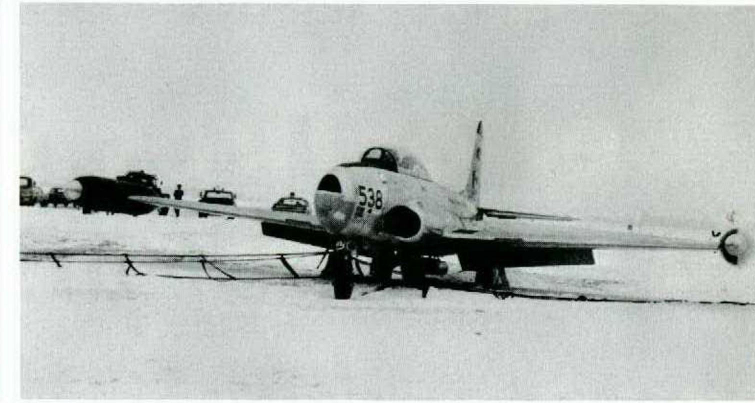
Fatal Accidents and Fatalities

There were four fatal accidents in 1971, the lowest number on record. However, these accidents resulted in 16 fatalities, the highest number since 1967.





	T33	CF104	CF101	CF5	CF100	ARGUS	CH112	CH113	CH113A	TUTOR	CHIPMUNK	TRACKER	OTTER	SEA KING	DAKOTA	CUH 1H	TWIN OTTER	TOTALS
Destroyed	1	5	1	1	1				1	1		1	1	1	1			15
B Cat		1		1			1						3	1				7
C Cat	1	4	2	4	1	1		1			1					1	1	17
All Acc																		39
Fatalities												4	1	3	8			16



One factor was common to three (Tracker, Dakota and Otter) of the four fatal accidents: evidence indicates that they occurred following the stalling of the aircraft at low altitude.

Ground Accidents and Incidents

The Canadian Forces sustained five ground accidents and 239 ground incidents. Of the reported ground occurrences, 146 resulted in damage to aircraft and there were nine minor injuries. All told there were 36 vehicle strikes on aircraft.

Air Incidents

Reported air incidents increased in 1971 to 2574, an increase of 188 over 1970. This increasing use of the reporting system is important; the reports often enable preventive measures to be applied in time to prevent an accident.

Air Accident Causes

The 39 air accidents in 1971 were assigned 82 cause factors. Fifty-three causes, a slight reduction from 1970, were assigned to PERSONNEL. Next came MATERIEL, with 17 followed by ENVIRONMENT with 10. The remaining three cause factors were listed as UNDETERMINED, UNIDENTIFIED FOD and OPERATIONAL.

You Can't Get There From Here

One of the more embarrassing things that can happen in an emergency is having the crash rescue vehicle crash. One unit recently had one of its vehicles damaged to the tune of $23,000 when the vehicle, responding to an aircraft crash, took off down an unserviceable road. More important, the vehicle never reached the scene of the accident!

This instance underlines the need for frequent surveys and up-dating of Crash Grid maps. If Grid maps aren't kept up to date, crash rescue vehicles, especially some of the newer, bigger models, might not be there when we need them the most.

AEROSPACE SAFETY

Let's See What's What - Carefully!

All pilots involved in closely inspecting another airborne aircraft, for any reason, should not forget the continuous presence of wingtip or rotor blade vortices of the generating aircraft. The prime requisite in formation flying and inspection is the safety of the two aircraft, and of least importance is "looking good" or sacrificing safety in order to get close enough to pinpoint the trouble. Single-seaters do not have any extra eyes to help see what's wrong, but multiseaters should have one pilot flying and another set of eyes or two trying to determine what's what.

APPROACH

Better Tires for Safer Landings

by Dr. F. G. Harcsar, Head of QETE Rubber Laboratory

It has been observed, with some concern, that the main wheel tires of a heavy aircraft frequently produce blue coloured smoke at touch down. High speed movie film shows that at touch down the non-rotating tire is forced to attain, almost instantaneously, the speed of the aircraft. During this split second, when the blue smoke is released, the tire loses its round shape, and becomes deformed. The deformations initiate wavy (sinuous) curves on the crown and on the sidewalls of the tires, and as the waves flatten, the tire regains its original shape. These physical deformations generate unbelievably great forces in the tires, which tend to tear them apart. During takeoff, landing, and taxiing, the tires of an aircraft are exposed to other deformations, all of which generate tremendous internal forces. A good aircraft tire must withstand all these immense forces.

One of the main duties of the QETE Rubber Laboratory is, in cooperation with Design and Inspection authorities, to assure top quality tires. These top quality tires are obtained only by thorough investigations and proper qualifications. Sometimes the specifications used to qualify tires are inadequate. The tires shown in photo no. 1 and 2 failed due to low adhesion between tire components, *but their specification had no requirements for adhesion between component parts*. To overcome these difficulties, the laboratory, as another part of its function, developed an adhesion test method, which led some manufacturers to produce higher quality tires and has helped the Canadian Forces to significantly reduce the incidence of tire failure.

Similarly to the adhesion requirements, the QETE Rubber Laboratory has proposed air permeability tests on tubeless tires to improve tire quality. By the application of this air leakage test, the air retention characteristics of a particular tubeless tire were determined and the Rubber Laboratory was able to prove the inadequate quality of the inner layer of this tire, (see photo no. 3) which must be replaced with good quality rubber compound to make the tire worth retreading.

In some cases, however, such as hydroplaning, (see photo no. 4) the Rubber Laboratory is unable to help reduce tire failures. It is well known that hydroplaning is caused by a combination of factors, including the speed and the thickness of the water layer covering the runway. Hydroplaning may be reduced only by the care and skill of the pilot.

In the case of Hercules main wheel tires, the QETE Rubber Laboratory is faced with another task: To propose the redesign of the tires. Photo no. 5 shows a section of an improperly designed tire, which failed in service. Photo no. 6 shows a section of an improved design of the tire.

Photo no. 7 shows sections of T33 main wheel tires which failed the dynamic test because of overheating of the crown area of the tires, due to faulty retreading. In this case the QETE Rubber Laboratory, in close cooperation with the manufacturers, were able to suggest corrective action and now the retreaders are able to supply properly retreaded tires.

QETE Rubber Laboratory is equipped to tackle any tire problem. Their services may be obtained through one of three channels: Design (DGAS), Quality Assurance (DGQA), or Maintenance (DGM).

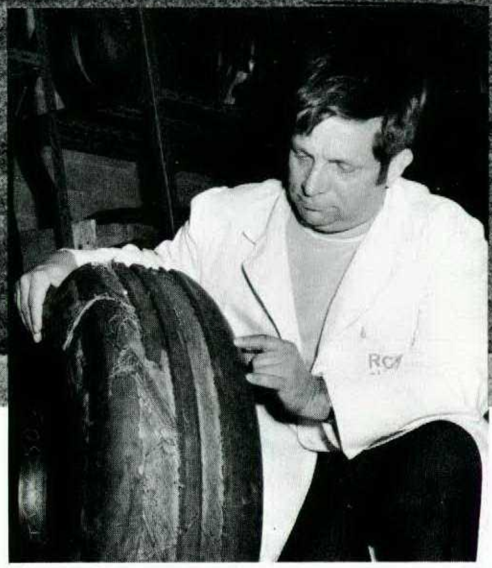


Photo #1
CF101 main wheel tire failure. The ribs of this tire were torn off during the first landing. The adhesion between the first reinforcing ply and tread material was found to be low, and was probably the cause of failure. In the latest procurement specifications the Canadian Forces have stipulated minimum values for adhesion between the various components.

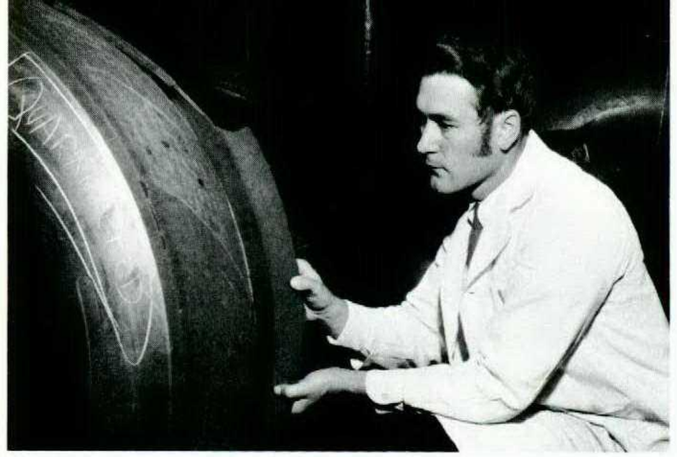


Photo #2
Hercules main wheel tire failure. The tread material of the tire separated from the carcass ply. The failure was caused by low adhesion between components. During service the tread material and the carcass delaminated and the tire failed due to tearing-off the ribs of the tire.

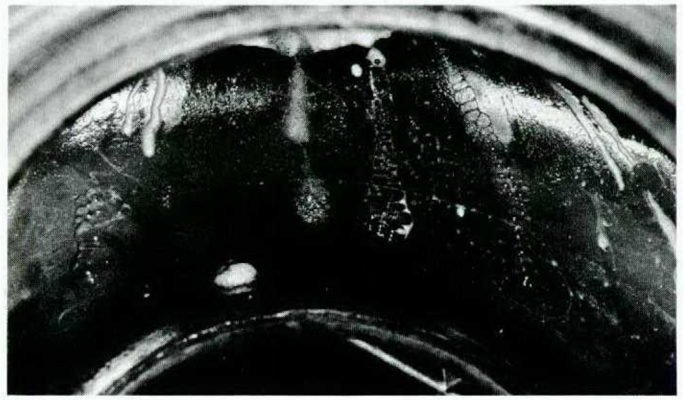


Photo #3
Buffalo main wheel tubeless tire failure. Interior surface of the tire, which should be the air barrier of the tire and serves as a tube for the tire, shows air leakage. Every group of air bubbles indicates a spot where the interior layer of the tire leaks. Tubeless tires which show air leakage are unserviceable.

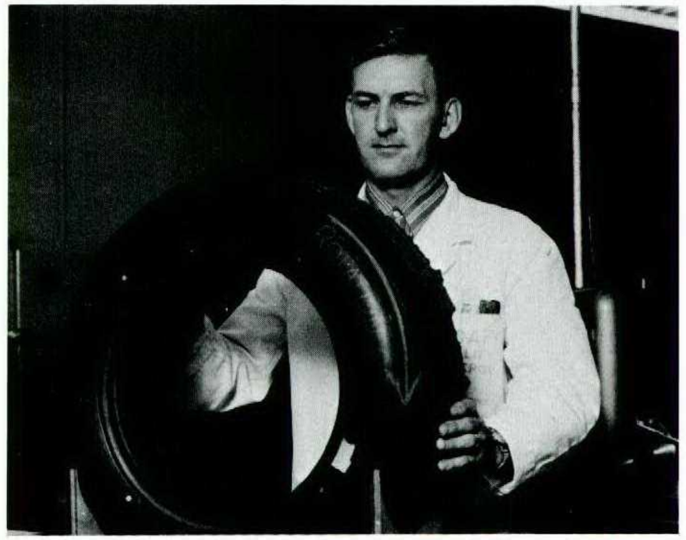


Photo #4
T33 main wheel tire damaged by hydroplaning. This phenomenon cannot be controlled by the quality or by the design of the tire.

Photo #5
Hercules main wheel tire failure showing delamination of the bead area which was caused by the dragging force on two of the tires during turns while the aircraft was taxiing.

Photo #6
Properly designed Hercules main wheel tire. The number of carcass plies was increased and three wire bundles were used in the bead instead of two.

Photo #7
Sections of T33 main wheel tires. Both tires failed during dynamic test. The failure was caused by excessive heat which developed in the tread material of the tire. The upper tire section was taken from a tire which failed because of inadequate ventilation provided by the narrow groove. The lower section was taken from a tire which had entrapped air bubbles initiating excess heat and blowing up the crown of the tire.

Diplomacy

Diplomacy is the art of saying "Nice doggie" until you can find a rock. - Robert Phelps

Interceptor

The search area comprised several square miles of snow-covered northern bush.

The right outer wing portion and tiptank as first sighted from the air.

Needles in a Haystack

by Capt D. W. Rumbold

When CF104 723 broke up in supersonic flight 15000 feet over Primrose Lake Range north of CFB Cold Lake last March, the pieces scattered themselves over several square miles of snow-covered northern bush. To reliably determine the cause of this disturbing accident, it was necessary to recover all of these pieces . . .

Most major items of wreckage were discovered within two or three days by air and ground search parties from the Base. However, the cockpit section, vertical stabilizer, stabilizer servos, "kicker" unit, and the outer portion of the right wing together with its tip tank, could not be found. Snowfalls, coupled with the small size of the missing pieces, negated the use of infra-red air photography.

Working from the known positions of wreckage found to date, and using the pilot's best estimates of aircraft speed, height at breakup, and mean wind, trajectories were plotted which enabled each piece to be "flown back" on paper to find the probable breakup position in space. Weights and drag coefficients were then estimated for the missing pieces, and their probable trajectories plotted outwards from the likely breakup position to predict areas of high search probability.

Reinforcements for the hard-working Cold Lake search team were obtained from 1 Combat Group at Calgary and 450 (Helicopter) Sqn Detachment at Namao, and the search for the "needles in the haystack" began. In appalling search conditions, on snowshoes, skis, foot and snowmobile, the high-probability areas were crossed and recrossed, coupled with intensive "Mark One Eyeballing" from helicopters.

Cpl Achtymichuk and "Sam".

Board President Maj S.G. Skinner (left), from CFB Bagotville, plans an afternoon's search over lunch with Cpl W. Careless, NCO i/c one of the CFB Cold Lake ground search parties.

The Technical Member of the Board, Capt G.P. Grant (left), examines the cockpit section with Capt Rumbold.

The large cockpit section was found impaled on a tree, having fallen almost vertically into the forest. The heavy vertical stabilizer, less servos, was found within 200 yards of a helipad in an area that had already been searched several times. The right outer wing and tip tank finally turned up about a mile and a half away from the main wreckage. As each piece was found, the trajectory predictions were continually updated and more refined forecasts were made nightly of the locations of missing pieces. The number – and size – of missing pieces became smaller and smaller.

Due to prior commitments, the 1 Combat Group Personnel had to return to Calgary before the search for vital evidence was completed. Phone calls to Ottawa on Easter Sunday night produced the welcome assistance of 60 paratroopers from the Canadian Airborne Regiment at Edmonton. Their first task was to seek the rudder; they found it within fifty paces from where the helicopter dropped them in the centre of its area of highest probability. Just as predicted, it had drifted almost two miles with the wind after the CF104 broke up. Most pieces of wing and stabilizer were eventually recovered in this manner, and the search then centred on various elusive hydraulic servos and "plumbing"

Based on a hunch that a tracking dog might be able to "sniff out" hydraulic components by the distinctive smell of spilled fluid, assistance was asked from the RCMP at Fort Saskatchewan. Aided by his tracking dog "Sam", Corporal Walter Achtymichuk was most successful in recovering even the smallest pieces – some even from under water.

Eventually the spring thaw prevented any more safe helicopter landings in the area, and the search had to be called off – but not before sufficient evidence had been gathered to pinpoint the accident cause and determine necessary corrective measures. A month's intensive efforts involving over 100 dedicated searchers paid off. But even these efforts would have gone for nought had it not been for agencies at CFB Cold Lake and elsewhere. Their efforts indeed showed how Flight Safety is everyone's business.

Murphied Messages

Most will agree that there is a certain art involved in message writing. Having mastered it, however, the drafter still can't be sure how his message will look at the other end, for he is harassed by those same gremlins who bedevil typographers. The following excerpts from recent incident messages illustrate both problems:

". . . WHEN THE UNDERCARRIAGE WAS LOWERED THE FUMES BECAME STRONGER. THE MATCHES WERE OPENED AND THE FUMES DISAPPEARED."

"LT GEN CAME OFF LINE SHORTLY AFTER START-UP. . ."

"AFTER APPROXIMATELY ONE HOUR OF CIRCUITS AND LANDINGS PILOT TOOK CONTROL OF AIRCRAFT. . ."

"THE A/C HAD BEEN DID BY ONE TECHNICIAN AND BFFID BY ANOTHER. . ."

". . . PILOTS NOTICED WEEPING ON THE PRE-EXTERNAL. . ."

"THE AIRCRAFT WAS DECLARED SERVICEABLE AND HAS SINCE BLOWN 3.7 NIGHT HOURS WITHOUT ANY DISCREPANCIES."

"THIRTY MINUTES AFTER TAKEOFF ALL CREW MEMBERS DETECTED STRONG ELECTRICAL FUMES."

"NORMAL BREAKING WAS APPLIED AFTER A NORMAL LANDING. A BANG WAS HEARD AND A FEW SECONDS LATER A THUMPING WAS FELT ON THE LEFT SIDE. THE AIRCRAFT WAS BROUGHT TO A HALT ON THE RUNWAY AND SHUT DOWN." *(We wonder what he "broke" to cause all the reported symptoms.)*

"START CREW BUMPED THE JET PIPE ASSEMBLY WITH THE RIGHT FRONT HEADLIGHT OF A D12 VEHICLE. . . CAUSE FACTORS: PERSONNEL – MAINTENANCE/CF – CARELESSNESS – PROCEEDING WITH VEHICLE WITH UNDUE CARE AND ATTENTION."

More on Graphite Pencils

An article in our May-Jun '71 issue entitled "Dangerous Chemical Reactions", concerned a circle drawn on an aircraft wing skin with graphite pencil. The article suggested that the graphite reacted with the aluminum alloy, producing accelerated local corrosion which led to a "can opener" effect which eventually caused the entire disc to drop out. Response from readers prompted DFS to obtain an evaluation from QETE of the validity of the article. The following are excerpts from the QETE report:

TEST PROCEDURES

Tests were performed on 7075-T6 aluminum alloy sheet material, the most commonly used wing skin material. Some test panels were prepared of unprotected stock, and others had alodized surfaces. The panels were marked with graphite pencil, grease pencil and "Magic Marker", with control panels being left unmarked. They were all then placed in a standard salt spray test chamber.

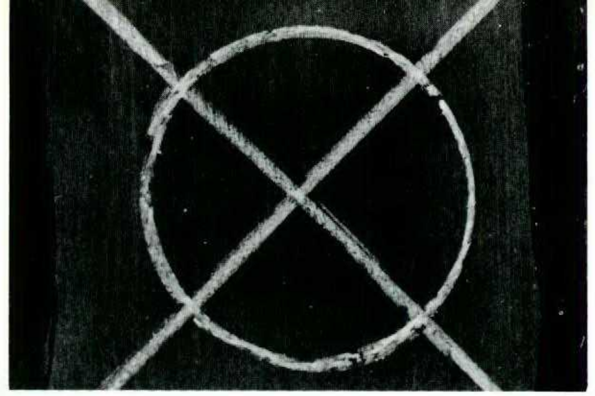
TEST RESULTS

The unprotected 7075 panels corroded over the whole test area, and the markings made negligible difference except that the "Magic Marker" and grease pencil markings acted to some extent as protective coating.

The alodized 7075 panels marked with "Magic Marker" and grease pencil showed very little corrosion after 20 hours and were comparable to the unmarked control panel (photo 1). The panel marked with regular graphite pencil, however, showed definite localized corrosion along the marked lines (photo 2). When the period of exposure was extended to 64 hours, the localized reaction continued while no general corrosion occurred (photo 3). In terms of actual penetration, photo 4 shows the 0.0005" penetration typical of the localized pitting after 112 hours. After 300 hours exposure the corrosion became less localized and pitting depths reached as much as 0.004 inches.

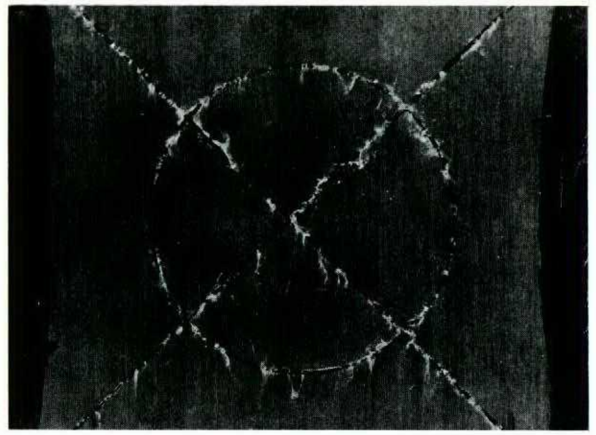
The results of the tests performed at QETE can hardly be directly related to field experience, however they do indicate that a definite hazard exists. It is a matter of record that authoritative references universally note that there is no corrosive reaction between graphite and aluminum alloys. The QETE results do not necessarily negate these references since graphite pencils contain more than just graphite, and the predominating corrosive influence in the tests was the salt spray environment (no reaction occurs in dry air). It remains, therefore, somewhat conjectural as to whether the adverse reaction with pencil markings is electrolytic, catalytic or just the result of mechanical damage to the alodized barrier layer due to the hardness of the pencil; or some combination of these effects. The QETE conclusion: graphite pencils do represent a corrosion hazard when used on high strength aluminum alloys; accordingly, their use should be forbidden.

Photo 1



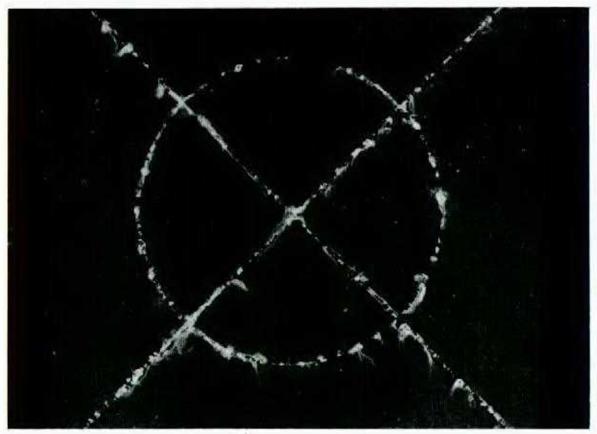
Alodized Panel – Grease Pencil – 20 hrs exposure showing no localized and minimal general corrosion.

Photo 2



Alodized Panel – Graphite Pencil – 20 hrs exposure showing localized corrosion along the scribed pencil lines.

Photo 3



Alodized Panel – Graphite Pencil – 64 hrs exposure showing more severe localized corrosion and minimal general corrosion.

Amendments to EO 05-1-2AU and EO 05-1-3/21, are being printed, stating that grease pencils are to be used. Meanwhile, all aircraft publications are being reviewed in order to delete any reference to the use of graphite pencils for marking out repair areas.

CLOSE CALL — OPERATIONAL HAZARD — SAFETY SUGGESTION

Close Call— After Ejection!

The reassuring shock of an opening parachute after ejection doesn't always mean you're out of the woods—a fact attested to by this student pilot. Only his quick thinking in response to the new hazard facing him averted the possibility of serious injury during the landing. All aircrew flying aircraft equipped with ejection seats might ponder how they would handle a similar situation.

This was my 9th solo flight in the Tutor. Everything had been normal during start-up, taxiing and takeoff and now I was climbing through 3000 feet (1100 feet AGL). About that time I noted that I had only 215K and the EGT was close to the red line. At 3500 feet I started a turn, keeping a close watch on my engine instruments. As I reached 30° of bank there was a loud "bang" and I immediately hit the airstart and brought the throttle back to idle. The aircraft seemed to do a "full stop" immediately. I noted 4200 feet on the altimeter and saw the RPM still unwinding. When I called the tower, the controller immediately responded with landing instructions, however my aircraft was descending and it was becoming apparent that I would be unable to make it back to base.

As I told the controller that I intended to eject, I noted the master caution and master warning lights glowing. I also thought—but I am not sure—that I saw the fire warning light as well. The next time I glanced back at the panel there were no lights showing at all. I pulled the handles at approximately 1000 feet above ground.

After a brief period of tumbling I felt the seat separate and the chute open. I also felt my hard hat depart. When the chute opened I looked up and saw a wide-open canopy, but I was surprised to find the ejection seat right in front of me. Somehow one of the seat handles had become tangled with a shroud line and the seat had pulled one of the risers down to a position 90° in front of me. Quickly I grabbed my knife from the knife pocket and cut the shroud line, allowing the seat to fall away. Moments later I landed, still clutching the knife. While I was still lying on my back I put the knife back in its pocket and got rid of the chute. I got up and checked if I had broken anything, then I sat on the seat pack to await the arrival of the helicopter from Base Rescue. The helicopter made one pass but didn't see me so I put the red flag out over my chute and was picked up within minutes.

...VS 880
New Role New Challenge

by Capt T. A. Bailey
UFSO, VS 880

The retirement of the Bonaventure in 1970 was felt by many to be the death knell for VS 880. Instead, an entirely new concept of operations has evolved for the squadron. The off-shore capability was lost, but new defence priorities have generated new roles and tasks.

880 Squadron was formed as an RCN unit in May, 1951, flying Grumman Avengers from Shearwater and HMCS Magnificent. In 1956 the CS2F Tracker was introduced and first flew from HMCS Bonaventure in 1957. Since then, many extensive additions and modifications have been made to the Tracker, resulting in the CS2F-3 in early 1967. During these years, VS 880's role had been to develop and perfect ASW tactics, and to this end, the squadron participated in many NATO, CANUS and national exercises.

The New Role:

- to conduct all-weather surveillance flights over waters of Canadian interest and adjacent land areas
- to conduct maritime warfare
- to conduct operations in cooperation with other commands, forces and agencies
- to perform search and rescue operations

The Aircraft

The Tracker is equipped for detection of surface and sub-surface vessels. It carries a four-man crew, various combinations of bombs, rockets and torpedoes and has an endurance of 8 hours, a cruising speed of 150K and a maximum speed of 260K. The aircraft is well suited for surveillance flights and with the ability to provide coverage over maritime and land areas, it frees the Argus aircraft for long range and mid-ocean missions.

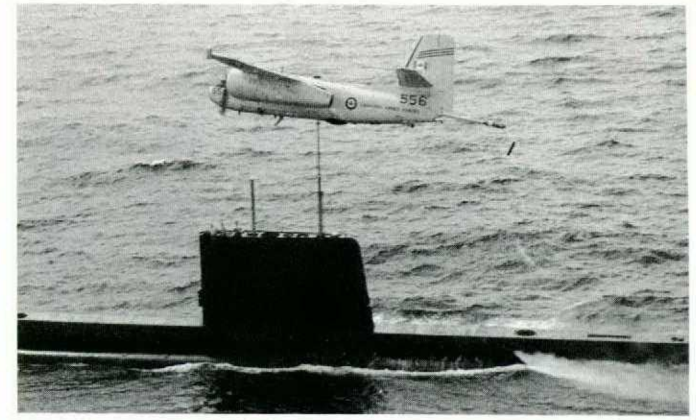
The Squadron

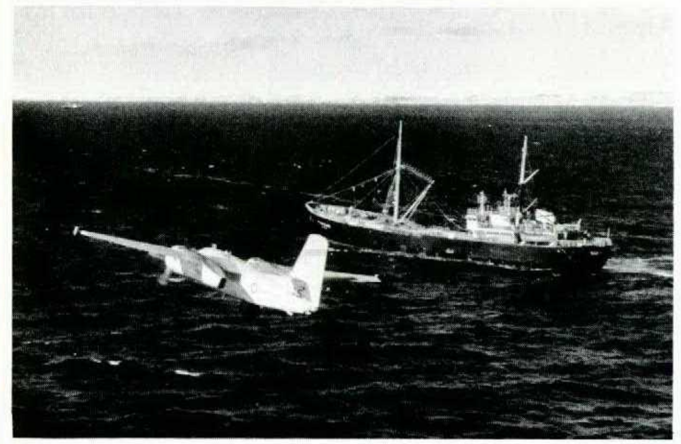
The Squadron is comprised of three flights, each with six aircraft and nine crews. The flights are individually capable of quick reaction deployment for up to six weeks during which time they can sustain around-the-clock operations for periods up to seven days.

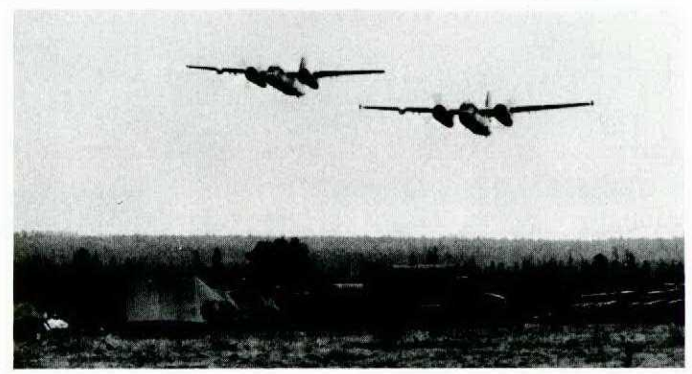
Captain Bailey joined the RCN in 1961 under the ROTP. After graduating with a BEng(Civil) from RMC in 1965, he proceeded to flight training and received his wings in April 1966. He served operationally in VS 880 from 1966 to 1969 and has now returned for a second tour and is employed as FSO.

In operating from Shearwater or forward deployment bases, VS 880 provides coverage of a significant part of Canada's coastline, including the Pacific and Atlantic mainland and islands and the Arctic mainland and islands. During the past year, the squadron deployed in detachments of two to six aircraft from such bases as Argentia, Frobisher, Fort Chimo, Goose Bay, Torbay, Moosonee, Wabush, Victoria, Sandspit, Yellowknife and Whitehorse. In addition, aircraft were deployed to Bermuda, Puerto Rico, Norfolk Virginia, and Quonset Point Rhode Island to carry out ASW and training exercises.

These missions provided new experiences for the aircrew. Besides the new procedures required for the primary tasks of coastal reconnaissance and those involving fishery and pollution patrols, new techniques had to be learned for missions such as ice reconnaissance, iceberg tracking, air-to-ground support of the land element, and search and rescue. Along with these, was the continuing requirement to maintain the necessary expertise in the ASW role.







Flight Safety

As may be expected, numerous flight safety problems occur with this diversity of operations. Flying and ground maintenance conditions are not always ideal. Bases and facilities in northern deployment areas are limited; there is a lack of available alternates and navigation aids. Gravel strips at some bases can present serious problems. Coastal and fishery patrols, of necessity being flown at low level, encounter the added hazard of sea birds concentrated around fishing operations. There is a problem of aircrew fatigue, as detachments usually fly periods of concentrated operations. And above all there is the problem of unpredictable weather.

Future

The Tracker will continue to be operated by VS 880 for an indefinite period. The tasks assigned assure a wide diversification of employment for the squadron pilots. From detecting, photographing and reporting suspected fishing and oil pollution violations on coastal surveillance patrols, to ASW exercises, SAR missions, or providing air-to-ground support for the land forces, the Trackers are being utilized to great advantage. VS 880 will continue to provide its pilots with an interesting and challenging tour of duty.

Could Be Famous Last Words

With high ranking passengers aboard the small jet, this flight crew flew their assigned mission in the following fashion:

On start-up, the pilot noted his fuel quantity was erratic and he had no indicated hydraulic pressure. He taxied to the takeoff position and upon advancing the throttles, noted no exhaust pressure reading. He continued his takeoff roll and upon becoming airborne the copilot reported no air conditioning or cabin pressurization. A decision was made to turn back, whereupon a high ranking passenger stated, "If it's safe to fly, press on", which they did.

The preceding was a good point that a lot of executive pilots, civilian and military, are faced with daily, the decision to press on at the desire of the boss. The question in a lot of minds is, is it better to get chewed out or fired by the boss because he was late, and live to work for a new boss, or be buried with the boss?

It should be noted that the removal and reinstallation of two improperly installed cannon plugs corrected all of the above discrepancies. Removal, reinstallation and checkout procedures took less than 30 minutes.

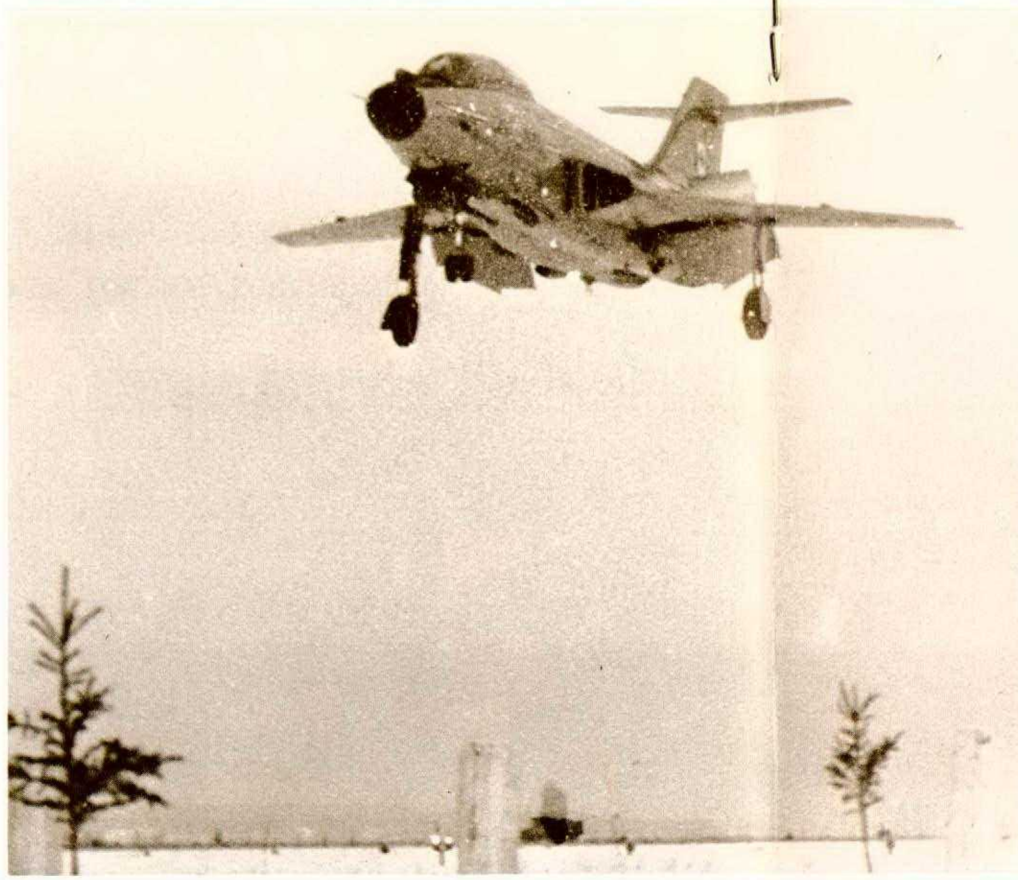
USN CROSSFEED

THE LAST MILE

Optical illusions can cause some mighty embarrassing landing errors. "Eye balling" the approach, particularly at night or under strange field conditions, is akin to sticking one's neck out.

Many optical illusions are intentionally deceptive, created by slight of hand, misleading arrangement of lines, perspectives, or gaudy colors. Knowing they exist is usually enough to reveal their various aspects. However, illusions are so subtle that they go unsuspected, and since we've learned to put great trust in our visual sense it is difficult to override our interpretations of what we see unless we know better. In flying, falling victim to an optical illusion would expose us to more than eye-strain, so we believe the following collection on the subject has real value.

Sloping terrain or Sloping Runways (we have several) can play tricks with depth or height perception during normal approaches. Four of the five conditions shown in figures 1 through 5 have misled more than one experienced pilot. Avoid these pitfalls by knowing the conditions on the approach to your airfield; maintaining proper power, airspeed, and position on VASI or ILS, and using the precision glide path rate of descent from minimum altitude to flare will keep you out of trouble.



RUNWAY CHARACTERISTICS

Various illusions in depth and height may occur as a result of runway characteristics:

- The narrow runway may appear to be farther away and longer, creating the illusion of being too low and producing the possibility of an overshoot.
- The wide runway may appear to be closer and shorter, creating the illusion of being too high, possibly producing an undershoot.
- After landing, the humped runway may appear to be shorter because the far end may not always be in sight, possibly producing very heavy braking, blown tire, and loss of directional control.

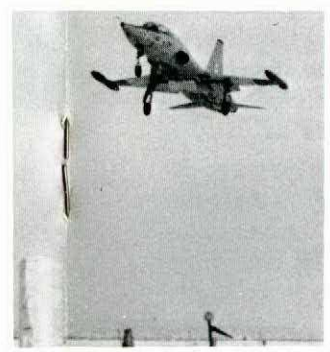
RUNWAY LIGHTING

Similar illusions in depth and height may result under varying conditions or runway lighting:

- The dimly-lit runway may appear to be farther away, creating the illusion of being too low. This again introduces the possibility of an overshoot.
- The brightly-lit runway may appear to be closer, creating the impression of being too high. An undershoot is the possible result.
- The absence of lighting in the approach zone increases the strength of the illusion created by the other two lighting problems.

VISIBILITY RESTRICTIONS

Encountering visual illusions under conditions of restricted visibility from haze, smoke, dust, fog, darkness, glare, rain or snow is also a possibility. Visibility restrictions reduce or eliminate many of the visual cues used in perception. When flying in rain, in addition to the reduction in visibility there is the likelihood of a refraction problem caused by the water on the wind screen. This would cause the horizon image to appear below the true horizon.



RUNWAY CONTRAST

Illusions are also created by the contrast of the runway and the surrounding terrain:

- A snow covered runway or a dimly-lit runway may lack sufficient contrast to provide good depth perception. Not only is there a possibility of an overshoot or undershoot, a hard landing can result from an improperly judged altitude at flare.
- A concrete runway on a sand surface or a macadam runway surrounded by dark foliage will provide similar difficulties.

CONCLUSIONS

Illusions and their effects can be minimized by the pilot who is aware of the factors which produce them. Simply think about these things before each flight and just before each approach. The consequences of not considering these illusions and not taking appropriate action can be disastrous. "Eye balling" the approach path is something the professional pilot resorts to only when the aids that will give him glide slope guidance are not available.

The safe smooth execution of the "last mile" usually involves all of the following:

- Maintenance of proper power, airspeed and position on the VASI or ILS.
- The use of the precision glide path rate of descent from minimums to flare.
- Careful study of the approach plate including lighting systems, runway lengths and slopes.
- Full employment of all possible aids such as ILS, GCA, VASI and flight instruments.

If it doesn't look right - Take the bird around.

AIRSCOOP

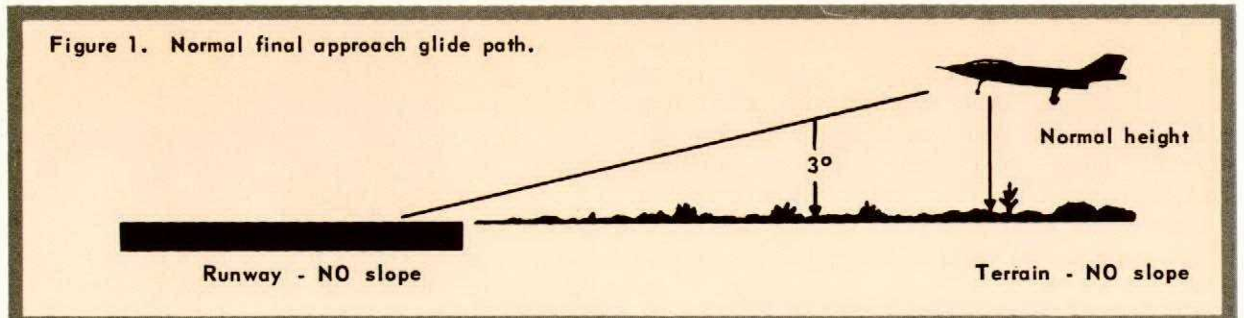


Figure 1. Normal final approach glide path.

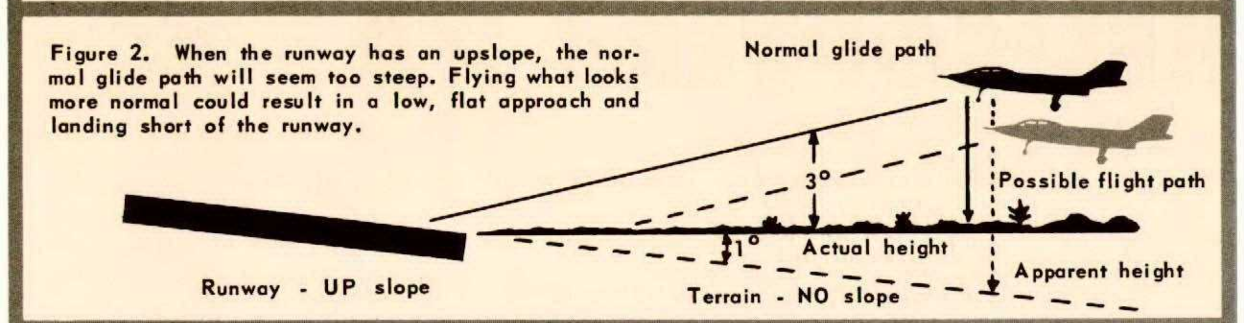


Figure 2. When the runway has an upslope, the normal glide path will seem too steep. Flying what looks more normal could result in a low, flat approach and landing short of the runway.

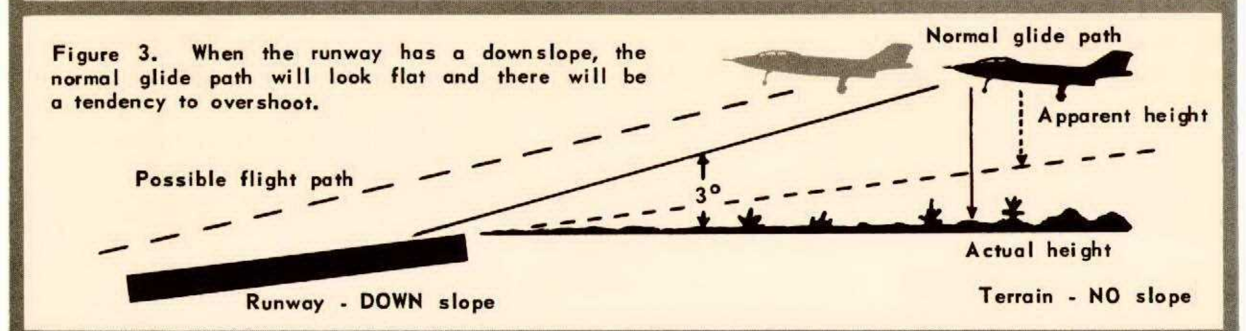


Figure 3. When the runway has a downslope, the normal glide path will look flat and there will be a tendency to overshoot.

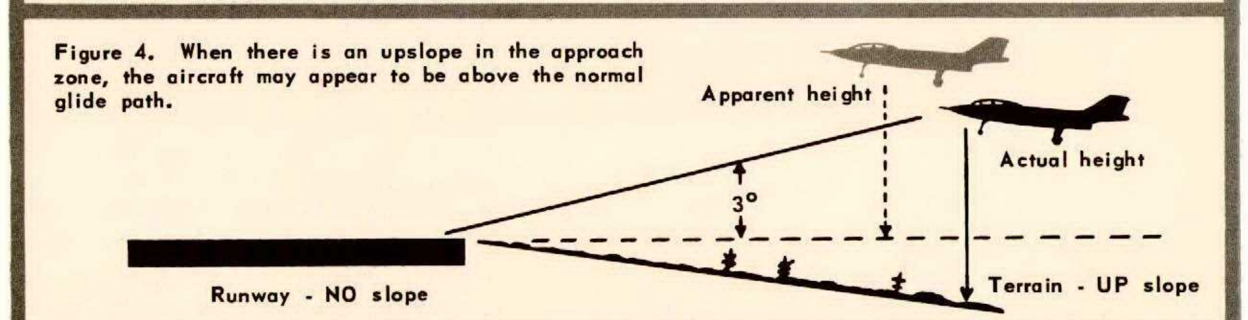


Figure 4. When there is an upslope in the approach zone, the aircraft may appear to be above the normal glide path.

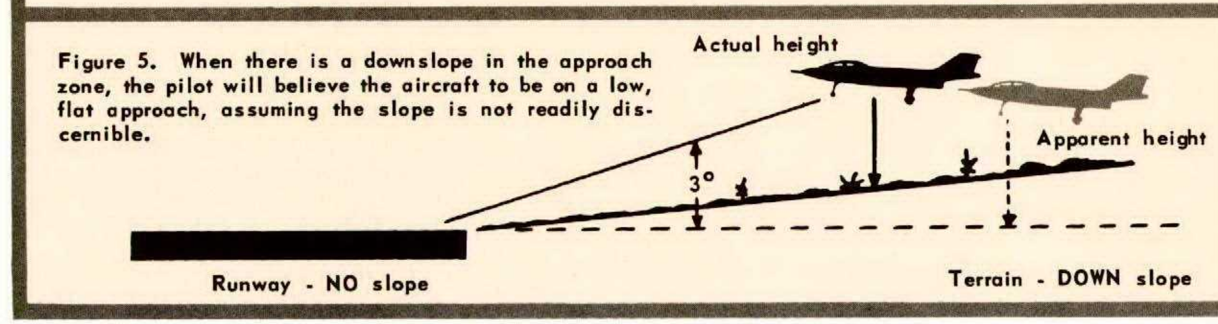


Figure 5. When there is a downslope in the approach zone, the pilot will believe the aircraft to be on a low, flat approach, assuming the slope is not readily discernible.

HELICOPTERS IFR

by Capt Baz Lawlor, 450 Sqn

"Well now that we have seen each other" said the unicorn,
"If you'll believe in me
I'll believe in you.
Is that a bargain?" (Alice) Through the Looking Glass.

"IFR in a helicopter! You must be joking!" said a jet jockey friend as he watched me fill out an IFR Flight Plan for a CH113A Voyageur. I assessed the remark as typical of fixed wing ignorance and proceeded to point out that my trusty steed had as much right to the airways as any stiff wing and was quite capable of flying ADF, Radar, TACAN, and all that good stuff – just like his raunchy old T-Bird.

Since this incident I have been in many situations where demonstrated ignorance of helicopter capabilities and limitations on the part of non-rotary wingers has prompted me to say "*You* must be joking!" However, some of these situations have been potentially hazardous and with the increased use of helicopters in the Canadian Forces this "communications gap" will tend to increase unless a concerted effort is made to achieve some "togetherness". Attempts are being made to educate the GRUNTS (Groundlings of Renown Undergoing Numerous Training Schemes) in the safe conduct of helicopter operations, but have we really spread the good word among our friends in the air environment; the pilots and air traffic controllers who, in the main, see helicopters as you did before you . . . became a *real* pilot.

"You are cleared to hover over the beacon at seven thousand (pause). Can you do that?"

"You are cleared for a vertical takeoff to three thousand feet." These are representative of some of the classic clearances received by the whirling wonders. The consequences of abiding by these clearances would have made interesting reading in Flight Comment so how can we, as helicopter operators, help close this communications gap?

First of all, have you ever discussed the peculiarities, or rather, the singular qualities of helicopter flight with the controllers at your base? Have you taken the Tower controller for a familiarization ride to show him just what your flight envelope is? A quick trip may help to eliminate those weird clearances and next time you probably won't be asked to park next to that light aircraft that isn't tied down! If you take those unsung heroes of the cathode tube, the Radar Controllers, on a few precision approaches, you may find that your next square pattern doesn't have to be the same size as one flown by a 707. Have you ever asked Radar to experiment with approaches suited to a helicopter's capability? It's up to us, the rotary wing afficionados, to make sure that we don't develop into an esoteric little clique, outside the mainstream of aviation - a sure way to be treated as an outsider. Remember, a little empathy can make for a lot of sympathy. So much for one aspect of helicopter operations but what about the whole question of Instrument Flying?

For at least six months of the year in Canada we are unable to fly helicopters in actual cloud conditions because of icing problems. On the other hand, clouds in the summer often pose a hazard because of thunderstorm activity and the turbulence associated with cumulus build-ups. Add to this the inherent instability of our machines, our lack of fuel to guarantee alternate requirements, a dearth of appropriate instrumentation, and I am almost ready to agree with my jet jockey friend that the value of Instrument Flying in helicopters is questionable. Why not just fly ESVFR (Extra Special VFR)? That's a euphemism for the old sneak and peek trick. Well, for those of you who need convincing, rare occasions do arise when an IFR Flight Plan allows a mission to be flown which would otherwise stay on the ground. As pilots we are trained to exploit the capabilities of our aircraft and to deny instrument practice is to lose an important facet of the pilot's art. Finally, there is always that slight chance of inadvertently entering IF conditions - a mistake made by even the most seasoned rotary wingers.

Paradoxically, it is because we only fly IFR so rarely that our level of instrument flying must always be at peak. On those few occasions when we are required to file are we always certain that our IF procedures and techniques are up to par. If not, then we are gambling with the lives . . . of ourselves, our crews and our passengers.

Instrument Ratings are valid for one year. We are required to fly only 5 hours per quarter IF, but how often do we find ourselves squeezing those last few hours into those last few days? How much of our IF time is really good instrument practice? Do you remember those straight and level trips between Trenton, Ottawa and Petawawa when you logged 3 hours simulated because the end of the quarter was close?

How good are your terminal procedures? Can you handle any type of approach that ATC may give you? Just how good is your heading control? Is your RT procedure getting just a little bit rusty? How about lost orientation? If you become IFR unintentionally will you be able to orientate to the dials immediately? How do *you* recover from an unusual attitude caused by vertigo or disorientation? Can you fly IFR safely with one or more emergencies to handle?

The point of all these merciless questions is that instrument flying in helicopters is not an area for complacency or "we don't need it" attitudes. The U.S. has discovered from bitter experience how important instrument flying can be in what is essentially a VFR operation. Let's profit from their experience, use our excellent training and common sense by making proper use of our instrument time.

Finally, if you are having a little trouble when . . . "under the bag", take heart from the White Queen's words to Alice:

"I daresay you haven't had much practice. When I was your age, I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."

Obey your urge to breathe

"Death by drowning," read the coroner's certificate. "But he was an expert swimmer," said friends. "What happened?" Studies by Albert B. Craig, Jr., Assistant Professor of Physiology at the University of Rochester School of Medicine and Dentistry, indicate that one of the ways in which a person may drown is to voluntarily hold his breath too long and thereby lose consciousness while swimming underwater. Contestants in underwater swimming events may be especially prone to this danger because, under the stress and excitement of competition they may ignore their own built-in "urge to breathe."

The possibility of such an accident is increased by the common practice of "overbreathing" (hyperventilating) before swimming underwater. Overbreathing depletes the body of carbon dioxide, which is the main factor controlling the urge to breathe. Thus, the urge to breathe is delayed to the point at which the oxygen supply is inadequate and the person loses consciousness. In such cases, the swimmer may have little or no warning that he is about to pass out. He may even continue swimming for a few more seconds. As a result, observers or fellow swimmers may not even realize he's in trouble until he loses all consciousness, automatically breathes, and, in the case of the underwater swimmer, drowns.

To simulate underwater swimming in the laboratory, Dr. Craig designed and perfomed experiments involving hyperventilation, breath-holding and exercise. In the laboratory, the exercise consisted of riding a stationary bicycle. It was noted that when the subjects overbreathed, then exercised while holding their breath as long as possible, the concentration of oxygen in their lungs became very low. One danger of low oxygen concentration is that the subject has little or no warning that he is about to lose consciousness.

Dr. Craig's advice to would-be mermaids and frogmen: in swimming underwater, obey your natural urge to breathe, and don't compromise its effectiveness by overbreathing before you swim. He urges swimming instructors and water sports officials to de-emphasize competition where the prize might depend largely on the length of time the underwater swimmer can hold his breath.

Aviation Medical Bulletin

Total Involvement

by Capt Gilles Bussieres
UFSO, CFANS

Is the navigator's involvement in Flight Safety superfluous? Some compare it to a non-paying passenger at best, a back seat driver (pejorative sense only) at worst. After all, are defensive driving courses directed to automobile passengers? Of course not! Even the Directorate of Flight Safety recognizes that attitude when it classifies navigators after the weather forecasters in the "Other Personnel" column (Annual Aircraft Accident Analysis 1970, p. 7)* There is nothing particularly upsetting with this attitude, unless navigators advocate it themselves, in which case it leads to a dangerous indifference, not only toward flight safety, but also toward the ultimate goal – accomplishment of the mission.

Navigators are members of a specialized team dedicated to mission accomplishment. They owe it to themselves and to every member of the team to be an active and effective link in every phase of every mission.

Providing safe and accurate navigation regardless of the situation is not easy. It is made complex by the vagaries of weather, equipment unserviceabilities and so on, all of which can severely test the navigator's skills.

The navigator has a vital role to play in the approach and landing phase. Since this is where most aircraft accidents occur, it is no time for the navigator to consider his work finished. It is a time to monitor approach clearances, check clearance limits, monitor the approach itself with all the instrumentation at his command, and assist the pilot with pertinent and useful information.

Reporting and discussing unserviceabilities, dangerous procedures or problem areas with other members of the team, on the ground or in the air, is another involvement. The navigator should not be tempted to say that it is none of his business or that it is outside his area of responsibility. Remember instead that involvement may save costly material resources or even human lives. This is reason enough to make it your business too.

To be prepared for a given mission then, means much more than just planning it. It also means anticipating problem areas and resolving them in advance. After all, emergency procedures have evolved from just such anticipation. Above all, care must be exercised to prevent routine tasks from leading to complacency.

Fellow navigators, ask no more whether you are involved in Flight Safety. Ask instead, "What more can I do for Flight Safety?" And by the way, do you know why the Directorate of Flight Safety ranks the navigator behind the weather forecasters in the "Other Personnel" section? It is because we make fewer errors than they do.

Courtesy HOT LINE

CFP 135B (Flight Safety For The Canadian Forces) recognizes the involvement of "other aircrew" as cause factors. Chapter 16, article, 1604 1. c. reads: "Personnel – Other Personnel. Any other persons, such as* ***other flight crew,* *passengers, air traffic controllers, meteorological forecasters ..." By the way, we've changed the 1971 Annual.*

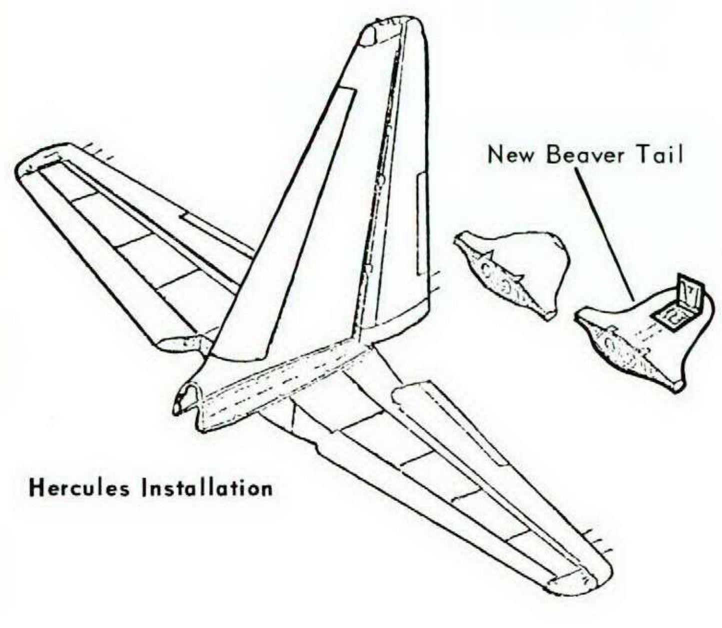
Capt Bussieres graduated from ANS in 1957. Following graduation, he had consecutive tours with 426 and 437 Squadrons, and #4 (T) Operational Training Unit. A recruiting tour at Chicoutimi was followed by two years as liaison officer at Laval University. He has been on staff at CFANS since 1970.

CPI/FDR

The recent acquisition of CPI equipment for CF passenger carrying aircraft means that all CF aircraft will now carry some form of locator capability, either as standard aircraft equipment or as an item of aircrew personal survival equipment. Additionally, most passenger carrying aircraft (Hercules, Falcon and Buffalo) will carry a valuable accident investigation system, the Flight Data Recorder. It is planned to upgrade the present 707 system and consideration is being given CPI/FDR installation for the Cosmo. The Twin Otter, Musketeer and helicopters will be equipped with a CPI only.

The following are brief descriptions of the CPI and associated equipment:

CPI	**Crash Position Indicator** A 243.0 MHZ beacon enclosed in an airfoil which is activated when the airfoil is ejected either manually or automatically on crash deceleration.
FDR	**Flight Data Recorder** Provides a recording of selected aircraft operating parameters during the previous 30 minutes.
CVR	**Cockpit Voice Recorder** Records cockpit voice and radio communication during the previous 30 minutes.
CPI/FDR	FDR and CPI in the same package.
DAPI	**Downed Aircraft Position Indicator** Civilian nomenclature for the CPI.



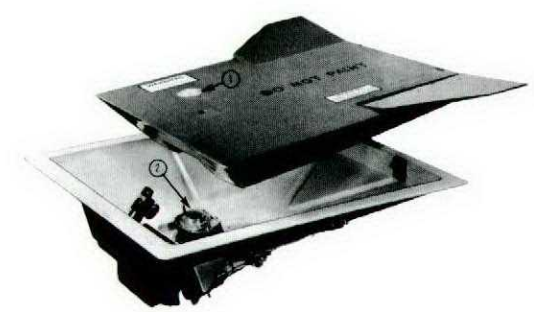
New Beaver Tail

Hercules Installation

Remote Control Unit located in the cockpit and provides the following:

a. Deploy switch (can be deployed manually in addition to various frangible switches which will release the airfoil in the event of a crash).
b. Battery Test Button to monitor the battery charge circuit.
c. Test Monitor Button to check the beacon transmission and Pilot/Co-pilot audio channels.
d. System On/Off Switch to control system start and stop.
e. Recorder Failure indicator light.
f. Replay indicator light.
g. Battery charge indicator light.

Recorder This recorder is located in the airfoil. The package contains the tape deck and a tape of the previous 30 minutes of flight. From the accident investigation point of view it is most important that this be located and turned over to the investigators. It should be quarantined and not tampered with in any way. DFS will issue disposal instructions.



Airfoil contains the Recorder System and Radio Beacon located atop the base which is fixed in the aircraft. The photo shows the location of the switch to turn the beacon off after it has been located 1 , and the location of recorder which is removable 2 . The airfoil is not a "black box". It is painted 'International Orange'.

Good Show

Capt K.J. Howard Cpl L.W. Nancarrow

Cpl R.G. Heans Cpl F.T. Lewis MCpl K.D. Fairhall Cpl W.A. O'Donnell

CAPT K.J. HOWARD
CPL L.W. NANCARROW

Capt Howard and Cpl Nancarrow were on duty in the Bagotville Terminal Control when a MAYDAY call was received from the pilot of a light aircraft lost in cloud over mountainous terrain. The weather over the area at the time was 3000 feet broken with extensive low visibility in haze.

Capt Howard was able to get a DF bearing from the first transmission heard by Bagotville. He advised the pilot to climb to 5000 feet to keep him clear of obstructions and gave him a heading to steer for Bagotville. He then kept up a conversation to restore the worried pilot's confidence, while Cpl Nancarrow attempted to locate the aircraft on radar. The two controllers spotted the lost aircraft simultaneously, and having established positive ID, they vectored the pilot to a safe landing at Bagotville.

The timely and competent assistance given by Capt Howard and Cpl Nancarrow, averted possible disaster for the civilian pilot.

MCPL R. BRADSHAW

MCpl Bradshaw was watching from the tire bay as a Dakota taxied between two hangars. Suddenly the aircraft's brakes failed and a strong gust of wind caused it to weathercock 180 degrees. When the aircraft came to a stop the pilot shut down the engines while the first officer raced to the nearest hangar for chocks.

During the first officer's absence MCpl Bradshaw saw the aircraft start to roll backwards towards one of the hangars. He quickly ran out and stopped the aircraft by placing tires behind the main wheels.

MCpl Bradshaw's quick thinking prevented the aircraft from being blown against the hangar.

LT E.R. COPEMAN

Lt Copeman, a Hercules first officer, was preparing for a flight in an aircraft that had just been overhauled at a civilian contractor. He decided to examine the exterior of the aircraft closely since the overhaul had included a paint job. The examination revealed that the painted designs had been outlined in lead pencil.

Remembering an article he had read about the corrosive action of graphite pencil lead on an aircraft skin, he informed the Base Flight Safety Officer of the situation. Command Headquarters were subsequently notified and a UCR raised.

Lt Copeman's keen observations and good memory prevented the possibility of expensive damage to the aircraft.

Lt E.R. Copeman

MCpl R. Bradshaw

MCPL K.D. FAIRHALL CPL F.T. LEWIS
CPL W.A. O'DONNELL CPL R.G. HEANS

MCpl Fairhall, Cpl Lewis, Cpl O'Donnell and Cpl Heans were sent to investigate the unserviceability of an Argus that was taxiing in with number two engine shut down because of smoke in the area of the power recovery turbine.

When the other three engines were being shut down, MCpl Fairhall noticed flames coming from the number two engine. The intensity of the fire indicated that fuel was leaking onto the hot turbine. Fast action was required.

The deplaning aircrew were immediately informed of the hazardous situation while Cpl Heans manoeuvred an aircraft towing vehicle into position so that MCpl Fairhall could use it as a stand as he attempted to contain the fire with the small dry chemical fire extinguisher stored on the vehicle. Cpl Lewis ran to the hangar for the large CO_2 fire bottle while Cpl O'Donnell rushed to the L-14 desk to call the Base Fire Department.

MCpl Fairhall and Cpl Lewis were required to use the CO_2 extinguisher several times as the fire in number two engine repeatedly burst into flames, however they succeeded in completely extinguishing the fire before the arrival of a fire fighting vehicle.

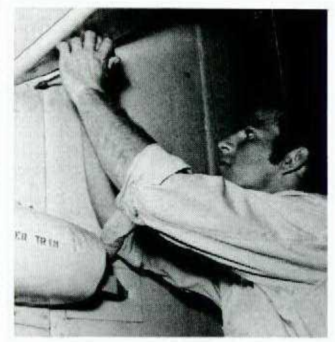
The timely action and unrehearsed teamwork displayed by these four airmen averted a serious fire on the aircraft.

CPL C.J. RIDEOUT

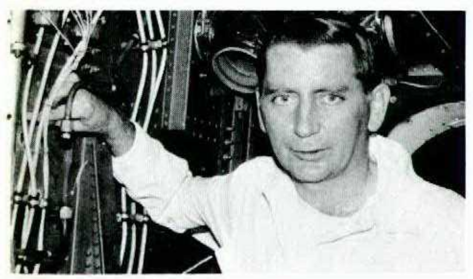
Cpl Rideout was removing the tapered pins from the horizontal stabilizer torque tube in the course of a CF5D sampling inspection at AMDU. Finding one pin seized, he removed the right horizontal stabilizer actuator to gain extra working area. He then examined the area closely and discovered a deep groove on the right horn assembly. Further inspection revealed a similar, although less severe, condition on the left horn assembly.

Actuator removal is not a requirement of the sampling inspection. It would not have come up in the inspection card system for 600 hours, until the next 800-hour inspection. Consequently, had it not been for Cpl Rideout's extra effort, the unsatisfactory condition might not have been discovered until it caused a malfunction of the horizontal stabilizer during flight.

Cpl A. Carpenter



Cpl D.T. Dove



MCpl A.L. Anderson

Cpl C.J. Rideout

Cpl S.G. Max

CPL D.T. DOVE

While checking the controls of a Tracker prior to launch, Cpl Dove noticed two screws missing from the lower left fairing assembly on the vertical stabilizer. The portion of the fairing from which the screws were missing is in an obscure area normally covered by the elevator and only when the elevator is fully extended upward are the screws visible from the ground.

Cpl Dove's attention to detail resulted in the discovery of a condition which could have resulted in a serious in-flight control problem.

MCPL A.L. ANDERSON

During a periodic inspection on a Hercules, MCpl Anderson, an airframe technician, removed a wing root panel to allow other trades to carry out their part of the inspection schedule. When the panel was removed, he took the opportunity to carry out a general inspection of the area; his inspection revealed an extensive crack in the TEE-beam fitting, as well as sheared and stretched bolts in the same area.

MCpl Anderson's initiative in carrying out a check not called for in his particular inspection procedures, averted further damage to the aircraft which could have had serious flight safety implications.

CPL A. CARPENTER

Cpl Carpenter was inspecting the nose landing gear during a primary inspection on a Hercules when he found a crack in the upper attaching bracket for the nose-gear steering actuator. Investigation revealed that with normal hydraulic steering pressure, this crack opened approximately 3/16 of an inch.

Although inspection of the nose-gear is part of a primary inspection, Cpl Carpenter's examination was particularly thorough; it was apparent that the crack had occurred some time ago.

Cpl Carpenter, like many others on the base, had been subjected to the fatigue of twelve-hour workshifts and the pressure generated by Exercise Running Jump II. Despite this, he took that little bit of extra care that may well have prevented a serious accident.

CPL S.G. MAX

Cpl Max was 'front-end' man on a CF104 start. When he marshalled the aircraft out of the line after all post-start checks were completed, he noticed a very fine accumulation of hydraulic fluid around the collar of the nose section. He signalled the pilot to stop in order to investigate the apparent leak. As the aircraft stopped, the nose oleo went completely flat and hydraulic fluid could be seen leaking from it.

The faint indications that something was amiss could easily have gone undetected during marshalling. Discovery of the malfunction by Cpl Max prevented the possibility of damage to the airframe due to lack of proper shock absorption during taxi, takeoff, or landing. It also showed that his previous checks on the aircraft were complete and thorough, as he was immediately aware of even a small discrepancy.

CPL R.S. BUCKINGHAM

While conducting a routine check on a 707 engine following completion of the periodic inspection, Cpl Buckingham spotted what appeared to be a crack at the weld in the upper mounting support of the fuel/oil cooler. This support is located in an area where it is very difficult to determine the presence of cracks without removing the existing lines, oil cooler, and tank.

After discussing the situation with maintenance technicians – who expressed doubt that the area was cracked – Corporal Buckingham was still not satisfied, so he wrote up an unserviceability against the aircraft. The cooler, tank, and lines were subsequently removed and a non-destructive testing check revealed not one, but two cracks in the mount.

The key point in this incident was Cpl Buckingham's persistence. Had the materiel breakdown not been found, it is likely that the aircraft would have experienced engine failure as a result of oil starvation.

MCPL C.S. LLEWELLYN

MCpl Llewellyn was assigned as Flight Engineer for a night training flight on a Buffalo. As he was conducting the pre-flight inspection (in darkness) he discovered a seized bearing in an outboard flap hinge.

MCpl Llewellyn displayed his professional approach to routine pre-flight inspections and by locating a malfunction, in an area difficult to inspect under the best of conditions, he averted a possible in-flight flap failure.

CPL J.A. SHEA

Cpl Shea was watching from a towing tractor at Line Servicing as a Hercules was being started some distance away. When number one engine started he noticed excessive smoke emission from the turbine area and quickly drove across the ramp towards the aircraft, signalling the crew to shut down the engine. All cockpit indications had been normal to this time.

The investigation uncovered an internal oil leak which was causing oil to spill overboard through air valves into the turbine area, where high engine temperatures during takeoff could possibly have ignited the oil. The turbine area has no fire fighting capability.

Cpl Shea's recognition of the problem and his quick reaction probably saved the Hercules crew from the hazard of an in-flight fire.

CPL N.A. SHEPHERD

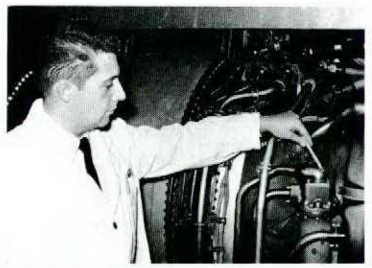
While carrying out an acceptance check on a CF104, Cpl Shepherd observed that the stabilizer cable sheathing was crimped at one end rather than swaged the entire length. As a result of his observation a further investigation revealed that several other aircraft had been fitted with similar cables and it was found that stocks held by an overhaul contractor were also unacceptable. Had this condition remained undetected, the sheathing may have come loose during flight, jamming the stabilizer controls.

Significantly, the inspection of these cables was made on Cpl Shepherd's own initiative, as it was not part of the acceptance check. This was the second occasion in little over a year in which his thorough inspection resulted in a timely discovery which prevented the development of a potentially dangerous situation. For Cpl Shepherd, his second Good Show.

CPL M.E. RAMSDEN

While carrying out a routine daily inspection on a CUH1N helicopter, Cpl Ramsden noticed excessive play in a flight control. Pursuing the inspection further he found worn bearings in the scissors lever assembly. He then checked the same item on three other aircraft and found discrepancies that led to the replacement of a total of seven bearings.

Cpl Ramsden's professional approach to his job demonstrates the high quality of CF tradesmen. His discovery of the worn bearings averted the possibility of an in-flight bearing failure and its attendant hazards. This is the second Good Show awarded to Cpl Ramsden.


Cpl R.S. Buckingham


MCpl C.S. Llewellyn


Cpl N.A. Shepherd


Cpl M.E. Ramsden


Cpl J.A. Shea

Flash-back

"... In those days, the average pilot could expect approximately one crash per flying hour, and only the exceptional pilot survived more than fifty hours before killing himself...

"... I would like to deny one rumour, to the effect that I tested the structure for strength by placing a chicken between the wings and if the chicken was able to free itself from the maze of struts and wires, we added more structure...

"... To prove the safety and controllability of the multi-motor concept, a motor would be deliberately shut down in flight while the mechanics would climb out on the wings and change the spark plugs as a demonstration... A number of stimulating incidents occurred, including an engine fire in mid-air (put out by two men climbing out on the wings and beating out the flames with their coats)...

"... The unusual configuration of my S-38 soon earned it a variety of descriptions, one of which was 'a collection of aviation spare parts flying in loose formation'...

"... My first helicopter demonstrated many of the characteristics of modern helicopters:

- it cost considerable money;
- it made a great deal of noise;
- it had much vibration;
- it generated great clouds of dust;
- it had one minor technical problem – it would not fly – but otherwise it was a good helicopter;
- control and stability were serious problems. The first motion pictures showed such an unstable and erratic machine that we never showed the films to outsiders except in slow motion, which slowed the darting and bobbing into graceful weaving...

"... After one of our early demonstrations to a few guests, one of them said: 'It's a remarkable machine. It hovers, flies sideways and even backwards. But I haven't seen it fly forward'. I was forced to answer: 'Yes... forward flight is a minor technical problem we have not solved yet'. In fact for some time the helicopter flew better backwards than forward. However, by steady, patient work we solved these problems..."

from a lecture by Igor Sikorsky

How's your Wx?

The "Remarks" portion of an hourly weather report may contain valuable information. Test your knowledge by matching the abbreviation on the left with its meaning on the right.

1. COTRA	A. frost on the indicator
2. VIRGA	B. cold transitional air
3. PRESSRR	C. lightning cloud to cloud
4. FROIN	D. drifting snow
5. KOCTY	E. frozen index
6. LTGCC	F. balloon ceiling overcast
7. BINOVC	G. precipitation not reaching ground
8. DRFTG SNW	H. cold air over city
	I. contrails
	J. breaks in the overcast
	K. pressure rising rapidly
	L. smoke over city

Answers on page 23

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: Base Commander CFB Winnipeg, Westwin, Man. Attn: ICPS.

RADAR AIR TRAFFIC CONTROL

What are the rules? How are they applied? Are procedures the same for MOT and DND?

THE PURPOSE

The purpose of utilizing radar in controlling the flight paths of aircraft is to expedite the flow of traffic.

The most crucial phase of radar ATC is positive identification. Radar identification shall be established before radar control service is provided and shall be maintained until radar control service is terminated. If identification is lost, the pilot shall be notified and reidentification accomplished immediately or standard IFR separation established. The IFF/SIF transponder (secondary surveillance radar) provides ATC with the most effective method of radar identification. Standard civil IFF/SIF code assignment for air traffic control may be found in MOT MANOPS ART 412 whereas local code assignments are included in LOPS (Local Operating Procedures).

SEPARATION STANDARDS

Radar controlled aircraft shall be separated by a minimum of 3 miles when less than 40 miles from the radar antenna – otherwise a minimum of 5 miles shall be applied. This separation shall be applied between:

1. two or more aircraft under radar control;
2. a radar controlled aircraft and all observed unknown radar targets, and;
3. a radar controlled aircraft and the boundary of airspace in which non-radar separation is in effect.

When an arriving aircraft on final approach is radar identified, an aircraft may be permitted to take off in a direction which differs by at least 45° from the reciprocal of the track of the arriving aircraft, provided:

1. the departing aircraft is airborne or, if crossing runways are used, has crossed the centreline of the runway on which the landing will be made before the arriving aircraft reaches 2 miles from the end of the runway;
2. when the possibility of a missed approach exists, lateral separation from the missed approach course is assured immediately after takeoff, and;
3. the arriving aircraft will not carry out a circling procedure.

Radar separation may be applied between an aircraft taking off or aircraft executing missed approaches and other radar controlled aircraft, provided that in the controller's judgement, the departing or missed approach aircraft will be identified within one mile of the end of the runway and radar separation will be established at that point, and continuing separation from all other aircraft can be assured.

TERRAIN CLEARANCES

When an aircraft is being vectored (e.g. vectors to a straight-in final approach) the controller is responsible for ensuring that 1000 feet terrain clearance is provided. However an aircraft may be vectored at an altitude which does not provide adequate terrain clearance above a prominent obstruction provided that the obstruction is indicated on the radar display and at least 5 miles separation is maintained between the aircraft and the obstruction until the aircraft has definitely passed the obstruction.

DND - MOT

Now that we have introduced some of the basics of radar control with which we were probably not too familiar, let's discuss radar approaches, with which we are all well acquainted – or are we?

Do we know that a final controller shall accept control on only one aircraft or formation at a time? Of course we do!

And we're certainly aware that there are no prescribed limits for acceptable course or glide path deviation. We know that after commencement of final approach the aircraft shall not be permitted to deviate from the on course or glide path unless immediate corrective action has been taken by the final controller.

But are we aware of any different practices between DND and MOT radar approaches?

1. When cleared to the airport for a radar approach DND requires that an alternate clearance to the airport be included in the event of communications failure – MOT does not, but gives missed approach instructions in event of lost communications.
2. DND requires that the pilot be advised of the minimum altitude (ASL) for the approach; that is, decision height for PAR and minimum descent altitude with ASR. This is not the case with MOT.
3. Prior to the aircraft commencing final descent the DND controller shall confirm aircraft altitude and altimeter setting, and provide a gear check. Although most MOT controllers do give this information it is not a requirement; they are, however, required to give a gear check when issuing landing clearance.
4. If specified in LOPS military controllers give a 3 second break while on precision approaches. MOT does not have this requirement.
5. When both military and civilian controllers are on continuous transmit, a pilot is unable to interrupt these transmissions. Discussions reveal that many military controllers do issue corrections in short transmissions thus allowing two-way communications. At present this decision is apparently personal preference and appears to be determined by aircraft type. The ICP school would appreciate feedback from anyone able to shed some light on this subject.
6. During surveillance approaches, MOT issue the recommended altitude at each mile from the end of the runway, whereas DND issue range and azimuth information leaving the descent to MDA at the discretion of the pilot. It should be noted that the military controller is also able to issue the recommended altitudes if requested by the pilot. In all cases both DND and MOT WILL give any warning of any situation which, in the controllers judgement is likely to affect the safety of the flight.

No discussion of radar approaches could be complete if distance from the touchdown at minimums were not mentioned. On a 2-1/2° glide path at 200 feet the aircraft would be positioned .75 of a nautical mile from touchdown. On a 3° glide path at 200 feet the aircraft would be positioned .625 of a nautical mile from touchdown.

Most of the preceding information was extracted from CFP 164 where reference is frequently made to LOPS. Be sure and check yours.

BEST BANG OF THE MONTH

Because the pre-takeoff check had been done several minutes before takeoff, the T33 canopy had been left cracked an inch or two. After takeoff, a cold breeze through the cockpit alerted the instructor in the rear seat to the fact that the canopy was still open. The speed was 190K as the instructor took control and told the student to close the canopy. Neither cockpit's electrical switch was effective, so the manual crank had to be used to close the canopy, which was then locked – *and the mission continued!*

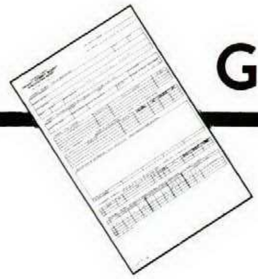
Answers to Wx Quiz

1-I 2-G 3-K 4-A 5-L 6-C 7-J 8-D

Taxiway Markers

It was suggested that taxiway identifier signs be installed similar to those at major bases such as Ottawa and Trenton. They would be of good value to visiting aircrew and would reduce the RT on ground frequency.

The Flight Safety Committee



Gen from Two-Ten

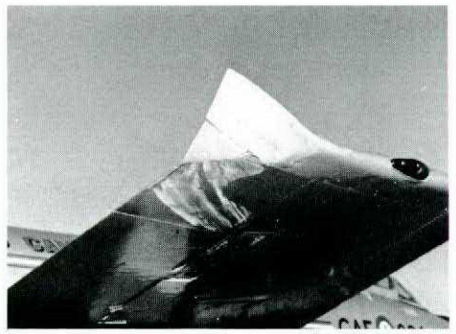
ARGUS, ATTACKED BY TOWING TRACTOR As the tractor, with the towbar attached, was backing into position in preparation for towing, the vehicle suddenly accelerated and crashed heavily into the aircraft radome, despite the driver's heavy braking and shifting into neutral.

The investigators found that the throttle linkage had become disconnected from the carburetor, at which point the throttle went to full power – a design feature highly desirable for some aircraft, but of dubious value in ground-bound towing tractors.

An additional aspect of this occurrence indicates a need to review quality assurance and the standards of acceptance inspections; the tractor was brand new, having a total of only 14 hours running time.

All told, it turned out to be an expensive crunch – $16,000, a conservative estimate for repairs to the radome alone.

VOODOO, MIDAIR COLLISION A 4-plane section was working up for a formation display to be held in a few days. On their second practice of the day they crossed their IP on time but slightly fast, and power was reduced to a low setting to ensure proper "on-stage" time. The lead called the formation from box to line abreast about 2-3 miles out. During this change #2 collided with lead. The damage was minor and all aircraft landed separately without further incident.



This marked the seventh midair since 1969. Invariably the causes have been very basic – in this instance, failure to establish wingtip clearance. Fortunately, it was an inexpensive refresher lesson this time.

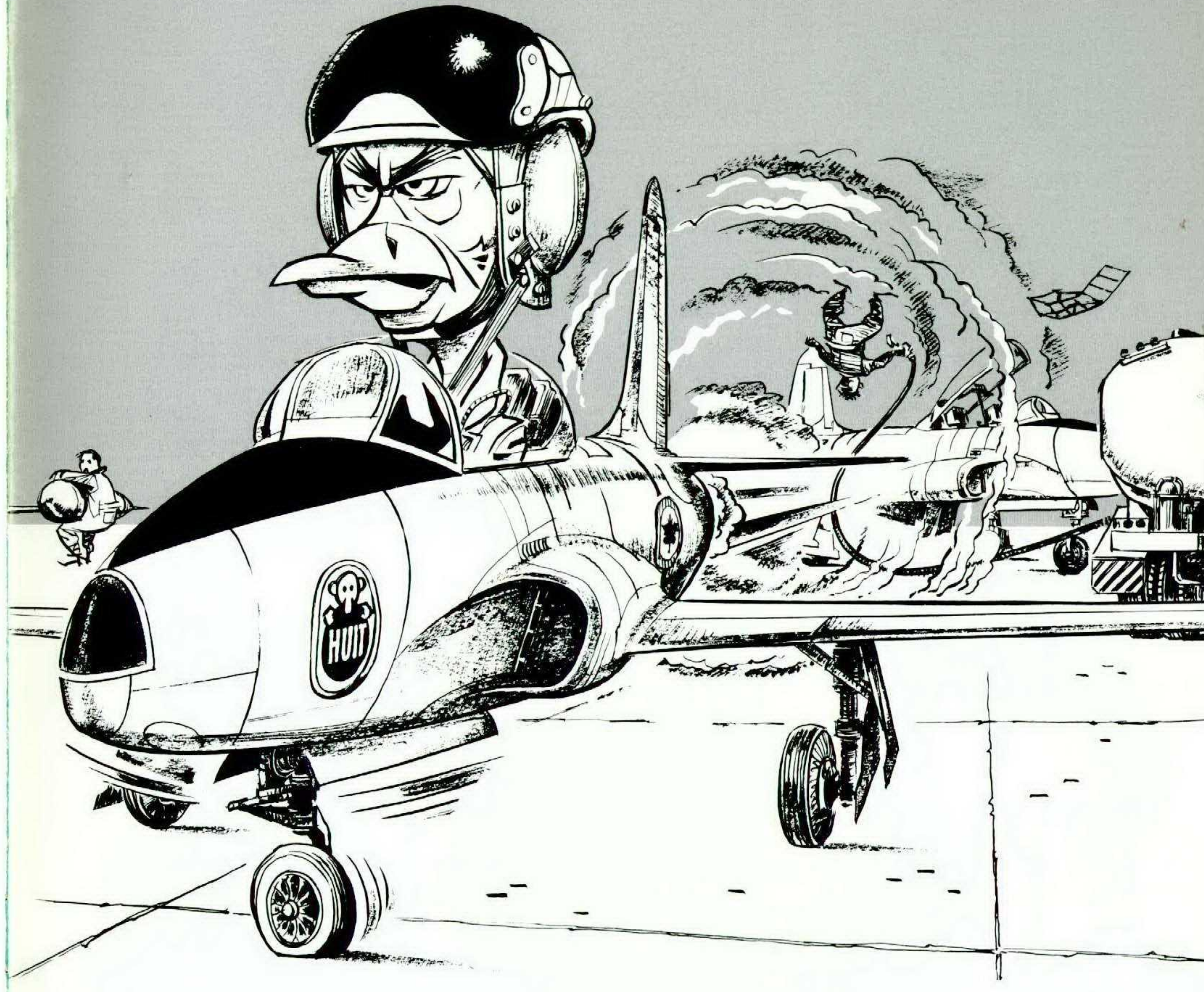
VOODOO, PITCHUP The mission was a Voodoo transition mission; the manoeuvre was a simulated, co-altitude break. As is the normal practice, the instructor counted down to a simulated "fire signal" expecting the student to then unload the "g" slightly, roll to approximately 90° of bank, then smoothly increase the "g" loading to the "limiter" boundary. However, the student entered the manoeuvre roughly. This disengaged the "limiter" so that when he increased the "g" loading he pulled right into pitchup. Recovery procedures were initiated and worked as advertised.

This manoeuvre is not simple; the pilot has very little "g" to work with at normal speeds and must therefore utilize what "g" he has to the maximum. If there is a moral to this story, it is this: Don't "rough handle" the Voodoo – make your control inputs smooth and deliberate *and watch that PBI* (Pitch Boundary Indicator). Engineers are now attempting to modify the "limiter" system to improve the protection given during similar manoeuvres.

CF100, OFF THE RUNWAY At one and a half miles on final everything appeared normal as the crew completed the pre-landing check, but when the aircraft crossed the threshold it was high and hot (10K fast). The pilot selected speed brakes and the aircraft touched down near the 5000-foot-remaining marker. At the 4000-foot marker, the pilot began moderate braking which resulted in a very slow turn to the left, but little deceleration. Subsequent heavy braking and nosewheel steering did not salvage the situation and the aircraft ran off the side of the runway just before reaching the end. It made its way across some 50 yards of sod and came to rest with the nosewheel lodged in a depression.

There was only minor damage to the aircraft, but this incident serves as a reminder to all of us that we can't afford to be complacent about even the most routine landings. Routine endeavours sometimes have a way of becoming very exciting before they are completed.

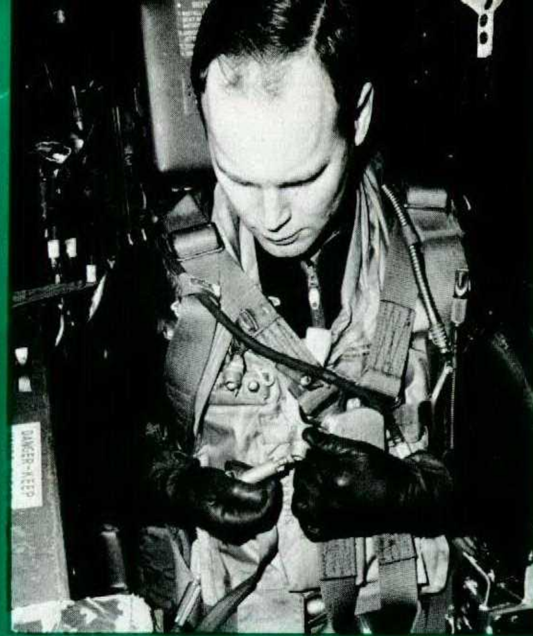
BIRD WATCHERS' CORNER



BLUNDER-HEADED THROTTLE BASHER

Years of experience have produced a wariness of the unpredictable behaviour which makes this flying oddity the terror of the nesting ground. Regard the characteristic commotion (oblivious to him) in the wake of the Basher's departure from the nest: chocks, APUs, groundcrew and so on, all airborne at the same time. Some birdwatchers attribute this behaviour to an irresistible aversion to confined spaces, an apparent bird-drome phobia. Others view it more simply as a manifestation of an inherited awkwardness while ground manoeuvring. One thing is certain. For getting a Bossbird's maximum attention, it's hard to beat the sound of a Basher loose on the drome. If you listen carefully, you may hear the call above the chaos:

I'M-OFF-AT-LAST TO-HECK-WITH-THE-BLAST



Maritime Lanyard Routing

A. When Life Jacket is Worn:

(1) Outside Right Thigh
(2) Over Right Parachute Thigh Strap
(3) To Life Jacket Lanyard which has been routed under Right Parachute Shoulder Strap
(4) Under All Seat Straps

B. When Life Jacket is Not Worn:

(1) Outside Right Thigh
(2) Over Right Parachute Thigh Strap
(3) To Fastener on Right Parachute Shoulder Strap
(4) Under All Seat Straps

Note: Care must be taken to ensure that the lanyard is NEVER routed through the parachute crotch strap.