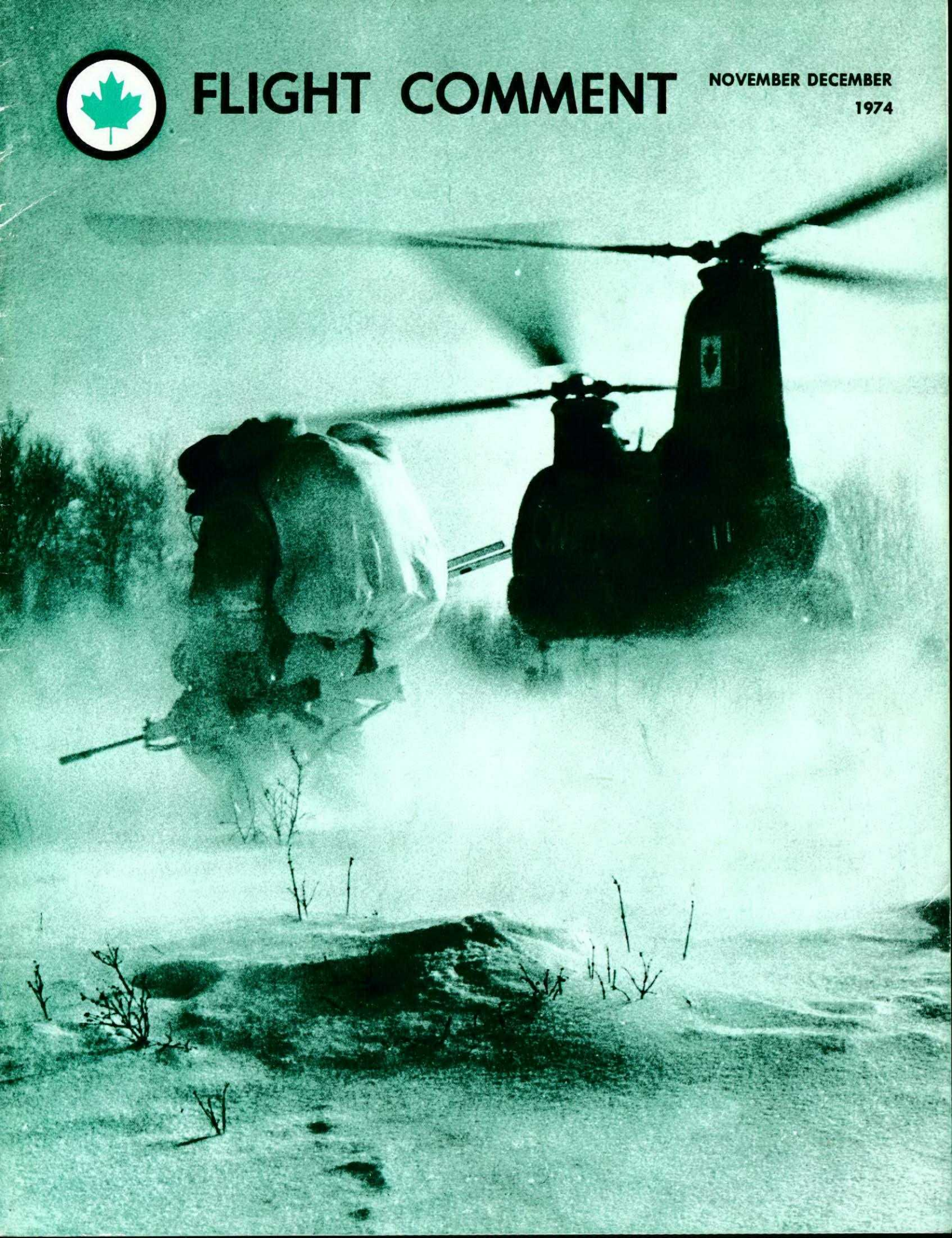
FLIGHT COMMENT

NOVEMBER DECEMBER
1974



Comments

Here's a case of oxygen system contamination – with a difference. While a Hercules was cruising in level flight a check of the pilot's oxygen equipment revealed yellow glue on the mask and hose. The mask could not be used because of the nauseous odor and a change of masks did not solve the problem. The lower portion of the oxygen hose had soaked up a considerable amount of glue which had eventually penetrated the hose. Where did the glue come from? Seems the rubber pads on the rudder pedals were being reglued and the glue was accidentally spilled. The oxygen hose was missed in the clean-up.

Were you anxiously waiting to get knotted on Dec 1, 1974. If so, our profoundest apologies (see Sep-Oct *Flight Comment* pg 15). Our friends at D Met Oc tell us that the programme is delayed. But it *will* happen when all the necessary publications and Notams have been printed.

Front Cover. We've had the occasional helicopter on the front cover this year but it was only fitting that this historic winter scene should grace the Nov-Dec issue. The aircraft is a CH113A Voyageur of 450 Sqn Det, Namao, operating in Wainwright, Alberta during Exercise Waincon, Feb 1969. The bundled up, camouflaged figures are stalwart members of the PPCLI.

The Voyageurs are retiring from service with MobCom and are being replaced by the CH147 Chinook. During their career the Vertols were employed in many roles and became a familiar sight across the country. Long before the Hueys and Kiowas arrived the Vertols were operating in Alaska, Norway and the Arctic islands. The Chinook will replace the CH113A but there are still hundreds of aircrew and maintenance personnel who will remember the days of the old Voyageur with affection.

NATIONAL DEFENCE HEADQUARTERS
DIRECTORATE OF FLIGHT SAFETY

COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

MAJ F.K. LAWLOR
Education and analysis

LCOL F. G. VILLENEUVE
Investigation and prevention

Editor Maj. F. K. Lawlor
Art and Layout J. A. Dubord
DDDS3, Graphic Arts

Flight Comment is produced by the NDHQ Directorate of Flight Safety. The contents do not necessarily reflect official policy and unless otherwise stated should not be construed as regulations, orders or directives. Contributions, comments and criticism are welcome; the promotion of flight safety is best served by disseminating ideas and on-the-job experience. Send submissions to: Editor, Flight Comment, NDHQ/DFS, Ottawa, Ontario, K1A 0K2. Telephone: Area Code (613) 995-7037. Subscription orders should be directed to Information Canada, Ottawa, Ontario, K1A 0S9. Annual subscription rate is $1.50 for Canada and $2.50 for other countries. Remittance should be made payable to the Receiver General of Canada.

HIGNELL PRINTING LIMITED, WINNIPEG
02GX12486-2080

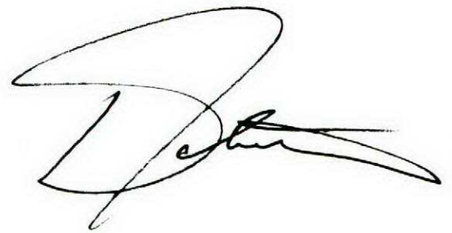
WHY MAKE THINGS DIFFICULT

It's a fact that more often than not it takes a lot more effort to take a negative stand and stick with it than to say yes and get on with the job. Nowhere is this more obvious than in the application of preventive measures in the flight safety business.

It is amazing how often people will resist instituting change because it appears to infringe on someone's freedom of action or because it doesn't solve the whole problem. Neither of these very human tendencies is easy to counter but that doesn't mean that we should just sit back and do nothing – or continue to waste effort in justifying our inaction. It is absolutely essential that we do what we can ***right now*** to improve each situation as it develops, even though such measures may not eliminate the total hazard.

It must be recognized that most of our progress in aircraft accident prevention during the past 15 to 20 years has resulted from the institution of relatively minor corrective measures. We must also accept the fact that this will probably be true in the future since seldom if ever is it possible to eliminate large and complex problems in a short period of time – with or without compromise.

Let's face it, there is no such thing as absolute perfection but if everyone does what he can without rationalization we will get a lot closer to it; at the very least we will not back-slide. The job will be a lot easier if everyone accepts his share of this responsibility. Making minor improvements may reduce the bigger, more complex problems to a point where they can be controlled or even eliminated.



COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

AMDU

aircraft maintenance development unit

Capt B.J. Meindl
AMDU CFB Trenton

The activities of the AMDU make it an instruction and exhibition centre for the Canadian Forces. Every year the Unit hosts several hundred working visitors and students from NDHQ, CHQs and bases. In a typical year 500 separate projects will be completed and every Canadian Forces Base will have been served in some way by the activities of the Aircraft Maintenance Development Unit.

During 1974 the Aircraft Maintenance Development Unit was deeply involved with Industry, Government Agencies and Armed Forces in Canada, the United States, the United Kingdom and Europe as the Unit pursued improved ways and means of maintaining Canadian Forces aircraft and associated equipment. New industrial products, techniques and procedures, materials and ideas were evaluated and, when considered beneficial; recommended for application in the Canadian Forces. One particular team of three men spent most of 1974 analyzing the maintenance required on the Boeing Chinook Helicopter. The team was responsible for ensuring that this new helicopter entered into service smoothly, with as few maintenance problems as possible. Other AMDU personnel undertook similar work in connection with the acquisition of the new long-range patrol aircraft (LRPA) to replace the Argus.

Many other teams and individuals fanned out across the country in 1974 doing a multitude of tasks to help maintain the operational readiness of the Canadian Forces while attempting to improve both the safety and the economy of those operations. More than 25 different bases were assisted in some way by AMDU personnel during 1974. Aircraft were inspected or repaired; aircraft navigational aids were installed; non-destructive testing centres were expanded; communications systems were improved; positive tool control around aircraft was accomplished; management information systems were introduced; aircraft maintenance programs were rationalized; equipment of all sorts was designed and manufactured; instruction was provided on a myriad of subjects and finally engineering orders were drafted and engineering drawings produced.

The AMDU's new motto, "Progress Through Development", flatly rejects any notion of sameness or maintenance of the status quo. AMDU's forerunner, 6 Repair Depot, would have been a very mature 34 years had the planners of 1967 not recognized the need for a development unit to ensure that the very important and expensive business of maintaining Canadian Forces aircraft kept pace with changing technology and management practices.

Industry has long recognized that it is research and development which sustains progress and produces beneficial growth and the Director General of Aerospace Engineering and Maintenance, at NDHQ Ottawa, holds the AMDU responsible for development work on aircraft, aircraft support equipment, electronic components and their maintenance requirements so that reliability, economy and safety will be achieved in the operation of all CF aircraft.

To fulfill these responsibilities the Unit has a staff of approximately 500 military, public service and civilian industry personnel. There are two main departments at AMDU: an Engineering Division and a Services and Support Division. The Engineering Division carries out the bulk of the development work and is comprised of five branches, each with its own unique function but all interrelated. The Services and Support organization has development projects of its own, but must also provide support and assistance to all the other elements at AMDU. AMDU branches are treated separately in this review for ease of description; however, in practice they are all closely interrelated, with several branches providing the expertise and resources usually required to see a task through to completion.

AIRCRAFT PROJECTS

The Aircraft Projects Branch is concerned with the mechanical aspects of CF aircraft. Aircraft structures and engines including hydraulic systems and armament are the responsibility of this particular branch. Improvements to existing equipment are investigated and new products ranging from tools to complete aircraft are evaluated. The Aircraft Projects Branch is presently introducing a comprehensive tool control system at all air bases and is also providing a team of personnel to ensure that our new Chinook helicopter enters service with as few problems as possible. During 1973 this branch was involved in the investigation of unserviceable sonobuoy ejectors for the Argus anti-submarine aircraft. During the ejection process some sonobuoys were sticking in the ejection tubes causing operational and flight safety problems. In order to gain data, hundreds of live firings were carried out, monitored by motion picture cameras and electronic test equipment: analysis of the resulting information showed the need for both mechanical and electrical changes to the system. These changes were designed, prototyped and tested by AMDU. The modifications overcame the problem and upgraded the reliability of the release system.

Another project is the prototype fitment of registering accelerometers into the structure of the Musketeer aircraft. The purpose of the meters is to record the amount of "g" applied to the aircraft during flying manoeuvres to determine any degree of overstress.

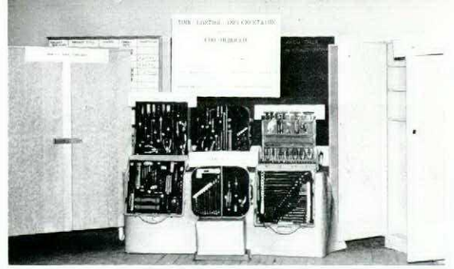
During 1973 the Aircraft Projects Branch was tasked with the conversion of a CF5 engine test cell for Venezuela, when that country decided to purchase 20 CF5 aircraft from Canada. The cell, consisting of three portable trailers, provides the basic equipment for testing any jet engine in the CF5 engine size range. However, in order to run the CF5 engine, numerous modifications had to be incorporated. From July 1973 more than thirty skilled technicians of all trades and from all areas of AMDU devoted 3700 manhours to the conversion. Attention is now being directed to CF engine test cells for the CF5 and Tutor aircraft.

ELECTRONIC PROJECTS BRANCH

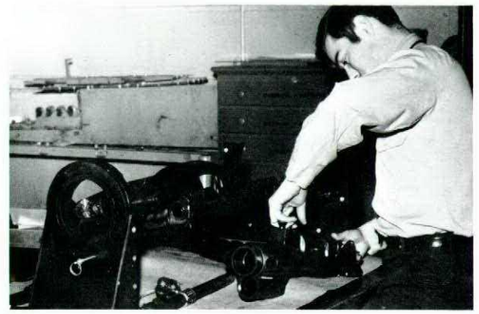
The Electronic Projects Branch works on the avionics (aviation electronics) portions of aircraft and their ground control installations. One task of the branch is the study of advances in electronics affecting avionics maintenance to ensure that Canadian Forces maintenance skills and equipment keep pace with rapidly changing technology: this includes study of such things as integrated circuitry and computerization. This branch was involved in the investigation, analysis and subsequent rectification of the Argus sonobuoy release system. As mentioned, the system has both mechanical and electrical parts necessitating close work between this branch and the Aircraft Projects Branch.

An interesting upcoming project for the electronics group will be the design and manufacture of navigation trainers for ground instruction on the Hercules transport aircraft. The system will be constructed so that the student navigator and his instructor will be able to sit at a virtual replica of the aircraft's navigation table and use the functioning trainer almost as if they were on board the actual aircraft.

Another electronic project is the design, prototype fitment and full scale manufacture of a new identification system for several CF aircraft including the CF104 Starfighter. The system allows ground radar stations to receive identification information from the aircraft automatically, resulting in better control and a safer operation. The project has involved electrical engineers, draftsmen, machinists, metal workers, and has demanded much expertise from AMDU personnel.



TOOL CONTROL VITAL. "Everything in its place and a place for everything" is the aim of the CF Tool Control Program. AMDU's Aircraft Projects Branch is responsible for assisting all aircraft units to convert to tool control programs.



MACHINE GUN STRIPPING. Pte J Dennie, a member of the Armament Projects Section strips the 50 calibre machine gun used on the CF5 tactical support aircraft.

ELECTRONIC BOXES MASS PRODUCED. Once conceived and designed, an electronic box goes into assembly line production at the Electronics Projects Branch. Mr P Fry, a member of the Quality Assurance Division, inspects a component of the assembly.

CONTROL TOWERS TESTED. The Electronic Projects Branch is responsible for solving the maintenance problems of all CF air base control towers. Sgt W Smith sits at a reconstructed mock-up of a working tower used for testing various components.

MAINTENANCE SYSTEMS DEVELOPMENT BRANCH

The Maintenance Systems Development Branch of AMDU is sometimes called the "papermill" because pen, paper and ideas are its essential tools. A long term continuing project for this branch is the "Rationalization" of aircraft maintenance schedules. Rationalization is best described as a review of an aircraft's past performance taking into account such information as: which parts failed, how frequently the failures occurred, what caused the problem, and when the failure happened. By logically analysing this information the branch produces inspections and maintenance schedules geared to the needs of the aircraft while ensuring that optimum use is made of the technicians' maintenance efforts. The data to be analyzed is collected from the technicians who fix the aircraft at all CF bases. The reporting system is called AMMIS, short for Aircraft Maintenance Management Information System.

A new AMMIS report form has recently been introduced and another task of the Systems branch has been to teach personnel at the various levels how to use the new forms since the development of effective inspection schedules depends, of course, upon the accuracy of the information received.

The handsome dividends resulting from this branch's work are evident from a study of the Buffalo Search and Rescue aircraft. Approximately 65,000 dollars were expended to produce the study; however, the annual reduction in scheduled inspection manhours will produce a net savings of more than 80,000 dollars for the first year alone.

AIRCRAFT SAMPLING AND PRODUCTION

A fourth branch of the Engineering Division is Aircraft Sampling and Production. In order to determine the structural integrity of its aircraft the CF recognized that to completely dismantle all the aeroplanes would be very costly; therefore, to avoid this expense and still provide a high level of reliability the AMDU Sampling Branch inspects, by complete dismantling, a small representative sample of different types of aircraft. The aeroplanes chosen for this inspection are those with the greatest number of operating hours and those which have been put through the most rigorous manoeuvres. If these aircraft are found to be sound it is judged that the remainder are also in good condition. However, if problems are evident during the sampling inspection a depot level inspection repair (DLIR) program is created and the necessary maintenance is completed on the whole fleet. These depot level inspections are done either at the AMDU – as in the case of the CF100 – or by civilian contractors as is the case with the CF101 Voodoo.

The Sampling and Production Branch evaluates newly introduced maintenance materials and processes and takes on many other projects which are beyond the capability of the bases.

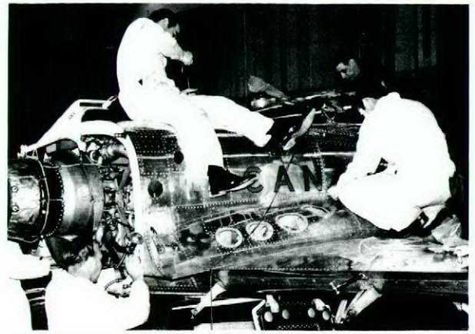
NON-DESTRUCTIVE TESTING CENTRE

This Branch is devoted to the development of techniques which will allow a greater depth of inspection than just visual. The centre uses x-rays, magnetics, and ultrasonics in developing methods of inspecting internal aircraft parts thereby reducing the requirement to dismantle the aircraft. A project of this nature, recently completed, was the x-ray inspection of the CF5 main wings. The condition of the internal parts of the wing was determined without removing the outer skin – thus producing considerable savings in time and money.

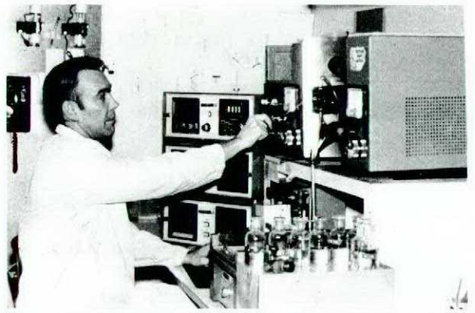
The Non-Destructive Testing Branch is also the centre for Spectrometric Oil Analysis which is a method of measuring the metal content of oil samples taken from aircraft engines. By plotting the increase in metal content the wear and tear on an engine can be monitored. An engine wearing excessively will show a significant increase in the metal content of its oil.

Another responsibility of the Non-Destructive Testing Centre is the training of all CF personnel involved in this specialty. The Centre provides courses for technicians and supervisors which ensure that suitable standards are maintained and that maximum use is made of this extremely important technology throughout the CF.

A YEAR-LONG PROJECT. Sgt George Shadwell and Cpl Leonard Smith of the Electronics Projects Branch recently completed a year-long project on defining the maintenance needs for the CF's new microminiature TACAN.

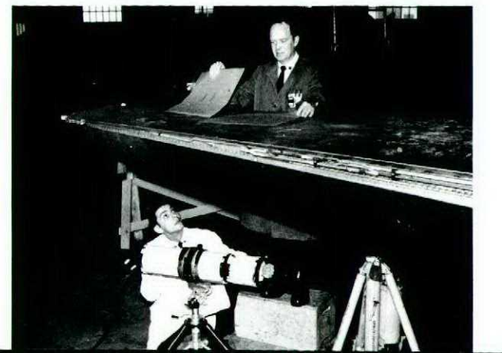


AIRCRAFT DISMANTLED. Complete dismantling of a Tutor aircraft for inspection by the Sampling and Production Branch is a common occurrence at AMDU.



OIL ANALYZED BY SPECTROMETER. MCpl AR Dalgleish of the Non-destructive testing centre. The Spectrometric Oil Analysis Program (SOAP) measures the metallic content of aircraft engines oil.

AIRCRAFT X-RAYED. The condition of the inside of this CF5 wing will be determined by Sgt J Bigney and Cpl A Cappuccilli using a portable x-ray machine.



SUPPORT AND SERVICES

The Services and Support Division has four Branches, some of which exist primarily to provide assistance to the Engineering Division while others undertake important development and research of their own.

TECHNICAL SUPPORT

Technical Support Services is staffed with technical writers, graphic artists and draftsmen – all important elements in any development undertaking. This branch also maintains a complete technical library including a new microfilm data retrieval system. This recent acquisition allows quick and easy access to technical information. This branch is responsible for maintaining control and liaison with Field Aviation of Canada, the contractor engaged in storage, preservation and depreservation of reserve aircraft held by AMDU.

PROJECT SUPPORT

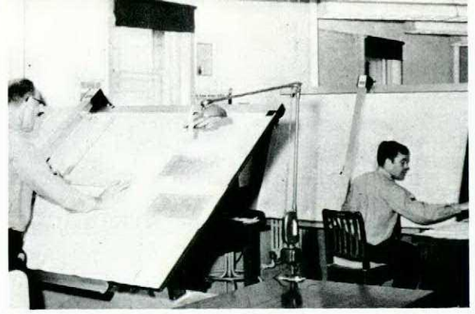
In order to maintain control of and provide information on the 300 to 350 projects that are active at AMDU at any one time, a Project Support Branch daily updates the progress of each task. This allows management to determine project completion dates and to ensure that effective use is made of AMDU resources.

CALIBRATION CENTRE

The third branch in this Division is housed in the newest AMDU building. To ensure that electronic testing gear such as oscilloscopes and voltage meters are accurate they must be tested and calibrated at regular intervals. The Cal. Centre is equipped to handle over 4000 items per year sent in from military and government establishments in the Central Ontario region.

WORKSHOPS BRANCH

The remaining branch within the Support Division has been referred to as the heart of AMDU. Without the expertise of the tradesmen of the Workshops Branch the Engineering Division could not function. The Workshops Branch provides the metal workers, machinists, welders, carpenters and refinishers as well as the advanced tooling needed to manufacture equipment and parts in the various AMDU branches. From precision machine work to rough carpentry the personnel in the workshops are the link between a new idea and its practical result. Although included in the Support Division, the Workshops Branch is also involved in the engineering research and development function, solving the problem of our complex aircraft by designing new and better mechanical components and repair schemes.



BACK TO THE DRAWING BOARD. Mr. AE Martin and Cpl FN Ring in the draughting section where highly technical drawing services are provided.

OSCILLOSCOPE PERFORMANCE IS MONITORED. MCpl A Cawston of the Calibration Centre monitoring the performance of a Cathode Ray Oscilloscope. The Cal Centre proves the performance of over 4,000 items yearly for the Canadian Forces and other government agencies.

METALWORK SHOP. A group of metal worker trainees on a visit from CFB Borden watch as Cpl J Romanko of the metal shop demonstrates the Wales Strippet Machine.

PRODUCTION OF PROTOTYPES. Cpl P Jobin of the metal shop checks the fitment of identification equipment in the holding rack from a high performance aircraft. Pte J Martin also of the metal shop checks the sliding fitment of rails.

GOOD SHOW

COL R.L. MORTIMER, MAJ J. SIMPSON AND MCPL J. TOMLINSON

Col Mortimer, Maj Simpson and MCpl Tomlinson were the crew of a Buffalo searching for a missing civilian aircraft. While searching down a mountain valley, the Buffalo's landing gear was lowered to increase the rate of descent. When the landing gear was raised at the lower end of the valley, one of the spotters reported that the left main gear doors had closed out of sequence and that the left main wheels were hard against the outside of the gear doors. The crew therefore elected to return to base with the gear down. However, when the gear was selected down the left main showed unsafe. Another visual inspection showed that the mid-fairing door was jammed against the scissors strut and this prevented the gear from fully extending and locking into position.

The AOIs do not cover a situation where the gear is down but not locked and specify a wheels-up landing when one main gear fails to extend. Numerous attempts were made to lock the gear down through partial cycling at maximum permissible speed and by using positive "g" – but proved unsuccessful. After six circuits of bouncing the aircraft down the runway on the left main gear at higher than normal flapless landing speeds while the flight engineer called the wheel height above the runway, the gear finally locked into position and a normal landing followed.

Col Mortimer, Maj Simpson and MCpl Tomlinson displayed a thorough knowledge of the Buffalo's systems and averted a possibly serious aircraft accident.

CAPT M.T. KRALL

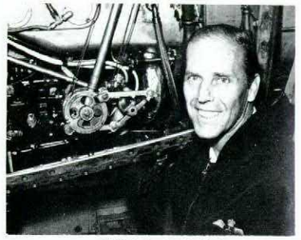
Capt Krall was the captain of a T33 en route from Ottawa to Winnipeg at flight level 390. One hundred miles west of Thunder Bay, engine vibrations, radio static and an inoperative TACAN were soon followed by a generator warning light and zero loadmeter reading.

Capt Krall immediately advised ATC of his situation and diverted to Thunder Bay. He elected to remain at altitude because of the low fuel situation he would face if the battery failed and the uncertainty of engine operation due to vibrations. Capt Krall started descent after he was certain he would reach the high key position, lowered the gear and flew a 360° flameout pattern. He attempted to put down flaps at low key but the battery had failed. Although the vibrations were still present the engine responded when the throttle was advanced. Capt Krall continued with a flapless approach and successfully landed the aircraft.

LCol R.L. Mortimer, Maj J. Simpson and MCpl J. Tomlinson

Capt M.T. Krall

Capt K.R. Pennie and Lt G.F. Lucas



WO J.A. Laliberte

The immediate response and good judgement displayed by Capt Krall in dealing with a serious aircraft malfunction bear witness to his high degree of professionalism.

CAPT K.R. PENNIE AND LT G.F. LUCAS

Capt Pennie and Lt Lucas were on a Sea King Medevac flight when they encountered an inflight emergency minutes after departing Grand Manan Island for St John, N.B. The Main Gear Box (MGB) chip detector warning light illuminated. The crew prepared for an immediate landing should further MGB break-up indications occur and, during a short hover session, the two pilots assessed the emergency indications.

Since the patient was in a very critical condition, the flight track was directed to the nearest mainland and then followed a main highway at low level into St John. The aircraft arrived safely one and one half hours after the initial chip detector warning.

Capt Pennie and Lt Lucas, faced with a crucial emergency, carried on with their mission to deliver the critically ill patient to his much needed medical attention at St John. The professional analysis and decision made by both pilots exemplify their knowledge of the aircraft and its complex systems. This contributed to saving the patient's life.

MCPL S.E. WRIGHT AND WO J.A. LALIBERTE

During a routine inspection on a C130 engine co-ordinator control link assembly, MCpl Wright discovered an abnormal amount of movement on the lower throttle and condition control pulleys. He reported this irregularity to WO Laliberte who investigated further. No control problems had been noticed in flight; however, WO Laliberte manipulated the co-ordinator lower pulley while MCpl Wright watched the quadrant movement. This revealed that a bolt on the control link assembly was worn down to one third of the original shank diameter. Since failure of this bolt would result in a complete loss of propeller control, a special inspection was initiated for all C130 engines.

MCpl Wright and WO Laliberte are commended for their initiative and attention to detail.

SGT J.A. BELLIVEAU

While conducting a preflight check on an Argus, Sgt Belliveau, a student flight engineer, noticed an abnormal situation in the brake unit on the port rear wheel assembly of the port bogie. Upon closer examination with a flashlight he discovered one brake puck hanging approximately 1/4 inch lower than normal and an adjacent puck extending approximately 1/2 inch. After removal of the port rear wheel assembly, pieces of the stator unit and puck assembly fell away from their mountings.

Sgt Belliveau's alertness and initiative prevented a possible wheel seizure during a critical stage of takeoff.

MCPL P.K. CAMPBELL, CPL G.H. BOYCE AND CPL R.M. GILLIES

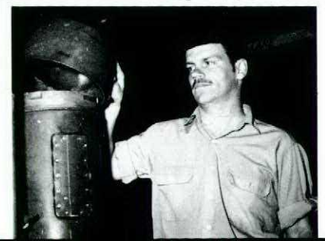
Cpls Campbell, Boyce and Gillies were assigned the task of installing reconditioned elevators on a T33 aircraft. They had completed the installation procedure as outlined in the CFTO when they discovered that the left elevator spring tab was not functioning properly. Not fully satisfied with the operation of the spring tab, they decided to remove the elevator and inspect the assembly. They discovered that the spring tab had been improperly assembled at the repair facility. UCR action was then initiated to ensure that proper follow up measures were being carried out by the contractor.

Cpls Campbell, Boyce and Gillies are commended for their diligence and extra effort which brought this hazardous situation to light.

Sgt J.A. Belliveau

MCpl N.P. Hudson and Pte K.D. Lillies

MCpl P.K. Campbell, Cpl G.H. Boyce and Cpl R.M. Gillies



Cpl E.J. Carr

MCPL N.P. HUDSON AND PTE K.D. LILLIES

MCpl Hudson, an air traffic controller, and Pte Lillies, a radar technician, were on duty at North Bay when the pilot of a single engine aircraft who had encountered heavy thunderstorms requested assistance to land. He had already attempted to land at Sudbury but poor weather conditions forced him to divert to North Bay.

Current weather at the time of the request was ceiling zero, obscured condition, visibility zero, heavy thunderstorms, rain and winds gusting 30 to 50 mph. Tower gave the weather and advised the pilot of a clear area to the north. The pilot turned north, hoping to land at a private airfield which was in the clear area but failed due to the weather conditions. He consequently became very frightened and disoriented.

With MOT radar off the air due to a power failure and the primary military radar (CPN4) still undergoing flight checks, only Quad Radar was available. However, the precipitation in the area made it virtually impossible to locate the aircraft using this equipment. MCpl Hudson therefore directed the radar technician, Pte Lillies, to run up the CPN4 and using this more sophisticated radar, he identified the aircraft at a position 12 miles north of North Bay. As the CPN4 was not commissioned it could not be utilized for approach purposes. MCpl Hudson resolved this problem by having Pte Lillies call off the aircraft's position on the CPN4 whilst he worked at the Quad Radar console. In this manner he was able to identify the aircraft and give the pilot headings to keep him clear of thunderstorm cells. The pilot eventually made a successful Quad Radar approach to North Bay.

The co-operation between MCpl Hudson and Pte Lillies in co-ordinating from one radar unit to another in a time of stress is indicative of their high level of professionalism. Their actions undoubtedly saved both the pilot and aircraft from disaster.

CPL E.J. CARR

Cpl Carr, a safety systems technician, was on drag chute pick-up duty when he observed an object falling from a CF104 during takeoff. He immediately notified the tower ground controller and drove to the area. The object was recovered and identified as a part of the CF104 rocket launcher. The pilot was contacted and advised not to fire the rockets. Cpl Carr's quick action prevented a possible serious incident and he is commended for his alertness.

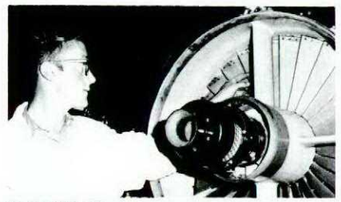
GOOD SHOW

Cpl B.J. Bearman

Cpl J.M. Lynk

Cpl D. Cockerill and Cpl G.V. Demchuck

Cpl R.M. Crouse



Cpl G.E. Gares

CPL J.M. LYNK

Cpl Lynk had just refuelled an Argus and was pulling away from the aircraft when he smelled fumes and noticed smoke coming from under the vehicle cab. Although the tender still contained 4000 gallons of Avgas and the power steering for the semi-trailer had failed, Cpl Lynk stayed with the vehicle and moved it well clear of the Argus.

Once at a safe distance, Cpl Lynk set the brake and make-safe switches and proceeded to take proper fire fighting actions. Post inspection of the vehicle showed that a broken power steering hydraulic line had allowed fluid to spill onto the hot exhaust manifold. Considering the difficulty which he encountered in manoeuvring a vehicle of this size without power steering, Cpl Lynk showed bravery, good judgement and excellent utilization of procedures in combatting this potentially disastrous situation.

CPL D. COCKERILL AND CPL G.V. DEMCHUCK

During night operations off the coast of Puerto Rico, a Sea King sheared off its starboard inner wheel on a hauldown landing on HMCS Saguenay and the aircraft remained resting on the outer wheel. Cpl Cockerill and Cpl Demchuck, knowing the dangers involved, installed jacks under the aircraft while the pilot held sufficient up collective to reduce the load on the damaged landing gear. Once the jacks were correctly placed, the two technicians chain-lashed the aircraft to the deck. They then initiated an extensive investigation to assess the extent of the damage. The aircraft could not be hangared and was therefore secured to the flight deck.

The work carried out by Cpl Cockerill and Cpl Demchuck under extremely hazardous conditions reflects great credit on the diligence and devotion to duty displayed by these two very capable technicians.

CPL G.E. GARES

Cpl Gares, an aero engine technician, was assigned the task of blanking off some open fluid lines on a J79 engine which would be sitting idle for some time. While blanking off these lines, Cpl Gares noticed that one of the first stage compressor blades appeared to be dented. With a strong light he then conducted a more detailed inspection which revealed one blade tip broken and three more dented. The engine was returned to the engine bay where further inspection revealed another 171 blades damaged. The engine was eventually returned to the repair and overhaul contractor.

Cpl Gares is commended for his alertness in spotting the damaged compressor blade. His subsequent follow up action started a chain of events that led to the discovery of a severely damaged engine.

CPL R.M. CROUSE

Cpl Crouse, an airframe technician, was removing a pylon lock cylinder on a Sea King when he noticed a white powdery deposit on the aluminum castings between the pylon lock cylinder shims. Further investigation determined that the powder was metallic salt caused by the corrosive action of salt water on the aluminum assembly.

The discovery of this problem prevented a gradual and insidious decline in the serviceability of an extremely intricate area on this aircraft and four other Sea Kings. Cpl Crouse's initiative and conscientious approach to his work reflect his keen sense of responsibility.

CPL B.J. BEARMAN

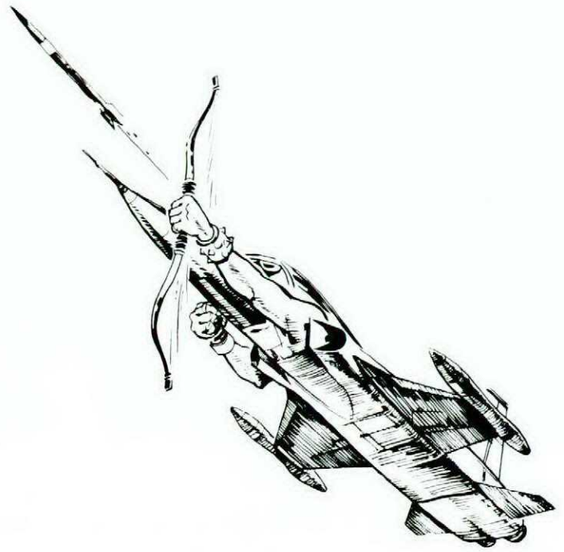
Cpl Bearman, an aero engine technician, started a Tutor and had just requested the pilot to cycle flaps and speed brakes when he noticed fluid leaking from the right main landing gear. He signalled the pilot to hold, investigated further and, as a result, discovered a brake hydraulic leak. He advised the pilot to shut down. On a later inspection, the leak was found to be quite substantial, resulting in a large pool of hydraulic fluid behind the right main tire.

Cpl Bearman is commended for his alertness and initiative especially under the prevailing adverse conditions (-22 degrees F, 15-20 mph wind, 1800 chill factor). Through his professional approach to a routine inspection he undoubtedly prevented a brake failure which could have resulted in an aircraft accident.

ASTROLOG

sagittarius

23 Nov to 21 Dec



Sagittarians are among the finest people to have on a flying unit – or any other unit for that matter. They combine a jovial manner and optimistic outlook on life with a positive, enthusiastic attitude towards the job on hand. And that job may well encompass the normal workload of two people since the Sagittarian has so much drive he may not be happy with just one task at a time.

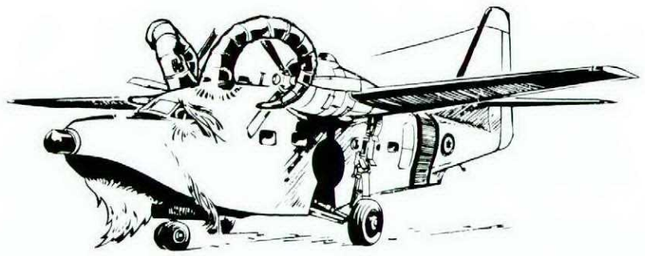
Sagittarius is the authentic archer, very frank and straightforward; his witty arrows are sharp enough to pierce the strongest armour. But you'll have trouble pinning this bowman down. A natural restlessness and love of travel make him almost intolerably elusive so don't try holding him to a schedule. Just when you have a special TD trip all planned he'll casually glide away somewhere else – leaving you strapped in – and solo. He's probably off following up some good cause – that just couldn't wait.

As a young pilot Sagittarius is a great risk taker and a lover of high speed machines. Many test pilots are born in December and they have little regard for safety at first. They tend to learn more from their own mistakes than from the experience of others. With increasing age the archer develops almost blind optimism but easily forgets the sins of his youth. He must beware against a moralizing attitude.

Sagittarians are scrupulously honest and noted for their curiosity about the whys and wherefores of any situation. And if you fly regularly with an archer be sure to take along two of everything – he's equally famous for losing things.

capricorn

22 Dec to 20 Jan



Most squadrons have at least one member who arrives first in the morning and leaves last at night – and it isn't always the CO! This fellow has a serious, responsible attitude towards life and will be one of the most reliable drivers in the group. If he seems cool and calculating and happy to conform to disciplined behaviour then you've probably found yourself a Capricorn.

The biggest mistake you can make is to think of him as a feeble, old goat. He may need security and a regular pay check but he's an ambitious type. Just as the wiry mountain goat plods steadily up the steep rocky path so the Capricorn methodically pursues promotion and success. He's determined to know everything about his aeroplane and if he happens to be an ICP or standards officer he'll expect you to perform: careless mistakes make him bellow. His head is full of figures and statistics so don't make any mistakes on your log card: he'll pick them up right away.

Capricorn drivers are happy to fly helicopters – especially in support of the land environment. Living in tents poses no problem as goats can bear considerable hardship if circumstances demand. Capricorns should take care however that they don't become too pessimistic and overly serious. They have a reputation for being the most prone to depression of all the signs.

Co-operation

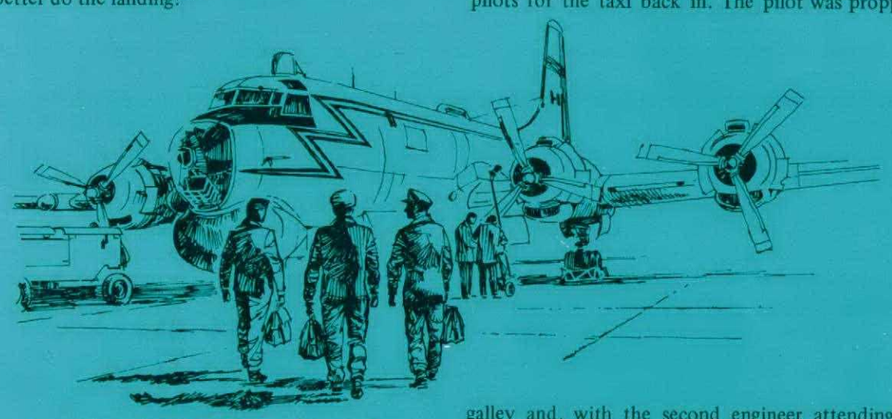
keep an eye on your crewmates

The following anymouse report was submitted by a flight safety conscious individual. If you have a story to tell which you feel may be of benefit to our readers then send it in. We guarantee anymousity.

We had returned to home base for further local pilot training after an IFR cross country. The "we" consisted of two pilots, two flight engineers and a four engined aircraft. The local weather was approx 1500 broken, with a strong, gusting crosswind, so it was fairly bumpy in the cumulus cloud as we started our first radar approach.

I flew the radar approach from the co-pilot's seat in accordance with PMA (Pilot Monitored Approach) procedures. This consists of the approach being flown from the right seat with the pilot taking control at minimums and landing the aircraft. Since this approach was a "low and go" I flew the approach and overshoot. "That one went so well", I thought, "I'll try the next on three engines". We simulated No 4 engine failure and continued with another radar square for a low approach and asymmetric overshoot. The weather had been bumpy, but not exceptionally rough.

At about 900′ on final approach the pilot said "We'll make this a full stop". Since he was the aircraft captain this didn't seem unnatural – at least not until approx 700′ when he qualified it with, "Cause I don't feel so good". He didn't look so hot either – quite pale – and I continued for a full stop, concerned but not worried. Then he really snapped me with, "You'd better do the landing! "



I immediately took down the blind flying hood and saw that he had slumped over against the side window. As I quickly tried to organize myself for a right seat landing, thoughts were butting each other out of the way. Right – no nose wheel steering – have to reverse with left hand – three engines – get that simulated engine going. "Engineer 2600 RPM and 70 torque on No 4" – there, that sure helps – crosswind's right on limits – too much happening – better overshoot and switch seats 'cause it's sure going to be hard to control on the ground with that crosswind and no nose wheel steering.

We were at 400 now and my cross check included the stiff windsock and the pilot who was still leaning against the side window and appeared to be barely hanging in. "I'm going to overshoot and we'll change seats" I told him. His response was "Just get it on the ground". Somewhere in the background I could hear radar talking but it seemed very remote. "I'll help with the nose wheel steering – if I can" he offered weakly. At the time I thought that would be a great help but it was nearly our downfall. He was slumped over again with eyes shut and had now turned a pale green-grey shade.

I got the beast on the ground in reasonable fashion and was controlling it with just about maximum rudder. I pulled the throttles back into reverse and the pilot came to life and attempted to help with the nose wheel steering. However, he was slumped over sideways looking out the side window and steered right where he was looking – at the radar shack! Differential reverse and a touch of premature outside brake counteracted the nose wheel and we got the aircraft stopped on the runway, although not on the centre line.

Now I allowed myself a few deep relaxed breaths that were quickly interrupted by the tower advising us to roll to the end and clear via the north taxi.

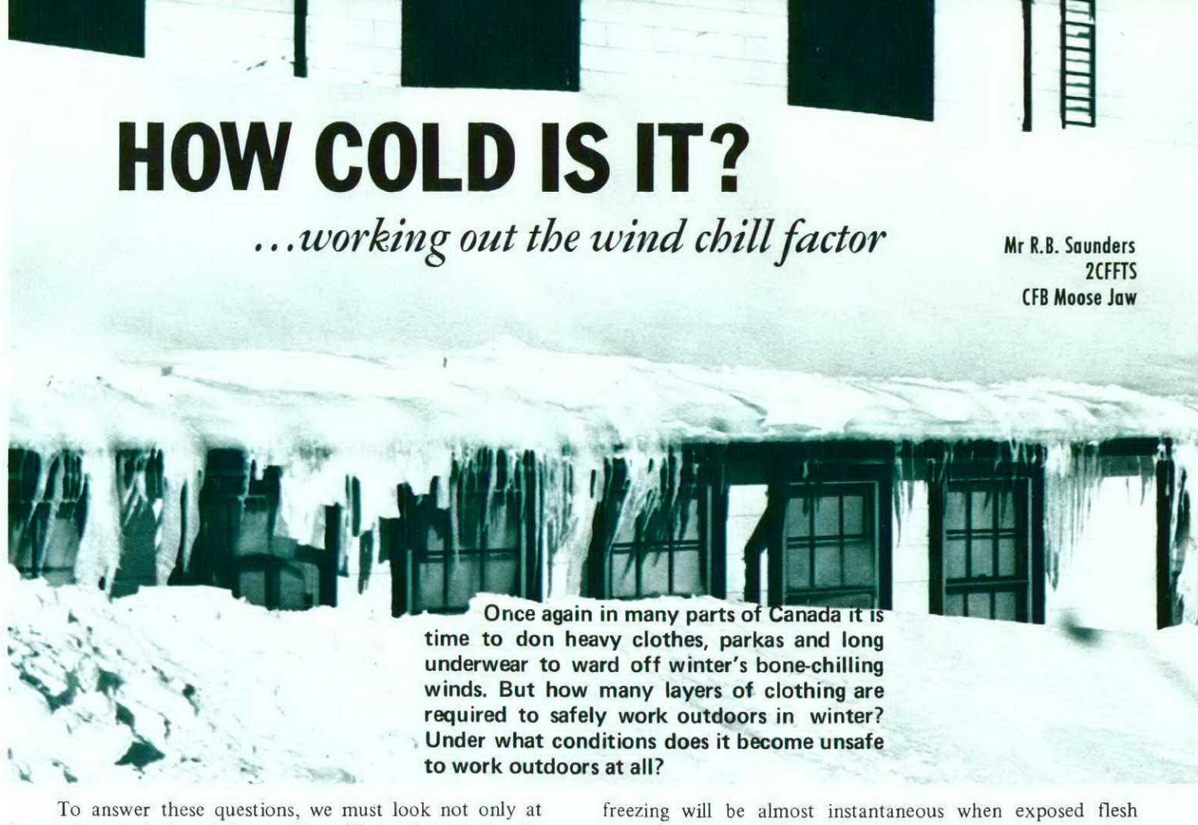
Then it dawned on me, "YOU DIDN'T TELL ANYBODY THAT YOU WERE HAVING PROBLEMS! " This was corrected as I explained our position to the tower and requested that an ambulance meet the aircraft at the hangar. I also advised tower that we'd be stopped while we switched pilots for the taxi back in. The pilot was propped up in the galley and, with the second engineer attending to him, we taxied back.

The ambulance met us on arrival and whisked the pilot away to the hospital. He spent the night there and his problem was assessed as a virus infection. In two or three days he was going full bore again.

Food poisoning? No! I took the remainder of his box lunch to the hospital: the analysis proved negative. He said that he'd been feeling a bit sick prior to eating his lunch but hadn't mentioned it.

When there's more than one crew member on an aircraft, I feel there is a degree of responsibility – to check on "the other guy" occasionally. I obviously didn't do this. SO KEEP YOUR EYE ON YOUR CREWMATES. And when something's not 100% right then tell somebody.

Speaking of telling somebody; as I think about it I'm not sure that I ever did tell tower that we were going to "FULL STOP" instead of "LOW & GO".



HOW COLD IS IT?

...working out the wind chill factor

Mr R.B. Saunders
2CFFTS
CFB Moose Jaw

Once again in many parts of Canada it is time to don heavy clothes, parkas and long underwear to ward off winter's bone-chilling winds. But how many layers of clothing are required to safely work outdoors in winter? Under what conditions does it become unsafe to work outdoors at all?

To answer these questions, we must look not only at temperature but also at the cooling effects of wind. As the wind speed increases the rate at which heat is removed from the body also increases. A number of formulae have been developed to calculate heat loss from the human body and the most common one, developed by Paul A. Siple, is reproduced on the following two pages in graph form.

This chart depicts cooling rates for various combinations of wind and temperature. To determine the heat loss, first determine the intersection of wind speed (mph on left, m/sec on right) and temperature (degrees C on top, degrees F on bottom). The rate of heat loss is found on the curved line; e.g., with a temperature of -11 degrees C and wind speed of 20 mph, the figure is 1400.

This figure reflects the rate of heat loss from normal human skin, exposed to the air, in the absence of sunlight, and is expressed in kilo-calories per square metre per hour ($Kcal/m^2/hr$). Under conditions of bright sunshine, the cooling rate is reduced by about 200 $Kcal/m^2/hr$. The formula, however, does not take into account conduction through contact with other objects, loss of heat by evaporation, respiratory cooling through the lungs, or radiative cooling. The figures obtained, therefore, are not absolute but give relative cooling rates at various wind speeds for exposed human skin.

It can be seen from the chart that a condition of low temperature and light wind may be no worse than a condition of higher temperature but stronger wind; e.g., the cooling rate for a temperature of -40 degrees C and a wind speed of 4 mph is the same as that for a temperature of -14 degrees C and a wind speed of 32 mph.

Note that at a value of 2000 $Kcal/m^2/hr$ (not uncommon on the Prairies), exposed areas of the face freeze within one minute; travel and life in temporary shelters become dangerous. Moreover, at very high wind-chill values, freezing will be almost instantaneous when exposed flesh comes in contact with:

a. bare metal;
b. liquids such as gasoline, JP4, etc;
c. propeller slipstreams.

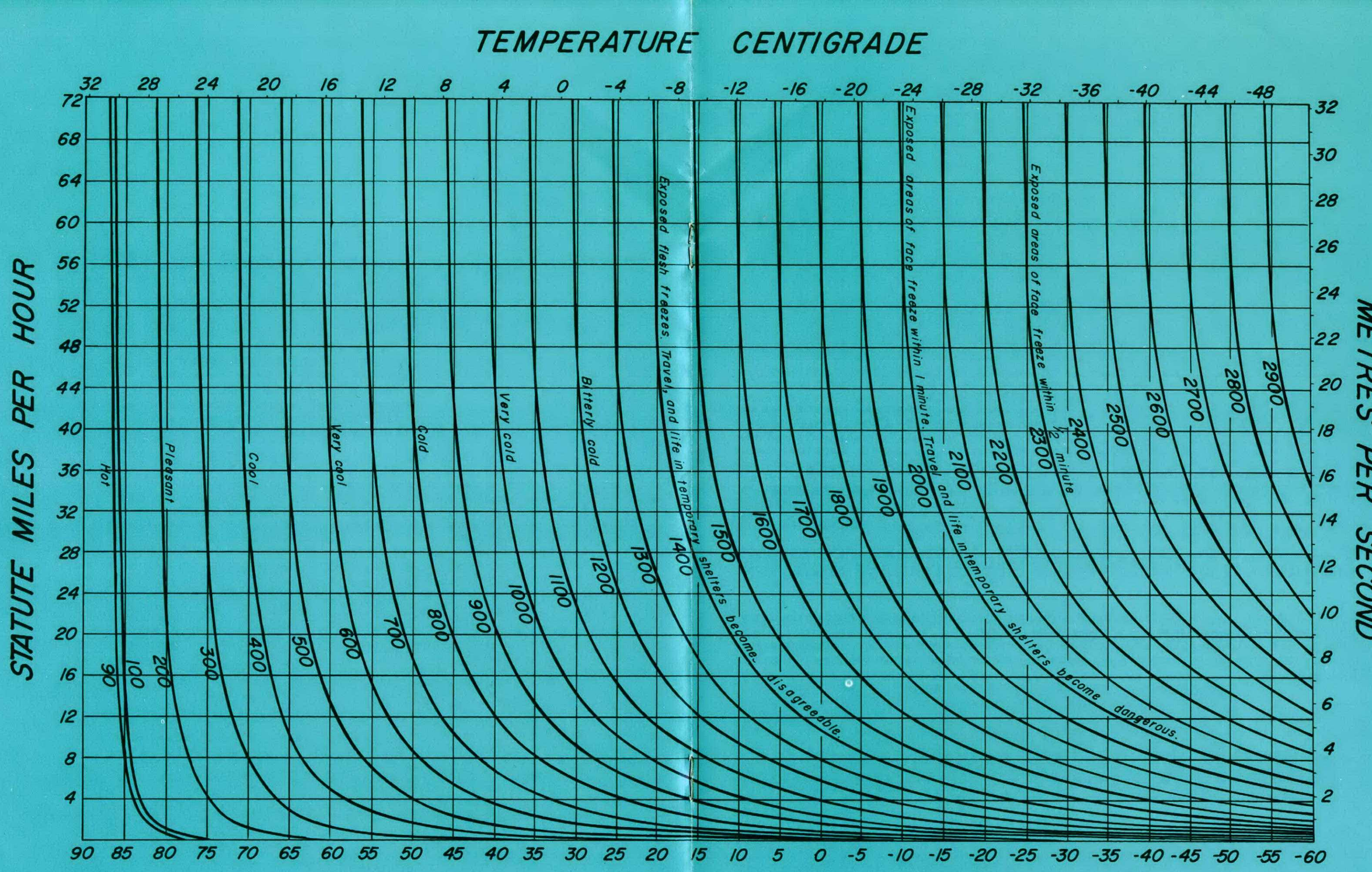
At this level, heavy clothing and adequate protection for face and hands are essential.

Sometimes wind-chill is also expressed as an equivalent cooling temperature. That is, the cooling effects of a specific temperature and wind-speed combination are expressed as the temperature that would produce the same cooling effects with a wind speed of 5 mph. For example: from the accompanying graph, a temperature of -4 degrees C and a wind speed of 25 mph produces a wind-chill factor of about 1200. The same wind-chill factor results with a wind speed of 5 mph if the temperature is -20 degrees C. In other words, with an air temperature of -4 degrees C and a wind speed of 25 mph, the equivalent cooling temperature is -20 degrees C. However, in the Canadian Forces, "wind-chill factor" is used much more frequently than "equivalent cooling temperature".

It only takes a little practice using wind-chill factors to find out just how cold a windy, freezing day can be.

About the Author

Mr Saunders is a graduate of the University of Victoria B.C. An 18 month tour in Esquimalt at the MARPAC weather office was followed by three years as a forecaster at Winnipeg. Mr Saunders has been the meteorology instructor at 2 FTS Moose Jaw since 1972.


TEMPERATURE CENTIGRADE
32 28 24 20 16 12 8 4 0 -4 -8 -12 -16 -20 -24 -28 -32 -36 -40 -44 -48
STATUTE MILES PER HOUR
72 68 64 60 56 52 48 44 40 36 32 28 24 20 16 12 8 4
METRES PER SECOND
32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2
Hot
Pleasant
Cool
Very cool
Cold
Very cold
Bitterly cold
Exposed flesh freezes. Travel, and life in temporary shelters becomes disagreeable.
Exposed areas of face freeze within 1 minute. Travel and life in temporary shelters become dangerous.
Exposed areas of face freeze within ½ minute
90 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900
90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60
TEMPERATURE FAHRENHEIT

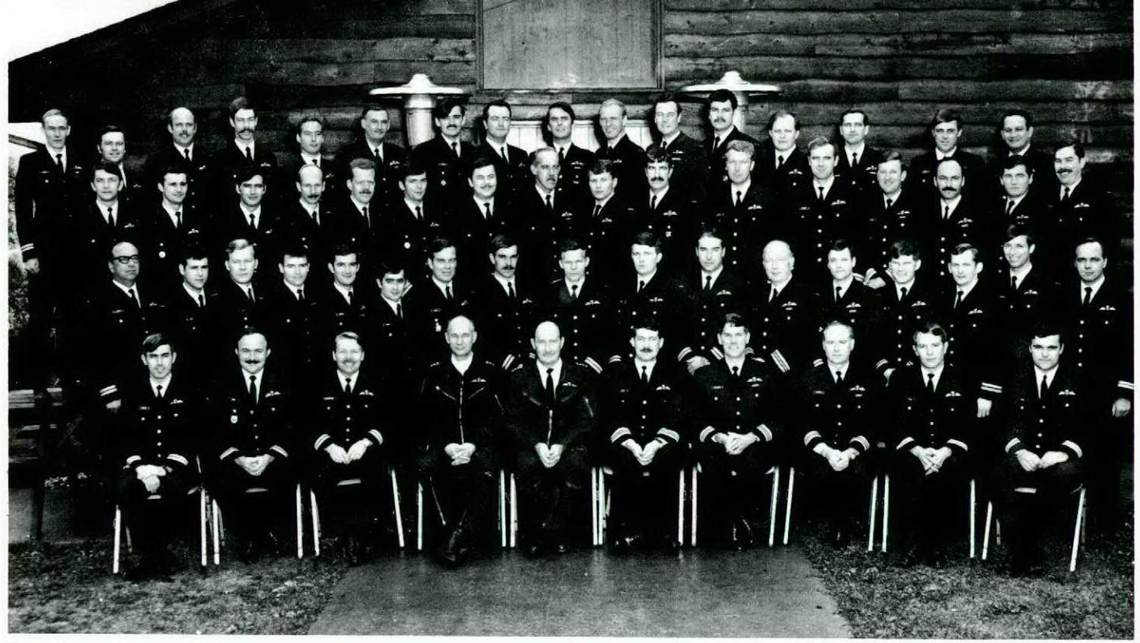
MGen H. McLachlan, CAO, addresses the newly appointed Squadron Commanders.

Front Row, Left to Right: LCol BA Merklinger, 413 Sqn; LCol FG Villeneuve, DFS; Col RD Schultz, DFS; LCol DA Davidson, CFB Ottawa; Maj HFE Swain, 450 Sqn Det.
Back Row, Left to Right: LCol RWR McDonald, CFS Goose Bay; LCol ABH Bosman, 417 Sqn; LCol BT Montgomery, 407 Sqn; LCol JALP Desmedt, 439 Sqn; LCol JR Allingham, 429 Sqn; Maj LE Novakowski, AETE.

1974

Squadron Commanders Flight Safety Seminar

Front Row, Left to Right: LCol GG Hynes, 449 Sqn; LCol JA Cann, 424 Sqn; LCol FG Villeneuve, DFS; Col RD Schultz, DFS; LCol DA Davidson, CFB Ottawa; LCol DI MacKay, 410 Sqn; Maj FK Lawlor, DFS.
Back Row, Left to Right: LCol AE McKay, 409 Sqn; LCol EG Francis, 414 Sqn; LCol JL Deakin, 425 Sqn; LCol DF Braidwood, 404 Sqn; LCol MM Zrymiak, 412 Sqn; LCol WN Russell, 436 Sqn; LCol JRC Bertrand, 433 Sqn; Cmdr GH Brown, 406 Sqn; LCol CB Lang, 442 Sqn.



Front Row, Left to Right: Capt TE Chester; Lt WH Muncy; Capt LA Illingworth; LCol FG Villeneuve; Col RD Schultz; Maj FK Lawlor; Maj JO Callahan; Maj GO Langen; Capt KC Pettman; Capt RA Lake.
Second Row, Left to Right: Capt WF Wright; Capt D. Libbey; Capt PP Smith; Capt LT Dufraimont; Capt GW Liddiard; Capt PJ Murphy; Capt JR Lunau; Capt MR Preuss; Capt JJ Ouellet; Capt TE Adkins; Capt CF Lohnes; Maj RR Clayton; Capt JO Stith; Lt PW Rebek; Capt A Leonard; Capt WB Low; Capt RW Coté.
Third Row, Left to Right: Capt FD Bosko; Capt JLK Lahey; Capt JCM Denis; Capt DA Nielsen; Capt L Schonberg; Capt MR Spooner; Lt RR Abbott; Maj BJ McComiskey; Capt SJ Kupecz; Lt BD Mask; Capt AJ Beaudette; Capt JP Oreilly; Maj JA Jaknunas; Capt R Chevalier; Capt AJ Mornan; Capt ED Lindberg;
Back Row, Left to Right: Capt JR Glover, Capt PD Malette; Capt DE Harden; Capt GC Bristow; Capt DJ Watkins; Capt SM Allingham; Capt JD Hunter; Capt DG Pearsons; Capt RD Gillan; Capt WD Card; Capt CR Gillis; Capt NK Fraser; Capt GR Teale; Capt GK McDonald; Capt DL Bashow; Maj JA Sequin.

Flight Safety Officers Course

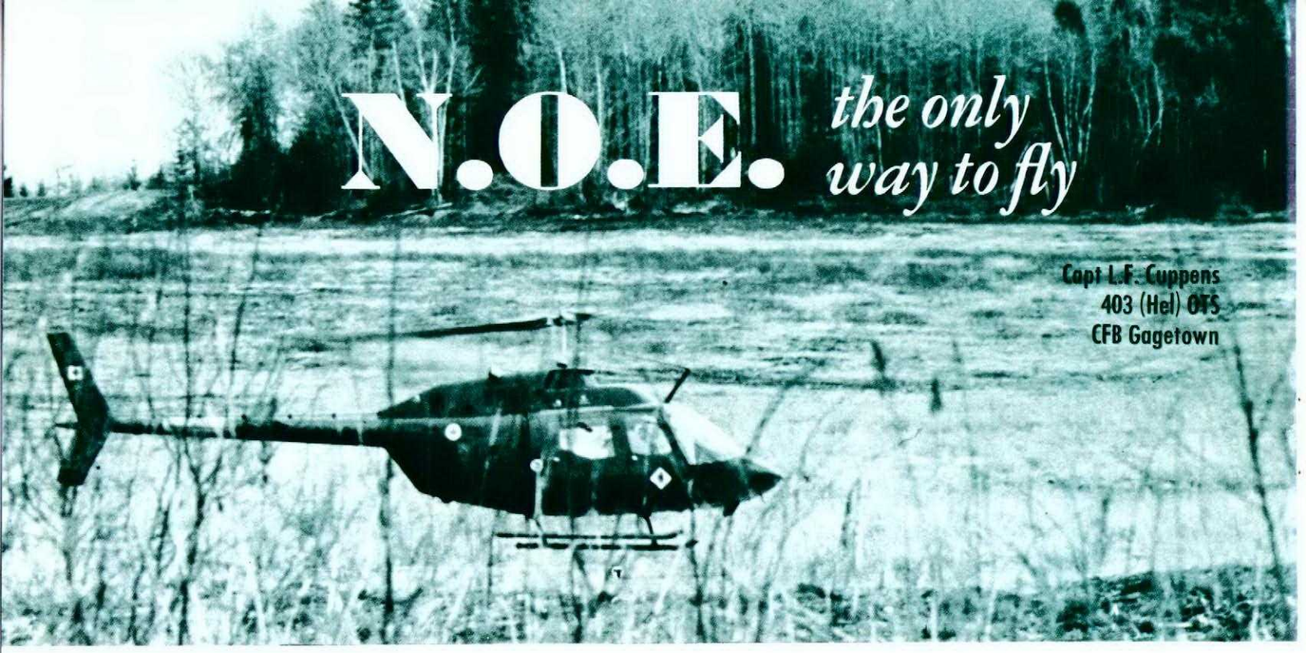
Nineteen newly appointed Squadron Commanders attended Flight Safety seminars during September and October of this year.

The seminars were held at NDHQ under the chairmanship of Col RD Schultz, Director of Flight Safety. This programme, which began in 1973, has been enthusiastically supported by those attending and will continue as a feature of Canadian Forces Flight Safety Education. The aim of the programme:

- to promote an understanding of the principles of a systematic approach to accident prevention;
- to identify and discuss the most important elements of the Canadian Forces accident prevention programme;
- to highlight the importance of supervision in accident prevention;
- to outline the training and capabilities of the FSO and recommend how the Squadron Commander can employ him most productively; and
- to detail the past and current Flight Safety problem areas of the Squadron Commander's specific weapons system(s).

The annual Canadian Forces FSO course, sponsored by the Directorate of Flight Safety, was held at CFB Trenton in late October. This year a record fifty four officers, representing all CF Commands, attended the two week course. Candidates are normally pilots who will be employed as FSOs on course completion.

Guest lecturers from non-CF organizations supplemented the Training Command staff and NDHQ representatives. Mr John Richards of MOT, spoke on new developments in MOT's accident prevention programme. Dr V.E.F. Solman, Chairman of the NRC Associate Committee on Bird Hazards to Aircraft discussed the history and latest developments in the programme to reduce the birdstrike hazard. Three speakers from the University of Southern California Safety Centre gave 18 hours of lectures. Mr W.J. Geiger's topic was the relationship between accident prevention and mission effectiveness. Dr R.O. Besco discussed Aviation Psychology. Mr E. Holt lectured on statistics and Systems Safety.



N.O.E. *the only way to fly*

Capt L.F. Cuppens
403 (Hel) OTS
CFB Gagetown

The skills and techniques of Nap of the Earth (NOE is sometimes referred to as NAP) flying have been taught in the Canadian Forces since 1962. However, little information on this most challenging aspect of flying has ever been publicized. NOE training for the Canadian Forces is carried out by 403 Squadron at CFB Gagetown. The techniques used by this OTS are so successful that other countries have adopted 403's training methods for their own programmes.

What is NOE? Nap of the earth flight is defined as *"flight as close to the earth's surface as vegetation and obstacles will permit which generally follows the earth's contours or earth's nap"*. Obviously the next question is "Why fly NOE"? and the answer is *survival* – in a mid intensity conflict. It may seem relatively easy for helicopters to avoid detection, gain information, and avoid being engaged, but over the years different theatres of war have demanded different techniques. Early in the Vietnam war the answer was to fly at high altitude to avoid small arms fire. In a mid intensity war, with more sophisticated weaponry, protection is achieved through low altitude and cover.

For the uninitiated a definition of "mid intensity conflict" is required. A senior Mobile Command officer says it is a euphemism for "war". The definition becomes clear if you consider a battle zone with predominantly armoured forces with artillery support and mechanized infantry, using surprise and mobility under heavy anti-aircraft cover (ballistic and missile systems) and fighter aircraft activity. This conventional type of warfare, using modern technology, could involve many different countries. The question of aircraft survival in this mid intensity conflict can only be answered by analyzing the ability of our aircraft to carry out their roles, with due consideration of their vulnerability to hostile weapons systems and the enemy's capabilities to employ those weapons.

A CH136 Kiowa of 403 HOTS "peeks" out from its hiding place behind a tree line

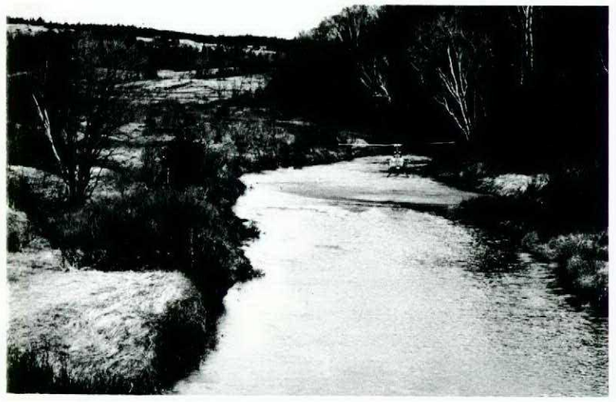
Survival, and the ability to carry out assigned roles is enhanced by NOE flight techniques; specifically by stealthy observation, concealment, frequent changing of position, and use of cover and terrain. These techniques can counteract the effect of enemy air defence.

Training. Speaking strictly in terms of "stick and rudder", new flying skills must be learned. Airspeeds and altitudes are not fixed or rigid. Airspeeds can vary from winkling slowly along a route (fast hover-taxi) to a fast (60 kts) bold dash across an open area to another concealed position. As airspeeds vary, so also do altitudes. Concealment can be achieved not only by flying behind a ten foot hedge-row and observing through the brush but also by stealthily flying a minimum skid clearance utilizing folds in the ground for protection.

This "ultra low" flight can cause severe strain on the aircraft crew. Operating close to the ground while twisting, turning, monitoring dials, avoiding obstacles, navigating and observing are some of the tasks which contribute to this strain. Nap of the earth flight movement is similar to the technical movement of ground forces' vehicles across terrain. The helicopter moves in a series of bounds from one observation position to another, all the time remaining concealed.

Let us look at some of the problems presented to the pilot in NOE flight, specifically in terms of ground, wind, obstacle clearance, navigation, concealment, observation and the tactical mission.

Ground and Wind. One might think that it would be relatively easy at the surface to keep the aircraft from striking the ground using normal height perception. But try to imagine the helicopter maintaining skid and tail rotor clearance, flying



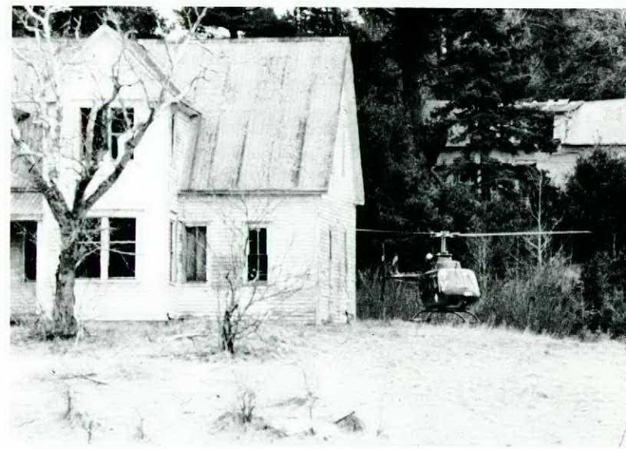
A Kiowa following low ground during Cat 3 training at Gagetown

downhill, turning to follow a slight shallow cut, keeping safe rotor tip and ground clearance, and doing all this while flying through undulating terrain. The ability of the pilot to feel even the most subtle wind is the key to successful aircraft handling. Out of wind manoeuvres demand more power than those utilizing the wind to advantage. Acceleration, deceleration and gain and loss of translational lift are constantly occurring. This perception (feel), judgement of distances, size and relative relationships are acquired skills. They are learned initially through systematic training, recognition of specific references and symptoms, and later through experience.

Obstacle Clearance. The pilot's visual acuity and hazard detection must be razor sharp. He must not only be aware of his aircraft size but of his peripheral surroundings. (The *US Aviation Digest* aptly describes this: "the aircraft must be an extension of the aviator"). It is impossible to describe in this article all the low level hazards. The following are just a few examples: low brush, deadheads (grey dead standing wood), narrow gaps in wood lines, overhanging branches on rivers and creeks, ridges, crests, rocks, stumps, low obstructions and flying debris. The photographs in this article illustrate the point more vividly.

Wires. Domestic and commercial wires are a constant hazard and the danger is increased with wires placed by communications personnel. Wires are generally unmarked and found almost anywhere. The keys to wire avoidance are a suspicious mind, conscientious map study and flight at proper height. It should be remembered that most wires are strung above fifteen feet.

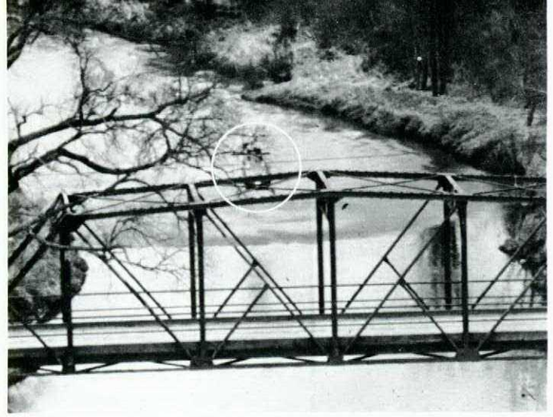
All the foregoing problems are introduced to NOE training through formalized NOE courses given by experienced instructors. Confidence or obstacle courses as illustrated in the



Stealthy observation, concealment, frequent changes of position and use of cover and terrain lead to survival and ability to carry out assigned roles

photographs are also utilized to expose the new pilot to random obstacles under safe, controlled conditions, thus providing practice in detection and avoidance of all kinds of hazards.

Navigation. In other modes of flight, aeronautical chart navigation is relatively simple to master. In "heads up" NOE flying, large scale maps (1/50,000) are used. The pilot must be able to "think map and see terrain". Since he is flying following the earth's contours he must be able to picture each fold in the ground from a glance at the maps. Navigation becomes even more difficult since heading, airspeed and altitude are constantly changing. Normal forward vision i.e., apparent horizon distances, vary between 500 metres and 1500 metres. A thorough schooling in "high speed memory map reading" is necessary. This "high speed" does not refer to aircraft speed, but rather to the speed with which a pilot can memorize the details of his route ahead. With practice, it can be done instantly.



The keys to wire avoidance are a suspicious mind, conscientious map study and flight at proper height

Concealment. It is not easy to remain concealed and at the same time observe a target. The pilot must learn how to follow low ground, fly in folds in the terrain, remain in the shadows, use background, avoid skylines and avoid blowing debris. These skills have to be taught – and they have to be constantly practised.

Observation. The enemy is assumed to be as cunning as the observer and training in rapid detection and identification (shape, shadow, silhouette, shine and use of sun) can only enhance the safety of the ultra low aviator. Ground forces by habit seem to first try to avoid detection from other ground troops and then detection from aerial observation. NOE flight offers a better slant range visibility and reduces vulnerability.

Tactical Mission. Once the pilot has mastered successful NOE techniques he must then learn the procedures, drills and conduct of land operations if he is to be a successful part of the team. The employment of his aircraft, not just his flying, is of paramount importance.

In essence, the pilot learns NOE skills to become an effective member of a ground/air team and to be effective he must survive. The pilot must not only overcome the physical hazards to NOE flight, but also his personal fatigue. Hot sun, low flight, random hazards, enemy threat and constant chatter from three radios are some examples of pilot stress encountered.

The pilot's visual acuity and hazard detection must be razor sharp

As already stated, the *must knows* are many and difficult to master, the *should knows* are life saving, the *could knows* are the marks of the professional. The job is both challenging and rewarding.

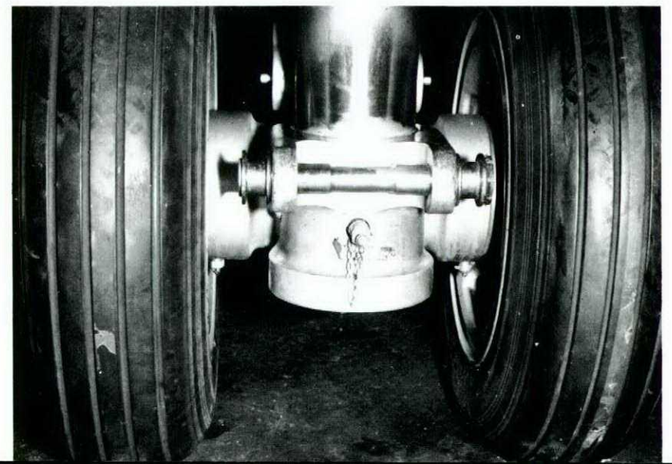
Mobile Command Nap of the Earth flying is aviation at its best. It's man and machine, and although the demands are great, the self reward is even greater.

Corner Quiz

The weight being supported by this bogie is 8000 lbs. One tire is inflated to 150 psi. What is the pressure in the other tire?

A. 150 psi
B. 200 psi
C. 0 psi
D. 50 psi

Answer is C. The tire has zero pressure – but you would need a gauge to know for sure, wouldn't you!



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.

WINTER / POINT TO POINT

■ It's that time of the year again; colder temperatures, icing conditions, slippery runways. All those things that make the skier and skater happy but create problems for aviators.

In an earlier issue of "On the Dials" we published the information from GPH 209 re: Temperature Correction Charts. At the moment the means of implementation has not been decided but it is vital that all pilots keep in mind that at the colder temperatures the actual altitude is lower than indicated. Therefore, it becomes even more critical that minima are adhered to – no sneaking down for a peek. Not that anyone would! Remember, Temperature Correction has been applied to Obstruction Clearances, where required, but not to MDAs and DHs.

A good review/refresher on the Cold Weather Operation section of the AOIs pertinent to your aircraft is a fine idea. Icy runways, carburettor icing (some people still have them), wing icing, intake icing. All these great things that make flying in the North so challenging and thrilling.

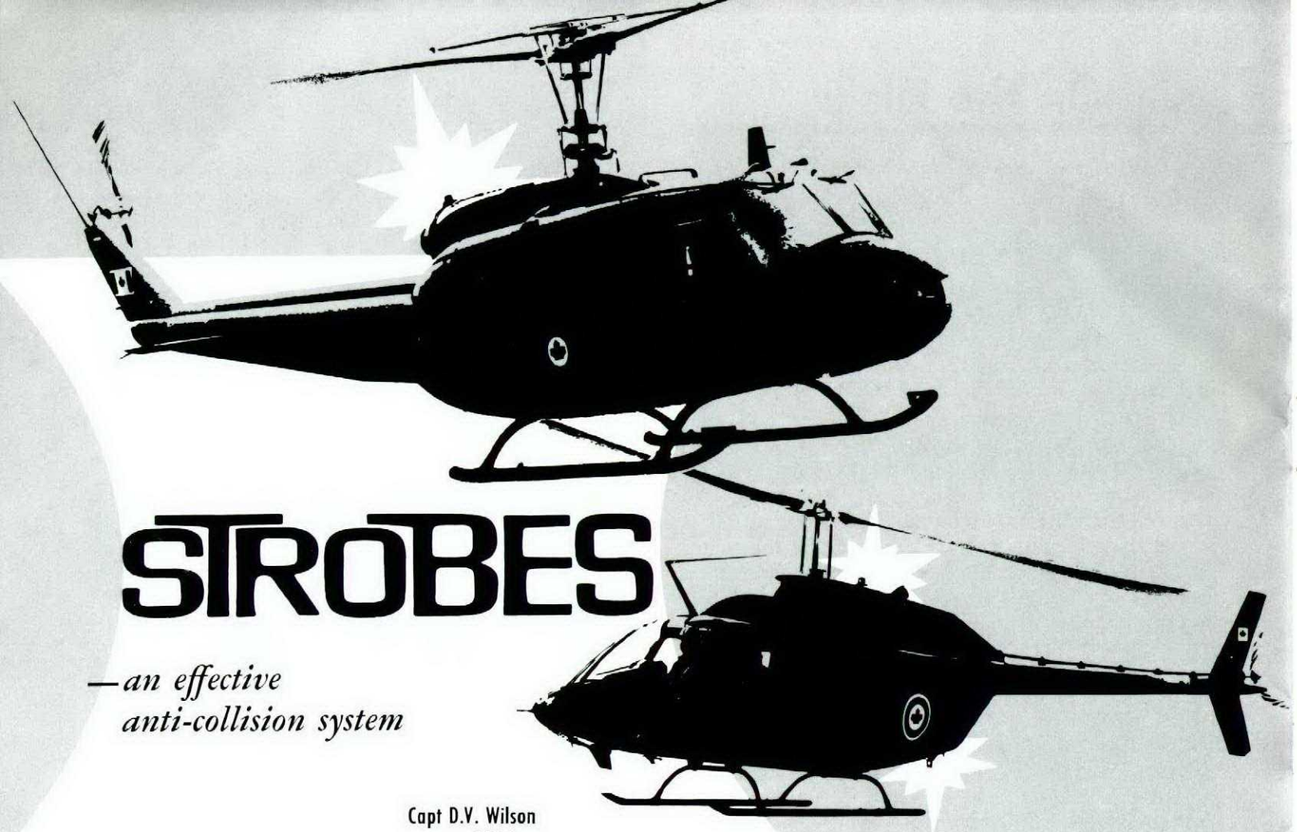
Cold weather wearing apparel is also a subject that is often overlooked by aircrew until they get caught out in the cold with summer wear. Hopefully it is/will be just a lesson well learned and not a tragedy. So flier – beware of Winter!

■ On point to point navigation exercises many pilots do not alter their original heading until they have connected the aircraft position to the desired point with an imaginary line.

A proficient pilot may determine a precise heading within a period of a few seconds, or while in the initial turn. The objective is to turn in the general direction of the desired point rather than fly away from the point while attempting to determine a precise heading. When using an HSI the desired radial may be set in the track selector window and the aircraft turned to a heading between the head of the bearing pointer and the head of the track arrow. The initial turn may be adjusted to roll out on a heading other than halfway between the bearing pointer and desired radial, depending upon the range relationship between the desired point and present location. If the range must be decreased, roll out on a heading closer to the bearing pointer. To increase the range, roll out on a heading closer to the desired radial. Once you have turned to your probable heading you can continue to update by connecting your aircraft to your desired point with imaginary lines. ■

500, 1000, 2000 hrs

During a recent visit to Training Command Col R.D. Schultz, DFS, presented flight safety awards to three instructors at 3 CFFTS Portage la Prairie. Capt DA McLeod (top) received his scroll for 500 accident free instructional hours and Capt RG Hall (centre) was awarded the Training Command plaque for 1000 hrs of accident free white knuckle time. Capt W Abbott was honoured with a scroll commemorating 2000 hrs instructing without an accident.



STROBES

—an effective anti-collision system

Capt D.V. Wilson
450 Sqn

It is rather paradoxical that the same operational reasons for repainting all helicopters employed in the land environment with combat camouflage paint schemes are in direct conflict with peace time requirements for increased aircraft conspicuity. Collision avoidance through the "see and be seen" principle is considered to be of prime importance for air operations and "state of the art" approaches to enhanced conspicuity include bright paint schemes.

One practical and economical solution to the problem would appear to be the installation of strobe lighting systems in the aircraft, as a replacement for our existing anti-collision lights. To use a hackneyed cliché, this would allow us to "have our cake and eat it too".

First of all, what is a strobe system? In non-technical terms, the strobe system is made up of a glass tube filled with Xenon and Krypton gas, a power source, a capacitor/timer and switches to control the system. Keywords used in describing the operation of the light are cathode, anode, molecules, trigger impulse, ionization, arcing etc., but as a pilot I prefer to look on it as a lamp which gives a very short, very bright burst of light to catch your attention when it is switched on.

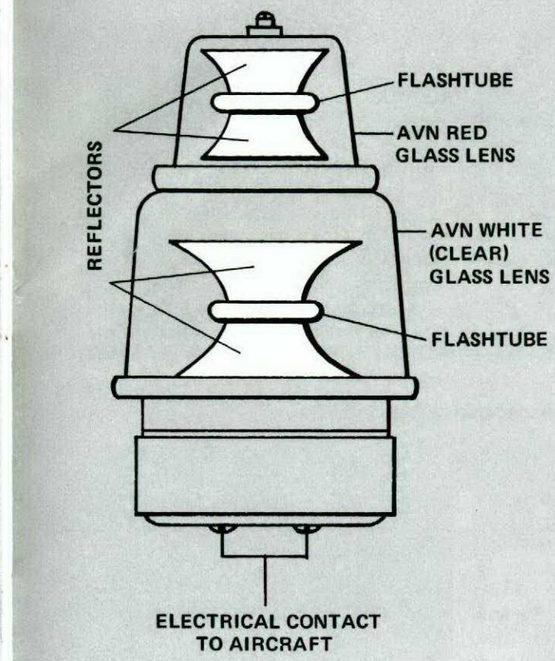
A strobe anti-collision system is an improvement over the present rotating beacon in several ways. An article by Major John Crosley in the March '74 issue of *US Army Aviation Digest* gives details:

- the system is solid-state thus eliminating moving parts and improving the reliability in high vibration environments such as found on aircraft;
- the "beam spread" or vertical light distribution is almost tripled over the old system. Thus a banking aircraft or one viewed from above or below the horizontal plane is more readily seen;
- the intensity levels have been increased to 3500 effective candelas (white) for day and 150 to 200 candelas (red) for night. The present rotating beacon is required to have only a minimum of 100 effective candelas output; and
- the flash characteristic is sharp (approximately one millisecond duration) and *very* conspicuous.

Note: A candela equals one candle power or that amount of light which keeps you from seeing what you are eating during a romantic dinner.

Of course there are problem areas to be overcome in employing a high intensity light and two disadvantages are reflections from aircraft surfaces (dependant on shapes and sizes) and reflective backscatter, the latter being of most importance to the rotary wing pilot.

Research on an improved anti-collision beacon was begun in 1967 by the US Army Aeromedical Research Laboratory (USAARL) in Fort Rucker, Alabama and since that time our own Directorate of Flight Safety has been compiling a great deal of information with regard to the effectiveness of high-intensity strobe lights. In every case study except one, this lighting was considered to be effective in increasing the conspicuity of aircraft. The one exception was a test conducted in 1968 when specific products of unknown performance were employed, and light intensities of the test lights could not be established in a way which would make a comparison with current products possible.



By the time this article appears a strobe light system should be undergoing evaluation by AETE and operational squadrons in the CF. The system is a red/white over and under "piggyback unit" similar to the one shown in the accompanying diagram. Although details are not yet completed, it is felt that the equipment will have the capability of being operated in either an all-white or all-red mode with the option of turning it off completely. Another consideration is to have the option of operating the top or bottom anti-collision light only on applicable aircraft.

All our helicopters, with the exception of the Kiowa, are presently equipped with rotating beacons and this should allow "screw driver retrofit" of the new strobe systems, i.e., fit into existing anti-collision light holes in the aircraft skins, using existing mounting arrangements, connectors and wiring. A special mounting bracket is being developed for the Kiowa which would allow the same type of retrofit.

The U.S. Forces are also continuing in their efforts along these lines and at the present time the US Army has decided to refit all its helicopters with high intensity strobe lights.

Although this article has dealt only with rotary wing aircraft, it is felt that strobe lighting is also a definite requirement for the fixed wing side of the house. The USAF has purchased 750 ship sets of strobe lights for its T37 fleet and testing is on-going on the T38, T39, C141, B52D, KC135 and the FB111.

With the effort being applied in this direction I think it becomes obvious that the requirement for a new collision avoidance system is receiving much attention – and so it should. The CF evaluations are being carried out at Cold Lake, Ottawa, Gagetown, Petawawa, Valcartier and Portage la Prairie, so if you get the opportunity to view them, do so and if you have any suggestions or opinions pro or con let your BFSO know. This program, like Flight Safety, involves everyone.

PREPARED?

Watch the wx at North Bay

North Bay Airport is located near the centre of a "Y" shaped plateau with high ground to the north – north-west towards Earlton, to the north-east across the Ottawa River, and south – south-east to Algonquin Park. A major influence on terminal weather is Lake Nipissing just over 3 miles to the south-west with a drop in elevation from 1210 feet to 650 feet at Lake level.

Winds from the south-west quadrant flowing off Georgian Bay are affected by the funnelling effect of the French River Valley before they cross Lake Nipissing and are subjected to the sharp upslope to the airport. These winds are generally moist so that considerable stratus develops in the vicinity of the airport, often quite suddenly – especially if precipitation is occurring. This stratus ceiling is likely to be quite variable over different parts of the airport. It is often ***lower*** to the east of the button of runway 26 than can be seen, measured, or reported from the observing site.

There is a higher frequency of occurrence of winds from the south-west in the months April to October inclusive than from any other direction. For the rest of the year, winds from this direction are still a major occurrence, though less frequent than northerly winds.

While it must not be thought that low ceilings or visibilities cannot occur with winds from other directions, they undoubtedly occur most often when the wind is from the south-west. At these times aircrew must ***be prepared for sudden deteriorations,*** at times occurring more rapidly than the observer can see and report them.

ADC FLASH

GEN FROM 210

CF5: NOSE GEAR COCKED After takeoff on a test flight with the nose wheel hike extended, the landing gear was retracted but the red light in the gear handle stayed on although the three gear lights went out. The pilot maintained speed below 240 kts and lowered the gear. The nose wheel then indicated unsafe. Another CF5 confirmed by a visual check that the nose gear was down and appeared to be locked, but was cocked 45 degrees to the left. An emergency was declared and the aircraft was set up for a straight in touch and go in order to bounce the nose wheel. The nose wheel touched down at approximately 190 kts and as the aircraft was tracking straight down the runway the pilot decided to make a full stop landing. Nose wheel damage was discovered after the aircraft stopped. A recovery crane removed the aircraft from the active runway.

A combination of factors is responsible for nose wheel cocking during gear retraction on the CF5:

- use of the hike system
- sub zero temperatures
- contamination of fluid in the hike chamber
- static type 0 rings vice dynamic seals used to seal the oleo strut from the hike chamber

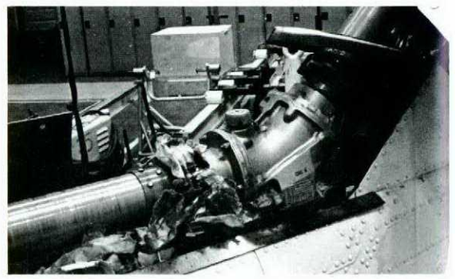
All the problems are being addressed and four modified nose gear assemblies will undergo field evaluation at 433 Sqn during this winter. A successful trial will result in fleet modification and removal of the operational restriction against the nose gear hike mode.

T33: BLOWN CANOPY The T33 landed at Calgary on Friday afternoon and was parked on the ramp at a civilian servicing facility for the weekend. The aircraft captain installed the tip tank and landing gear safety pins but the canopy remover jettison initiator pins located at the canopy rail on the right side of the rear cockpit were not installed. On Sunday afternoon two fifteen year old boys gained entry to the airfield through the fence and rode their bicycles along the flight line, looking at the parked aircraft. When they reached the T33 one climbed up on the wing to look inside the cockpit. Meanwhile, the other youth pulled the external canopy jettison handle and jettisoned the canopy. Fortunately, no-one was injured but the total cost of the damage to the aircraft was in the region of $25,000. This incident is an expensive reminder to all personnel that extraordinary safety precautions must be taken when normal maintenance services are not available. This is particularly true when using non-military facilities. Also, to prevent any possibility of ambiguity in future the T33 AOIs have been amended to direct that the canopy jettison pins shall be installed at all times when the aircraft is on the ground.

Ed. note: Three months after this incident the external canopy jettison handle was pulled on a T33 in Vancouver. This time however the pins were installed.

CH135, FOD WRAPPING A CH135 was flown to a maintenance facility for painting and, as part of the preparation, the horizontal portion of the tail rotor drive shaft was wrapped with paper for protection while the protective cover of the shaft was painted. When the painting was completed a Mobile Repair Team arrived to ferry the aircraft to another base for further modification. A DI was carried out under somewhat hurried conditions during the afternoon, while personnel were still putting on decals and painting black alignment marks for Dzus fasteners on the tail rotor drive shaft cover. The aircraft was flown to base for a special mission kit installation and then returned to the maintenance facility for dismantling prior to shipment overseas. Two months later the overseas requirement was cancelled and the aircraft was re-assembled by another Mobile Repair Team. A DI was carried out and after a local test flight the aircraft was flown to its home base. During the acceptance check by base personnel the tail rotor drive shaft cover was opened and the wrapping paper FOD was discovered.

The aircraft had flown for almost eight hours with foreign objects in a critical control area. Failure to follow the prescribed check list, carelessness and inattention were all factors here. The lack of work control by supervisory staff could have resulted in a serious accident.

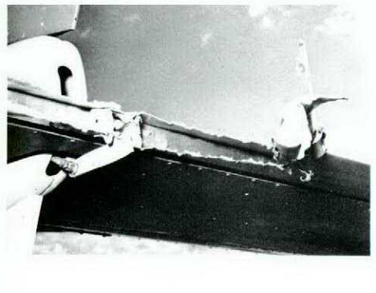


CF 104 PROBABLE BIRDSTIKE During the run-in on a target, at approximately 100 ft AGL, the pilot observed a large bird at close range and immediately afterwards experienced a compressor stall. The aircraft was "zoomed" and after one unsuccessful relight attempt, the pilot ejected and parachuted to safety. He was recovered by helicopter and returned to base. An extensive investigation of the engine determined that there was pre-crash compressor damage although no trace of bird ingestion could be found.

In recent years the incidence of birdstrikes has decreased considerably at Cold Lake where certain flight restrictions are imposed as the bird activity increases. In addition to the existing orders stipulating that low level flying shall be cancelled when the bird activity level reaches seven or higher and night flying operations shall cease when the intensity is six or greater, the following additional restrictions will also apply when the bird intensity level is forecast to be five or six:

- maximum permissible airspeed for day low level navigation tactical training shall be 450 KIAS; and
- the minimum en route altitude from point of departure to the attack transition initial point shall be 1000 ft AGL. During the attack and weapons delivery phase of the mission, existing minimum altitudes will apply.

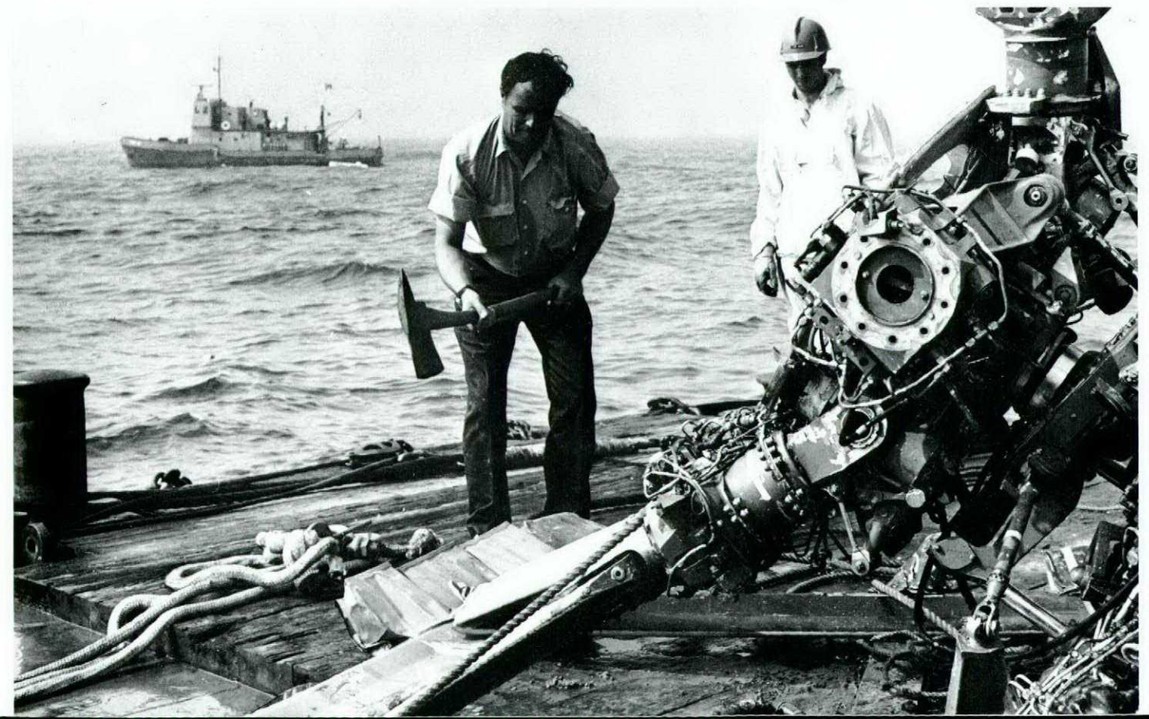
Ed note: Bird intensities are based on a scale from 0 (meaning no birds visible) to 8 (meaning radar scope completely covered by bird echoes). This system is used daily by the Bird Hazard officer at CFB Cold Lake to forecast bird intensities during migration.



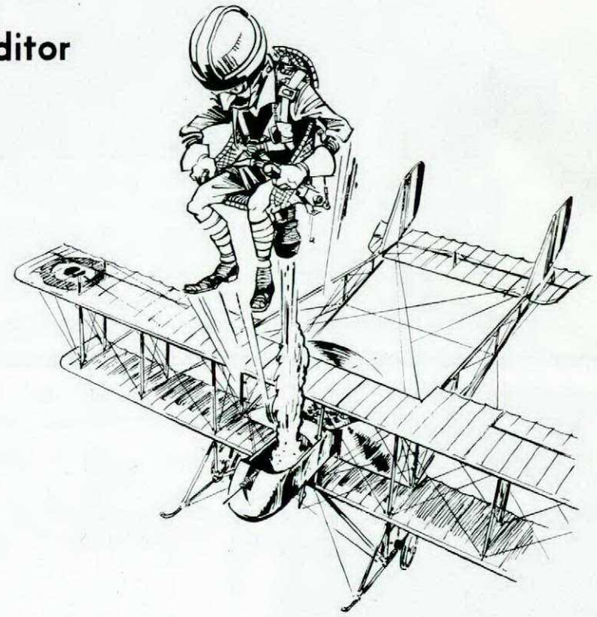
MUSKETEERS, MID-AIR A four plane formation of Musketeer aircraft were carrying out a practice for an airshow. Immediately after rolling out from a 270 degree turn in box formation, No 4's propeller contacted the lead's stabilator trim tab. The lead aircraft felt the slight impact and No 4 advised him of the collision. No 2 took over the lead and the aircraft were checked for damage and controllability. All four aircraft landed uneventfully. Although the damage to the lead aircraft was assessed as D category this incident had all the potential for a disaster. The cause of the mid-air was assessed as pilot technique in that No 4 applied too much power in his effort to regain position.

Flashback Life on the Ocean Wave

"Better get a move on – the Captain wants it ready by noon".



Comments
to the editor



DAKOTA HARNESS

I was interested to read on page 12 of your Jul-Aug issue a comment regarding the installation of Shoulder Harness in the Dakota.

After forty years of faithful service, it is encouraging to know that the old veteran Dak is not being overlooked. But my guess is that the poor bird will be on retirement leave before procurement and installation can occur.

As one wag suggests, "how about an ejection seat for the Maurice Farman Shorthorn".

Nevertheless, carry on the good work.

Maj R Morris
DNW/NDHQ

The mills of God do indeed grind slowly but as our illustration shows we're always open to suggestion.

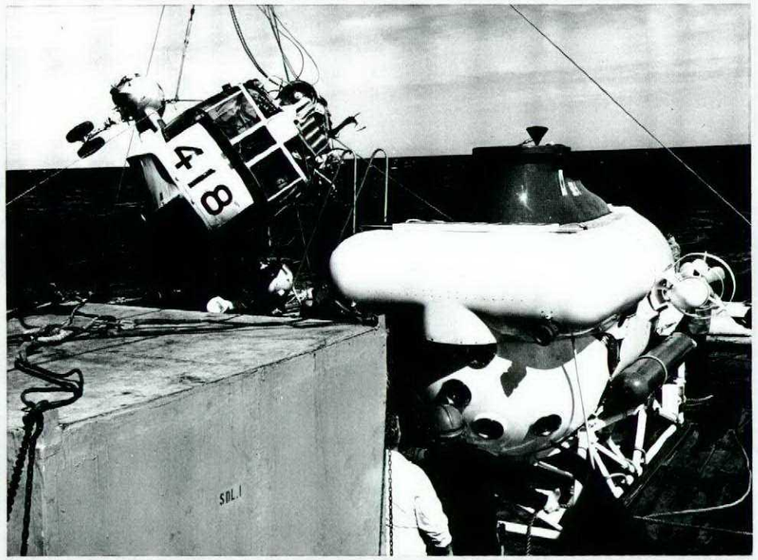
WRONG SUB

A *Gen from 210* article in Jul-Aug *Flight Comment* relates that the recovery of Sea King 418 was made possible by the use of a PISCES submersible. This statement is in error and a correction is owed to your readers.

To set the story straight, the PISCES submersible withdrew from the scene after two attempts to recover the Sea King. The task was then passed on to the Canadian Forces submersible, SDL-1, based in Halifax, NS. The submersible was completing its refit at this time and the crew included the salvage task with their recertification trials of SDL-1. Using a single mechanical arm on the bottom, the crew attached lifting lines to the airframe and retrieved the Sea King intact from a depth of 525 feet. The task was completed in two working dives and SDL-1 was recertified to conduct deeper missions. The enclosed photograph is evidence of this feat and should be included to authenticate your correction.

I should add that SDL-1 is a diver lock-out submersible operated by Fleet Diving Unit (Atlantic) and that Sea King 418 is one of two military aircraft that SDL-1 has recently recovered intact from the seabed.

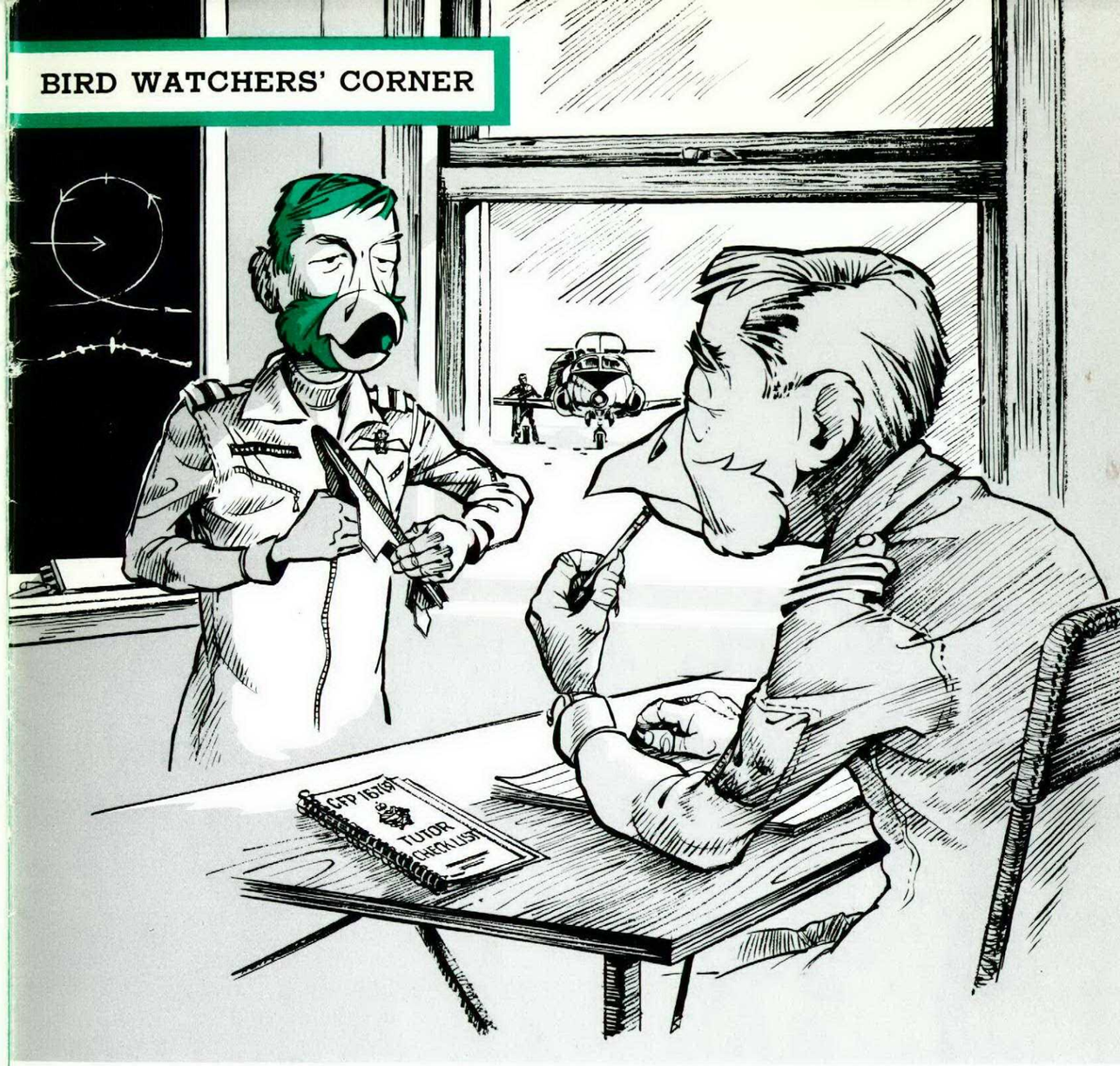
Knowing your reputation for accuracy and detail, I am looking forward to a correction in the next issue of *Flight Comment.*



R. Coren
LCmdr
Fleet Diving Unit (Atlantic)

Great jumping jellyfish and cringing crabfats LCmdr you're so right! The Pisces did retire from the scene and SDL-1 retrieved the sunken Sea King. We are always pleased to give credit where it is due tho' to be fair to Pisces she did recover one engine and the transmission before leaving in disgust. Now then, knowing **your** *reputation for accuracy and detail we are looking forward to the article on salvage operations that was promised.*

BIRD WATCHERS' CORNER

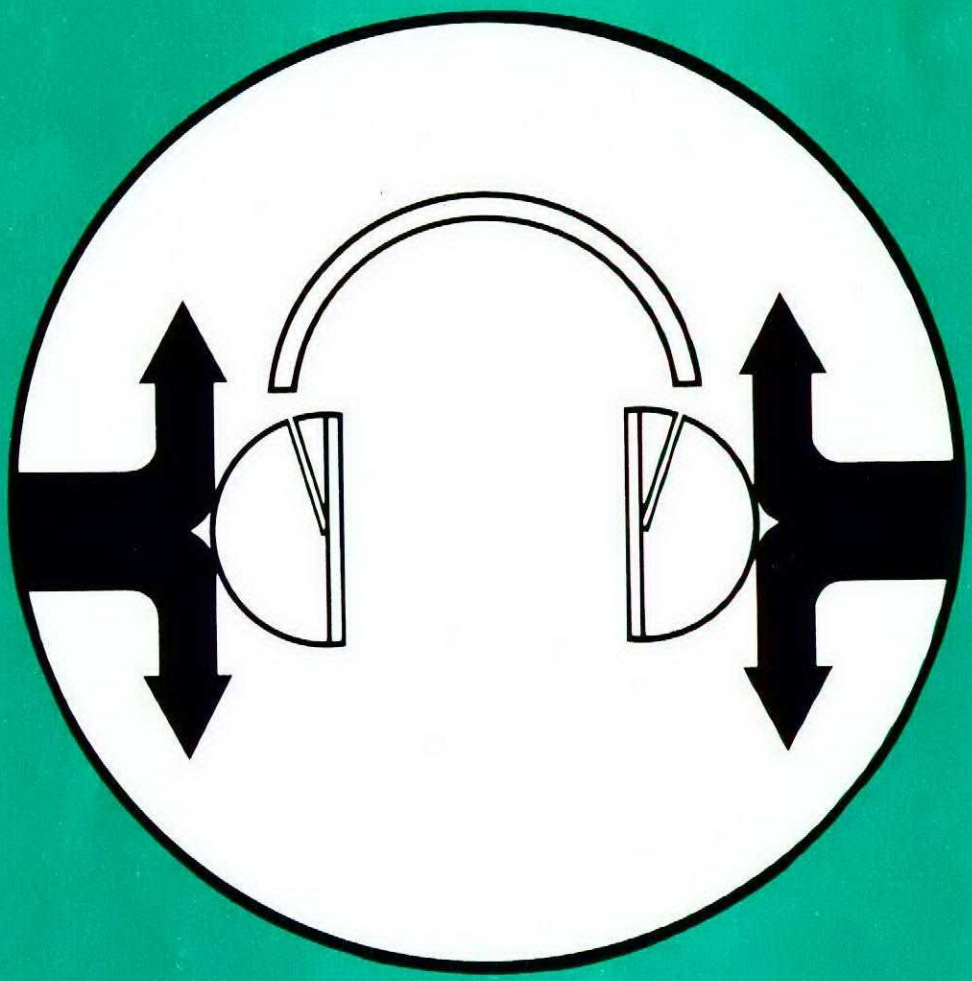


SINGLE STANDARD SWIFT

Every flock of fliers has a special flight made up of Single Standard Swifts (SSS). The birds in the unit may be big and heavy with fixed feathers or they may be of the small, rotating type. Whatever the species Single Standard Swift is an essential member of the group. He flies regularly with all the birds to ensure that the highest standards of flying and airmanship are being maintained. Without the SSS, frisky fledglings would be continually flexing their feathers and fluttering about the sky in whatever way they felt fit. Old, grey feathered types would forget their early training and fall prey to the bad habits of old age. Since fliers are notorious for their curiosity, unsafe and unorthodox techniques would soon become widespread and all the lessons of experience would be lost.

The Single Standard Swift is often just a junior bird whose flying skill and knowledge of a particular operation makes him most suitable for the job. Old, long in the beak senior birds recognize this and pay attention to his briefing. His lesson, like his call, comes through loud and clear:

"FLY-BY-THE-BOOK-AND-YOU'LL-STAY-OFF-THE-HOOK"



NOISE HAZARD AREA