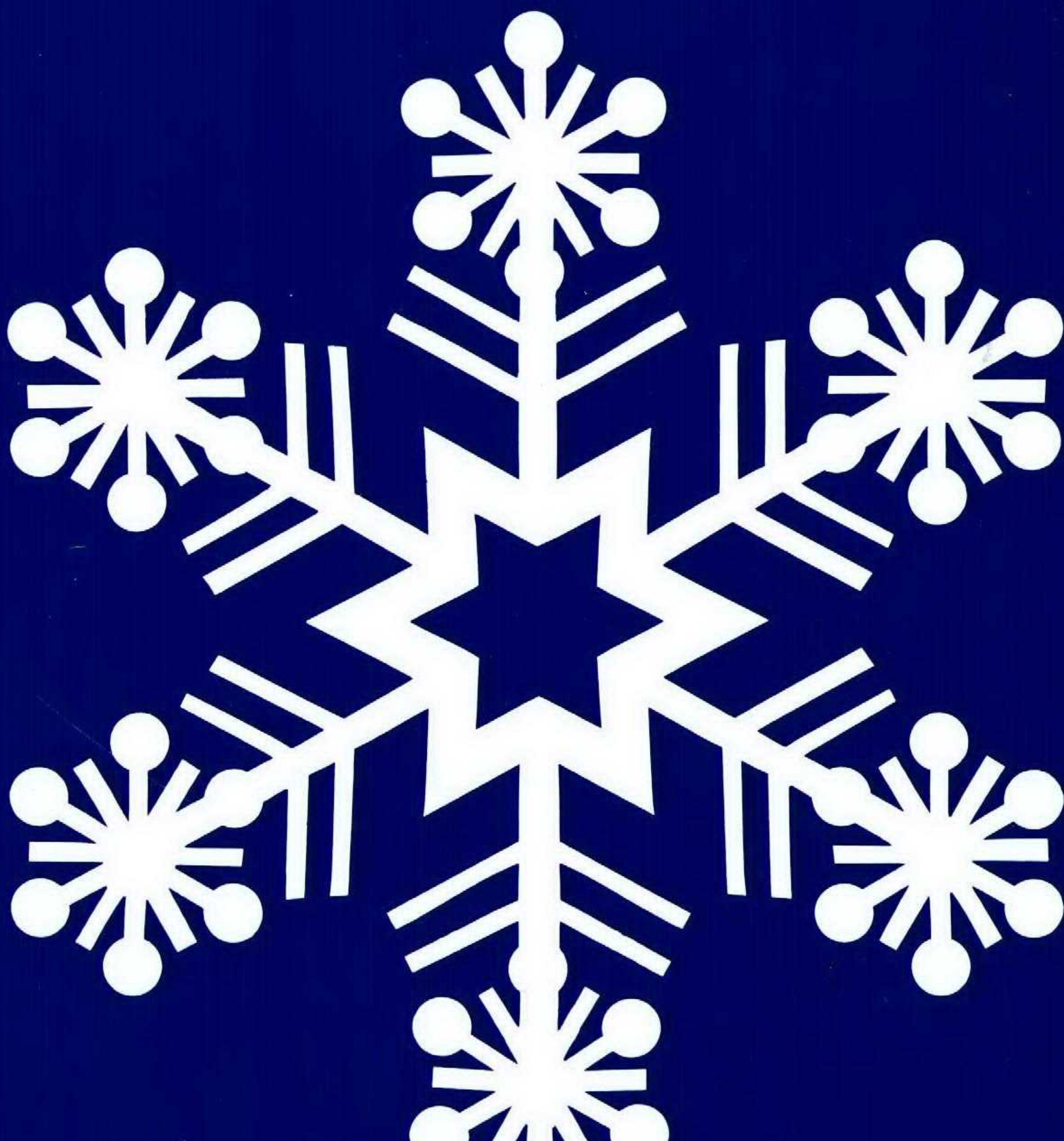
FLIGHT COMMENT

NOVEMBER • DECEMBER
1972



Winter woes – part VI

Comments

Although we've been flying the T33 for about 20 years now, there seems to be no end to finding new wrinkles. The recent experience of an instructor and student during a cross-country is a case in point. At one stop, as the front seat was lowered approximately one inch, the front seat lap belt auto-release mechanism fired and the lap belt opened. T33 Safety System Techs discovered that this was caused by a helmet bag and visor stored under the seat. When the seat was lowered, enough tension was placed on the auto-release mechanism arming cable to fire the blank cartridges.

The absence of warning streamers hanging from the landing gear of your bird doesn't necessarily mean that someone has pulled the pins — as a CF104 pilot discovered not long ago. Somehow the streamers had become wrapped around the landing gear struts, and consequently the pins went undetected — until the pilot attempted to raise the gear after takeoff.

During the summer a Tutor pilot on a *round robin* was surprised to find a live bat accompanying him. The stowaway was quickly captured and consigned to safe storage, and later delivered to the appropriate custodian when the aircraft landed. So far, no one has been able to ascertain at which stopover the creature boarded — or why.

Don't let your hair or beard let you down! Beards and sideburns should be recognized as hazards in some situations. For example, although beards can be worn when wearing respirators that maintain positive pressure within the mask, not all respirators are of this type. Sideburns or a beard can result in *as much as fifty percent loss in the mask-to-face seal in such cases*. Where oxygen is required, or when a possibility exists of poisoning from noxious fumes, personnel must ensure that the mask or respirator they may be required to use will really do its job! —Dept of Labour Newsletter.

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DIRECTOR OF FLIGHT SAFETY

MAJ O. C. NEWPORT
Education and analysis

LCOL F. G. VILLENEUVE
Investigation and prevention

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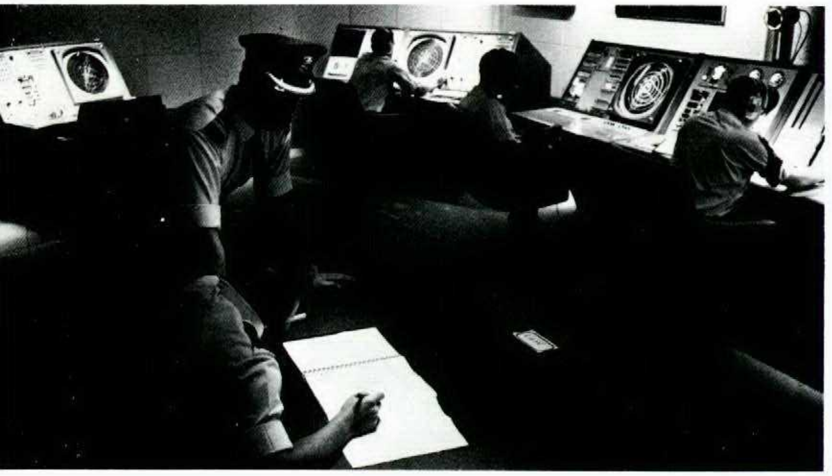
Hindsight or Is It Rationalization?

After an occurrence has been investigated you often hear such statements as, "Anyone can see what went wrong, with the gift of 20/20 hindsight" or, "Who do they think they are, acting as Monday morning quarterbacks? "

Such reactions are understandable because people don't like to be judged by those who were not directly involved and see such reasoning to rationalize the circumstance in their favour; or occasionally to deliberately obscure the real issue. It is this basic human trait that should be of concern to everyone associated with air operations since seldom, if ever, do unsatisfactory situations get clearly identified, let alone corrected, unless the facts are openly expressed.

There is no argument that it is usually very easy to figure out what went wrong and who was to blame after the event. However I contend that a defensive attitude usually indicates that the individual isn't really as concerned with someone else's hindsight as he is with his own lack of forethought. If it is accepted that we have the knowledge and experience to anticipate most of the hazards in a particular operation, then let's use foresight and prove that we are sincere about "before-the-fact accident prevention".

COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY



SIF & SSR

selective identification feature and secondary surveillance radar

by WO Lynn H. Kent
CFB Cold Lake

The modern SIF system is a development of a WW II system known as IFF (Identification Friend or Foe). This system used ground equipment to transmit an interogation signal to an aircraft, and a receiver/transmitter in the aircraft to transmit a response back to the ground station. If the equipment in the aircraft had been adjusted to reply to the challenge, the transmitter portion sent a signal to the ground station. The signal was processed by the ground equipment and displayed on a cathode ray tube. If the response was satisfactory, the aircraft was considered to be friendly.

SIF is a special form of radar in which an aircraft fitted with a transponder, transmits replies in response to interrogation signals received from the ground. Although capable of independent operation, SIF is normally associated with a primary surveillance radar system. Both primary and secondary radar targets may be displayed on the same radar indicator.

ATC (Air Traffic Control) uses SIF to identify and provide secondary radar service to individual aircraft. While SIF employs basically the same concept as that of the IFF system, the serviceability of both the airborne and ground equipment has been considerably improved. In its use in supplementing primary surveillance radar, Secondary Surveillance Radar offers an improved and expanded coverage for SIF equipped aircraft. It also facilitates the identification of aircraft (by eliminating the necessity for identifying turns), reduces communications workload, and facilitates radar hand-offs. Some other advantages are that it permits the controller to display only the SIF data applicable to his sector. In addition, an aircraft experiencing an emergency can be immediately detected. In the case of the latter, most MOT installations employ an aural and visual alarm system that is activated when an emergency code has been selected. New military equipment will also incorporate this feature.

Interrogation and response processes occur in the following manner:

Moding is a ground-to-air process whereby the interrogator transmits coded RF pulse pairs at the PRF (Pulse Repetition Frequency) of the primary radar system. The time interval between the leading edges of these two pulses determines the mode.

Coding is an air-to-ground process. The transponder reply from the aircraft is comprised of two framing pulses, designated *Start* and *Stop*. Information pulses are located between *Start* and *Stop* pulses. Various combinations of information correspond to different codes.

An additional feature of the airborne equipment is an Identification Control. When the pilot activates the Ident Control, an additional pulse is transmitted. The controller then receives an additional single slash on his radar indicator one-third of a mile from the first slash. This two-bar presentation appears for approximately 30 seconds and then automatically terminates. Should this feature be inoperative, the controller may request the pilot to select standby which results in the single bar disappearing from the applicable radar target and reappearing as the airborne set is switched back on.

Six different interrogation modes are presently available for use in the SSR/SIF system, however, only the first three are currently in use at CF installations:

Modes 1 and 2 – Military Tactical Control
Mode 3 – Military and Civil ATC
Mode B – Civil ATC
Mode C – Civil and Military altitude reporting
Mode D – For future development

Military and Civil equipment varies slightly as to the response received by the controller, however this difference is not too significant. The following SIF responses may be presented, the small dot in front representing the aircraft's radar target:

a. Single slash ·) – normal response
b. Ident ·)) – normal response, with ident feature
c. Emergency ·))))

In addition, on Canadian Forces modified ground equipment, 7600 or 7700 code selection will be received as a filled in response, i.e. ·))))). Under normal circumstances this response is quickly discernible to the controller who then determines whether or not a 7600 or 7700 code is being transmitted. Unlike MOT installations, most Canadian Forces ATC units do not have aural and visual alarms to indicate an emergency response. If the aircraft is beyond the range selected, the controller will have no indication of an emergency reply. Forthcoming equipment will be required to incorporate this feature.

One of the major problems experienced by ATC when utilizing SIF/SSR is that of Ringaround. This is a series of replies caused by a transponder being interrogated by side-lobes of the main SIF antennae coverage pattern. The resulting replies may appear on the indicator as several SIF returns, all at the same range, but different bearings. As the radar range to the transponder decreases, these false returns can increase until they form a complete ring around the antennae. A transponder receiver must be very sensitive to be satisfactory for long range operation. Modern transponders are particularly designed to operate at great distances from the interrogator. At short ranges these sensitive receivers can detect the radiated energy from a ground station even when the main signal is not pointed at the aircraft. This problem can be overcome to some degree by the use of the *Low Power* feature on the transponder.

Another interfering factor is aircraft shielding and signal deflections. The altitude of an aircraft relative to the ground may affect the SIF indication received by the controller. Since the transponder antennae is usually installed beneath an aircraft, the transponder may not receive and therefore not be activated, while the aircraft is in a climb, descent, or turn.* At some sites, buildings or other reflecting surfaces near the ground antennae may interfere with signals received via the deflecting surface, in addition to those received directly from the ground antennae. Should this deflecting surface also deflect the transponder replies, false targets will be displayed at a range and bearing different from the transponder.

As new radar equipment is procurred within the Canadian Forces, advanced secondary radar is expected to perform a much greater role. Additional features such as altitude information readout, side-lobe suppression (reducing or eliminating ringaround), better compatibility with civil radar, and a dual channel capability are some of the many requirements.

In addition, as computerized flight plan data is realized, it will have the effect of considerably reducing a controller's workload. It is now necessary to copy all relevant flight data in longhand on control strips, and update it as the flight progresses. Any number of aircraft operating within a terminal area are constantly changing altitudes, approach times, etc. The attention a controller gives to his control strips necessitates his attention being continuously directed away from the radar indicator. Computerized flight data will be correlated to SIF/SSR, and subsequently displayed on the controllers radar indicator. This will in effect provide instantaneous current flight data to the controller, eliminating time consuming procedures with control strips, while providing constant surveillance of an aircraft during his flight.**

While it is generally accepted among Air Traffic Controllers world wide that ATC equipment has not kept up with aircraft technology, the new concept and procurement of computerized ATC and its related equipment should help close the gap.

* This effect, which is mainly associated with fighter-type aircraft can be overcome by the use of two antennae (upper and lower) and lobe switching when required. The CF5 and CF104 have such a system.

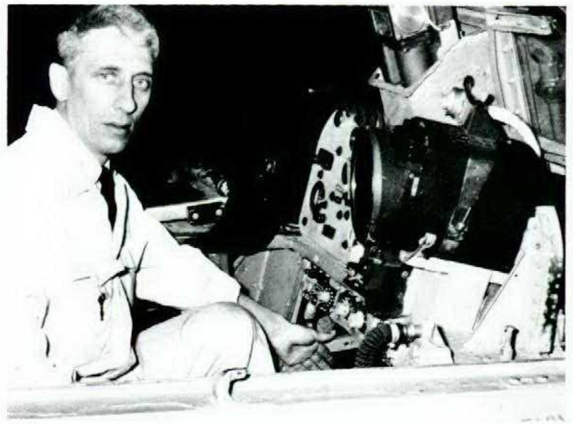
** Altitude information will be automatically displayed on the PPI when available for any aircraft designated by the controller. Codes transmitted by aircraft which don't correlate with any flight data will be automatically displayed to warn the controller that either an unexpected aircraft is in the area or an error in data entry or transponder code setting has been made. There will be no separate code or altitude readout for SIF/SSR. Ed.

WO Lynn H. Kent joined the RCAF at Edmonton in December 1953 as an Aircraft Control Operator. He spent six years in Saskatoon in the Flight Planning Centre and Radar and then six years in the Air Division, Europe. Following his return to Canada he had two-year tours in Halifax at the Rescue Coordination, and on radar at Goose Bay. He is currently the Senior Air Traffic Controller at Cold Lake where he has recently completed his 20,000th letdown.

LCol T.W. Harris, BOpsO, Cold Lake, is shown certifying WO Kent's log book recently, on the completion of the controller's 20,000th radar run.

Good Show

MWO J.B. Whittle



CPL J.J.S. Hébert

Cpl JC Nauss

L to R, Sgt D. Patterson, Cpl B.W. Miller, WO M.P. Carroll, F/L C.S.M. Anderson

Cpl P. Silvey

Mcpl D.M. Dougan

Cpl J.M. Ogilvie

CPL J.J.S. HÉBERT

Cpl Hébert had become intrigued by a CF101 which arrived on his unit at Bagotville with a long history of flight control snags. Write-ups for control stiffness had persisted since its acceptance into the Canadian Forces during the ***Peace Wings*** program, however repairs elsewhere had consistently failed to pinpoint the exact cause of the unserviceability. On the first test flight at Bagotville the same perplexing snag was again encountered.

Cpl Hébert stubbornly pursued the problem and to ensure continuity in the investigation, volunteered to spend his days off in applying himself to it. After diligent and tedious work using an unconventional approach, he finally isolated the snag in an almost inaccessible area. There he discovered that under certain conditions there was insufficient clearance between the stabilator bellcrank and the engine throttle conduit to the rear cockpit. This caused binding which appeared to the pilot to be stiffness in the control column. On checking other aircraft, he determined that the problem was not unique and he informed his superiors accordingly. The information was rapidly disseminated to the entire CF101 fleet in the form of a Vital Special Inspection.

While Cpl Hébert was working on the control stiffness snag, he also discovered that the push-pull rod between the front and rear brake pedals was bent. As the rod moved through the roller cage it would jam on the control trough cover, thus restricting the left brake pedal movement. The replacement of this rod cleared up another snag on the aircraft that had been perplexing maintenance personnel for some time.

With this outstanding display of technical professionalism and dedication, Cpl Hébert corrected two long-standing and potentially hazardous problems.

MWO J.B. WHITTLE

MWO Whittle was the lead Flight Engineer on an Argus crew pre-flighting their aircraft prior to a training flight. The aircraft had a recent history of fuel leaks around the supercharger casing drain on #3 engine, however functional checks had been carried out by servicing crews and all associated fuel lines had been checked. The aircraft had since flown a 14-hour patrol without incident.

During his inspection MWO Whittle discovered that fuel was again leaking from #3 engine. He followed this up with a close examination of the fuel lines leading to the supercharger casing through the primer solenoid, and found that the lines had been "murphied". The right hand fuel vapour vent line was crossed to the primer solenoid, while the left line was connected into the primer line to the supercharger casing, allowing vented fuel to pool in the casing.

MWO Whittle's display of initiative and technical knowledge in identifying the source of the fuel leak, prevented the possibility of an in-flight emergency.

CPL JC NAUSS

Cpl Nauss was a member of a CF101 start crew conducting visual checks that are part of the Last Chance Inspection. In the course of his checks, he discovered that air was leaking from the left main tire, through a hole that was not visible as a surface cut. The leak had been missed on the pre-flight because the defective section of the tire tread was in contact with the tarmac.

Cpl Nauss' detection of the defective tire – in spite of the fact that he was wearing ear defenders and both engines were running – prevented the possibility of the CF101 crew being subjected to the hazard of landing with a deflated tire, a situation made more hazardous by the fact that the crew would have been unaware of the tire problem.

F/L C.S.M. ANDERSON, SGT D. PATERSON, WO M.P. CARROLL, CPL B.W. MILLER

In the course of sonobuoy dropping during a routine Argus patrol over the North Atlantic, F/L Anderson (a RAF exchange pilot) encountered a restriction in the movement of the elevator controls when he initiated a descent. While he set course for Lajes, the nearest airfield, Sgt Paterson (lead Flight Engineer), WO Carroll (AVN Tech) and Cpl Miller (AF Tech) carried out a systematic inspection of the control system. Later F/L Anderson joined them. Eventually they discovered a 4-inch hole in the lower aft fuselage. A sonobuoy "vane" found in the vicinity had apparently penetrated the fuselage and severely damaged the elevator control torque tube.

WO Carroll, Sgt Paterson and Cpl Miller straightened the bent tube somewhat by using gentle hand pressure, then they strengthened it with hose clamps removed from other equipment in the aircraft. The aircraft was flown using trim only so as not to place any stress on the elevator controls.

On arrival at Lajes 3½ hours later, F/L Anderson completed a successful flapless landing, again using trim as much as possible and keeping elevator control movement to a minimum.

The high degree of professionalism displayed by these crew members enabled them to improvise an in-flight repair which probably averted the loss of elevator control.

CPL P. SILVEY

Cpl Silvey had just completed changing an unserviceable rain remover on a CF104 and was carrying out a FOD check. In addition to carefully examining the area in which he had been working, he also checked the area of the cockpit housing the flight control cables. There he found a 3/4-inch stone lodged under an aileron cable at the pulley.

Cpl Silvey's extra effort in checking adjacent areas for FOD probably averted an in-flight emergency, as the stone could have worked its way into either the pulley to cause binding or down into the aileron control quadrant where it could have caused a control seizure.

MCPL D.M. DOUGAN

While conducting a fuel leak test on a Hercules during Field Level Maintenance, MCpl Dougan found what appeared to be slight seepage on the undersurface of the wing between the pylon tank and the number four engine. The normal repair for seepage from a rivet is to remove the old sealant from the damaged area inside the tank and replace it with fresh sealant. However, MCpl Dougan had not previously encountered seepage in this area and he was not satisfied that it was in fact a "normal" leak. He removed paint around the area and on thoroughly inspecting it he discovered a hairline crack approximately 1½ inches long, extending behind the butt adjoining the skin planks. Further examination showed that the crack started from an earlier repair apparently made during manufacture.

By his determination to find the exact cause of the fuel leak, MCpl Dougan uncovered a longstanding defect which could have quickly developed into a very serious and costly failure.

CPL J.M. OGILVIE

Cpl Ogilvie was in the crewman's position to the rear of a CF104 which was being started for an airtest. During his inspection of one of the flaps he grasped the trailing edge and exerted upward and downward force to check for excessive movement and to ensure that it was secure. Sensing that something was not quite right, he continued checking and exerting up and down pressure, and finally noticed movement on the fillet near the flap actuator. When he examined the area closely he discovered a small break on the actuator casting. He then signalled the pilot to shut down, and on further investigation found that the lower portion of the actuator casting was broken.

Had the aircraft gone flying it is probable that the forces exerted on the flap during takeoff would have broken the remaining portion of the casting, possibly resulting in a split flap with consequent serious control problems.

Cpl Ogilvie's inspection went beyond that called for in the crewman's duties. His close scrutiny of the suspected problem area required peering through a narrow gap between the flap and the fairing, a task made more difficult by the fact that hot BLC air was blowing straight into his face. His dedication to his job undoubtedly averted the development of a potentially disastrous situation for the pilot.

cont'd on next page

CPL M.H. Sommerville

L to R, Cpl D.F. Murray, Cpl J.R. Orr, Cpl P.J. Lawson, MCpl R.C. Kitching, Cpl J.K. Swanson, Sgt Steckler. (Missing Cpl M.G. Dandurand)

CPL D.D. Schriver

CPL J.W. Bird

SGT R. STECKLER AND CREW

After completion of a #11 Check on a Dakota, Sgt Steckler and his crew were repairing an engine oil leak, a task which involved the removal of the oil sump. When the sump was removed, a small threaded blanking plug was found which no one on the hangar floor was able to identify. Most felt that the plug had been left in the engine during the last overhaul.

Sgt Steckler was not satisfied however, and he and his crew searched the EOs and finally conferred with employees of the civilian overhaul shop. As a result of these efforts the plug was identified as belonging to the connecting rod bushing assembly. Its loss would have deprived the connecting rod bushing of all its oil pressure, but this loss of pressure would not show in the cockpit, with the result that severe damage could have resulted before a crew realized that anything was amiss.

The high standard of technical excellence displayed by Sgt Steckler and his crew in discovering the source of the blanking plug probably prevented an engine failure in flight.

CPL D.D. SCHRIVER

When checking the engine during a routine DI on a T33, Cpl Schriver detected a 1¼-inch crack on the nozzle box casting in the area between #1 and #2 combustion chambers. As a result of this discovery the engine was dismantled and an additional 1½-inch crack was found on the nozzle box casting along the #2 combustion chamber adapting flange. Had these cracks gone undetected, they might eventually have lengthened and resulted in sections of the nozzle box breaking free, causing severe damage to the engine and engine compartment. The engine was subsequently returned to the overhaul contractor.

Cpl Schriver's extra effort in checking the nozzle box, which is not called for on the DI, averted the possibility of an engine failure in flight.

CPL M.H. SOMMERVILLE

Cpl Sommerville was running routine "A" check on a T33 in the course of a night flying program. In addition to the items called for in the inspection, he also examined the front and rear cockpits with the aid of a flashlight. In the rear cockpit he noticed that the cable for the landing gear selector valve solenoid was hooked on the left rudder quadrant. He reported this finding to his supervisor who in turn initiated an inspection of the entire fleet which revealed one aircraft with a similar condition and the possibility of it occurring on others.

The thorough inspection carried out by Cpl Sommerville brought to light a condition which could have caused a serious hazard under certain circumstances. With the cable hooked over the rudder quadrant and the rubber pedals moved to their full travel, it would be possible to either render the landing gear overrride lever inoperative or, worse, to activate it (either "up" or "down") inadvertently at any time.

CPL J.W. BIRD

Cpl Bird and his crew were awaiting the departure of a CF101 so that they could inspect the arrestor cable serving the active runway. As the aircraft lifted off and was approaching their position, Cpl Bird observed a small object fall from the aircraft. Investigating, he found a piece of tire tread and immediately informed Air Traffic Control. A check of the runway revealed numerous pieces of tire tread.

The aircrew were then alerted to the situation and while they burned off fuel, crash response crews were brought into position. The pilot then landed without mishap.

Cpl Bird's quick response alerted all personnel concerned to a dangerous tire condition that, had it gone undetected, might easily have resulted in a serious accident during landing.

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.

DID YOU KNOW?

Most pilots have a good knowledge of normal instrument procedures, however, the ICP school has found that many, including even highly experienced pilots, are not aware of some of the information contained in GPH 209 and GPH 204. The following questions and answers will give you a chance to check your knowledge of these publications.

Did you know . . . that on the arc portion of a published approach procedure you are only protected to 5nm either side of the arc? This protected area makes allowance for both system and instrument errors. (Ref GPH 209, Art 421.)

Did you know . . . that missed approach obstacle clearance (100 ft) is predicated on a minimum climb gradient of 152 ft per nautical mile? For example:

120 kts ground speed – minimum required rate of climb 304 feet per min;

180 kts ground speed – minimum required rate of climb 456 feet per minute.

GPH 209, Art 630, states that all missed approaches shall assume an inclined plane which:

a. will rise at a slope of 1:40 (2.5% or 152' per nm)

b. starts at the designated missed approach point.

Therefore do not delay your overshoot; the obstacle you may contact could be miles away, and in cloud.

Did you know . . . that when flying a category 1 ILS approach you are guaranteed 100 feet of obstruction clearance only if the aircraft is maintained above the half-scale fly-up indication.

For example: ILS glide slope indicator deflected up by ½ the instrument scale. (Ref GPH 209, Art 1301-6.)

Did you know . . . . that if being vectored for an ILS approach you note glide slope interception prior to localizer interception and begin to follow glide slope you run the risk of descending while not in the area for obstacle clearance? And did you know that the maximum width of the obstacle clearance area is 2 nm either side of the localizer? (Ref GPH 209, Art 1310-7, diagram 13-A.)

Did you know . . . that you must not be above your maximum holding airspeed when entering or flying a holding pattern? (Ref GPH 204, Art 612.) The article states that holding patterns must be entered and flown at or below the following airspeeds:

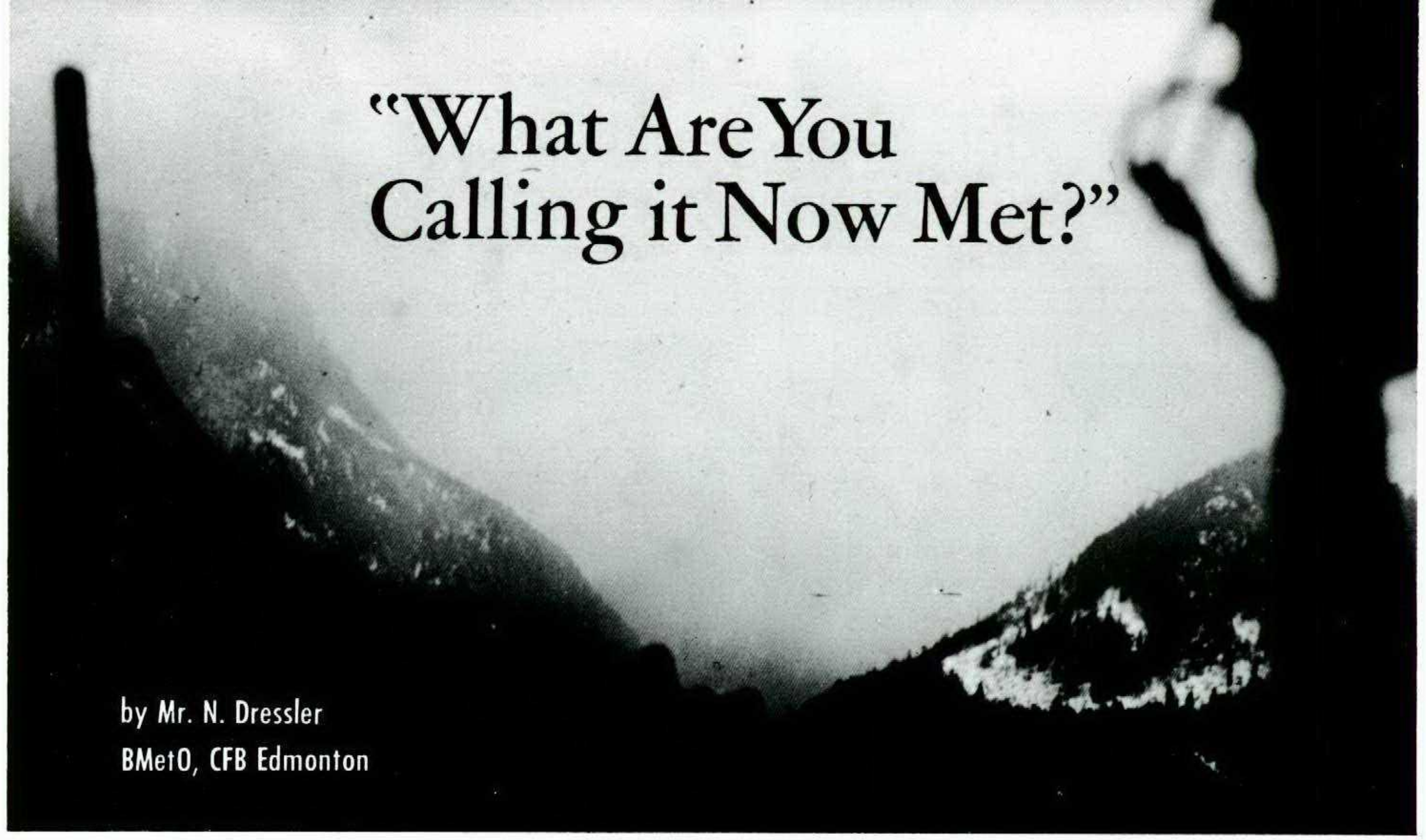
Prop driven aircraft	175 KIAS
Jet aircraft (except (4) below)	
(1) up to and including 6000 feet	200 KIAS
(2) above 6000 feet to 14,000 feet inclusive	210 KIAS
(3) above 14,000 feet	230 KIAS
(4) CF101, CF104, CF5	310 KIAS

Pilots are to advise ATC immediately if airspeeds in excess of those specified above become necessary for any reason, including turbulence, or if unable to accomplish any part of the holding procedure.

Refuelling Muddle

A recent incident report describing the refuelling of a USN C131 with the wrong type of fuel at a CF base, shows just how easy it is for a slight uncertainty or misunderstanding to lead to big trouble. Readers will draw their own conclusions as to whether *their* operations have weaknesses which could lead to a similar muddle.

"On landing, request for fuel was passed to the NCO i/c Line Servicing. The NCO called the fuel bowser operator and requested 115/145 fuel for the C131. In order to identify the type of aircraft for the bowser driver, the term "American Cosmo" was used because the bowser driver did not know what a C131 looked like. This term apparently set the bowser driver's mind on JP4 because CF Cosmopolitan (Convair) aircraft take JP4. The bowser driver selected the JP4 truck despite the order 115/145. When the truck arrived, the aircraft crew began refuelling. No personnel from line servicing were present. The bowser driver didn't challenge the aircraft crew as to the type of fuel required, nor did the aircraft crew challenge the driver as to what type of fuel he had delivered. Fuelling continued until a member of the crew noticed the JP4 sign on the truck."



"What Are You Calling it Now Met?"

by Mr. N. Dressler
BMetO, CFB Edmonton

It is a well recognized fact in aviation circles that flight familiarization is an important, even necessary part of training for aircraft maintenance technicians, air traffic control officers and many other ground support personnel.

Flight familiarization is a very important part of training for a meteorologist as well. Such experience can mean the difference between a truly operational meteorologist and one who simply writes forecasts. The graduate meteorologist has a good background in physics and mathematics and has been taught innumerable theoretical relationships involving the interaction between aircraft and the various meteorological parameters. If his training ends at that point, his approach to forecasting is purely theoretical. He becomes in effect a "legless man who teaches running". For a meteorologist to actually experience the effects of clear icing on an aircraft, or of moderate turbulence on the crew, and to witness the spur of the moment decisions an aircraft commander is required to make when destination weather suddenly deteriorates below landing minimums, gives him an appreciation of the serious nature of such occurrences. This type of experience will undoubtedly cause vivid imagery to flash through his mind when preparing forecasts or briefing crews back at the weather office, thus helping him to communicate his knowledge a little more clearly and to align his forecast more closely to operational requirements.

On several occasions I have been asked for the authority which allows civilian meteorologists to accompany military flights for familiarization purposes. It is generally accepted that the authority exists, but the actual reference is not commonly known. Admittedly the authority is not easy to find because the index in CFAOs does not lead you directly to it. However, if you check CFAO 20-20, item 14 in the table of Annex A, Appendix 1, you will find that such flights are permissible under Base Commanders' authority for Domestic flights, and with CFHQ authority for International flights.

Several other side benefits can be derived from such flights. For example, viewing the terrain from the air, particularly around frequently-used terminals, gives the forecaster a better understanding of the local topographical influences and helps him to interpret forecasts in the light of these influences at subsequent briefings. Visiting other weather offices and discussing mutual problems with local staff, helps to improve techniques and hopefully results in better service to aircrew.

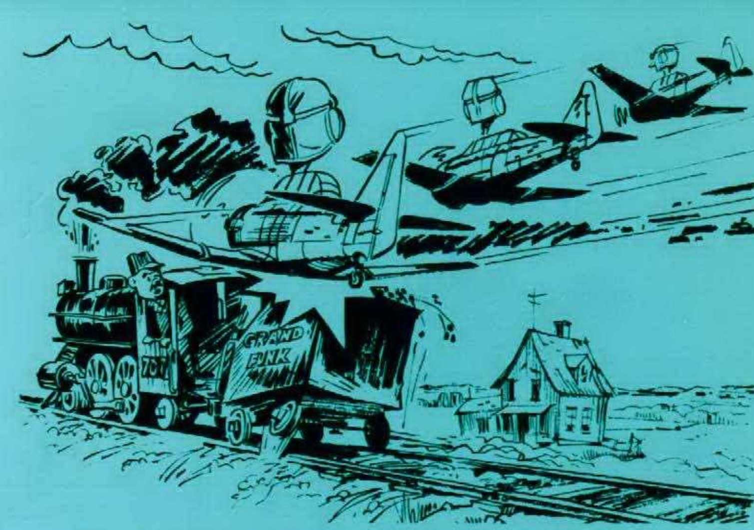
As part of the price for taking a familiarization flight, the forecaster usually is requested to prepare the crew briefing. This ensures his full understanding of the weather situation at the time of departure. After completion of the trip, he prepares a report on what he has earned from the experience. This procedure has a three-fold benefit: It gives the individual some practice in report writing, it conveys the knowledge he has gained to his colleagues, and last but not least it provides an indication of his writing ability to his superiors.

When a Met Man is on a familiarization flight, the aircrew are afforded the opportunity to demonstrate graphically their need for particular weather information or service. Having the captive attention of a meteorologist for a few hours might provide the ideal opportunity to have that question you missed on the last aircrew Met exam explained. It also gives the crew a chance to show why Aalborg, for example, is a better alternate on a trans-Atlantic flight than Prestwick or why it is better to RON in Vancouver rather than Comox.

In this brief discussion of flight familiarization, let us not forget the Met Tech. He is charged with the responsibility of trying to describe to the pilot the present weather conditions at his aerodrome, by means of the Hourly Weather Report. Flights, particularly during marginal weather conditions, will dramatically bring home the requirement for accurate weather observations and timely specials. The Met Tech's understanding of air operations is becoming more important with the gradual involvement of senior Techs in briefing positions.

The next time you're in the local weather office, why not make plans to take a member of the Met staff flying.

Flashback



A midair with a train (and flying away from it) unquestionably qualifies as an unusual occurrence. But it really happened! The description of the event appeared in a 1949 issue of "Crash Comment", the predecessor of "Flight Comment". While the main lesson in the account seems to have been effective – there have been no subsequent train-plane tangles–, the pre-flight "runaround" described in the last paragraph is a ritual that has been carefully preserved and is still practised by some aircrew.

"The trade of locomotive engineer can be hazardous, as one of its followers found during what should have been a peaceful and uneventful jaunt through a section of rural Quebec. In this case it was stated 'my coal tender was struck by an aircraft and the ventilator on top of the cab was scraped. I looked out and saw three aircraft going away but one was a little lower than the other two.'

"Later some parts from a light series bomb carrier were found in the coal tender and a bomb carrier on one Harvard was found damaged. Also the starboard wing, to which the carrier had been attached, was damaged 'beyond repair'.

"It was later established that the aircraft involved was one of three engaged in a formation flying exercise and was flown in No. 3 position. The formation leader said they were down 'as low as 300 ft.' The No. 3 pilot stated, 'I was not conscious of being at a dangerously low altitude but as I was concentrating on keeping position in the formation it was not possible to observe the ground as well. I did not see any train. . . . . and was most certainly not conscious of the aircraft hitting any object'.

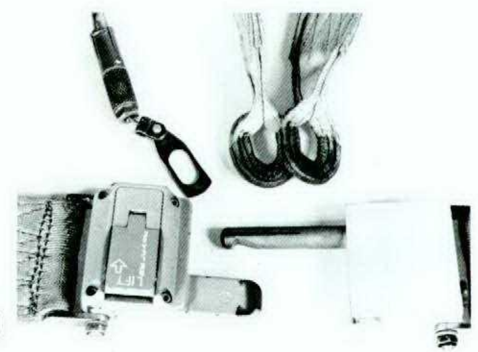
"One should keep an eye on one's leader during formation flying, but if you are so close that his aircraft, or whichever aircraft you are following, obscures all other objects, then you are maybe a little too close.

"The aircraft concerned was flown four times on the day of this incident and the damage was done on the first flight. The damage was not discovered until the next daily inspection. The various pilots concerned all made a pre-flight check of the aircraft."

A Modified RPI Lapbelt

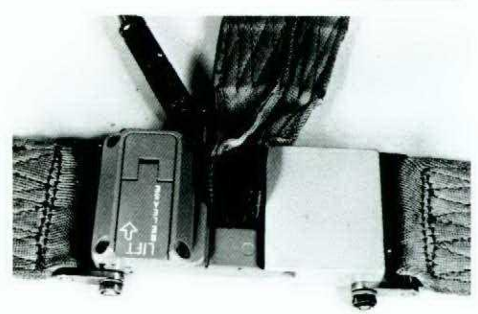
A modified RPI lap belt is being introduced into service. This "new" belt features a pull actuator on a hinge block to replace the present thumb button on the manual portion of the belt. The modification represents a vast improvement over the present lap belt in both safety and ease of operation:

- Provides a positive lock
- Cannot inadvertently open under normal use, strap loading, and shock loading
- Easier to open and close
- Satisfies or exceeds all applicable specifications.



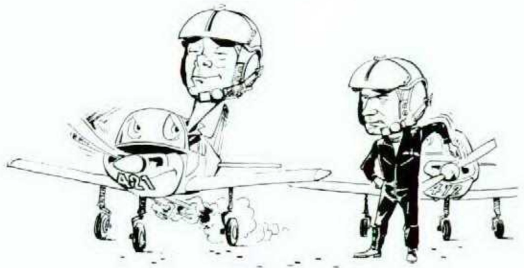
1. Open and unarmed

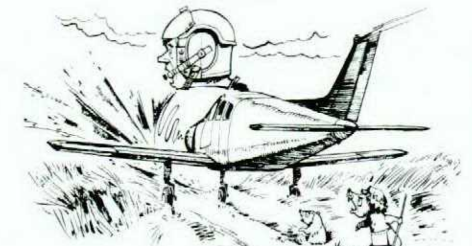
2. Armed and engaged (unlocked)

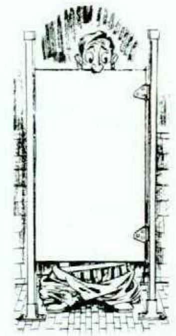


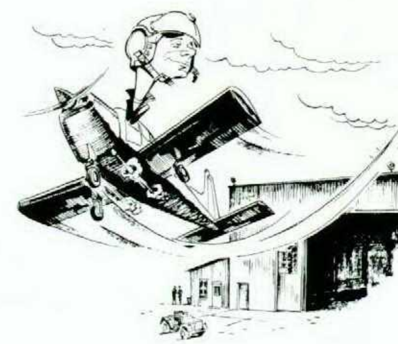
3. Locked

4. Released to open









A Look at a Rumble Book

In all fields where the influence of advancing technology has been felt, probably nowhere has the impact been greater than in the aircraft we fly. Yet, strange as it may seem, some aspects of the flying game have succeeded in resisting change to a significant degree. This fact was brought home not long ago when we had the opportunity to browse through a current Rumble Book. As you read these extracts you will see (whether your flying training took place last year or 30 years ago) that aside from the obvious influence of inflation, ". . . . crooked loops and student bloops and misdemeanourings . . . ." are still with us — essentially unchanged. (Our thanks to A Flight of 3 CFFTS Primary Training Squadron at CFB Portage.)

Rules for the Rumble Record

1. All entries are to be made by a Qualified Flying Instructor, duly authorized and learned in the ways of monetary stimuli.
2. Any scorn and/or abuse levied against the party of the first part, hereafter known as the Rumbler, by the party of the second part, hereafter known as the Rumblee, shall result in an immediate audience with the Flight Commander, hereafter known as the Grand Exalted Doubler of Rumbles.
3. The maximum value of all such penalties shall be $5.00, however, if further action shall be deemed necessary by the Rumbler, that action shall take the form of hangar cleanliness duties.
4. Regardless of the nationality of the Rumblee, all currency shall be Canadian.

OFFENCE	PENALTY
Wrote up a serviceable aircraft as unserviceable – cause primer unlocked	1.00
Destroying his instructor's confidence	2.00
Leaving pieces of check list in aircraft	.25
Sleeping in lounge (under influence of meditation)	1.00
Falling asleep in the circuit	1.00
Doing pre-flight on wrong aircraft	1.00
Not signing in	.25
After getting landing instructions, student indignantly asked tower, "29.81, what's that?"	.10
Wanted to land on wrong runway	1.00
General principles	.50
Cutting off former instructor in the circuit	1.50
Giving fellow students duff gen re runup areas, particularly runway 19	.50
"Ratting" on a fellow student	1.00
Not removing power before applying brakes	1.00
Forgetting time board	1.00
Subtracting X number of days from instructor's life span	4.00
Walking across tarmac like Capt Canada with helmet on	1.00
Power against brakes x 4	1.25
Forgetting post-landing check	.50
Flying with "blinders"	1.00
Poor briefing preparation	1.00
Improper post-landing sequence	.25
Parking in middle of taxiway for post-landing check	.50
Messy time board	.50
Cutting off the deputy Flight Commander in circuit	1.00
Revenge from his instructor	.50
Forgot to call tower on final (twice)	1.00
Causing left side of rwy to be worn down more than the right side	1.25
Mags on after shutdown	.25
Pulling dumb stunts during air exercises	2.00
Wearing instructor's patience "very" thin	1.00
You bug me	1.00
Forgetting multi checks (25 ¢ a doz)	.50
No landing clearance	3.00
Trying to enter a spin *2300 feet above ground*!	2.34
Making an uncalled for attempt on his instructor's life & mental well-being – *using stall recovery for a spin*!	1.00
Trying to spin outside area	1.25
Flying without a map of area	2.00
Having the nerve to deface B Flt's rumble book	1.01
Forgot downwind check (x 3)	1.50
1100 RPM when groundcrew removing chocks	1.00
Leaving pants in aircraft	.75
Calling initial in Dutch	1.50
Forgot post-takeoff check	.25
Forgot post-takeoff check again	.50
Again	.75
Again	1.00
And again	1.25
One more time	1.50
No landing clearance	.25
No clearance again	.25
Once again	.25
That's a real bad habit you have there	.25
Housing his brains in his wooden shoes – took off into a formation of 2 CF5s when told by the tower to "hold"!	5.00
Started wrong aircraft	5.00
No climbing turns. Did not listen to tower when all aircraft advised circuit altitude changed	2.50
Wrong procedure for landing att stall	.50
Incorrect joining procedure on engine failure after takeoff – tried to land on roof of barn!	1.00
Trying to steal an aircraft	1.00
Forgot final clearance x 6 @ .50	3.00
Arrived late at Flight and enjoyed it	1.00
Brushing teeth on company time	.12
Trying to take off on one mag	2.00
Mishandling throttle	.50
Trying to take out a landing light	1.00
Wrong terminology for raising flaps	.50
Failure to understand good honest slang	.50
Hiding from instructor	.50
Trying to take spotlights off the top of # 1 hangar with landing gear	1.00
Trying to mow the grass on the infield with a Musketeer propeller	1.00
Trying to snow instructor about what was printed on his checklist (pre-land)	.25
Student tied up aircraft in greed	.50
Student made low level high speed dart (unauthorized) at tower	1.00

Again last year the rigours of our northern winter brought a rash of weather-related mishaps – including a fatal accident in whiteout conditions. The recurring nature of many of these misadventures should provide clues for managers and supervisors as to which aspects of their operation are most likely to encounter winter woes. Their preventive thrusts could involve such measures as the provision of suitable clothing, ensurance that over-exposure to cold will be avoided, re-emphasis of the responsibilities of tow-crew supervisors, or warnings to anyone who might be tempted to press-on into snowshowers.

WINTER WOES

(an annual feature – No. 6 in the series)

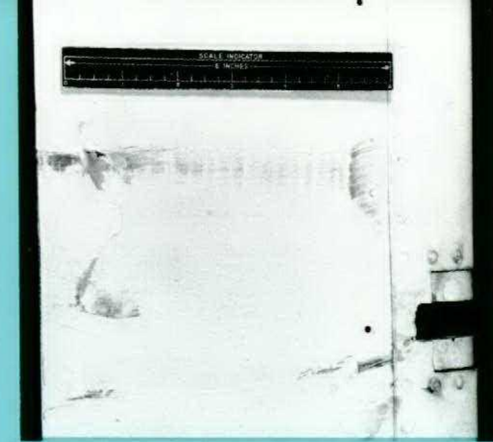
Last winter's record shows that . . .

- Whiteout over an unbroken snow-covered surface continues to be a lethal hazard for low flying aircraft.
- Towing crews exposed to extreme temperatures and hazardous winter conditions are more prone to errors in judgement resulting in towing mishaps.
- Radar and other final approach aids are recommended for avoiding undershoots when whiteout conditions exist in the runway approach area.
- Personnel continue to take chances by not wearing adequate environmental clothing.
- Lack of suitable winter apparel for technicians continues to appear as a cause factor in aircraft occurrences.
- Specific tie-down instructions for helicopters are a must.
- Cockpit visibility in a helicopter can drop instantly to zero when flown near snow-covered ground.
- Tall, rigidly constructed obstacles can turn up in the path of towing operations where they are least expected.
- No aircraft damage was attributable to private automobiles.
- For the fourth year in a row Otters stayed off thin, thin ice.

	WINTER INCIDENTS		WINTER ACCIDENTS	
	70-71	71-72	70-71	71-72
SNOW ON INFIELD	1	1	1	0
RESTRICTED VISIBILITY – HEAVY SNOW AND WHITEOUT	5	5	0	2
SNOW/ICE/SLUSH – RUNWAYS TAXIWAYS AND RAMPS	12	18	0	0
ICING – AIRFRAME, ENGINE LANDING GEAR, FLIGHT CONTROLS AND INSTRUMENTS	27	29	0	1

Partial whiteout and marginal weather conditions obscured visual references as the crew of this SAR Dakota attempted to drop supplies to a downed pilot. Evidence indicates that the aircraft stalled and crashed during a low level turn. All eight crewmembers perished.

Windrows of snow across the runway are not an uncommon winter phenomenon. Up to four feet deep in places, they provided an arrival surprise for the crew of this T33 landing in snow and blowing snow.

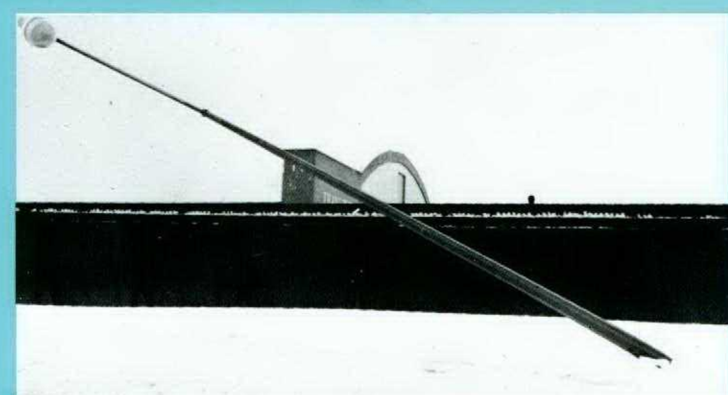


Snow and ice along one part of the tarmac prompted the tow crew supervisor to move the Argus along the opposite side, even though one wing would protrude over the snow-covered grass area. This route also afforded the crew some respite from the night's -44°F wind chill. Not until the last moment before impact did the wing man notice the obstacle. The crew assumed the area along the tarmac was free of obstacles and probably the last thing they expected to be opposed by was a tall (10' 2") fire hydrant marker constructed of *1-1/4-inch diameter pipe*.

With snow and ice completely covering the airfield, the Argus pilot had difficulty finding the exact location of the runway as he turned final, and whiteout conditions on final made depth perception deceptive. It just wasn't a day for VFR approaches and landings.

"Now *that's* what I call a well-defined ceiling."

A lamp post, a noisy muffler system, snow and slush – what did they mean? For one thing, trouble for a crew towing a Cosmo. The lamp post, lurking just behind a blast fence, went unnoticed by the tractor driver who was concentrating on preventing his vehicle and the aircraft from becoming snowbound. The noise of the vehicle drowned out the shouted warnings from the cockpit, and when the driver finally became aware of the impending crunch, his braking efforts were ineffective on the slippery surface.



A sudden, unexpected increase in wind velocity was one cause for winter grief. The Voyageur had not been tied down after its last flight (EO data on tie-down requirements was not specific) and when the high winds struck, the blades began to rotate, flapping and damaging the fuselage before technicians working nearby were able to bring them to a stop.

Single Action Ejection Controls

...what's new in life support equipment

by Capt R. L. Chercoe

Except for the CF104 and CF100, all other CF ejection-seat equipped aircraft require two distinct actions to initiate the ejection sequence. However, modifications are now in progress to refit the CF101, Tutor, T33, and CF5. As you read this article it is probable that the CF101 seat refit will have been completed, while on the other hand, a modification kit for the CF5 seat has not yet been approved. The Tutor and T33 modification program should be under way in the near future.

Why a single-action ejection control? It can be argued that the two-action sequence is much safer, in that inadvertently raising the armrest (or leg guard, as it's called on some aircraft) will not initiate ejection. As a matter of fact, raising the leg guard in the CF5 only exposes the trigger which then must be squeezed before even the canopy is fired. These safety features aimed at preventing inadvertent ejections are not in question, however several accidents have led us to conclude that a two-action sequence is undesirable. Aircrew confronted with an ejection decision are under high stress and may not be able to find the ejection trigger. One example of this occurred following a mid-air collision, when a highly experienced pilot raised the armrest but could not find the ejection trigger. He released his harness and, luckily, was thrown clear of the tumbling aircraft, suffering only minor injury. Another pilot was not so lucky; he attempted a low level ejection but was not successful. In this case, plots of the canopy and ejection seat trajectories showed that there was a delay of approximately two seconds between the time the canopy was fired and the time ejection finally took place. Had ejection occurred in a normal sequence, it would likely have been successful. Although the cause of the two-second delay will never be known, fumbling for the ejection trigger cannot be discounted. Single-action ejection controls should overcome the problem of *finding and actuating* the control, thereby saving previous seconds in the ejection sequence.

Okay, the "why" of single-action controls has been explained. Now for the "how". This is not intended to be a technical dissertation on the modified seats, but rather a general discussion on how the modified seat will affect aircrew actions, plus a few precautions which must be observed.

All that is required to initiate ejection in the modified aircraft is movement of the armrest (or leg guard). The force required to move the armrest or leg guard out of detent will vary slightly with different aircraft types but is in the area of a 20 lb pull force. However, as an additional safety factor, the initiators have "sheer wires" installed which must be broken before the initiator will fire. The pull force required to break the sheer wires and overcome mechanical friction is about 35 lbs, with 60 lbs force being the maximum permitted. Safety Systems techs are required to do a "pull check" (using dummy initiators) before the seat is installed in the aircraft. Decals will be affixed to the handgrips or leg guards warning personnel that the seat is initiated by a single action. Naturally, the seat is safetied by a safety pin which aircrew must remove prior to flight and re-install after each flight.

T33

FRONT SEAT INITIATES EJECTION:

1. **Both ejection handles up, but only right handle initiates ballistic system. Sequence then becomes automatic.**
2. **Canopy ejects and both ballistic inertia reels fire simultaneously.**
3. **Rear seat ejects 1 sec after initiation (to ensure adequate canopy clearance at low speed).**
4. **Front seat ejects 0.5 sec after rear seat (total 1.5 sec after initiation).**

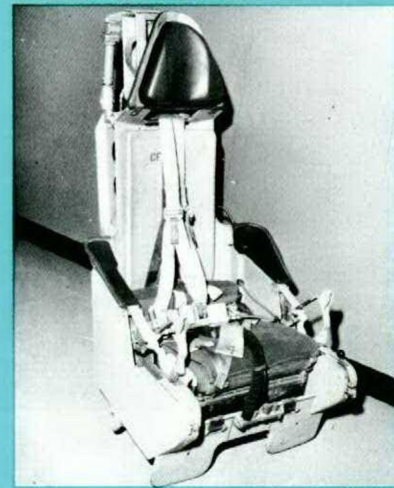
Sequence is same whether or not rear seat is occupied.

REAR SEAT INITIATES EJECTION:

Occupant can also initiate his own ejection independent of front seat occupant's action. Armrests function in the same manner, except front occupant will not be ejected; he must initiate his own sequence. After rocket catapult fire the ejection sequence is the same for both seats:

1. **As the seat goes up the rails, it mechanically fires a 1 sec delay initiator which opens the lap belt and operates the seat/man separator.**
2. **The parachute is armed either by momentum of the automatically opening lap belt segments or by the seat/man separator motion. Parachute arming delay is 1 sec.**
3. **Parachute will be fully inflated 2 to 3 sec after seat/man separation, depending on ejection velocity.**

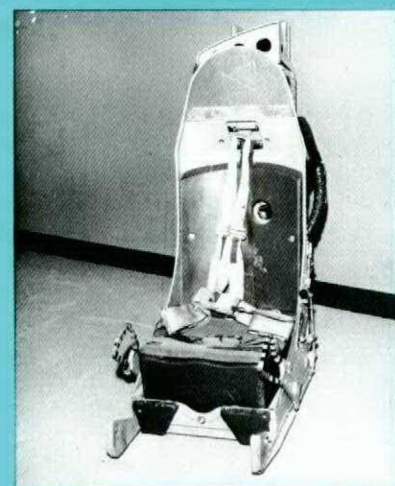
The rear occupant should be under a full canopy approximately 6 sec after raising the armrests. The front seat occupant's sequence is completed 0.5 sec later.



CF101

Each seat has control of its own sequence. The raising of either or both ejection handles will fire the ballistic system as the handles are interconnected. The sequence is automatic from then on:

1. **Canopy goes simultaneously.**
2. **The catapult fires 1 sec later and the seat starts up the rails.**
3. **As the seat goes up the rails, it mechanically fires a 1 sec delay initiator which opens the lap belt and operates the seat/man separator.**
4. **The parachute is armed either by momentum of the automatically opening lap belt segments or by the seat/man separator motion. Parachute arming delay is 1 sec.**
5. **The parachute will be fully inflated 2 to 3 sec after separation, depending on ejection velocity.**



TUTOR

Each seat has control of its own sequence. The raising of either or both ejection handles will fire the ballistic system, as the handles are interconnected. The sequence is automatic from then on:

1. **Canopy goes simultaneously.**
2. **The rocket catapult fires 0.5 sec later and the seat starts up the rails.**
3. **As the seat goes up the rails it mechanically fires a 1 sec delay initiator which opens the lap belt and operates the seat/man separator.**
4. **The parachute is armed either by momentum of the automatically opening lap belt segments or by the seat/man separator motion. Parachute arming delay is 1 sec.**
5. **The parachute will be fully inflated 2 to 3 seconds after separation.**

PRECAUTIONS

Safety precautions with regard to modified seats are basically unchanged and follow good common sense procedures. However, these precautions are re-iterated here for emphasis:

(1) Ensure the Safety Pin is installed *before* entering cockpit. This applies to maintenance personnel and aircrew.

(2) Never remove the safety pin until all strap-in procedures are completed. Be careful when moving lap belt or maritime lanyard. If snagging occurs, take your time and carefully clear the snag. *Never jerk or pull the lap belt or maritime lanyard if it is snagged.*

(3) Ensure that the maritime lanyard is not fouled in ejection handles. Subsequent movement in the cockpit with the lanyard fouled might raise the handle out of detent or cause difficulty during an actual ejection; for example, it might prevent raising the armrest all the way or make seat/man separation impossible.

(4) In an actual ejection situation, *assume proper ejection position before raising the handgrips* (time permitting) since automatic sequencing is rapid and will not provide enough time to properly position yourself.

(5) *Always install the safety pin before unstrapping.* Doublecheck to ensure pin is properly in place.

(6) In event of an emergency ground egress, be aware that the seat may not be safetied. Too much haste could make waste if you inadvertently raise the handgrip.

(7) *Ensure that unqualified personnel,* who may be unfamiliar with the aircraft seat operation, are adequately briefed before flight. This includes unqualified-on-type aircrew and all other personnel who may be required to fly. In addition to thorough briefing, several practice strap-ins and ejections in a simulator are strongly recommended. How many canopies have we lost in the past several years because we thought that the man in the back knew what he was doing? With single action, more than a canopy is at stake!

SUMMARY

In conclusion, the single-action ejection seat will provide us with a slightly increased ejection capability, since only one action is required to initiate an automatic sequence of events once the decision to eject is made. But although an increased ejection capability will result, ejection should not be delayed to the point where success depends on split seconds. The single-action modification is being incorporated for one reason only – *to give us a better chance in an emergency under marginal conditions.* Therefore, the better chance provided must never be compromised for extra time in attempting to salvage a hopeless situation. The system can save your life if used within design parameters – give it a chance to do the job.

KNOWLEDGE VS DESIRE

ONE of the most difficult aspects of flight safety education is the conversion of skeptics into believers. Aircraft accidents will generally accomplish this, but only if the person being converted is involved in the accident himself or has a close friend involved in one. Needless to say, this is the undesirable way.

A pilot must know where and how he is liable to be involved in an accident. Not just in relation to emergencies and other obvious pitfalls, but in relation to the situations and environmental atmospheres that precipitate emergencies and potential accidents. These are the subtle and subconscious causes of accidents, and they are the most heinous of all the causes in that they are so obvious and plain, but yet so nebulous.

We are all human, and because of this, we share common failings. There are three main peculiarities of the species *Pilotorum humanis* that account for the majority of aircraft accidents. Do not deny these manifestations of human nature, because you have them like the rest of our breed. If you have not noticed them by now, you will eventually . . .

The first of these peculiarities is the fact that men tend to be prouder of their willingness to take a chance than of their caution, conservation, and carefulness. No doubt many of us can recall flying in marginal weather to make that date or stretching our fuel supply to avoid a refuelling delay, or even attempting hazardous flights in aircraft we are not fully qualified to be flying. Sure, we all made it. From the stories we hear, we would think the odds are predominantly in our favor, but are they? Unfortunately, testimony to the contrary reposes quietly in flight safety files under the heading of "Pilot Factor".

While remembering these talks of daring episodes, how many can remember the times you have heard of cancelled flights because of weather or of diverting before reaching the destination because of low fuel? Not many, I'll wager. Why? Because it is human nature to romanticize, to startle, to glamorize. Flying is a romantic business. It is so because it is hazardous.

Any profession that involves hazards over and above those encountered in the more common occupations is romantic. Who does not admire the bullfighter, the mountain climber, the auto race driver? There is an undeniable human tendency to romanticize the risk-taker more than the man who figures a way to avoid the risk.

To what does this all add up? Simply this: conservatism and caution must compete with a subconscious tendency to regard these qualities as a form of timidity unworthy of a pilot.

The second undesirable peculiarity of human nature is the fact that men tend to use their powers of logic and reasoning to find justification for the things they want to do rather than to determine what is best to do. In other words, we tend to compromise our better judgment in favor of our desires by rationalizing.

Basically man is a creature of emotions, feelings, impulses, and unrecognized urges, all kept under precarious control by a flimsy bridle of intelligence, rationality and logic, and the painful whip of authority and social pressure. Most of us, when confronted with a problem involving a conflict between what we know we should do and what we would like to do, tend to seek a way to satisfy our desires while convincing ourselves that it is the proper thing to do.

"I'd sure like to get back to play in that golf tournament this weekend, but the weather looks pretty mean," we say. "What the heck, I need some weather time anyway, and if I stay low I probably won't get any icing." This is rationalization. "I'd like to get home. I know the weather is bad and I shouldn't go. Anyway, I need some weather time. How convenient. Warm up the golf sticks, I'm on my way!"

When man's basic nature, his fundamental urges and strong desires pull him toward one decision, and his education inclines him toward another, all too frequently he will go with his feelings.

Now *the third* undesirable characteristic of man is this: men will risk losses out of all proportion to possible gains if they feel that through their skill and luck they can probably avoid the loss. Why do people in automobiles attempt to pass on hills or blind curves? Why do pilots flying a poor landing approach go on and attempt to land when they know they should go around? They know better. Why do they do it?

Why? Simply because it is one of those undesirable human quirks. What is to be gained and what is to be lost? A few minutes' time in the case of the former, a life in the case of the latter. What gambler would play odds like that? Still, if someone asked if you were a gambler, how would you answer?

If you were to sit with a man in his living room and give him these situations, he would tell you he would do the safe thing. But put him in one of the above situations and see what he does. More than you would expect will gamble. It is human nature, and it comes back to the old conflict of knowledge versus desire.

Being a pilot is a hazardous profession, but it is only as hazardous as you want to make it. Control your desires, and be aware of the traps human nature has laid for you. In years to come, remembering what you have read here may save your life.

APPROACH

Heads Up for Radiosondes

by Capt R.B. Rathbone
NDHQ, DARTS

Statistically, the chances of an aircraft striking a radiosonde balloon are very slim. Yet it has happened – and in a remote area to boot. Fortunately, the aircraft emerged from the encounter unscathed.

We know that when a high-speed aircraft hits a low-speed bird the results are sometimes devastating. On the other hand, the consequences of clobbering a radiosonde instrument package is open to speculation – probably it would be somewhat like hitting a Canada goose. The radiosonde instrument package is roughly the size of a shoe box and weighs about four pounds. It is lifted at 1000 feet per minute by a hydrogen-filled ballon which expands from a diameter of six feet at ground level to some 20 feet, before bursting at an altitude of 80,000 to 100,000 feet.

The radiosonde measures pressure, temperature and humidity, and transmits these readings to the ground release station. Tracking the course of the radiosonde with a highly directional antenna permits the determination of upper wind velocities. No radar reflector is incorporated.

Radiosondes are released by more than 30 Atmospheric Environment Service (AES) stations twice a day, at 1100 hrs GMT and 2300 hrs GMT, and "as required" at several DND bases.

While many of the release points are in fairly remote locations, like Baker Lake, NWT, over two thirds of them – Edmonton and Seven Islands, for example – are within, or beneath positive control airspace. AES policy is to advise local Air Traffic Control facilities of balloon releases, but considering the rate of ascent and the vageries of upper winds, it would be unrealistic to expect ATC to warn all pilots in the area of a balloon release.

So keep an eye out for balloons – some of them could be carrying a nasty surprise.

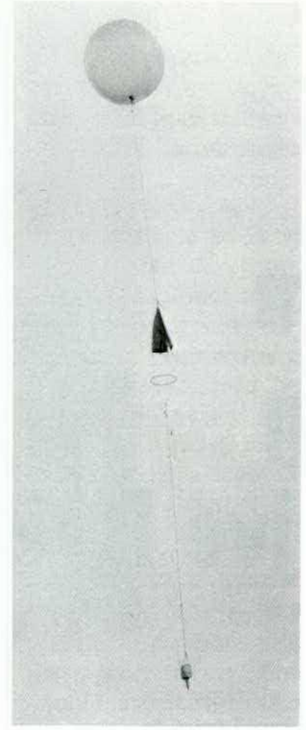
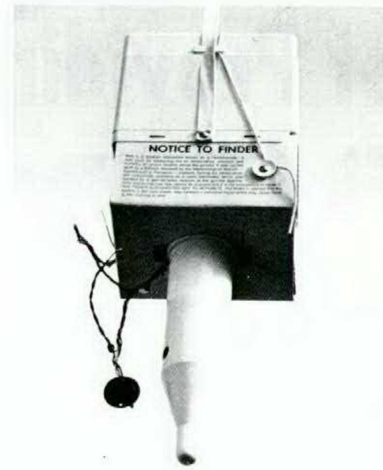


Photo by Steven Leitch



Don't Get Caught With Your Altitude Down

Maj A.J. Timmins
ATC/HQ

Altimeters are calibrated to read correct or true altitude above MSL under International Standard Atmosphere (ISA) conditions. When ISA conditions do not prevail – they seldom do – the altimeter gives an incorrect altitude indication, the magnitude of the error depending on actual pressure and temperature distributions.

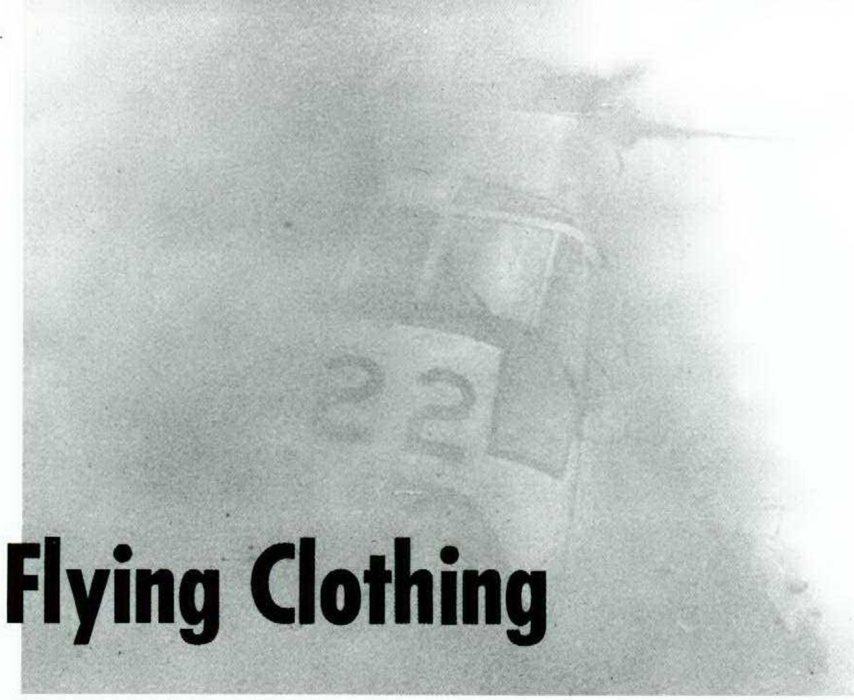
Throughout the Altimeter Setting Region (ASR), the error attributable to pressure deviation is removed when a local altimeter setting is used. However, the error caused by temperature deviations from ISA is not corrected. A problem arises when temperatures are colder than ISA because indicated altitude in that situation will be higher than the actual or true altitude. The error can be calculated; it is four feet per thousand feet of altitude above the station per degree of temperature deviation. The following example shows why it is advisable for aircrew to increase their terrain and obstruction clearance tolerances by 1000 feet when enroute temperatures are below normal:

- Indicated altitude 10,000 feet
- Station Elevation 1,000 feet
- Temperature -35°C
- Solution: 4 x 9 x -30 = -1080 feet
- True altitude is 8920 feet.

A flight in the Standard Pressure Region (SPR) presents a different problem. In this case both pressure and temperature deviations from ISA must be taken into account. Since the aircraft is flown at a Flight Level, it will climb and descend with the standard pressure surface. When the standard pressure surface is lower than normal, the actual or true altitude of the aircraft will be lower than the flight level indicated by the altimeter. The average level for the 700 MB level during the winter months at some northern locations is about 8500 feet. This is 1400 feet lower than would be the case if ISA conditions prevailed, and means that an aircraft flying at FL 10 is actually 8600 feet above MSL.

The implications of low temperatures and low pressure for IFR operations are obvious. Don't get caught with your altitude down.

K. W. L. Kenchington
NDHQ/DCGE



The Problem of Providing Fire Protective Flying Clothing

Fire protective flying clothing for aircrew is a subject that has generated a considerable amount of controversy and a significant effort aimed at developing a satisfactory system. The author, who is head of Clothing and Equipment Development at the Directorate of Clothing and General Engineering, details here why it has not been possible to make flying clothing fire protective without compromising more important characteristics such as comfort and appearance.

The relevant Operational Equipment Requirement (OER A-2/69, released November 1970) lists in order of importance the priority of clothing characteristics required by the users as human engineering (comfort), either appearance or performance (excepting fire protection) depending upon the particular type of garment, fire protection, and reliability and maintainability. In placing fire protection as the fourth priority, the OER points out that for this characteristic a meaningful statement of requirements cannot be defined as yet, undoubtedly because the operational considerations are exceedingly complex. It further states that when such a definition can be made it will be possible to identify or develop suitable materials which can be introduced into current designs of clothing without compromising more important characteristics.

At this point it should be interjected that the technical considerations are also exceedingly complex and imperfectly understood, and this has prevented a "broad band" solution being found. The developer is handicapped by an acknowledged need to provide more information as to the level of fire protection required, and by a priority which imposes some very formidable constraints.

At the present time, the only reference to fire protection contained in the OER is that materials shall be highly resistant to flame and to 'hot melt'. Even if one could ignore requirements of higher priorities, the provision of fabrics to meet this definition of fire protection would leave much to be desired. Fabrics of stainless steel or glass fibre would comply almost perfectly with what is asked for and, moreover, they provide certain protection bonuses, such as retention of strength and structure under conditions of severe assault, but they also transmit heat very efficiently and are thus likely to do a better job at preserving the clothing than protecting the man.

There are many aspects of fire protection to take into account before it is possible to consider the trade-offs to achieve a balance with other needs, and the process must start from fairly objective definitions in order to make finite measurements and to quantify performance as much as possible. Fire protection is not a quality which can be assessed by user trial. Indeed, it is exceedingly difficult to assess by any means, even if the objective is precisely known.

It is generally accepted that the fire hazard of a fabric is dependent upon its ease of ignition, the rate of flame propagation and the amount of heat produced. There are many other factors – such as the manner in which the fabric is exposed, the ambient humidity, the characteristics and duration of ignition – which will affect parameters of the hazard, but even if these additional factors are ignored the interactions remain complex. For example, a light-weight cotton fabric is more likely to ignite easier and burn faster than a heavier fabric of wool, but if complete combustion is allowed, the wool fabric is likely to produce the greater amount of heat (the direct cause of damage to the skin in burning accidents). In this very simple instance it would be reasonable to believe that wool provides the lesser hazard on the grounds that more time is available to extinguish the flame, but what if the wearer is unconscious and help is not immediately available? If, moreover, these fabrics burn at elevated barometric pressures, or in an oxygen enriched atmosphere, combustion will be more rapid and complete, and the argument, such as it is, in favour of wool will be weakened. The point to be made in choosing two such familiar materials as cotton and wool is that performance is dependent upon the circumstances to be catered for, even before considering the broader issues of fire protection and compatibility with other fabric requirements. The plethora of flame retardant fibres and finishes does not alter the situation; nothing is a winner on all counts.

Fire protection is the quality called for in the OER, and this superimposes a number of factors on those relative to fabric combustion. Consider first the man exposed to fire without his clothing having ignited. Very good protection against radiant heat can be provided by using fabrics with a shiny metal surface, but the reflection of heat thus achieved is converted to good absorption if the surface of the clothing becomes soiled, for example by a sooty fire. Such materials are also impermeable, or virtually so, and thus are uncomfortable in normal wear, and their appearance is unacceptable both aesthetically and from considerations of camouflage. Good insulation can be achieved by permeable fabrics of conventional appearance, but only if they are thick enough to accommodate a substantial layer of still air. Their efficiency is further improved by selecting fibres and constructions which least absorb moisture. Unfortunately, both these considerations are opposed to comfort under warm climatic conditions. Thermal capacity, which is a measure of density and specific heat of fabrics, can be useful where short-period protection is required against high rates of heating, and where high thermal insulation cannot be provided. However, fabrics which have a high heat capacity also tend to be good conductors, and as it is impracticable to provide enough material to make a really good heat sink, the effects of high conductivity rapidly take over. Unless the wearer can quickly withdraw from the heat source there is a distinct possibility that heat will be conducted to internal layers much quicker than it can be dissipated, due to restricted convection and, in some instances, low emissivity of the outer layer.

At high rates of heating, but before fabrics ignite, hot gases will begin to be emitted which are liable to cause skin burns unless there is good protection beneath the outer layer. It is interesting that many flame retardant finishes applied to textiles will increase the production of hot gases and, indeed, depend upon these emissions to achieve a local atmosphere which will not support combustion. If a suitable barrier against hot gases is to be incorporated into the clothing, a comfort problem is immediately encountered. The need for some sort of barrier is made more acute if the outer layer crumbles with decomposition. In general, the fire protective qualities of clothing are very dependent upon the thickness, weight and number of layers of fabrics employed, and upon the extent of skin coverage – all of which are opposed to the higher priority requirement for comfort.

When heat applied to clothing raises it to ignition point, it may be argued that for the very highly flame resistant fibres, irreparable damage to the wearer will already have been done, and the extra heat from combustion will be of no consequence if he is already dead. This reasoning may apply, for example, if the wearer was immersed in flame, but not if flame was applied only to a small area. And the reason for making the point is again to emphasize the necessity for establishing exactly what fire protection is intended to mean, if satisfactory solutions are to be found. Normally, of course, the extra heat from combustion is important, as is the behaviour of fabrics when ignited. In this latter respect wool fabrics are beneficial, as they pass through the stage of forming a carbonaceous mass which retains a cohesive structure and, as such, provide a degree of resistance to the transmission of heat. Many of the inherently flame resistant fibres shrink on ignition or exposure to heat, and thus pull the hot surface closer into contact with underclothing or skin. Others are liable to melt and deposit a hot, sticky mass on the skin. A great deal of concern has been expressed for 'hot melt' burns, which are said to be difficult to treat. For all materials which shrink or melt when heat is applied, it is advisable to protect the skin underneath with layers of insulative material, which should in turn not readily combust. Such an arrangement would be acceptable in cold climates, but under hot conditions it would impede body cooling by reducing ventilation and conductive heat loss. (Note: all fibres decompose under conditions generated by crash fires.)

This account has so far concentrated upon the difficulties in achieving fire protection, and in attempting to relate it acceptably to the more important quality of comfort (here it should be noted that the requirement is to enhance comfort, not merely to maintain it). However, these are not the only solutions to be found: it is necessary to cater for fire protection against the more important requirements for minimum electrostatic propensity, the provision of strength to withstand highspeed bail-out, good water-repellent qualities, lightness in weight, and a fairly precisely defined appearance (which restricts scope for alleviating the problem by investigating unconventional designs). There are other requirements classed as more important than fire protection, but these do not represent severe difficulties.

The Nomex Dilemma

While it is impossible to discuss the performance of all candidate materials in a short article, so much comment has been generated on Nomex that a few remarks on its suitability would appear to be expected. Nomex has excellent flame resistance, but it nevertheless shrinks on exposure to heat and, ironically, the strength it retains resists the wearer in breaking out of his hot, shrunk clothing. It is somewhat difficult to dye satisfactorily* and to impart a good water-repellent finish, and it is also susceptible to damage from the ultra-violet portion of sunlight (the OER calls for good protection for the wearer against the effects of solar heating, so presumably it is of some concern if the clothing is degraded by the effect of the sunlight expected). However, taken overall, Nomex is outstanding among flame resistant materials. Unfortunately, like all other candidates, its ability to protect the wearer against fire is dependent upon weight, bulk and body coverage. Furthermore, it has a very low capacity for absorbing moisture, and this adds to the comfort problem created by protection. It also means that the high electrical resistivity of Nomex is preserved even at very high humidities, and thus its electrostatic propensity remains high under all conditions. In this connection it is interesting to note that when the Directorate of Clothing and General Engineering (DCGE) developed and tested a Nomex/Dynel fabric (Dynel is also a fibre of low moisture absorption capacity) for tropical flying clothing, it was criticized for its electrostatic effects and was not enthusiastically regarded for its comfort, despite the fact that it was made so light in weight and porous in construction that it was additionally objected to on grounds of translucency. In retrospect it is fortunate that this development was rejected, because all that was being attempted at the time was to produce a light-weight, flame retardant, comfortable coverall; it possessed very little fire protection capability.

Interest in Nomex continues, and development has shown that when blended with a special fire retardant viscose rayon it is possible to reduce static propensity, and improve performance in respect to comfort, dyeing and finishing. Part of the price which must be paid to achieve these effects is to

* There is evidence to suggest that the most suitable technique for producing colourfast Nomex – by incorporating the colour into the polymer before fibre formation – is liable to increase the rate of burning to approximately the level obtained from cotton.

lose strength, and to progressively reduce flame retardance on washing.

Many other flame retardant fibres and finishes are being examined, but none appear capable of overcoming the comfort problem unless it is declared that only a small degree of fire protection is required. If a high degree of protection is required then it appears necessary to change the order of priorities. It is highly likely that the earliest solution will be found for cold weather flying clothing, as the acceptable weight and bulk allows more scope for implementing the principles of fire protection. The tropical clothing currently under development will provide a greater challenge.

Finally, in approaching the task of determining minimum requirements for fire protection, one can consider some of the extraneous factors which impose limiting objectives. It is well known, for example, that the temperature of inspired air can be the principal cause of fire fatalities. Although survivable exposures to temperatures up to 175°C have been recorded, it is hazardous to breath air in excess of 50°C. Under conditions where lung burns occur, facial burns are also liable to occur and, to complicate matters, air inspired from fires may not be of breathable quality. It is also of interest that the threshold temperature for pain is about 45°C and the highest rate at which heat can be absorbed without causing pain is about 0.025 cal/cm^2/sec. If these exposures are prolonged, irreversible damage to the skin can occur, and with a linear increase in severity of exposures the tolerance times decrease logarithmically, e.g. with an increase in skin temperature from 45°C to 65°C the tolerance time may be reduced six-thousandfold. Of course thresholds for pain and thermal injury are perhaps not of great consequence, but if we compare the associated values for temperature and heat flux with those produced by some typical fire situations, we begin to see what we are up against. In a range of situations which start from proximity to a large fire with an occasional lick from not fully emissive flames, proceed to proximity involving transient immersion in flames, and eventually reach total immersion in flames, it is estimated that the air temperature will rise from about 800°C to 1200°C, and heat flux will increase from about 0.5 to 4.0 cal/cm^2/sec. Allowing for a great deal of variation in values derived from these situations, the magnitude of the problem is still very clear, and there is little point in defining a severe situation to be catered for while the qualities of appearance, comfort, etc are of higher priority, and the provision of cool, breathable air cannot be assured.

Mr K.W.L. Kenchington was educated in England, graduating initially in chemistry. Following part-time commissioned military service in the UK, he resumed studies and qualified as a Chartered Textile Technologist. In 1949 he was appointed Section Head, Clothing and Equipment Physiological Research Establishment, Ministry of Defence, where he specialized in the influences of clothing and equipment on individual military efficiency. In 1958 he became Superintendent, Clothing and Textiles Experimental Unit, Ministry of Defence, with wider responsibilities for research, development and evaluation of military items involving textiles. In 1967 he came to Canada and took up his present position as Section Head, Clothing and Equipment Development, Directorate of Clothing and General Engineering, CFHQ.

Mr. Kenchington holds separate Fellowships awarded by the Textile Institute and the Clothing Institute, and in 1961 was presented with the Textile Institute Medal for contributions to the science of textiles and clothing during the post-war years. Among his present appointments he serves as Director of the Canadian Institute of Textile Science.

ROTORWASH

With the greatly expanded helicopter operation in the Canadian Forces (they now account for one-third of our operational aircraft), more and more attention is being directed towards helicopter accident prevention. To this end, helicopter content in Flight Comment has gradually increased over the last few years and more information has been provided by way of posters and the Info Kit. ROTORWASH is a new regular feature (directed to helicopter types) based on the philosophy that professional pilots should know not only how their aircraft flies, but why. It will endeavour to provide food for thought as well as answering questions. If you have something to ask, write!

Q What is the difference between ground cushion and ground effect?

A. No, they are not the same. In 1972 there are still people who say that when you hover close to the ground a nice little bubble of air is built up and as a result, you require less power because the aircraft weight is supported by this denser air.

In a hovering helicopter the power required can be broken down into two distinct areas: that due to the generation of the thrust of the rotor (lift) and that due to the profile drag on the rotor. When the helicopter is hovering in the vicinity of the ground, the downwash will be deflected. Under such condition the induced drag and thus the induced power is less than when out of ground effect.

The same thing happens in fixed wing aircraft close to the ground as in helicopters hovering in ground effect. CFP 169(1) article 2311 contains the information.

Gen from Two-Ten

CF5, ABORTED TAKEOFF During a two-plane formation takeoff from Frobisher Bay, the pilot of the lead aircraft aborted when he was unable to rotate his aircraft at the programmed airspeed. An icy runway impeded his efforts to stop and finally a tire blew and the aircraft rolled off the end at 30-40K. In the overrun, the nose gear collapsed and the recce nose was damaged.

The investigation showed that the accident stemmed from a series of relatively minor events, the absence of any one of which could have averted the mishap:

- the pilot did not maintain aft stick pressure during the rotation attempt;
- The pilot miscalculated his takeoff weight which led to errors in computing takeoff parameters. As a result, he failed to achieve the rotation speed required for his configuration.
- For many technical and environmental reasons, a portable barrier has not yet been acquired by the Canadian Forces, hence no barrier was available at Frobisher;
- Due to the pilot's incorrect interpretation of limiting drag chute speeds, he delayed deploying the chute.

Corrective measures in the aftermath of this accident focussed on the need for more attention to detail, thoroughness of pre-flight planning and a greater general knowledge of aircraft operations. They stressed that these points must be considered by all levels of command in planning and supervision of this type of operation. Deployments must be influenced by the resources available and environmental conditions encountered.

T33, WHEELS UP The aircraft had returned to base and completed two full traffic patterns. Overshooting from the second one, the pilot called for a closed pattern, followed by a touch-and-go. As he came in for the touch-and-go, he noted an unusually long float period and a quick glance at the gear indicators confirmed the worst. He applied full power, but the aircraft contacted the runway so he throttled off and slid to a stop.

The review of events immediately prior to the mishap showed that the aircraft had been cleared for the closed, but had not been assigned a number in the landing sequence because the controller was unsure of the exact position of another aircraft on final for an IFR approach. As the pilot levelled on downwind the controller transmitted, "...keep it tight you'll be number one." The pilot was reducing power and the landing gear warning horn was sounding at that point, so the second pilot, in the rear cockpit,

"punched off" the horn to be able to hear the tower transmissions, however, he failed to inform the pilot of his action. The pilot kept his speed up until abeam the button, where he selected speed brakes, lowered flaps and began final turn, during which he acknowledged the tower's gear check by replying that he had "three wheels". During the turn the pilot was looking for the other traffic. Similarly, tower personnel were concerned with spotting the IFR traffic to ensure there would be no conflict.

This mishap reflects a fairly classical case of human failure, in that the pilot was subjected to a number of stress factors. He was on the CF101 OTU and had just flown his first CF101 flight that morning. Flying another type of aircraft (He had not flown the T33 for at least six weeks) during this phase can easily lead to confusion in handling techniques. Being told to "keep his circuit tight" in fact resulted in an interrupted procedure and, as so often happens, the consequent omission of some item of a routine check.

The moral of this episode has been stated before, but needs periodic airing: If you find that any of your normally routine procedures are interrupted, be on the alert. Attend to the problem creating the distraction, then, when you can afford your undivided attention, re-do the entire check or procedure.

MUSKETEER, FORCED LANDING Two pilots on a staff mutual encountered an extremely rough-running engine in the middle of an aerobatic sequence. All efforts to clear the engine were to no avail and with insufficient power to hold level flight they declared an emergency and made a successful forced landing in a field.

Investigation showed that carburettor was partially blocked by an empty desiccant bag lodged behind the carburettor intake filter. The desiccant had been placed in the carburettor intake when the aircraft was placed in short term storage in order to absorb moisture, but had not been properly tagged. When the aircraft was brought out of storage the foreign material was not detected by the inspecting technician. The aircraft flew 60 hours before the bag finally worked its way into a position where it could cause a problem.

Fortunately, this turned out to be an inexpensive reminder of the hazards which can be brought about as a result of superficial inspections. A similar power loss under other circumstances could have extracted a higher price by far.

Safety '75 Sécurité

DND SAFETY TARGET '75

You will be seeing a lot of the above "logo" over the next few years. As a symbol representing the "DND Safety Target '75" campaign, it will be used in DND news media and in safety periodicals, posters and other material to help publicize, create interest and motivate people to participate in this campaign.

The message from the Minister of National Defence and a joint message from the Deputy Minister and Chief of the Defence Staff launching this campaign illustrate the importance, goal, scope and major requirements of "DND Safety Target '75".

FROM MND

SUBJECT: SPECIAL SAFETY CAMPAIGN – DND

1. THE GOVERNMENT OF CANADA HAS CALLED UPON DEPARTMENTS AND AGENCIES TO PARTICIPATE IN A SPECIAL THREE YEAR SAFETY PROGRAM DUE TO THE HIGH RATE OF INJURIES RESULTING FROM ACCIDENTS.

2. DESPITE THE SUCCESS OF VARIOUS DND SAFETY PROGRAMS, EACH YEAR OVER 100 MILITARY AND CIVILIAN PERSONNEL LOSE THEIR LIVES, 7,000 SUFFER DISABLING INJURIES AND LARGE AMOUNTS OF MATERIEL ARE DAMAGED THROUGH ACCIDENTS. THE ANNUAL COST TO DND OF ACCIDENTS EXCEEDS 35 MILLION DOLLARS.

3. THESE UNHAPPY STATISTICS ARE MADE WORSE BY THE FACT THAT THEY NEED NOT HAVE HAPPENED. MOST OF THEM WERE PREVENTABLE. THE HUMAN SUFFERING AND SERIOUS WASTE OF MATERIEL AND MONEY THESE FIGURES REPRESENT ARE CAUSE FOR DEEP CONCERN. THEY CLEARLY INDICATE THE NEED FOR AN ALL OUT DRIVE TO REDUCE ACCIDENTS IN DND.

4. I AM THEREFORE LAUNCHING A SPECIAL THREE-YEAR CAMPAIGN OF EMPHASIS ON SAFETY PROGRAMMING AND ACCIDENT PREVENTION THROUGHOUT THE DEPARTMENT. THIS CAMPAIGN TO BE CODE NAMED DND SAFETY TARGET 75 WILL COMMENCE IMMEDIATELY AND HAVE AS ITS GOAL A MINIMUM 20 PERCENT REDUCTION IN ACCIDENTS BY 1975.

5. THE SUCCESS OF DND SAFETY TARGET 75 DEPENDS UPON THE COOPERATION AND SUPPORT OF EVERYONE, THEREFORE ALL DND MILITARY AND CIVILIAN PERSONNEL MUST PARTICIPATE IN THIS CAMPAIGN.

6. DETAILS OF THE DND SAFETY TARGET 75 CAMPAIGN WILL FOLLOW.

FROM DM AND CDS

SUBJECT: SPECIAL SAFETY CAMPAIGN – DND

1. YOU ARE AWARE THAT THE MINISTER HAS LAUNCHED A SPECIAL SAFETY CAMPAIGN CODE NAMED DND SAFETY TARGET '75 AND HAS ASKED FOR THE SUPPORT OF ALL MILITARY AND CIVILIAN PERSONNEL. WE STRONGLY BELIEVE THAT IT IS VITALLY IMPORTANT TO REDUCE ACCIDENTS THROUGHOUT THE DEPARTMENT AND THAT SAFETY IS A MATTER OF CONCERN FOR EVERYONE.

2. MANY OF THE DEPARTMENT'S SPECIALIZED SAFETY PROGRAMS SUCH AS IN THE FIELDS OF FLIGHT SAFETY, NUCLEAR WEAPONS, FIRE PREVENTION, MECHANICAL SUPPORT EQUIPMENT OPERATION AND EXPLOSIVES HAVE MAINTAINED EXCELLENT RECORDS OVER THE YEARS. THE EFFORTS OF THE PERSONNEL INVOLVED IN THESE AREAS ARE FULLY RECOGNIZED. BUT OUR OVERALL RECORD IS FAR FROM SATISFACTORY.

3. THERE IS AN URGENT NEED TO MINIMIZE ACCIDENTAL MANPOWER AND MATERIEL LOSSES AND TO PROVIDE THE SAFEST POSSIBLE ENVIRONMENT FOR PERSONNEL. THIS IS THE OBJECTIVE OF THE DND SAFETY TARGET 75 CAMPAIGN.

4. SUCCESS OF THIS SPECIAL SAFETY CAMPAIGN WILL DEPEND ON A COMPREHENSIVE AND VIGOROUS SAFETY EFFORT ON THE PART OF ALL PERSONNEL. COMMANDERS, MANAGERS AND SUPERVISORS AT ALL LEVELS MUST ACTIVELY PARTICIPATE IN THE CAMPAIGN AND PROVIDE SAFETY LEADERSHIP AND GUIDANCE FOR ALL ACTIVITIES UNDER THEIR CONTROL.

5. DURING THE PERIOD OF THE CAMPAIGN INCREASING EMPHASIS WILL BE PLACED ON SAFETY PROGRAM ACTIVITIES. THESE WILL INCLUDE SAFETY MANAGEMENT, SAFETY TRAINING, ACCIDENT INVESTIGATION AND REPORTING, ACCIDENT ANALYSIS, SAFETY INSPECTIONS AND SURVEYS, SAFETY COMMUNICATIONS, SAFETY PUBLICITY AND THE DETECTION AND CONTROL OF HAZARDS.

6. DETAILS OF THE CAMPAIGN WILL BE FORWARDED AT AN EARLY DATE AND ASSESSMENTS OF ONGOING PROGRESS WILL BE MADE AT PERIODIC INTERVALS.

DFS is actively participating in the "DND Safety Target '75" campaign with additional emphasis on all aspects of the Flight Safety Program.

Command, base and unit Flight Safety Officers are urged to become personally involved and to cooperate fully with General Safety Officers and DND special safety program personnel in implementing the many safety measures that will be necessary to make the campaign a success. Aircrew members can also make an important contribution in this campaign by applying the principles learned in flight safety training to their other activities and by assisting in creating safety consciousness in other personnel both on and off duty.

Photos Anyone?

Do you have a favourite aviation photo that you would like to share? Flight Comment has a standing requirement for photographs to illustrate the various topics covered in the magazine. Perhaps we could publish yours. The photo on the front cover of the Jul-Aug issue, for example, came from a personal collection. Photos and slides received will be returned within approximately three weeks, as soon as reproductions can be obtained. The address: NDHQ/DFS, Ottawa, Ontario KIA OK2 Attn: Editor, Flight Comment.

New Investigators at DFS

Maj D.A. Davidson

Maj W.G. Willson

Capt R.A. Hall

MAJ D.A. DAVIDSON

Maj Davidson joined the RCAF in 1951 and attended Royal Military College at Kingston. Following wings graduation in 1955, he served flying tours as a Harvard instructor at Claresholm, and as a C119 pilot with 436 Sqn at Downsview. In 1961 he was assigned to instructional duties at the Central Officers' School at Centralia and following that he attended the RCAF Staff College in Toronto. After the completion of Staff College he remained in Toronto on the Directing Staff at the RCAF Staff School and later at the Extension School. During the four years prior to his arrival at DFS, Maj Davidson was Squadron Training and Standards Officer of 435 Sqn, flying Hercules at Namao. At DFS he takes over as an investigator for transport and long-range aircraft, replacing Maj R.L. Rogers who has been transferred to 450 Sqn at Uplands.

MAJ W.G. WILLSON

Maj Willson joined the RCAF in 1955 and obtained his wings at Gimli the following year. He was then transferred to Bagotville where he flew CF100s with 432 Sqn and 413 Sqn. In 1959 he moved to Cold Lake to instruct at the CF100 OTU and later to command the Radar Support Flight there. The CF101 conversion course followed in 1962, after which he joined 410 Sqn at Uplands. While with 410 he completed the Interceptor Weapons Course at Tyndall AFB Florida. In 1964 he was transferred to 416 Sqn at Chatham where he was later appointed BFSO. For three years prior to coming to DFS, Maj Willson was a QFI and Flight Commander at 2 FTS Moose Jaw. He replaces Maj S.O. Fritsch as T33 and Tutor investigator. Maj Fritsch has been transferred to the CFHQ Directorate of General Safety.

CAPT R.A. HALL

Capt Hall joined the Canadian Army in 1956. In 1959 he began flying training on helicopters at Camp Wolters, Texas and Fort Rucker, Alabama, after which he was posted to Fort Benning, Georgia, on exchange duty. Returning to Canada in 1961, he was posted to 4 Transport Company in Winnipeg and while there attended the fixed wing conversion course. This was followed by a tour of duty as Military Career Counsellor at Fort William and then to 1 Transport Helicopter Platoon, during which time he attended the US Army Flight Safety Course at the University of Southern California. In 1968 he was named SOFS-2 at Mobile Command Headquarters where he remained for two years before joining 422 Sqn at Gagetown. Prior to his arrival at DFS, Capt Hall attended The Canadian Land Forces Command and Staff College in Kingston. At DFS he will be an investigator for light, medium and rotary wing aircraft, replacing Maj J.R. Pugh who has been posted to Fort Rucker, Alabama, as CF Liaison Officer.

Comments to the editor

416 Reunion

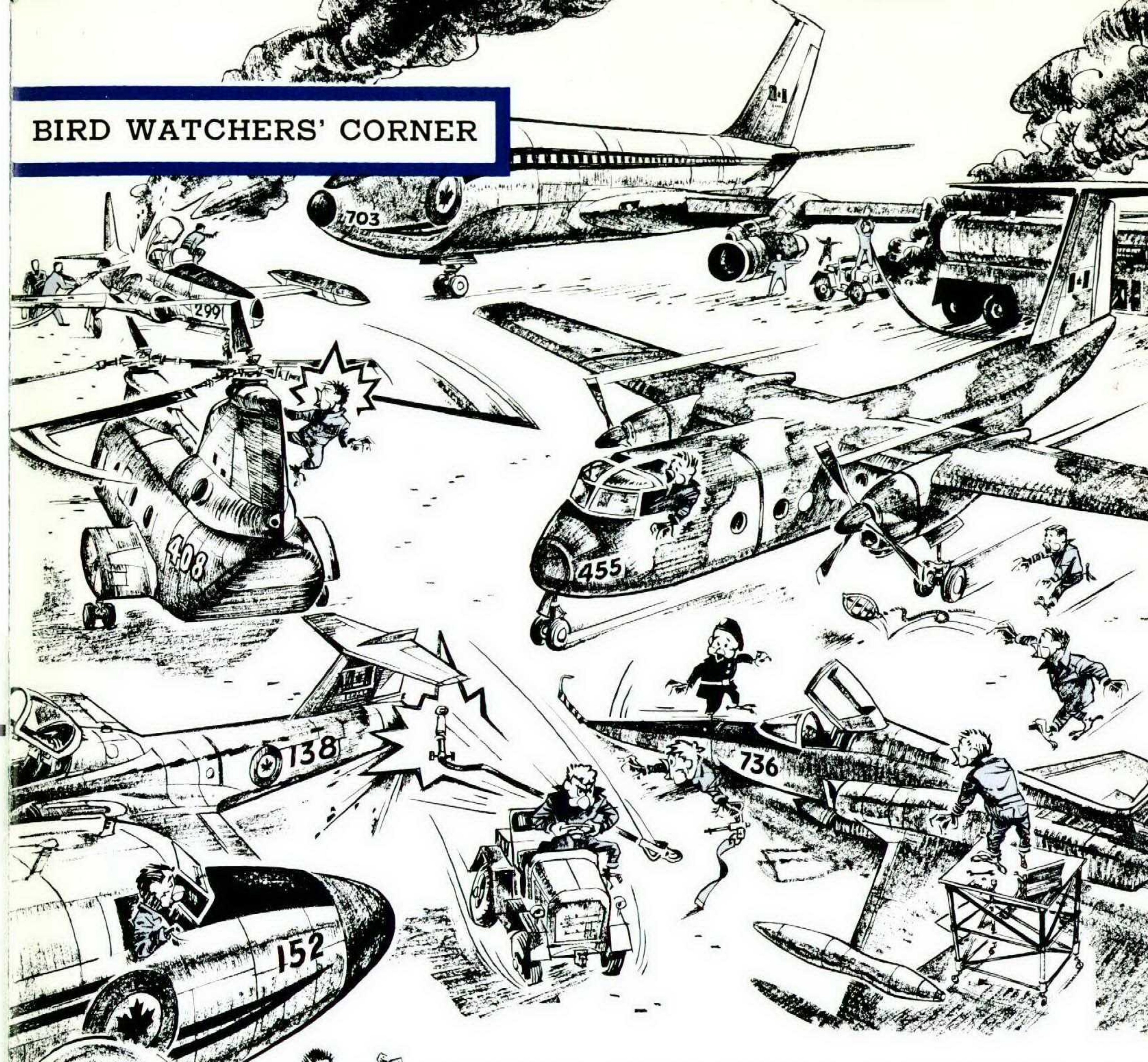
The 416 Lynx Squadron will be celebrating its 25th Anniversary in the spring of 1973 with a reunion of all former Squadron members and the presentation of the Squadron Colours.

Planning for the anniversary has commenced and we are seeking a listing of all aircrew and groundcrew who served with the Squadron since its inception on 22 December 1941.

Former members are requested to provide me with their names and addresses in order that reunion material may be distributed to them.

LCol J.L.Twambley
C.O. 416(F) Sqn
CFB Chatham,
Curtis Park N.B.

BIRD WATCHERS' CORNER



REGULATORUM DEPENDUS

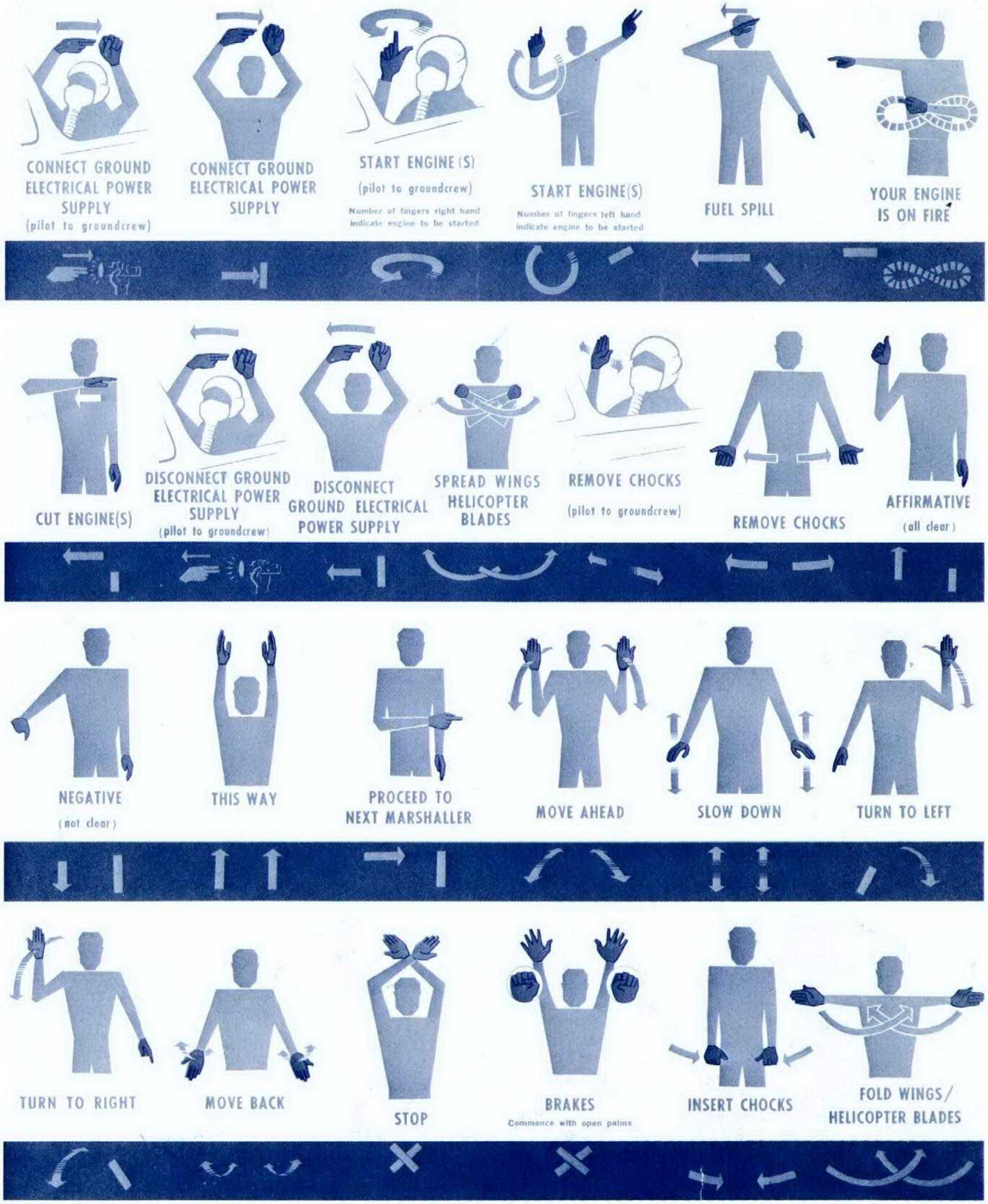
"Show me a drome and I'll show you a Regulatorum Dependus," said the experienced birdwatcher, after surveying the scene of the year's umpteenth mishap ascribed to the same basic cause—absence of common sense. Regard the individual crunches assembled here. Nature has imparted to this sub-species of the family Procedurum Ignorus (even to some of those in a position of authority) a blatant unconcern for the most obvious hazards. And to what is this curious behaviour attributed? The Regulatorum Dependus assign the blame to the lack of detailed instructions, the apparent inference being that guidance must be provided for every conceivable eventuality. Seasoned ornithologists, on the other hand, maintain that common sense is the key, and that asking for written guidance for every contingency is asking for the impossible. The characteristic birdsong can usually be heard sung in chorus:

US-THINK?   OUR-MIND'S-ON-THE-BLINK

CANADIAN FORCES

MARSHALLING SIGNALS - all aircraft

(These are supplemented by Rotary Wing Aircraft signals)



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