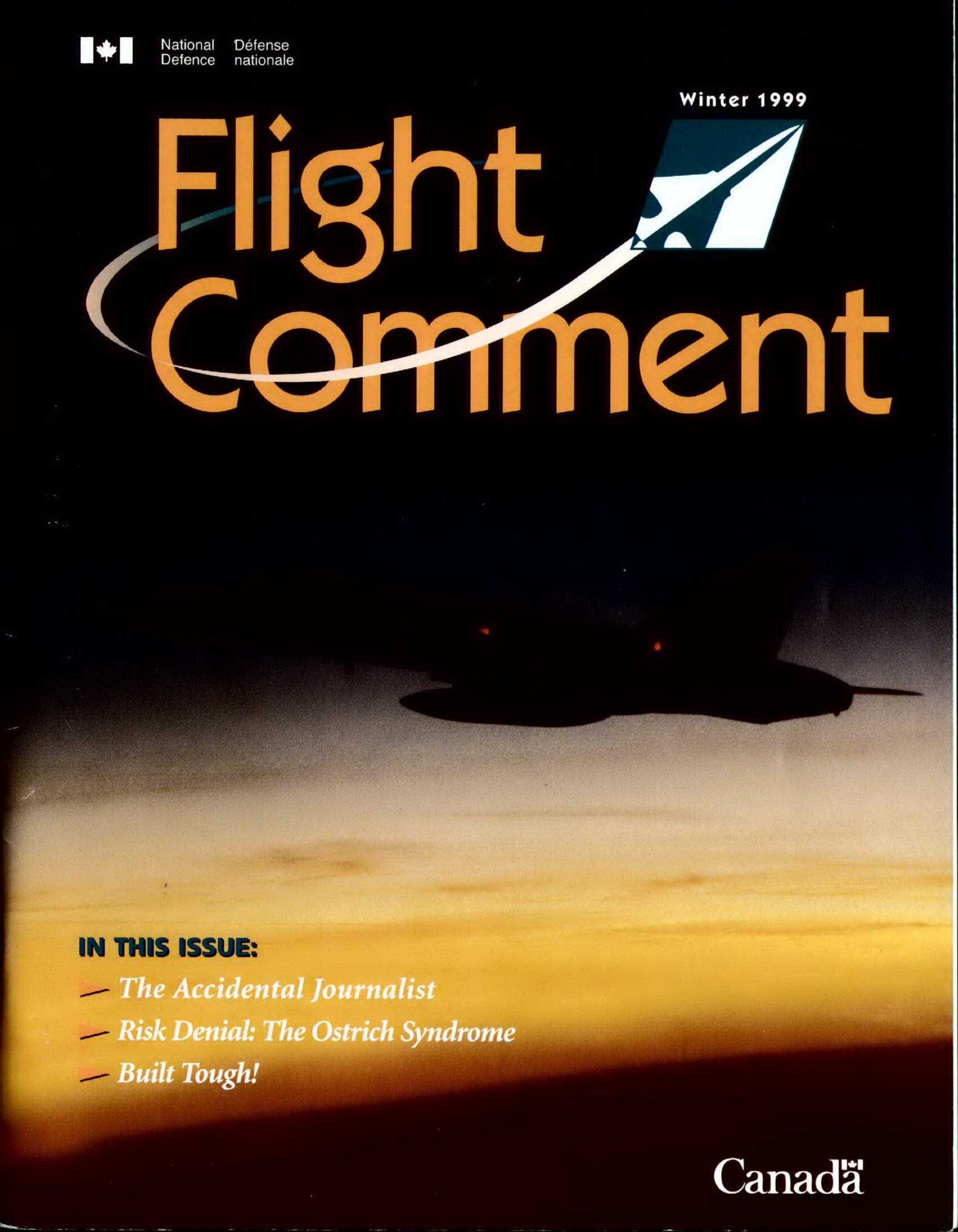
National Defence / Défense nationale

Winter 1999

Flight Comment



IN THIS ISSUE:

- *The Accidental Journalist*
- *Risk Denial: The Ostrich Syndrome*
- *Built Tough!*

Canadä

Table of Contents

Editorial

Departments

Cover photo by Mike Reyno/Skytech Images

Flight Comment

Directorate of Flight Safety

Director of Flight Safety
Col M. Legault

Editor
Capt. J.S. Medves

Art Direction
DGPA-Creative Services

Photographic Support
CF Photo Unit-Rockcliffe
Cpl K. Allan

Translation
Coordinator
Official Languages

Printer
Tri-co
Ottawa, Ontario

The Canadian Forces Flight Safety Magazine

Flight Comment is produced 4 times a year by the Directorate of Flight Safety. The contents do not necessarily reflect official policy and unless otherwise stated should not be construed as regulations, orders or directives.

Contributions, comments and criticism are welcome; the promotion of flight safety is best served by disseminating ideas and on-the-job experience. Send submissions to:

ATT:
Editor, *Flight Comment*
Directorate of Flight Safety
NDHQ/Chief of the Air Staff
Major-General George R. Pearkes Bldg.
Ottawa, Ontario K1A 0K2

Telephone: (613) 995-7495
FAX: (613) 992-5187
E-mail: ac912@issc.debbs.ndhq.dnd.ca

Subscription orders should be directed to:
Publishing Centre, CCG,
Ottawa, Ont. K1A 0S9
Telephone: (613) 956-4800

Annual subscription rate: for Canada, $19.95, single issue $5.50; for other countries, $19.95 US., single issue $5.50 US. Prices do not include GST. Payment should be made to Receiver General for Canada. This Publication or its contents may not be reproduced without the editor's approval.

ISSN 0015-3702
A-JS-000-006/JP-000

The Accidental Journalist

by William Boot

Some years back, a story circulated that Bob Woodward, with a perfectly straight face, had said he saw no reason why a team of dedicated investigative reporters could not discover a cure for cancer. Woodward was known to have an expansive notion of journalism's capabilities— "he thinks you can do virtually anything," according to his erstwhile co-author, Scott Armstrong — but the cancer tale proved to be apocryphal. Even so, I've been tantalized ever since by this vision of near-limitless horizons for journalists and have spent many an hour considering what might be possible, armed with just a notepad and some experience pounding a newsbeat, if only one dared to be great: *WORLD'S FIRST BRAIN TRANSPLANT PERFORMED BY SEATTLE REPORTER; TIME'S SIDEY TESTS STEALTH FIGHTER LIMITS IN DARING SOLO*; "Do people have free will? News Seven's Insight Team has found the answer. Film at 11."

Intriguingly, there is one area in which journalists actually do attempt feats that are nearly this ambitious. I refer to the coverage of major airline accidents.

The National Transportation Safety Board's highly trained investigators in Washington frequently require a year or more to determine the causes of these mishaps, which tend to be very complicated, technical, and hard to trace (at times involving freakish multiple failures of safety back-up systems). Yet journalists, facing deadline pressure and editors' demands, often feel pressed to "solve" the mystery of a crash on the very day it happens, in time for the next edition or broadcast, or as soon thereafter as possible, before the public loses interest. Sad to say, the results of their reporting are often about as satisfactory as those one might expect from a brain operation performed by William Boot. Journalists working under high pressure without access to the flight data and voice recorders or pilot interviews that the NTSB generally has available within a few days are decidedly accident-prone.

But, in keeping with a long tradition, reporters covering the September 20 crackup grasped for quick "explanations," many of which proved to be misleading, incomplete, or flatly wrong,

Aviation experts here in Washington, from the independent NTSB to interest groups such as the Air Transport Pilots Association (ALPA) and Air Transport Association, have been shaking their heads over inaccuracies in air accident coverage for years, as I learned not long ago after being assigned to cover a crash on takeoff at LaGuardia Airport in New York. An NTSB team is still investigating that mishap, in which the pilot aborted the takeoff of USAir flight 50-50, a Boeing 737 which skidded off the runway into the East River, breaking into pieces and killing two passengers. But, in keeping with a long tradition, reporters covering the September 20 crackup grasped for quick "explanations," many of which proved to be misleading, incomplete, or flatly wrong, as for instance:

- The "crazed pilot" thesis. News outlets including *The New York Times*, The Associated Press, and CBS reported that the pilot, Michael Martin, was "mumbling" and "irrational" prior to takeoff. The source of this yarn was co-pilot Constantine Kleissas, who later said his remarks had been misconstrued and Martin had not behaved at all oddly.
- The "fugitive pilot" account, another human-error explanation. Two days after the crash, news organizations reported that the pilot and co-pilot had disappeared. The headlines and lead paragraphs almost certainly lead the audience to infer that the crew was on the run and probably culpable in the crash. *LEAVING THE SCENE OF AN ACCIDENT* was how the *New York Daily News* put it (September 23), The *New York Times* reported in its lead front-page story that Martin and Kleissas were "unavailable without explanation" ...*OFFICIALS SAY CAPTAIN LEFT SCENE AFTER ACCIDENT*. *Newsday* announced: *PILOTS DUCK CRASH PROBE...*" Investigators were trying to determine yesterday why the pilot... disappeared from the crash scene shortly after the plane tumbled from the LaGuardia runway..." The *New York Post* declared: *HIT & RUN... PILOT GOES AWOL...* "The pilot... has dropped out of sight and is refusing to cooperate with investigators." (All September 22).

In fact, there was nothing at all remarkable about the pilots absenting themselves, once they had helped with the rescue of the passengers, which they did. (Sixty-one passengers and crew survived.) According to Ted Lopatkiewicz, a spokesman in the NTSB's Washington headquarters, it is standard practice, and quite legal, for pilots to leave a crash scene and consult attorneys before answering questions from investigators. Even the pilots who brought a disabled United DC-10 in to a crash-landing in Sioux City last summer, and were instantly declared heroes, talked to their lawyers before seeing investigators, according to ALPA.

continued on page 31

LESSONS LEARNED

When Does 500 Feet Equal Five Aircraft Destroyed and 59 Fatalities?

By Major Kevin McCarthy A/DFS 2

During the period from March to November 1998 we came very close losing 59 personnel and destroying five aircraft. Catastrophe was averted by a combined total of about 500 feet of separation. Instead we had four E Cat incidents. It is worthwhile reviewing these incidents to see what lessons can be learned.

Aurora CP140102 – St John's, Newfoundland – 14 March 1998

The crew of an Aurora was on an open ocean surveillance mission when their aircraft suffered several mechanical malfunctions that required them to shut down the number one engine and the number one hydraulic pump. Deteriorating weather in Greenwood, Nova Scotia necessitated a diversion to St John's Newfoundland. The crew requested a straight-in approach after declaring an in-flight emergency. Landing clearance was not received until the aircraft was 1.5 miles from landing because of conflicting traffic on the runway. In the meantime, the crew completed pre-landing checks and configured the aircraft with approach flaps. The co-pilot called the airspeed low and the pilot increased power to compensate. Shortly after, land flap was selected and the co-pilot called the aircraft slow again – this time for the land flap speed. When the aircraft was almost over the end of the runway, a momentary intercom failure and an uncommanded increase in UHF radio volume diverted the pilot's attention. The co-pilot once again called the airspeed low and the pilot initiated an overshoot at below 50 feet AGL with the speed at or near Vmca (Velocity Minimum Control Airborne).

The FE very quickly set maximum power on the three good engines. As a result of the low airspeed and asymmetric power, the aircraft rolled, yawed left, and traced a path west of the runway. The pilot was unable to stop the heading change with deflection of the flight controls and, in fact, eased off on his efforts in order to allow the aircraft to turn inside the control tower. After passing between the tower and the airport terminal complex at low altitude the pilot reduced power on the number 4 engine to counter the asymmetric effects, gained full control, and climbed to circuit altitude prior to completing a safe landing. Compounding the pilot's control difficulties was the reduced output of the hydraulic system as a result of the pump failure and the high demand as the flaps and gear were retracted during the overshoot.

The investigation determined that in addition to allowing the airspeed to fall below minimum approach speed, the pilot was task saturated on short final and crew co-ordination deteriorated during the approach and overshoot.

But for **50 feet** we nearly lost a crew of **11** and an **Aurora**.

Polaris CC15003 – Trenton ON 23 May 98

The Polaris had recently departed Trenton and was climbing to 11,000 feet. The right-seat pilot looked up after completing the post take-off check and a frequency change and was surprised to see a small Cessna at their 1:30 position approximately 300 ft above and 200 ft away on a converging course. There was no time for evasive action by the Polaris. Fortunately there was no mid-air collision. The TCAS (Traffic Collision Avoidance System) on the Polaris was functioning, but provided neither visual nor aural warning. No traffic advisory was issued by ATC.

The investigation revealed that ATC did not identify the collision potential between the known VFR traffic and the departing IFR Polaris. The civilian pilot had elected not to utilize his Transponder, which would have generated a TCAS alert on the CC150, and may also have allowed ATC to identify the collision potential of this situation. If you are under IFR control you are ultimately responsible for avoiding VFR traffic. The requirement to be vigilant in the lower levels especially in high traffic areas is obvious.

But for **300 feet** we nearly suffered the loss of the **Polaris** with **34** people on board as well as the Cessna and its occupants.

Aurora CP140116 – Overwater 60 miles SE St Mawagan UK 28 May 98

At the time of the incident, the crew was setting up for a simulated attack on a co-operative submarine. The aircraft was at 300 feet ASL with the Automatic Flt Control System (AFSC) and Altitude Hold on. After the pilot entered a 40-degree bank turn to set up for the attack the aircraft commenced an inadvertent descent. The descent was not noticed until the aircraft was passing through 200 ft still in the turn, at this point the co-Pilot, FE, and AESOP all gave verbal warnings. The pilot and co-pilot leveled the wings and recovered. The lowest observed altitude was 100 ft.

The crew was flying a demanding low level mission in instrument meteorological conditions at night. After the pilot entered the 40-degree bank turn, his attention became focused on ensuring that the bomb bay door switch was in the open position, that the weapon ready light was on, and that the aircraft would be properly positioned according to the cues on his Horizontal Situation Indicator. The co-pilot had his attention focused on the Armament Control panel and on the Computer Display screen. At some point during the turn, the AFSC altitude hold was deactivated – probably through inadvertent pressure on the yoke switch, and the aircraft began to descend. The warning systems to alert the crew to this danger were all serviceable and did their jobs, yet the crew did not immediately notice them.

Many CP140 pilots have become quite comfortable with operating at minimum altitudes and view aggressive maneuvering at these altitudes as almost routine. Pilots may become conditioned to subconsciously disregard, or give low priority, to Radar Altimeter and altitude warning lights and tones – perhaps as a result of the frequency that they are activated. The 400 ft automatic warning may also contribute to this conditioning because it adds to the number of times this system activates in the course of any given flight.

But for **100 feet** we nearly lost a crew of **11** and an **Aurora** aircraft.

Hercules CC130324 Trenton ON – 16 Oct 98

A formation of three Hercules aircraft was conducting an overshoot after a low approach. The night formation trip was tasked by 1 CAD to evaluate a new night TAL formation procedure. During the rejoin after the overshoot, Number 3 used excessive cut off which almost resulted in a collision with Number 2. Both aircraft took avoiding action, but separation distance was estimated to be as low as 50 feet as Number 3 pulled up and flew over the tail of Number 2 who had bunted down.

The investigation revealed that this was the first night mission being conducted using the new 4000 foot spacing. The rotating beacon on the tail of Number 2 was not working. ATC had informed the formation of the unserviceability on departure but Lead decided to continue as briefed. As well, the Left seat pilot of Number 3 was qualified, but not current to fly this demanding night formation mission

The formation lights on the Herc are difficult to see at 2000 foot spacing and even more so at 4000 feet. The right seat pilot in No. 3 was not comfortable with the rejoin after the overshoot and continued to ask the left seat pilot to confirm he had No. 2 in sight. Eventually he assertively directed the left seat pilot to pull up and roll out and then he broadcast their actions on the tower frequency. This warning resulted in No 2 bunting to further increase the separation. After formation integrity was regained, a full stop landing was completed without further incident.

But for **50** feet we nearly lost **13** crew and two **Hercules** aircraft.

An old Flight Safety adage is that there are no new accidents – only new people having the same old ones. All of these cases have disturbing parallels to past occurrences.

The fly by of the St John's tower was a sobering reminder of the horrific A Cat accident of 31 March 1977 at Summerside Prince Edward Island when an Argus (the predecessor of the Aurora) got below Vmca during a

3 engine overshoot. As in the case of the Aurora, the Argus obeyed the laws of physics and aerodynamics by starting a gradual turn towards the dead engine, notwithstanding the futile efforts of the crew to regain control. Unfortunately the left wingtip of the Argus clipped the tail of a civilian Electra parked on the ramp resulting in the Argus crashing to the ground in a fiery wreck.

The Polaris incident highlights once again the responsibility crews have to see and avoid other traffic even when IFR. A recent E cat incident near the Gagetown Restricted Area in April 1997 was another example of this type of occurrence. In that case it was our T-33 that was VFR – loitering at a visual hold point east of the Restricted Area. An Air Atlantic Jetstream was approaching from the south heading for Fredericton under Instrument Flight Rules. Both TCAS and ATC had warned the crew of the airliner to the presence of the T-33. Even though they were actively searching, the crew of the Jetstream could not locate the T-33 before it appeared belly up in their windscreen. The miss distance was estimated as less than 100 feet or 1/10th of a second at the closing speeds that were involved. The coordinated investigation conducted by the Transportation Safety Board and DFS concluded that at closing speeds of over 400 knots the chance of avoiding a mid air is largely dependent upon chance. By knowing when the danger of collision is greatest we can focus our attention on looking for other traffic. In some cases you might have the rest of you life to see and avoid the other guy and your life may only be a few tenths of a second longer.

By knowing when the danger of collision is greatest we can focus our attention on looking for other traffic. In some cases you might have the rest of you life to see and avoid the other guy and your life may only be a few tenths of a second longer.

The second Aurora incident highlights the need to concentrate on keeping the basic handling of the aircraft as the highest priority. In the heat of an operational scenario you must keep in mind what the most significant threat is, and assign appropriate attention to counter that threat. Another Argus A Cat accident from 1965 tragically demonstrated what can happen if this principle is forgotten. Shortly after the Argus advised that it was commencing an Anti-Submarine Warfare procedure which involved flight at about 100 feet over the water, a submarine involved in the exercise saw a large flash on the horizon, followed by break-up noises on the hydrograph. While the cause of the accident was never conclusively determined, the most likely scenario was that the aircraft inadvertently descended and struck the surface of the water. Fortunately for the crew of the recent Aurora incident a warning was issued and the pilots arrested the descent before tragedy struck.

The near miss during the Herc formation mission reminds us once again of how unforgiving these sorties can be. On 29 March 1985 at Edmonton another Herc formation trip ended in tragedy when No. 2 and 3 collided during a battle break. One of the basic principles of formation flying had not been adhered to. Successive elements of the formation were pulling up and turning to downwind without being able to see the aircraft ahead of them. The safety and success of the manoeuvre depended upon everyone flying exactly the same profile to ensure the correct spacing. When this didn't happen on that day we lost 10 crewmen and two Hercs. In the more recent case, the crews maintained sight of each other, but the combination of a lack of currency, an unfamiliar flight profile, and the difficulties of assessing a rapidly evolving scenario with quickly changing angles, almost resulted in another tragic mid-air. The correct application of Crew Resource Management tools by the right-seat pilot in No. 3 likely prevented an accident.

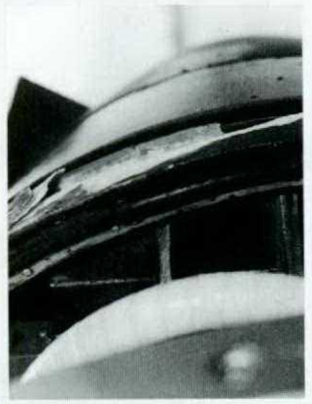
A rudimentary analysis of the causes of these occurrences reveals that many involve management or supervision. Although some of the details of these occurrences have not been given for sake of brevity, the issues identified relate to poor or inadequate procedures or information that is supplied to our people through AOI or SOPs. As well, supervisors must ensure that they assign tasks and monitor ongoing situations in keeping with their crew's capabilities. The re-establishment of the Flying Supervisors Course should fill in some of the gaps that have been identified in recent accident investigations.

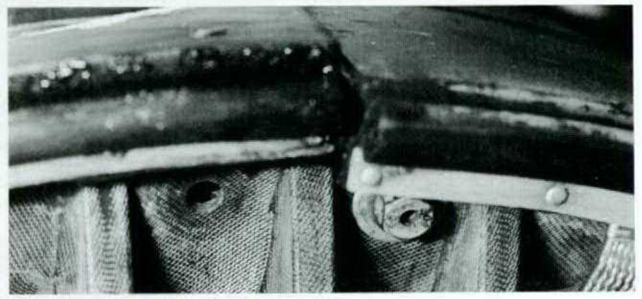
The difference between a tragic A Cat accident and an E Cat Lesson Learned is often measured in feet or seconds. In the incidents reviewed in this article – 500 feet can equal 59 fatalities and 5 aircraft lost. ◆

CC130 Hercules Prop Upper Afterbody

During a post periodic inspection test flight of a CC130 Hercules aircraft in Jun 96, the no. 3 prop upper afterbody came loose and rose until the blade roots of the prop contacted the afterbody. The no. 3 prop was feathered, the engine shut down and the aircraft returned to base without further incident.

LESSONS LEARNED II





Upon investigation all aft blade roots on the no. 3 prop were found with large portions of the foam area torn out. The right hand side of the upper afterbody assembly was found damaged and protruding several inches. The bottom left hand, and both upper and lower right hand afterbody attachment bolts were found lying in the engine compartment, just aft and below the prop pump housing. The top left-hand attachment bolt was still installed but was loose.

Further investigation revealed that a technician began installing the upper afterbody bolts of the no. 3 and no. 4 props finger tight. He then proceeded to complete the full final area close out, upper afterbody installation and panel up of the no. 4 engine. While working on no. 4 engine another technician installed the panels on the no. 3 engine. The technician on the no. 3 engine thought the first Aero Engine technician had finished the no. 3 upper afterbody installation and did not check the torque of the bolts. Review of CF349's indicated the upper afterbody pass signature block for all four engines had been initialed by a supervisor who was not present during the upper afterbody installation and did not carry out a visual inspection on any afterbodies. It was also noted that AE techs from no. 4 engine had initialed for upper afterbody installation on all four engines, even though he did not work on all the engines. Personnel stated that during the final area close out it is not unusual for AE technicians to help each other out, and one may end up signing for more work than he/she actually carries out.

No independent checks were carried out on any upper afterbodies as required. Higher headquarters on Sep 95 mandated independent checks on afterbodies. In Jan 96, through misinterpretation of message traffic between higher headquarters and maintenance squadrons, some personnel at squadron level were led to believe that independent checks were no longer required on upper afterbodies. Consequently, some maintenance crews had not carried out independent checks on upper afterbodies installations since Jan 96.

On this specific occasion there was also added the stress of an airshow taking place on the weekend after the aircraft was due out of the periodic inspection. Many of the technicians and supervisors were experiencing stress to get the aircraft out of the hanger to create space for the indoor displays.

In summary, these series of events led to a potentially serious accident. A number of poor maintenance practices had been going on for some while, and it was only a matter of time before the system of checks and balances failed. Some fundamental lessons learned were brought to the forefront; ones that have been re-learned the hard way many times before, only with different aircraft, different people, and different circumstances. They are as follows:

1. Never do a partial installation of a component on any aircraft. Always carry out the task through to completion.
2. Never assume the other technician finished the job, Always challenge and have an active two-way communication system in place.
3. Only sign for what you have physically carried out or checked yourself.
4. Make sure you know what the message traffic is actually saying, if in doubt, research and verify with the originator for clarification.
5. Don't get involved with too many taskings at the same time. Take your time and do one task completely before starting another. ◆

Sgt J-R. Audette

Epilogue

TYPE: CH11307
DATE: 13 Jan 97
LOCATION: 15 NM north west Comox

CH11307 was conducting boat hoist training with the Coast Guard Vessel POINT RACE. While setting up for the initial hoist, the lead Flight Engineer (FE) reported a strong smell and smoke in the cabin. The crew proceeded to the nearest landfall and commenced emergency procedures response. The aircraft quickly filled with smoke and the AC made the decision to ditch. They successfully completed a water landing and egressed the aircraft. The helicopter sustained "B" Category damage. The investigation into the accident is now complete.

The Flight Safety Summary Investigation (FSSI) determined that the source of the fire had been the #1 generator. The FSSI outlined a history of problems with the CH113 generators going back many years which at the time of their report did not seem to be adequately addressed by the engineering authorities. This concern with respect to configuration control and apparent lack of follow-up action to past airworthiness recommendations prompted a DGAEPM Process Audit of the CH113 Generator Failures.

Further investigation determined that the #1 generator suffered a catastrophic failure of the drive end bearing. The bearing exhibited wear patterns indicative of exposure to excessive axial loading which was likely due to over torquing of the six fan end bearing mounting assembly nuts. The audit team discovered that the contractor was not using the proper torque wrench for the generator build-up and did not have an adequate system of independent checks in place. These quality assurance problems have since been rectified.

The audit also detailed the lengthy history of generator upgrades and contractor delays which resulted in three different types of generator variants installed in the Labrador fleet. To complicate matters they were only catalogued under two stock numbers. The fleet has subsequently been standardised to one generator type. Earlier reports that generator bearing materials were not to specification were based on inaccurate data provided by the Original Equipment Manufacturer. The audit confirmed that the bearings met all design and airworthiness requirements as specified for continued use.

The audit discounted management issues at DGAEPM as a direct contributor in the ditching of CH11307, but did make numerous recommendations for the improved effectiveness of the organisation which were subsequently taken for action. These changes together with the implementation of the new Airworthiness Program should reduce the likelihood of this problem happening again. ◆

Epilogue

TYPE: CH146421
DATE: 12 Nov 96
LOCATION: Killiniq Island, NWT

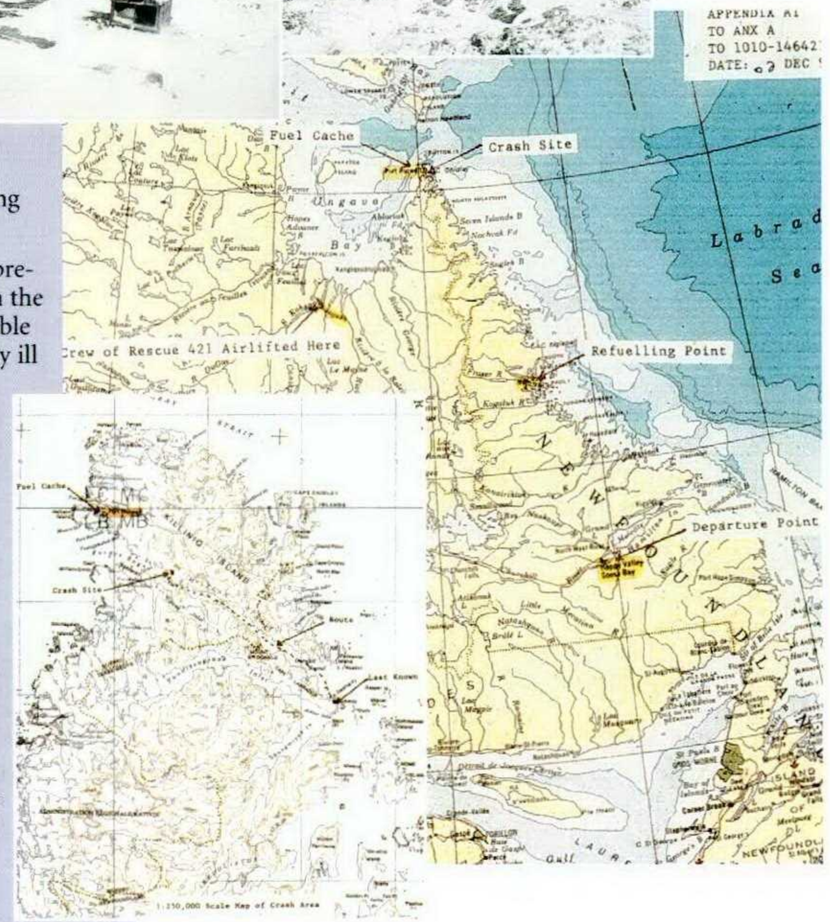
A 444 Squadron Griffon was tasked by RCC Halifax to medevac a critically ill sailor from a fishing trawler near Resolution Island. The final leg of the flight was conducted using Night Vision Goggles (NVGs). While proceeding to a fuel cache on Killiniq Island, the crew encountered inclement weather, lost situational awareness and the helicopter impacted the water. One minor injury was suffered during impact and three serious injuries resulted from cold exposure during the wait for rescue. The aircraft sustained "A" Category damage. The investigation into the accident is now complete.

The last leg of the mission was flown at less than 200 feet AGL, over water, in low light conditions and deteriorating weather. The NVGs had been focused in-flight which rendered the crew more susceptible to the misrepresentations and illusions characteristic of NVG operations. The pilots visual cues were lost and unrecognised as such due to the use of NVGs beyond their capabilities with respect to weather, lighting conditions, flight over water and focus. This coupled with the mis-management of the RADALT led to a loss of spatial orientation, which in turn resulted in the aircraft impacting the water.

There were many factors which should have prevented the launch of this aircraft. However, in the mind of the crew there was no one else available to undertake the mission, there was a critically ill patient awaiting transit, and SAR Techs were planning to jump into the ocean at night. All of these factors did contribute to the decision of the crew to undertake and complete the mission despite the obvious risks.

The Commander AIRCOM ordered a follow-on investigation to address the systemic problems raised in the initial Flight Safety Board of Inquiry. As a result of this review, a series of measures were initiated to correct the deficiencies brought to light by the accident. New 1 CAD Orders have been published which outline the training, standards and operational employment of NVGs in the air force. CS squadron Griffon operations are now governed by TRSET Trenton with input from 1 Wing for aircraft training and standards. NVG operations in the CS squadrons ceased following the accident but have since been re-instituted with the training of unit NVG Specialists and advent of a proper regulatory structure. New direction for the employment of secondary SAR resources has been implemented by the Rescue Coordination Centres and is about to be published in the National SAR Manual.

This accident can be directly attributed to a lack of supervision at several levels. The Air Force has traditionally counted on experience, "time in" and advanced professional courses to prepare individuals for the responsibilities of senior rank. This may have provided the requisite training for the administrative aspects of command but neglected the operational requirements. With the bleeding off of our "time in" personnel this lack of supervisory oversight will become more problematic. This accident has highlighted the urgent requirement for an operational flying supervisor course. ◆



Epilogue

TYPE: CT114080
LOCATION: Glen Falls, New York
DATE: 19 May 1997

The Snowbirds were conducting a scheduled show on 29 May 97 at Glen Falls, New York. The two solo aircraft had just rejoined the other seven aircraft for the closing segment of their performance. As the nine-plane formation completed the Big Diamond Roll, the left wing tip of Snowbird (SB) 8 contacted the lower right surface of the stabilizer of SB2. SB2 briefly lost stabilizer authority while descending through 800' AGL and was forced through the bottom of the formation. SB6 and SB8 also departed the formation. The remainder of the show was cancelled and all aircraft landed safely. The SB8 aircraft sustained C-category damage, the SB2 aircraft sustained D-category damage and the SB6 aircraft registered an 8.5 G overstress.

The briefed spacing for the 9-plane formation was 4 feet of wing overlap. Analysis of the airshow video tape revealed that SB8 flew most of the Big Diamond roll sequence with approximately eight feet of wing overlap. At the moment of contact, the wing overlap between SB8 and SB2 had increased to twelve feet and SB8 was also five feet high on SB2.

The investigation determined that the formation references used by the pilot of SB8 in the Big Diamond formation were directly causal to the mishap. To maintain lateral separation from SB2, the pilot of SB8 used two lines of sight to triangulate his position. However, the angle subtended by these two lines was approximately 8 degrees and was too small to allow accurate station keeping. Moreover, the forward line of sight was established by aligning a reference point on the SB2 aircraft with a second point on the Lead aircraft. Analysis shows that, if SB2 drifts back 10 inches on Lead, the pilot of SB8 must overlap his wing with SB2 by 12 feet in order to regain the correct sight picture. In the absence of reliable visual references, SB8 had come to rely on depth perception to gauge the distance between his own aircraft and SB2. On the day of the accident, overcast skies and a late afternoon show time (6 PM) resulted in dull, flat lighting conditions that degraded SB8's ability to perceive depth.

During the 1997 training work-ups, the Snowbirds practiced 9-plane 4-foot overlap formations on four occasions. Since the 1997 airshow season had begun, the Snowbirds had completed only one airshow in 4-foot overlap and there had been no formal rehearsals. The investigation concluded that SB8 had been provided with fewer opportunities than normal to practice formation flying in 4-foot overlap and that pilot proficiency had not been adequately monitored.

A relatively junior team member had previously noticed that SB8 had a tendency to fly too close. When the issue was raised, the junior member was discouraged from commenting further even though he continued to view SB8's tendency to fly too close as a significant flight safety issue. The investigation concluded that adverse group dynamics and training methodology had prevented SB8 from receiving adequate feedback about the errors, or near errors, that were so vital to his learning experience.

Following the accident, the Snowbirds flew all 9-plane formations at wingtip spacing until some practice sorties could be scheduled and satisfactorily completed. A previous Team Lead was invited to fly with the Snowbirds and critique the Team's performance. Changes to the Big Diamond formation were subsequently made to reduce the level of difficulty associated with the Big Diamond Roll manoeuvre.

A more structured training/workup syllabus is being developed for the Snowbirds with emphasis on improved instructional material, well-defined standards, external oversight and quality assurance. More detailed training records will be maintained and regular proficiency checks will be introduced. Finally, an abridged CRM programme will be developed for the Snowbirds to facilitate communication and to ensure that productive team building occurs. ◆

Epilogue

TYPE: Air Cadet Glider C-GCLW
LOCATION: Moose Jaw, Saskatchewan
DATE: 14 Sept 97

The accident flight occurred during winch launch conversion training for recently licenced glider pilots. Seconds after the "All OUT" call was given to commence the take-off sequence, the winch operators heard a garbled transmission on the SP10 FM radio which they understood to include the word "Stop". Interpreting this to be a transmission from the LCO to abort the launch, an immediate reduction of winch power was completed.

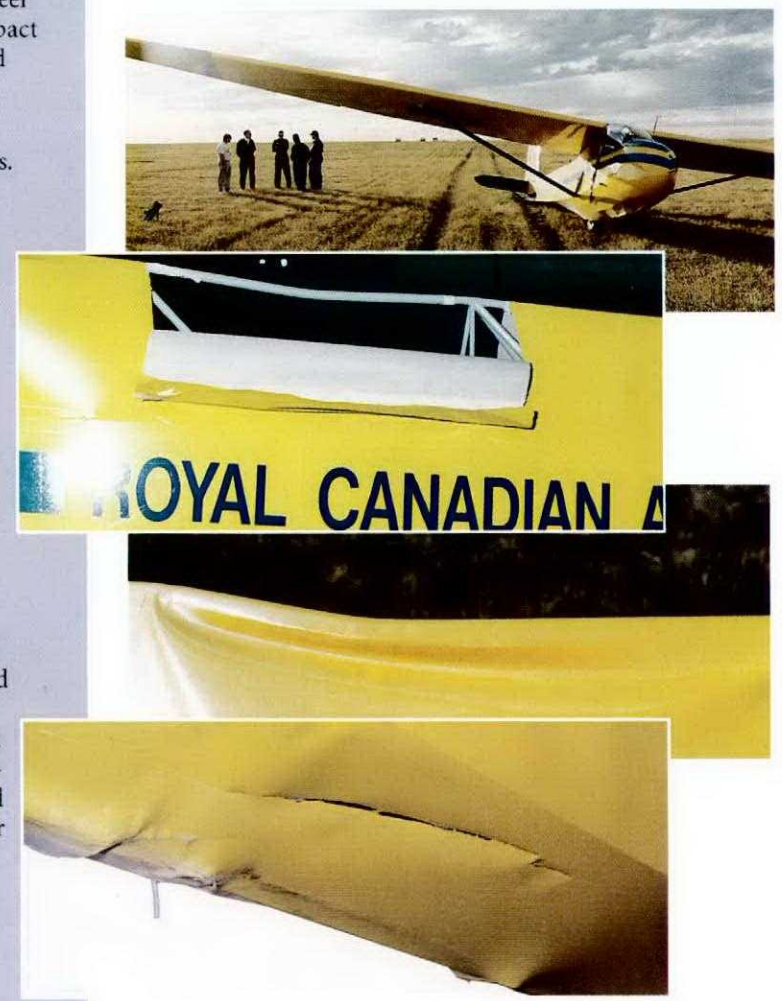
At approximately 50 feet AGL, the student pilot noticed the loss of acceleration and checked forward on the control column. The instructor pilot then took control, lowered the nose and landed straight ahead. The glider impacted the ground nose first, tore off the skid plate, pivoted rearward, broke off the tail wheel spring and stopped 25 metres from the initial impact point. Both pilots egressed unassisted but suffered minor injuries. The glider suffered "C" category damage from the hard landing.

The winch launch has unique take-off characteristics. The dual occupancy stall speed is about 35 mph. From full power application to lift-off is roughly 4 seconds. Acceleration from 30 to 65 mph takes about 3 seconds. The transition from lift-off to the 'full climb' attitude of 30-45 degrees must occur in about 4 seconds to avoid exceeding a VNE of 69 mph. This requires accurate and timely flying and emergency procedures.

The two main emergencies possible during a winch launch are a 'Cable Break' or 'Loss of winch power'. The critical difference in the symptoms of these scenarios is that the former has instantaneous deceleration and the loud sound of the cable break while the latter has reduced acceleration that is barely noticeable at first and there is no aural cue. The physiological and aural cues of the 'cable break' make it easy to identify and to respond to while the very subtle symptoms of the 'loss of winch power' result in longer reaction times (perhaps up to two seconds) to effect proper procedures. This second scenario is more critical at low altitude and low airspeed where the danger of stalling is greatest.

There is no doubt that the limitations of the SP10 FM radio precipitated the events that followed. However, the investigation revealed that the instructor and student pilot allowed a higher than normal initial climb attitude and/or did not ensure that the airspeed of the glider was sufficient during this phase of flight. This resulted in a climb speed of 40-50 MPH. The rapid dissipation of energy at this low altitude did not allow for a full recovery from the aerodynamic stall. Three factors contributed to the rapid energy dissipation: the airspeed/climb attitude combination; the delayed reaction to the emergency by the pilots; and finally the reduced effectiveness of the controls at this low airspeed which increased the time to complete the 'nose over' for stall recovery.

The key preventive measures revolve around two main issues. The first is to reinforce all procedural learning related to the "initial climb", that critical phase of flight below 200 feet AGL. This includes classroom instruction as well as the conduct of training for the safe execution of the 'loss of winch power' simulated airborne emergency. The second is to re-evaluate the use of the SP10 FM radio to ensure that there is unrestricted communications for the launch sequence. ◆



From the Investigator

TYPE: CH113 LABRADOR 11305
LOCATION: 3 NM S Marsoui QC
DATE: 2 October 1998

Aircraft CH11305 left Greenwood at 0330Z on 2 Oct 98 as Rescue 305. The crew had been tasked to medevac a patient from La Romaine, QC to Sept-Iles, QC. Following successful completion of the mission, the crew was replaced as they had insufficient duty time remaining for the trip back to Greenwood. The replacement crew had been flown in from Greenwood aboard a 413 Squadron Hercules. The new crew (Tusker 27) checked the weather, flight planned the return leg VFR direct Greenwood and launched at 1800Z. At approximately 1845Z they crossed the South shore of the St. Lawrence River at Marsoui, QC. Persons who viewed the last seconds of flight stated that the helicopter emitted smoke, started a turn and then there was an explosion and/or fireball and the aircraft came apart in the air. All six crew members suffered fatal injuries.

The aircraft broke into three pieces: the forward fuselage, aft pylon and aft fuselage. The fuselage separated at station 220, just behind the spotter seats and the aft pylon separated at waterline 71, just below the Canada flag. The three sections fell separately at near vertical angles. The aircraft suffered 'A' Category damage.

The aircraft crashed into heavily forested mountainous terrain about 450 feet above sea level. The debris field extended uphill for 600 vertical feet and encompassed an area 1 x 0.5 kilometer. The three main pieces of wreckage landed about 200 meters apart with the aft end of the aircraft being furthest downhill. This section of debris included the engines, main gearbox and the fuselage forward to the centre hatch floor door. There was a post crash fire in this location that ignited the magnesium transmission case and although controlled, burned for more than 48 hours. The aft pylon with the rear mast and rotor blades attached landed about 40 meters uphill from the aft section.

There was no rotational damage to the surrounding 60 foot trees. One rotor blade was extensively burned yet there was no fire damage to the surrounding terrain. The cockpit section landed 150 meters further uphill. There was considerable rotational damage to the trees in this area. There was no post crash fire in either the pylon or cockpit areas. There is evidence that the rotor blades contacted both the forward and aft fuselage sections. All six crew members were found near the cockpit area.

Medical evidence confirmed the witness testimony that there was an in-flight explosion. The geometry of the wreckage entry and the lack of connecting forest damage confirmed that the aircraft had come apart in flight.

The throttle and engine control actuator for number 2 engine were in the "off" position. The crash position was within one minute flying time of two ideal emergency landing areas. These last two facts indicated the aircrew had initiated some emergency actions but did not have sufficient time to conduct an emergency landing. No emergency radio call was detected from the accident aircraft.

In summary, the aircraft sustained a catastrophic failure resulting in an in flight break up. This involved explosion, fire and fuselage/blade contact. The aircrew initiated some emergency procedures but did not have sufficient time to conduct an emergency landing. The technical investigation has moved to Ottawa for 3D wreckage re-build and laboratory analysis. ◆

From the Investigator

TYPE: SAR Tech Parachute Injury
LOCATION: Red Deer, Alberta
DATE: 05 May 1998

An annual squadron regional SAREX was being conducted near Red Deer, Alberta. The five-day exercise was being supported by a CH 146 Griffon helicopter.

On the second day the mission included two separate personnel parachute drops into a pre-selected confined area DZ. The accident SAR Tech was scheduled as the lead jumper in the second personnel drop. On the first personnel drop, a single SAR Tech descended to just above tree top level over the DZ when a gust of wind pushed him several metres into the trees adjacent to the DZ. He landed without incident. The second personnel drop was planned as a two-man drop with both SAR Techs wearing full equipment and the SAR Personal Equipment Lowering System (SARPELS).

The accident SAR Tech exited the Hercules at 2000 feet AGL. Winds at altitude were 30 Knots decreasing to 15-20 Knots at tree top level and 4-7 Knots on the ground in the DZ. As he neared the upwind end of the confined area, he turned into wind to hold briefly in the 'full glide' parachute configuration. He then commenced a left turn onto a downwind leg paralleling the DZ. Several seconds later he applied full left toggle to commence a continuous 180-degree turn for a landing in the DZ. The latter portion of the turn became a "HOOK" turn – a spiralling steep bank manoeuvre which pendulums the parachutist outward and increases the horizontal velocity and the rate of descent. While still in this turn, the accident SAR Tech cleared the 35-foot trees, impacted the ground and sustained serious injuries to both legs. (The enclosed photo of the DZ is from the upwind side). The DZ dimensions are approximately: length 450 feet; width varies from 90 feet at the narrow final approach end to 175 feet at the wide end).

The DZ Ground Party administered medical care immediately. The total time from impact to arrival at the Red Deer hospital by Griffon helicopter was approximately 50 minutes.

Cautions and prohibitions related to confined area approaches, strong or gusting winds, and steep bank turns near to the ground are well documented in the CFACM 60-2605 and the CFSSAR CSAR-4 Training Précis. Given the recent history of serious injuries to SAR Techs, the Flight Safety investigation is examining the systemic issues of training, initial qualification, SAR Tech re-certification as well as currency and proficiency requirements. ◆

Built Tough!

These photographs show an SU-27P (NATO codename Flanker B) of the Russian Knights aerial demonstration team during a landing sequence at Bratislava, Slovakia, in June 1997. The incident occurred when the pilot forgot to put his gear down prior to landing. The incident demonstrates the rugged construction of the SU-27 as little damage occurred; the aircraft was raised, the landing gear lowered and the aircraft was flown back to Russia the next day. The incident occurred during the first demonstration by the Russian Knights outside Russia after the crash of three of their aircraft in Vietnam in December 1995.

Good Show

Warrant Officer Jim Jardine, Sergeant Mark O'Connor & Sergeant Kirk Canning

Sergeant O'Connor and Sergeant Canning were performing their preflight inspection on an AWACS aircraft when they noted what appeared to be excessive heat in the right main-gear cavity. Further investigation revealed bleed air coming through the right wheel bulkhead. They immediately lowered the keel beam door and, with the assistance of Warrant Officer Jardine, endeavoured to detect the source of the leak.

Although hindered by high noise and heat, they located an eight-inch crack in the welding of the bleed air duct. At the location of the crack, bleed air in excess of 450 degrees Fahrenheit was jetting directly onto the drain line of the central fuel-cavity-vent. Had the gear been retracted, the leak would have allowed hot bleed air to stream into the sealed right main-gear well; the potential for a devastating in-flight fire would have been extreme.

The perseverance and expertise demonstrated by Warrant Officer Jardine, Sergeant O'Connor, and Sergeant Canning undoubtedly averted a potential disaster. *Well done!* ◆

Corporal Michael Johansen, Corporal John Grant, Corporal Robert Hunt, Master Corporal Benoit Therrien & Corporal Martin Underwood

Corporal Johansen, Corporal Grant, and Corporal Hunt were conducting ground runs on a Buffalo aircraft to verify its serviceability after a right-hand propeller change and the replacement of the left-hand engine fuel control unit. Following completion of the right-hand propeller functionals and a leak check on the left engine, the crew proceeded with the remaining left engine functionals. While going into maximum reverse during the slam checks, the engine exploded sending shrapnel through the aircraft and engulfing the engine in flames.

Corporal Hunt observed the explosion from the port spotter window and called out that the engine was on fire. Corporal Johansen confirmed the presence of the fire and immediately pulled the engine fire handle – with no obvious results. He then calmly initiated shutdown procedures while Corporal Grant transmitted a distress call. Corporal Hunt and Corporal Grant egressed the aircraft with the halon fire extinguisher, and attempted to control the fire until Corporal Johansen had completed the shutdown and exited the aircraft.

Master Corporal Therrien and Corporal Underwood, although not part of the run-up crew, reacted immediately upon observing the fire. Fearing for the lives of those on board the aircraft, they seized a fifty-pound extinguisher and proceeded to fight the fire at close range. Their efforts effectively contained the fire until emergency crews arrived.

The outstanding teamwork of these five individuals following a catastrophic engine failure averted a potential disaster and undoubtedly saved a valuable aviation resource. *Well done!* ◆

For Professionalism

Captain Lynn Bragagnolo & Corporal Vicky Kruger

Captain Braganolo, the duty aerodrome control officer at 5 Wing Goose Bay, cleared an IFR flight planned Beech King Air for a takeoff on runway 26 from the Bravo intersection. The pilot acknowledged the clearance, taxied out, and began a takeoff roll for departure on runway 08. Captain Braganolo immediately commanded the aircraft to abort. Simultaneously, Corporal Kruger the ground controller ordered two snow removal vehicles to vacate runway 08.

Had the air traffic control personnel not reacted immediately, the pilot of the King Air would have attempted departure on three thousand feet of runway, over an arrestor cable, with a ten knot tailwind, toward two vehicles that were working on the runway.

Captain Braganolo and Corporal Kruger's professionalism and attentiveness to duty during a relaxed period of airfield operations averted a potential tragedy. *Well done.* ◆

Corporal Martin Gelinas & Corporal Michel Schryer

Corporal Gelinas and Corporal Schryer were tasked to perform a flap gearbox installation on a Hercules aircraft. While working in the aft wing box to complete a tension rigging of the flap control cables they noticed a slight discolouration of one of the cables. Although slight discolouration of the cables is not abnormal, and the area is not easily accessible, they decided to investigate further.

A thorough examination of the pulley and cable assembly revealed a severely frayed cable. The cable was out of rig and had been rubbing against the guide pins. Had the cable failed during flight, hydraulic control of the flap system would have been lost.

Corporal Gelinas and Corporal Schryer's thorough inspection resulted in the discovery of component damage that had the potential to produce a serious flight safety incident. *Well done.* ◆

Corporal Andrew Brown

Corporal Brown was tasked to complete an "inspected and passed by" check on a Twin Huey helicopter following the installation of a new tail-rotor assembly. During his examination he noticed that an improper trunnion had been installed on the tail-rotor hub during build up. Corporal Brown immediately informed his supervisor of the situation.

Further investigation revealed that the tail-rotor hub had been received from supply with the trunnion already installed. Subsequent inquiries disclosed that the contractor had omitted to install the proper trunnion during component overhaul as required by a special inspection. Had the situation remained undetected the potential for a complete tail-rotor failure existed.

Corporal Brown's professionalism and attention to detail undoubtedly prevented a serious flight safety occurrence. *Well done.* ◆

Corporal Terry Shanks

Corporal Shanks was tasked to conduct a number four maintenance periodic inspection on a Silverstar aircraft. During the course of the inspection he discovered what appeared to be little more than a minor scratch on the left rear spar web. Not satisfied that scratch was only a skin blemish, Corporal Shanks requested that a non-destructive technique inspection of the area be carried out. The examination confirmed the existence of a thirty-five millimetre crack in the spar web.

The defect was discovered in an area that is extremely difficult to inspect because of limited visibility and restricted access. The minor scratch could have been easily overlooked as it was partially obscured by several other components. The aircraft was subsequently ferried for depot level repair and eventually returned to service.

Corporal Shanks' diligence, dedication, and professionalism prevented what may have been a catastrophic in-flight wing failure. *Well done.* ◆

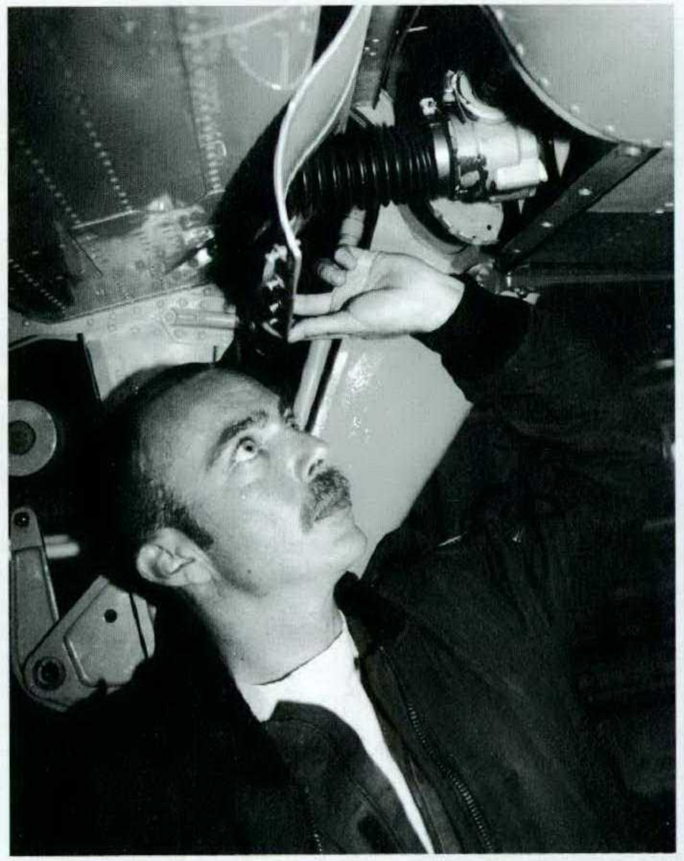
Corporal Louis Nadeau

Corporal Nadeau was assigned to a routine three hundred hour inspection on a Griffon helicopter. While changing the transmission fluid and filter he noticed that the old filter had expanded to the full size of the housing. He then researched the aircraft unserviceability records and could find no record of a transmission oil overpressure or contamination. Concerned that there was indeed a problem, Corporal Nadeau decided to investigate further.

A company representative suggested the condition might have been the result of a faulty element or cold-weather operations. A visiting technical representative submitted that, as the filter assemblies were purchased and installed as complete units, the damage may have been caused by pressure testing at the factory. After further discussion it was found that the filter element had been changed after the aircraft's first flight and factory testing could not have caused the expansion damage. Corporal Nadeau and the technical representative then postulated that it was possible that the transmission oil filter manifold assembly had been installed backwards. An inspection of the aircraft confirmed their hypothesis. Had the condition gone undetected there would have been no oil bypass if the filter had clogged in flight.

Corporal Nadeau's professionalism and perseverance eliminated a serious flight safety hazard. *Well done.* ◆

Corporal Carl Joncas



Corporal Joncas was tasked to conduct a rigging check on a Buffalo aircraft. During his inspection he heard a clunking noise originating from within the wing trailing edge. Turning off the hydraulic power, he positioned himself near the source of the noise. When the hydraulic power was reapplied he felt a definite vibration on the aircraft's skin as the flaps were being raised and lowered.

During further investigation, in an extremely confined space, Corporal Joncas discovered that as it was turning the left-hand torque tube was making contact with one of the wing's stiffeners. Further damage was discovered upon removal of the torque tube. Evidence clearly showed that at one time a control cable had been inadvertently wrapped around the torque tube causing it to distort.

Corporal Joncas's professionalism and diligence undoubtedly eliminated a serious safety hazard. *Well done.* ◆

Corporal Torreen Ferrari

During a routine park of a Hornet aircraft, Corporal Ferrari noticed an unusual movement of the wingtip during wing folding. Knowing that the pilot had lost the use of his CATM-9 during the flight, Corporal Ferrari suspected a problem existed with the LAU-7 launcher. Her investigation revealed that the electrical connector from the aircraft to the launcher had come undone and, that with great effort, the launcher could be made to rock. Corporal Ferrari immediately notified her supervisor and the assembly was removed for inspection.

Non-destructive testing revealed a twenty-six millimetre crack in the forward mounting bolt. As the launcher had been installed on the aircraft for over ten months it would appear that the bolt had loosened off gradually. Had the condition remained undetected, the LAU-7 could have easily broken up in flight causing serious damage to the aircraft.

Corporal Ferrari's professionalism and initiative allowed her to detect a serious flight safety hazard. *Well done.* ◆

Corporal Bernie Goldstein

Corporal Goldstein was conducting checks on a Hercules aircraft when he noticed smoke and flames erupting from a ground power unit plugged into a nearby aircraft. He immediately ran to the power unit and began fighting the fire.

Corporal Goldstein depressed the unit's stop switch – to no avail. Air and oil drawn from the crankcase of the unit, and not its fuel, were feeding the fire. He next discharged a portable fire extinguisher into the blaze – again with no effect. Realizing the potential for the fire to spread to the aircraft, Corporal Goldstein towed the power unit 30 metres away while informing the servicing desk to call the fire fighters. Fire department personnel arrived and successfully smothered the flames.

Corporal Goldstein's swift and decisive actions were instrumental in preventing a potential disaster. *Well done.* ◆

Corporal Craig Fanning

When the engine access panel of a Labrador helicopter was opened for the removal of vibration analysis equipment a three-inch long pin was observed to drop out. The origin of the pin could not be determined despite an extensive FOD check. The aircraft was signed out serviceable and returned to flight status.

Five days later the members of another servicing crew were discussing the incident. Corporal Fanning immediately became suspicious as to the possible origin of the FOD. After viewing the FOD, Corporal Fanning took it upon himself to disassemble a quick release pin. He confirmed that the FOD was the inner locking rod of a pip pin that secures the upper engine mount to the airframe of the helicopter. Corporal Fanning promptly notified his supervisor and the critical information was passed to the crew that was now flying the helicopter. The aircraft was immediately landed and a field repair was conducted to rectify the problem.

Corporal Fanning's dedication and perseverance in determining the source of the FOD undoubtedly prevented a very serious incident. *Well done.* ◆

Corporal Maurice Ruel

Corporal Ruel was assisting a solo student with a start on a Tutor aircraft when he noticed that the ejector pump doors under the aircraft had not opened. Corporal Ruel wrote a note requesting that the pilot check the position of the circuit breakers and the status of the annunciator panel. He caught the pilot's attention and handed him the note while visually confirming that all indications in the cockpit were normal. The student pilot also confirmed that lights and circuit breakers were normal. Corporal Ruel then signaled the pilot to shut down and proceeded to explain the reason for the shutdown once the pilot had egressed.

It was later discovered that the ejection pumps were not working because of an intermittent break in the terminal block that initiates the cooling in Zone Two. Had the problem remained undetected the student would have been faced with a Zone Two cooling overheat which could have caused serious damage to the aircraft.

Corporal Ruel's alertness and professionalism in detecting an aircraft fault while performing a very routine task undoubtedly prevented a student pilot from flying an unserviceable aircraft. *Well done.* ◆

Captain Michelle Casey

Captain Casey was controlling traffic on the inner runway at Moose Jaw and had sequenced a solo student number one for a full stop landing. The student had selected the landing gear down, but a faulty relay prevented the gear from going down. There were no lights or warning tones to alert the student that the landing gear remained retracted. The pilot twice verbally confirmed that the landing gear was down and locked when challenged by the controller.

Although not part of her duties, check of the position of the aircraft's landing gear. The aircraft was approximately one hundred and fifty feet above ground on short final when Captain Casey ordered the pilot to overshoot because no landing gear was visible. The pilot overshot and climbed to a safe altitude to carry out an emergency gear lowering procedure prior to returning to base for a successful landing.

Captain Casey's professionalism and alertness in detecting the gear up aircraft on short final undoubtedly prevented a serious accident. *Well done.* ◆

Corporal Brian Millejours

Corporal Millejours was tasked to conduct a valve housing change on a Hercules aircraft as a member of a mobile repair party. Two blown right main-gear tires had been replaced on the previous day. It was supposed that the tires had become damaged when the aircraft was landed at an austere airfield.

On his own initiative Corporal Millejours decided to inspect the ruined tires. He became convinced that a failure of the anti-skid system, and not the condition at the airfield, had caused the damage to the tires. Although the anti-skid system tested serviceable, a rigorous investigation revealed a broken ground wire leading to an unserviceable right side anti-skid valve. A systems failure had indeed caused the destruction of the tires.

Corporal Millejours's outstanding diagnostic skills and professionalism allowed him to discover a fault of much greater magnitude than original circumstances indicated. *Well done.* ◆

Corporal Pierre Brassard

Corporal Brassard was tasked to conduct a required area inspection on a Tutor aircraft after the completion of a load monitoring retrieval. Although not called for in the inspection, Corporal Brassard elected to open the right side gull door to further examine the area. Looking through a small hole in the base of the battery compartment, into a poorly lit and cramped enclosure, he was able to determine that one of the battery's metal quick disconnect retaining clips was missing.

Corporal Brassard initiated a FOD check and the clip was located and reinstalled. Although seemingly trivial in size, the missing fastener had the potential to cause a serious flight safety incident. An unsecured battery, and a loose piece of metal in an area of high voltage and current, could well have resulted in a catastrophic electrical malfunction.

Corporal Brassard's sincere concern for the task at hand and desire to go beyond the written requirements of his assignment may well have prevented the loss of a valuable aviation resource. *Well done.* ◆

Corporal Gerry Jomphe

During a periodic inspection of an Aurora aircraft, Corporal Jomphe discovered small pieces of plywood on and around the radar transmitter in the number one rack. Theorizing that the FOD was indicative of a larger problem he decided to investigate further. Although not called for in the Aurora inspection package, Corporal Jomphe decided to remove the radar transmitter.

During the subsequent inspection more and larger pieces of plywood were found throughout the number one rack and the top panel was found to be in an advanced state of delamination. Pilots and flight engineers conducting aircrew check rides use the panel periodically as a seat. Should the panel have failed when it was being utilized as a seat the occupant would have likely been electrocuted.

Corporal Jomphe's professionalism, and refusal to accept what appeared to be a marginal deficiency, eliminated a potentially lethal hazard. *Well done.* ◆

Captain Bruce Mornan & Lieutenant J.P. Lafleur

A civilian pilot on a VFR flight from Victoria to Courtenay reported to Comox ATC that he was on top of cloud and "somewhat lost". Captain Mornan, the aerodrome controller, quickly determined that the aircraft was fifteen miles southeast of the airfield on a westerly heading. As the pilot was not IFR rated, Captain Mornan suggested a northwesterly heading to a point where a hole in the overcast ceiling was developing. The pilot acknowledged the transmission, but failed to follow the recommendation. The pilot then agreed with Captain Mornan's proposal to switch to terminal control who could provide VFR vectors to the hole in the ceiling.

The duty terminal controller, Lieutenant Lafleur, radar identified the aircraft and issued vectors to a clear area north of the airfield. The pilot sighted the hole, but took no action to descend. When queried about his lack of action the pilot could only nervously respond with a simple "Roger". Captain Mornan observed another hole opening up west of the airport and passed the information to Lieutenant Lafleur. Lieutenant Lafleur vectored the aircraft to the clear area and this time the pilot descended, reported visual, and was switched to tower frequency.

Captain Mornan and Lieutenant Lafleur continued to monitor the pilot's progress. They quickly realized that the pilot was now heading in the opposite direction to his intended destination. Captain Mornan pointed out key geographical features and the pilot was eventually able to determine his location and land safely at his destination of Courtenay.

Captain Mornan and Lieutenant Lafleur's professionalism and teamwork undoubtedly prevented a tragedy. *Well done.* ◆

Master Corporal Mike J.N. Falardeau

Master Corporal Falardeau, a restricted flight engineer, was tasked to carry out a post-maintenance flight engineer walk around on a Labrador helicopter while under the direction of a qualified supervisor. The periodic inspection had been completed and experienced technicians had rectified all post-periodic observations.

During his inspection of the canted bulkhead area, Master Corporal Falardeau noticed a slight discolouration of a hydraulic line that was clamped underneath four other lines in close proximity to the engine oil tank. He wiped the line clean, but was not satisfied that the line was serviceable. Master Corporal Falardeau notified his supervisor who in turn advised squadron technicians. The location of the hydraulic line made it impossible for the technicians to visually determine the reason for the discolouration. The hydraulic line was removed and discovered to be over fifty percent worn – far below technical manual specifications.

Although not yet qualified on type, Master Corporal Falardeau detected a very serious flight safety hazard. His dedication and attention to detail definitely averted a situation that would have resulted in a hydraulic line rupture. *Well done.* ◆

Risk Denial: The Ostrich Syndrome

or

An ostrich should never even try to fly,

or

If an ostrich does try to fly, it will very likely get more than it's head stuck in the sand.

Dr. Robert O. Besco (Capt. AAL, Ret.) MO 0949
President, PPI, Inc.

The goal of this paper is to crystallize the thinking and activities of aviation safety professionals who have the capability to identify and manage previously ignored risks. The intent is to provide a stimulant to the industry to identify the conditions that are falsely used to justify the denial of risks.

Every aircraft accident that this writer has studied or investigated in the past 28 years has had advance warnings that the risks were present. This observation has been valid from the Constellation out of Midway in 1962, through the L1011 in the Everglades, the DC10 in Sioux City and continuing right up until the present. Every accident has been caused by both foreseeable and foreseen factors. The "BIG QUESTION" is why are these warnings and foreseen elements ignored by well meaning, competent and rational professionals? It can be a very frustrating existence for accident investigators when they isolate causes of accidents and then have those causes defined as trivial and/or unworthy of correction or change. It is particularly frustrating to have those causes reoccur and bring about a subsequent accident or accidents.

Risk denial is a term applied to many types of behaviors caused by many varied and complex psychological dynamics. The processes of ignoring, tolerating, trivializing and downgrading risks are all elements of the risk denial syndrome. The perception of risk has only recently been studied scientifically as a significant process in the psychological dynamics of minimizing dangers (Besco, 1990 & in press; Lederer, 1990; Reason, 1988; Slovic, 1986 & 1987; and Wiener 1989).

The relationship between risk and danger has been defined by Lederer (1990) as "risks are exposures to dangers." The edge of a cliff is dangerous, but it is no risk to you while you sit in your living room. Risk management can be considered the control of exposure to dangers. In aviation, an example would be that there is always the danger that a jet engine will fail and throw out metal fragments. We manage and control that risk by controlling exposure to the uncontained engine failure. We use metallurgical overdesign to minimize the probability of failures. We also shroud the engines and position them in locations away from critical areas. We develop conservative operating and maintenance practices. We provide redundant sources of thrust and energy conversion (electrical, pneumatic and hydraulic) in the event an engine does come apart. Even though the engines have become extremely dependable, we still utilize these risk management techniques to control the exposure to the dangers of engine disintegration at high RPM.

There will always be a danger of crew errors. We control and manage the risk in several ways. We select quality people. We provide for backup with other crew members. In training, we utilize overlearning and recurrent skills testing. We clear out performance obstacles and counter-productive organizational forces. We use good human engineering design practices. We provide leaders with positive rewards for excellence. Wiener (1990) discusses how and why the human factors specialist is becoming recognized as a major element in improving pilot performance and reducing crew errors.

Ostrichism

Risk denial is the process of (1) discounting or ignoring dangers, (2) downgrading the probability of their occurrence or (3) underestimating the severity of their results. Risk denial can be considered analogous to the behavior of the legendary ostrich who sticks his head in the sand to escape oncoming and imminent dangers. It seems most appropriate to use the ostrich (see Figure 1) as the symbol of risk denial in aviation when the following definitions from the Thorndike Barnhat Dictionary are considered:

Ostrich: A large bird that can run fast but cannot fly.

(Figurative): A person who refuses to face reality or an approaching danger.

Ostrichism: a refusal to face reality or an approaching danger.

Bernard Hollowood's definition: It is stupid ostrichisn to pretend that history will never, under any circumstances, be invited to repeat itself.

The Catch 22 of risk denial is that the aviation system currently has such a large margin of safety that unsafe performance does not usually result in an immediate negative event. Therefore, the risk denial behavior is positively reinforced because the results are either benign or inconsequential. However, the Catch is that the more frequently a particular risk is ignored and/or the greater the number of risks that are ignored, the more the margin of safety will be eroded. Eventually the margin will deteriorate to the point that accidents will occur. In aviation we need a good safety margin low level light to act as an early warning system to tell us when the margin of safety is dangerously low.

The person that thinks "It can't happen to me" or "I would never make that mistake" is an accident looking for a place to happen. The incredibly wide safety margin that has been built into the aviation industry provides protection from the risk denying pilot. Most pilots retire before their risk denial behavior results in an accident. A paraphrased quote from P.T. Barnum seems appropriate to the risk denying aviation professional. "You can ignore some of the risks all of the time and you can ignore all of the risks some of the time but you cannot ignore all of the risks all of the time." The risk denying aviator needs to be reminded of his shortsightedness by using the acronym "YET" or "You're Eligible Too." The theme song to adopt is the jazz classic "It Could Happen to You." The entire industry needs to identify the latent risks imbedded in the system and to apply the best possible resources toward minimizing them (Arbon et al, 1990; Besco, 1990; Degani & Wiener, 1990; Feynmann, 1988; and Reason, 1988).

Examples of Risk Denial

Pilot error is blamed for 65% to 80% of all accidents (Caesar, 1989 and Congress, 1988). With all of the signals that we get from accident reports and statistics, why haven't pilots become more wary of the dangers of procedural errors. After working as a commercial and military aviator for over 36 years, this writer has come to the following conclusions: 1) Individual pilots deny that they, personally, are susceptible to committing the same mistakes that are attributed to the accident pilots, 2) Pilots also deny that the crewmembers and pilots in their organizations are at risk for these same type of mistakes.

Wrong Stuff Syndrome

Conclusions of accident reports have often listed descriptive causation factors such as complacency, lack of discipline, lack of professionalism, inattentiveness, tunnel vision, instrument fixation and irresponsible conduct as factors in pilot performance breakdown. These are merely descriptors or categorizations of the pilot error and do not explain why the errors occurred.

Most pilots do not perceive themselves as being at risk for wrong headed blunder types of errors. They consider themselves to be conscientious professionals who would never behave in an unprofessional, complacent, inattentive or irresponsible manner. Pilots deny they face those types of dangers when they fly because they have the "right stuff" to avoid the same mistakes. The accidents pilots are judged to have the "wrong stuff." Pilots who have accidents are perceived to be somehow deficient in ways that cause them to have accidents. Wolfe (1979) captured this aspect of the risk denial syndrome in his popularized descriptions of the defense mechanisms adopted by military test pilots. Wolfe observed that surviving pilots repeatedly attributed the lethal pilot error accidents to the "wrong stuff" on the part of their departed colleagues. A pilot could be considered an excellent performer until he was killed in an accident. After an accident, the previously admired pilot was scorned because of his alleged malperformance which led to the fatal accident. This risk denial behavior reduced the anxieties of the surviving pilots, but did little to reduce the risk of the dangers that they faced.

Training as a Panacea

Training is quite often relied upon to be the panacea or cureall for reducing or removing the risks of pilot performance breakdowns (Arbon et al, 1990, Besco, 1959, 1989, and Mager & Pipe, 1984). It has been very appealing to airline executives to deny that there are any causes of pilots performance breakdown that cannot be corrected by additional training.

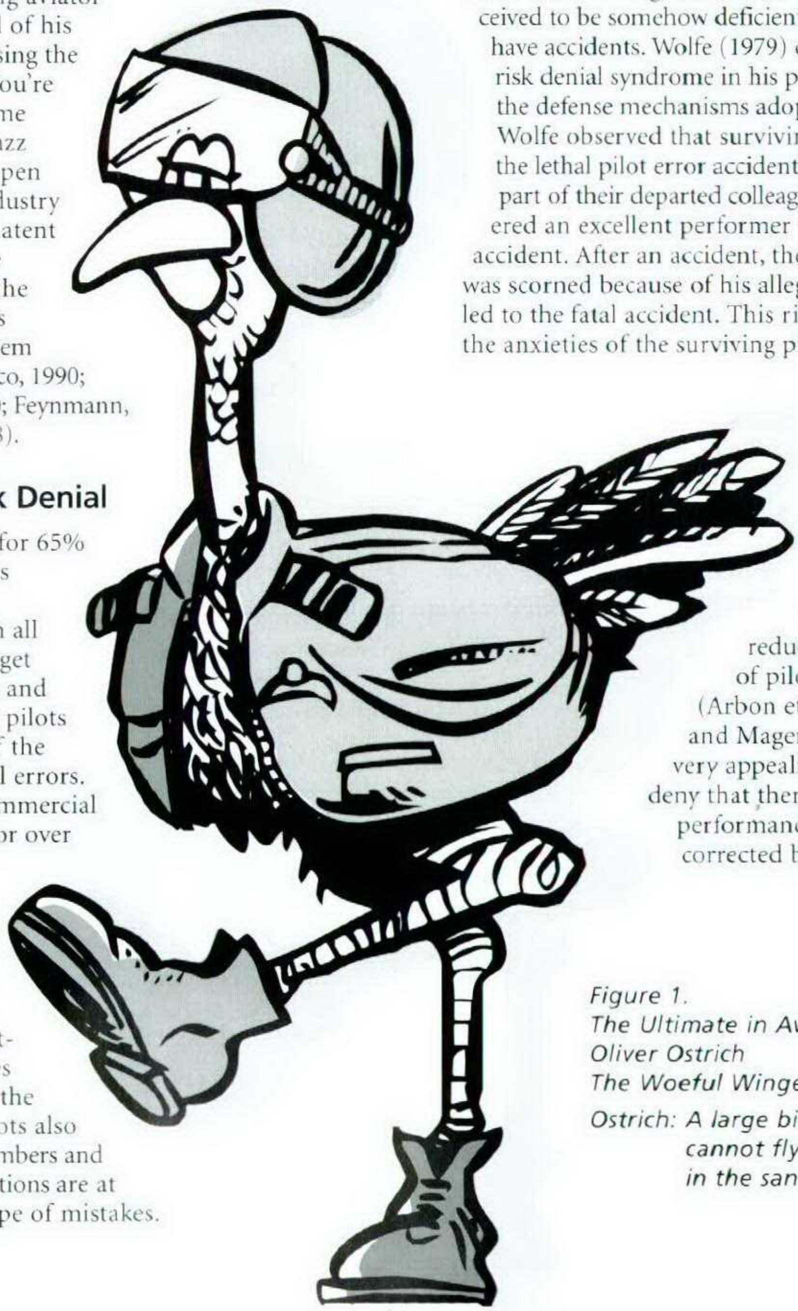


Figure 1.
The Ultimate in Aviation Risk Denial
Oliver Ostrich
The Woeful Winged Wonder of the Airways
Ostrich: A large bird that can run fast but cannot fly. An ostrich buries its head in the sand to avoid dangers.

Cockpit Resource Management training has been focused almost exclusively on intrapersonal and group dynamics objectives. The systemic and organizational issues have been largely ignored in the training programs to remove the problems inherent in Cockpit Resource Management. Cockpit Resource Management Training has been conducted in the attempt to correct for flawed personnel plans, principles, policies, procedures and practices. Deficiencies in equipment, tools, facilities, raw materials, schedules, staffing levels and budgets have been brought to training departments to have the effects eliminated. Managements have even concluded that low-experience pilots with minimal qualifications can be hired and their performance quickly brought up to standards with superlative training. Training has also been relied upon to correct for faulty equipment designs, flawed organizational practices, dysfunctional leadership and inadequate screening processes at hiring. However, pilot training cannot patch up every mistake that has been made in the system. Proper training is an essential contributor to high performance. However, adequate training is but one lone element in the complex system that determines superlative accomplishments in the cockpit.

Qualification & Certification

Since before WW II, the air transportation industry has depended upon the military pilot aptitude screening and training programs to provide high performing professional air crews. The civilian certification and qualification system, as monitored by the FAA, did not have to protect the airline traveller because the airlines were hiring primarily young, fully qualified ex-military pilots. The aspiring airline pilot without a military background was one of the few professionals who could not receive a publicly supported, academically accredited quality education. The industry denied that there were any risks associated with the selection procedures and with the quality control methods for developing civilian trained pilots. The training and aptitude screening programs for civilians were aimed primarily at recreational aviators. The system had become insensitive to marginal performance by prospective recreational pilot. It was common knowledge that the marginal student pilot could shop around and find an instructor and check airman who would sign off on their substandard performance.

Well-intended flight school operators developed a direct conflict of interest (Besco, 1987). They needed to attract students to pay tuition and keep their school house doors open. If they screened out a significant per cent of marginally performing students, prospective students would take their tuition checks to a friendlier flight school. In the past, these recreational pilot training practices have not immediately increased risks to the travelling public. The entire industry used the risk denial process to become complacent in pilot qualification and certification procedures. Every passing day the military is training fewer of the entry level airline pilots. The civilian pilot educational system will soon be stretched to its output capacity in both quality a quantity.

Overconfidence

The corporate culture and organizational standards can also go too far in placing a false sense of pride and confidence in its pilots (Arbon et al, 1990). Table 1 contains an unpublished list of paradoxes which this writer observed to be present during a survey of Cockpit Resource Management programs. Organizations were observed to become so defensive about their invulnerability and infallibility that negative responses to criticism actually contributed to increased risk levels.

Risk Denial

The Paradoxes of Dysfunctional Safety Attitudes

We are so much better than everyone else that we will never make that mistake here.

It will never happen to us.

We are above the need to protect ourselves from the kinds of mistakes made by ordinary people.

Our people are better than that.

It won't matter.

If there was a need to make a change, we would already have made it.

Laws, rules and regulations are for people who are lacking in good judgment and common sense.

Good people do it right by instinct; mediocre people need regulations, education and guidelines.

You don't need to look for improvements when everything is already going great.

It's not false pride when you really have it.

We haven't had any accidents, therefore there is nothing that needs to be improved.

The accidents we have had are the result of a combination of bad luck, irresponsible individuals and someone else's negligence.

We have already implemented all of the worthwhile ideas.

We are not at risk for those kinds of hazards.

Table 1

Complacency

Pilots get complacent when they deny that risks exist. Some managements support the belief that no risks are present. Subtle and indirect communications from management can tell its pilots that their job is not critical to either safety or economic survival in many ways. Low pay, cursory background checks for new hires, fill the squares training practices, poorly maintained facilities, demeaning statements during labor negotiations, adversarial leadership and lack of corporate respect for pilots are but a few of the ways that complacency can be developed and nurtured. In the last decade airline managements have been competing actively to reduce labor costs and pilots' compensation. Many of these labor negotiations have involved treating the pilots' responsibility as one that can be fulfilled by individual whose skill levels are so low that the entry level compensation is below a fast food franchise. Pilot performance was perceived to be a commodity. The labor relations negotiators attempted to downgrade the contribution of the pilots to reduce the bargaining power of pilots' unions.

Complacency will naturally flourish in any corporate culture which is permeated with this "wrong stuff." It is like a physical disease. Some pilots will be totally immune, some will have a high tolerance and others will get it at the first opportunity (Wiener, 1990). Sanitary emotional conditions and healthy attitudes towards risks and performance requirements are the best protection against the pathogens (Reason, 1988) which breed complacency. If we want to reduce pilot complacency, we need to emphasize to pilots that their superlative performance is vital to safety, profitability, growth and even survival of every individual organization.

Incident Suppression

Non-fatal and sometimes trivial appearing incidents have the potential to be an early warning system for risks. Unfortunately there is a tendency to discount the significance of incidents that do not involve loss of life or major property damage. This writer prefers the concept of risk ignoration to describe the wrong thinking forces within the industry which consider incident reporting as a negative for growth and survival. The Aviation Safety Reporting System of NASA (ASRS) was started to relieve this incident suppression process. The ASRS has made significant progress in reducing risks. However, ASRS is quite often used primarily as a tool for avoiding reprisals. When the entire industry fully embraces the ASRS principles, the positive benefits will be enormous. Parker (1988) has maintained that the information from incident reporting has been used in military aviation safety programs as a most powerful and critical element in reducing accident rates. Feynmann (1988) cites an excellent example of risk denial by incident suppression in the Challenger accident.

Overcautious or Counterproductive

Pilots who put safety first are often perceived as being either overcautious, counterproductive or lacking in testicular fortitude. Organizations bring pressure to bear on pilots to press on in marginal weather or to accept airplanes that are in questionable mechanical condition. Fellow pilots who are practicing risk denial will bring peer pressures on the safety conscious pilot. This is in spite of the fact that all aviation organizations put safety as the primary operational objective. Pilots who exceed the group expectation in such areas as level of detail in preflight briefings and/or inspections will be ridiculed. Pilots who are highly concerned about their physical well being before they accept a flying assignment will be accused of malingering. There have been air carrier accidents in which letters of commendation were found in the dead pilot's personnel files. Managers had actually praised them for flying with airplanes and in weather conditions that other pilots had refused (NTSB, 1985).

The Myth of Personality Stereotypes

The recent resurgence in chasing the "will o' the wisp" (defined as the "personality profile" of the "at risk" aviator) is doomed to perpetuate these counterproductive attitudes and repeat some very expensive mistakes and history lessons from the behavioral sciences. The industry seems to have latched on to pilot personality characteristics as an opiate to remedy the performance problems defined under the title of cockpit resource management. It is almost as if the unproven concepts of bad personality traits have become as sacred as the "Emperor's new clothes." The unchallenged assumption has been that pilot performance is related to differences in personality characteristics. To make the observation that there are no personality and personal adjustment differences between good and mediocre pilots is almost as sacrilegious as observing that the emperor was not wearing any clothes.

This writer served in six separate military fighter and training squadrons over a 13 year span and worked as a full time airline pilot for over 21 years. Twenty-seven of these cockpit years occurred after finishing an MS dissertation on leadership and a Doctoral dissertation on aptitude testing. It has been my unique experience and privilege to have received a top level behavioral science education and then to have taken those skills to the cockpit to observe pilots in a non contaminated operational environment. I have concluded that the overzealous personality theorists are attempting to capitalize on concepts that have not been identified in the operational world. Further, they are trying to measure these concepts with tools that scientifically evaporate in both replicated experiments and operational practices. It appears that the personality theorists are illustrating an axiom of Abraham Maslow. Maslow stated that "when the only tool you have is a hammer, you tend to see every problem as a nail,"

Personality theorists have yet to demonstrate the scientific and practical value of the basic concepts of the specific testing instruments they are promoting (Besco, 1989; Cureton, 1950; Dolgin & Gibb, 1989 and Helmreich, 1990). The history lessons of behavioral science reveal the lack of both scientific and practical value for personality measurement in selection programs for professional performance (Cureton, 1950; Dolgin & Gibb, 1989; Haddon et al, 1964; Heinrich, 1931; Mintz & Blum, 1949; Tiffin & McCormick, 1958 and Wong & Hobbs, 1949). In my studies, I have found that personality research has been valuable only in improving the mental health of patients who want to be helped. It is a very appealing trap to believe that we can significantly reduce the risks of pilot performance breakdowns by selecting only those pilots with the proper personality characteristics.

In this pilot/psychologist's experience, no existing personality stereotypes or measurable personality character) can distinguish the low performing from the high performing aviator. Even further, no scientifically defensible studies of personality traits were found which can separate population of professional pilots from the general population (Besco, 1989 and Dolgin & Gibb, 1989).

The basis for personality stereotypes assumptions seen come from fiction novel and screen writers and not from scientific sources. The economic purposes of the popular media seem to be served by promoting these unsubstantiated stereotyped concepts. The misconception is that all pilots and especially military fighter pilots are notorious for exhibiting some form of the following set of undesirable behavioral and personality characteristics:

1. Devil-may-care value systems,
2. Live-for-the-moment attitudes,
3. Womanizing sexual ethics,
4. Rebellion against authority and cultural conditions,
5. Low level of professional commitment,
6. So individualistic that they make poor team players,
7. Inconsiderate, self-centered and self-serving,
8. Macho, ego-maniacs who cannot tolerate criticism,
9. Deficient in self-analysis,
10. Power and status hungry authoritarians, and
11. Superstitious beliefs in magical solutions.

These stereotypes may sell fiction novels and increase attendance at movies such as "Top Gun," but in my experience they are so fallacious that they are counter productive in the real world of operational military and commercial aviation. Sadly, some personality theory psychologists have bought this fiction, "hook, line and sinker." The myth seems to fit these few psychologists' personal preconceptions to the point that they start to actually believe their own untested academic theories. They lose their scientific objectivity and accept any fragmented evidence that they can find to promote their suppositions. Aviation managers who are desperate to find solutions to pilot errors, incorrectly assume that the academic credentials of these personality theorizing psychologists automatically means that their theories contain scientific and practical relevance, utility and validity.

The scientific and practical utility of personality testing is flawed by the following three factors:

1. Lack of replication or cross validation.
2. Biases and contamination in the performance evaluations.
3. Transparency and fake-ability of the testing instruments.

1. **Lack of replication.** There is a centuries old adage that is applicable to both the scientific and practical issues here. Poor Richard's Almanac was the first place that I observed; "One swallow does not a summer make." It is possible to do a "one time" demonstration of a correlation between a personality test and just about any type of performance you can define, pilots included. The problem is that in any ONE sample you can find the one combination, out of the thousands possible, that demonstrates "statistical significance" on the basis of random factors alone (Cureton, 1950). If you are using the five per cent level of significance, you will expect to randomly find five of them in every one hundred possible combinations. The scientific and practical problem is that when you apply that same identical personality pattern, profile, factor structure, cluster, scoring key or multiple regression equation to a subsequent sample, the correlations shrink to a practical zero (Guilford, 1952). The failure to perform the cross-validation has become known since the turn of the century as the foldback error. The professional standards of the American Psychological Association (APA, 1985) require that this cross validation and replication be conducted before validity claims of psychological tests are made to the public. Replication of scientific theories, findings and discoveries is just as vital in the behavioral sciences as it is in the physical sciences (Besco, 1989).

2. **Biased evaluations.** In any research on human behavior, in which the performance criteria are the evaluation or judgment of expert raters, it is essential that the experts be blind to the treatment conditions the subjects have received. This is true in research involving medical diagnosis as well as with pilots being rated by check airmen, psychologists or fellow crewmembers. Many elaborate research programs have come to naught because the researchers did not control this critical contamination factor. When uncontrolled, this factor is almost certain to provide false positive results. The variables being researched are then assumed to have value and implemented into the system. However, it soon becomes apparent that the world has not changed for the better and the problems still exist. The early polio research is one tragic example of the failure to control for contaminated evaluations.

3. **Transparency of personality tests.** Personality testing to screen out undesirable traits at hiring and promotion has had a miserable history of negative results. The characteristics that one is trying to eliminate from the professional population become known and the applicants fake the tests so that they will pass. In aviation, an entire industry has grown up to help the marginally qualified applicant get through the screening. As soon as an airline develops a personality cluster for hiring, a company will sell a seminar, crib sheet or scoring key to insure that the applicant will pass. Personality testing is only reliable and useful when the person being tested is cooperative and desires to discover something about himself. An applicant is not about to make a statement on a personality test that will reduce the possibility of gaining employment. This reduces pre employment screening by personality testing to an exercise in futility.

If, and when, the scientific and practical validity of personality testing for selecting pilots is demonstrated, the entire aviation industry will be ready to receive the benefit. Until that time, the personality test promoters, the mental health practitioners and the personality theorists should remain in research settings. They should cease making claims that their unproven personality theories and testing products will benefit aviation today. The aviation industry deserves the best that the behavioral sciences has to offer. A unique window of opportunity currently exists for psychologists to contribute to pilot performance (Wiener, 1990). Managers, executives and leaders in aviation need to say to the personality test salesperson, "prove it to me that it will work to make things better" rather than "If you tell me it works and we like it, we'll buy it and use it."

Passengers

Risk denial can be observed in passengers as they ignore passenger safety briefings, seat belt warnings and luggage storage requirements. Passenger consumer advocate groups actively oppose safety enhancements that put additional restrictions on comfort, convenience and economy. Passengers only seem to respond to risks in the few days immediately following an aircraft accident.

Payoffs of the Risk Denial Syndrome

It is this writer's observation that the behavior of all functional human beings is purposeful, rational and has observable payoffs. Individuals who practice risk denial have a very definite reason for ignoring or discounting risks. They are not mentally defective. They are not totally self serving. They are just as dedicated to their families, friends, value systems, professions, countries and organizations as those of us who are more sensitive to risks. What, then, are some of the factors which enable individuals and entire organizations to ignore risks which seem to be obvious to others?

We must look for the payoffs that enable people to deny risk. While examining risk denial in pilots, we come across a microcosm of the risk denial factors present in all other professions in aviation. The pilots' payoffs have analogies to maintenance, management, designers, manufacturers, traffic controllers, politicians, government regulators and policy makers. Some of the same risk denial payoffs that pilots seek influence passengers.

Stress Reduction

Pilots turn their backs on risks for many reasons. It can be very discomforting and stressful to face the threat of imminent dangers on a continuing basis. It becomes stress reducing to ignore risks. Pilots accept a definition of the working environment and develop a "theory in use" which does not contain any dangers. The payoff is the reduction of tension and stress. The elimination of at least the following stress producing elements reduces tensions

Life Threats. Refuting the daily exposure to risk lowers the perceived threat of personal injury and death.

Family Abandonment. Risk denial reduces the concern of the pilots for their own family's suffering in the event that an accident would remove them as the breadwinner.

Mortal Responsibility. Denial reduces the burden a pilot feels for the duty to defend the well being, safety and survival of passengers.

High Performance Demands. Ignoring risks enables the pilot to be relieved of the burden to maintain a perpetually high performance level.

Vigilance. Risk denial eliminates the need to be constantly on the alert to errors and breakdowns.

Career Insecurity. The perceived threat of economic professional and career catastrophes is removed by the risk denial processes.

All of these payoffs reinforce risk denial behavior. This list is by no means exhaustive of all the reasons that competent aviators and other professionals turn their attention away from risks. *This list is put forth as a stimulant to the industry to develop an exhaustive set of conditions that are falsely used to justify the renunciation of risks.*

Elements of Risk Management

It is practically impossible to eliminate all risks from aviation. The goal of this paper is to crystallize the thinking and activities of a large group of aviation safety professionals who have the capability to identify and manage previously ignored risks. Management of risk involves conducting at least the following interrelated and interacting processes:

1. Risk identification: the active process of inquiry and examination of the entire system's environment to isolate and define the hazards that are resident and latent in the aviation industry.
2. Risk analysis: the identification of all the elements and environmental conditions which interact to influence the probabilities that risk will cause an abnormality.
3. Risk evaluation: the estimation and quantification of the probabilities that a risk will develop into an anomalous situation.
4. Risk assessment: the qualitative definition of the criticality of anomalous events. Criticality is defined in terms of potential for injury, death, property damage or disruptions to service and mission objectives.
5. Risk reduction: the process of implementing policies and practices in the design, manufacture, operation and management of aviation organizations which enable the system to minimize and to cope with hazards and risks.
6. Risk removal: the ultimate goal of the entire process is the elimination of all unnecessary risks.

One of the difficulties in defining "unnecessary risks" is that it is a very subjective definition. What one person find is a necessary risk, another might define as totally unnecessary. A facetious definition of an unnecessary risk is "a risk that someone else introduced into the system." A necessary risk can be defined by the corollary as a "risk that we are personally responsible for managing." The Risk Manager's Prayer is borrowed from the Serenity Prayer. It is offered as an approach to understanding the difference between necessary and unnecessary risk.

The Risk Manager's Prayer

GOD GRANT US:

The confidence and capacity to manage, reduce and cope with those risks that are necessary;

the courage and resources to eliminate those risks that are unnecessary;

and the wisdom to know the difference.

(apologies to the SERENITY PRAYER)

Risk Awareness

Risk awareness is the process by which professionals and other participants acknowledge that dangers and hazards do exist. When risks are acknowledged and perceived to be worthy of attention, the first major step towards increasing the margin of safety has been taken (Bruggink, 1975). The processes of acknowledging and accepting the responsibility for controlling risk are essential for improving our safety records. When every professional knows that risks exist, believes that risks can be controlled and feels that risk management is a welcome part of their obligation to the passengers, the false benefits of denying risks will vanish.

When everyone in the industry realizes that safety is very far ahead of any and all other passenger needs and wants, then the resistance to risk management will all but disappear. When the industry focuses on providing the passenger with their number one requirement, the arguments for ignoring and discounting risks will evaporate. Industries and organizations that have placed a strong emphasis on customer satisfaction ahead of short term economic benefits have prospered (Drucker, 1976 and Peters & Austin, 1985).

Risk Identification

It has long been acknowledged that the individual who discovers a previously unidentified risk is in a very precarious position. It is rare that a supervisor will look on the risk identifier with favor. It is a centuries old axiom that you don't bring bad news to the king. The bearers of bad tidings have frequently been negatively rewarded for their deeds. This has been true from the days of ancient Rome until the present (Feynmann, 1988).

It is my conclusion that we need to remove the risk or threat of being a risk identifier or a risk finder. It would benefit all of us to make heroes of those individuals who can find previously unrecognized dangers. Too often, our leaders and organizations have branded the risk identifier as "a loose cannon." Risk identifiers have been professionally and socially isolated. They have received formal and informal reprimands. They have even been demoted and discharged for their efforts. It is small wonder that in some organizations risk denial is reinforced and even encouraged.

We need to develop a system where individuals who are risk identifiers are perceived as positive and necessary forces by the entire industry. In this writer's judgment, the entire aviation industry, including organizations and individuals, would benefit by accepting a system in which a "risk discovery" is received, reviewed, recognized and rewarded as a positive and indispensable influence. We should treat the identification of a previously unknown risk in much the same manner as we welcome the isolation of a new disease causing pathogen or virus.

It should be economically beneficial to develop recognition and reward programs for identification of previously undefined risks. Active surveys conducted with proven scientifically sound methods are potentially worth several times their cost even in the short run (Parker, 1988). An active risk reduction program can have permanent benefits by reducing costs of accidents, incidents, disrupted schedules and equipment downtime (Arbon et al, 1990, Lederer, 1987, Lederer & Enders, 1987).

Wariness

The probability of an accident resulting from one hazardous process or event is extremely low. Accidents result from a sequential chain of events in a pathogenic climate of indifference, incapacity and neglect. Any one event that did not occur would break the chain or sequence and prevent the accident. Each negative event by itself could easily have been prevented or removed by a reasonably wary individual.

Qualified, responsible professionals have regarded these events as being trivial, benign and inconsequential (Arbon et al, 1990). Potentially lethal anomalies are sometimes judged as being unworthy of the effort to have them changed. It takes a thorough investigation of aircraft accidents to identify all of the innocuous errors and latent risks and bring them to light. The significance of these minor events is sometimes only recognized after an accident (Bruggink, 1988). Everyone in aviation from the flight line to the boardroom needs to be sensitive to and wary of the problem of risk denial. Wariness is the term Bruggink (1975) has given to the process which can combat risk denial. We need to develop, promote and reward those that exhibit wariness.

The "Oliver" Award

The "Oliver" Award has been offered by the fictitious OSTRICHES ANONYMOUS ASSOCIATION as an anonymous annual award to the individual or organization who makes a conscious decision to discount or ignore a significant aviation risk.

The anonymous "OLIVER" will only be offered to those individuals who cannot be positively identified by their award winning decisions or statements. The purpose of the "OLIVER" is to enlighten and entertain, never to embarrass. Those individuals who would not be amused, enlightened or entertained by being nominated to receive the "OLIVER" are automatically disqualified. All quotations and references are to be paraphrased and sanitized to preserve anonymity.

The first nominee for the OLIVER was the ancient Greek aviator who developed the first human powered ultra-light aircraft in 747 BC. His statement for which he received that years nomination was "It will be all right as long as you don't fly too close to the sun and melt the wax in the wings."

The Ostriches Anonymous Association (OAA) is totally autonomous and is in no way endorsed or supported by the ISASI or any other sane and competent individual, organization or society. If you would like more information on the OAA such as membership requirements, how to make nominations for this year or any prior years or how to obtain a complete list of prior nominees write to:

Oliver Ostrich
Head Chancellor and Nominations Arbitrator
THE OSTRICHES ANONYMOUS ASSOCIATION
c/o Dr. Robert O. Besco (Capt. AAL, Ret.)
4150 Annapolis Road
Lakewood, CA 90712 (213)420-7732

The following nominations have been received to date for the 1990 award:

Position	Risk Denying Statement of Qualification
Attorney	"My client's high blood alcohol did not degrade his flight deck performance. He is an alcoholic and has a high degree of tolerance."
Personality Theorist	"Most Airline Cockpit Resource Management problems would never have materialized if airlines hadn't hired military fighter pilots or other pilots with stereotyped 'macho' personality traits."
Accident Investigation	"It sounds like the cause of this accident is Investigator going to be a repeat. I have known for a long time that this thing was going to reoccur. I'll bet that when we get into this, my pet theory on causation will be confirmed."

This is a light hearted approach to resolving a very serious situation. I have found risk denial to be a primary contributor to maintaining accident rates at a stable level for 30 years (Congress, 1988). Most of our accidents could have been prevented if early warning signs of risks had been acknowledged (Arbon et al, 1990). This writer has a standing offer to anyone who can cite an aircraft accident that was caused by an unrecognized risk. If any accident can be found with even one totally unpredicted factor in the causation chain, the discoverer will receive a life time honorary membership in *The Ostriches Anonymous Association.*

Recommendations

Bringing the problem of risk denial out into the open light of scientific, managerial and operational analysis will be one of the major aviation safety contributions of this decade. To acknowledge that there are powerful forces out there which promote risk denial is a large step toward managing and removing risks.

What is needed is a risk identification, risk awareness and risk management program that isolates and defines all of the seemingly trivial risks before they cause an accident The safety program must doggedly pursue hidden, latent risks to eliminate them from the system. Once identified, most risks are relatively simple and inexpensive to remove or to reduce to practically zero. Risks are allowed to remain not because of the difficulty of removing them. Risks persist in the system primarily because the consequences of their independent existence are judged to be of an insignificant or benign nature. All professionals in aviation, from pilots and mechanics to directors on corporate boards, need to be dedicated to the removal of all of the risks and the pathogenic conditions which induce error. By removing all such risks, we can prevent them from accumulating to cause the major catastrophes. Neither heroic discoveries, nor dramatic bold actions, nor major breakthroughs in science and technology, nor major changes in the system will be the most effective vehicles for significantly reducing unnecessary risks. We can all assist in "making the world a better place in which to fly" by paying meticulous attention to and developing a persistent distaste for all of the seemingly mundane elements of latent risk.

References

American Psychological Association. (1985). *Standards for educational and psychological testing.* Washington, DC: Author.

Arbon, E. R., Mouden, L. H., & Feeler, R. A. (1990). The Practice of Aviation Safety, Observations from Flight Safety Foundation Safety Audits. *Flight Safety Digest, 9 (8),* 1-42.

Besco, R. O. (1987). Maintaining Minimum Pilot Aptitude Levels in Commercial Aviation. *Proceedings of the Fourth International Symposium on Aviation Psychology,* 564-567. Columbus, OH: Ohio State University, Department of Aviation.

Besco, R. O. (1988). The Professional Performance Analysis Checklist. ISASI *forum, 21(4),* 60-68.

Besco, R. O. (1989). *Analyzing Knowledge Deficiencies in Pilot Performance.* Paper presented at the Fifth International Symposium on Aviation Psychology at Ohio State University, OH.

Besco, R. O. (1989). Validity, Reliability, and Baloney: Revisited. Human Factors Society Bulletin, 32(8),19-20.

Besco, R. O. (1990). *Why Pilot's Err: And What We Can Do About It.* Paper presented at the Lawyer-Pilots Bar Association, Winter Meeting, Ojai, CA.

Besco, R. O. (in press). Aircraft Accidents Aren't: A Classic Case of the Risk Denial Syndrome. *Flight Safety Foundation.*

Besco, R. O., Tiffin, J., and King, D. C. (1959). Evaluation Techniques for Management Development Programs. *Journal of the American Society of Training Directors, 13 (10),* 13-27.

Bruggink, G. N. (1975, March). *The last line of defense.* Paper presented at the special LEC Meeting of the Air Line Pilots Association in New Orleans, LA.

Bruggink, G. N. (1988). To Kill A Myth. ISASI, *forum, 20 (4),* 4-9.

Caesar, H. (1989). What Have We Learned Over the Past 30 Years? *Proceedings of the Twentieth International Seminar of the ISASI, 3-7.* Sterling, VA: International Society of Air Safety Investigators.

Congress of The United States, Office of Technology Assessment. (1988, July). *Safe Skies for Tomorrow: Aviation Safety in a Competitive Environment.* (OTA-SET-381). Washington, DC: U.S. Government Printing Office.

Cureton, E. E. (1950). Validity, Reliability, and Baloney. *Educational and Psychological Measurement, 10 (1),* 94-96.

Degani, A. & Wiener, E. L. (1990). *Human Factors of Flight Deck Checklists: The Normal Checklist.* (Technical Report NASA CR-177549). Ames Research Center, Moffett Field, CA: National Aeronautics and Space Administration.

Drucker, P. F. (1974). *Management: Tasks, Responsibilities, Practices.* New York: Harper & Row.

Feyomann, R. P. (1988). *What Do You Care What Other People Think?* New York: W. W. Norton.

Guilford, J. P. (1952).When not to factor analyze. *Psychological Bulletin, 49 (1),* 26-37.

Haddon, W. H., Jr., Suchman, E. A., & Klein, D. (1964). *Accident Research Methods and Approaches.* New York: Harper & Row.

Heinrich, H. W. (1931). *Industrial Accident Prevention.* New York: McGraw HilL

Helmreich, R. L. (1990). *Studying Fight Crew Interaction: The Intersection of Basic and Applied Research.* Talk presented at the dedication of the NASA-Ames Research Center, Human Performance Research Laboratory.

Lederer,J. F. (1987). Economics and Air Safety. ISASI *forum, 20 (1),* 14-19.

Lederer, J. F. (1990, September). *Safety Science in Aviation.* Paper presented at the First World Congress on Safety Science in Cologne, Germany. Sponsored by TUV Rhineland.

Lederer, J. F. & Enders, J. H. (1987, June). *Aviation safety-The Global Conditions and Prospects.* Paper presented at the Deregulation and Safety Conference, Northwestern University, Evanston, IL.

Mager, R. F. & Pipe, P. (1984). *Analyzing Performance Problems* (2nd ed.). Belmont, CA: David S. Lake Publishers.

Mintz, A. & Blum, M. L. (1949). A Re-examination of the Accident Proneness Concept. *Journal of Applied Psychology 33,* 195-211.

National Transportation Safety Board. (1985). *Aircraft Accident Report, Air Illinois Hawker Siddley, HS 748-2A, N-746LL near Pinckneyville, Illinois, October 11, 1983.* (NTSB/AAR- 85/03). Washington, DC: Author.

Parker, G. B. (1988). A Critical Evaluation of Aviation Safety in Civil Aviation. ISASI, *forum, 20 (4),* 91-94.

Peters, T. & Austin, N. (1985). *A Passion for Excellence.* New York:

Reason, J. (1988, October). *Resident Pathogens and Risk Management.* Paper presented at the World Bank Workshop on Safety, Control and Risk Management, Washington, DC.

Slovic, P. (1986). Informing and Educating the Public About Risk. *Risk Analysis, 6 (4).*

Tiffin, J. & McCormick, E. J. (1958). *Industrial Psychology* (4th Ed.). Englewood Cliffs, NJ: Prentiss-Hall.

Wiener, E. L. (1989). Reflections on Human Error: Matters of Life and Death. Presidential Address in *Proceedings of the Human Factors Society 33rd Annual Meeting,* 1 -7. Santa Monica, CA: Human Factors Society.

Wiener, E. L. (1990). The Golden era of human factors in commercial aviation. *Human Factors Society Bulletin, 33*(8), 1-2.

Wolfe, T. (1979). *The Right Stuff.* New York: Bantam Books,

Wong, W. A. & Hobbs, G. E. (1949). Personal Factors in Industrial Accidents—A Study of Accident Proneness in an Industrial Group. *Industrial Medicine, 18,* 30.

Dr. Robert O. Besco, Founder and President of Professional Performance Improvement, Inc., is the only Board Certified Psychologist with in-depth experience as an Air Force Fighter Pilot, a Manager of Aircraft Industry Human Factors Engineering Groups, a Captain for a major commercial airline, a University Professor and an Accident Investigator.

Partial Listing of Previous Nominees

Year	Position	Risk Denying Statement
1989	Government Official	"The structural failure was a rogue accident, accident inspection and maintenance procedures do not need to be changed." (Anonymous statement describing a 1988 incident, Aviation Week, Jan 2,1989.)
1988	Aviation Publisher	"Since this safety procedure can not guarantee that we will never have another accident of this type, we should not publish it."
1988	Government Official	"The whole industry is now so sensitized to the no-flap type of error that it will be many years before we are at risk from no flap mistake being repeated." (Address made to a professional society 23 months after the first accident and one month before the second accident.)
1987	Airline Executive	"We needed the wage concessions of $350 million to keep the airline in business." (Statement made prior to realizing a $350 million personal gain from a stock merger, privatization and debt restructure transaction with that same airline.)
1986	Airline Executive	"Why should we spend the money to fix that problem, it hasn't caused any accidents?"
1985	Flight Crew & All The Guys Ahead	"It must be all right to approach and land, all the guys ahead of us made it."
1984	Airline Instructor	"They will teach you about the Digital Flight Guidance System curing your Initial Line Operating Experience."

1983	Airline Executive	"We don't need to raise our pilots wages. We are able to hire plenty of licensed pilots at less than $1500/month.'
1982	VP of Flt. Training	"Sure Boss, we can reduce training costs and still pass the inspections."
1981	Avionics Designer:	"Our Digital Flight Management Systems and Glass Cockpits of the future will greatly reduce the workload on the flight crews."
1979	Government Official	"Safety margins will remain the same after deregulation. "
1978	Manufacturer, Government & Airline Officials	"These pylon cracks are not immediately dangerous. There is no reason to be alarmed about structural integrity."
1972	Approach Controller	"Pilots would never be that far below an assigned low altitude. My equipment must be malfunctioning again."
1971	Airline Copilot	"its great to fly with fully qualified Copilot and experienced Captains. You don't have to be constantly on the alert for their mistakes."
1969	Probationary Copilot	"If I tell the Captain he is doing it wrong, he will write me up and I could be discharged without right of appeal."
1966	Airline Instructor	"Let me show you how you can land these big jets, just like a glider. Pull the power off, we can glide in from here."
1965	Wingman	"Blue Leader, it is my personal feeling, based on my current analysis of the situation, that you might want to reconsider your current plan of action. I recommend that you seriously consider an alternative tactic which would involve the detachment of the bogey from your six o'clock position by complying with the following suggestion: BLUE LEAD, BREAK HARD LEFT, NOW!" (Warning call made after completing leadership sensitivity and assertiveness training.)
1959	Airline Executive	"We prefer to hire less experienced pilots. We find them to be better and more loyal employees than a Major who is a test pilot with advanced degrees and has thousands of hours of flying time. We think the hot shot pilot will be a malcontent if he has to spend half of his career in subordinate assignments."
1958	Airframe Manufacturer	"We do not need a backup for that system, it will only fail once in 1000 years."
1957	Instructor	"I'm going to pass you, but don't ever do it that way on the line."
1954	Airline Executive	"If we distribute educational materials to our pilots on accidents, incidents, hazards and risks, it might be picked up by the media and put us at a competitive disadvantage."
1953	Accident Investigator	"The flight control system is fine. The aircraft inflight break up was caused by pilots who were unskilled at avoiding pilot-induced oscillations."
1951	Airframe Manufacturer	"We can make them fool proof, but we cannot make them damn-fool proof."
1950	Accident Investigator	"Those pilots were briefed to maintain high engine RPM until on the runway."
1949	Jet Engine Manufacturer:	'Just tell the pilots not to reduce the engine RPM to idle until the landing is assured"
1948	Avionics Designer	"It had to be pilot error. Thousands of pilots have used the three pointer altimeter without misreading it."
1944	Pilot & Designer	"The warning horn was making so much noise that I couldn't hear the tower telling me to put the landing gear down."
1940	US Army Air Corps General	"They don't have the engineering, manufacturing and military capability to design, build and fly airplanes in combat that are as good as ours."
1926	Airmail Pilot	"We can deliver the mail in any weather."
1914	Lt. General	"My son-in-law was unfortunate in that he tried to fly on a day in which there was not much lift in the air. He survived the crash through a combination of superior skill and good fortune."
1913	US. President	"Can't we buy just a few airplanes and let the pilot take turns flying them?"

Reprinted courtesy of *ISASI Forum*, Volume 23, No. 4 February 1991

The Accidental Journalist

Continued from page 1

(The FAA suspended the USAir pilot's licenses and blasted the two men for delaying taking alcohol and drug tests, which were not mandatory at the time. ALPA says they took the tests "in a timely fashion.")

- The wrong-button story. On September 23, the news media's fickle finger of fame swung away from Captain Martin but towards co-pilot Kleissas. Newspapers strongly implied that he caused the crackup by pressing the wrong cockpit switch. The *Washington Post*'s lead paragraph said: "[He] inadvertently hit the wrong controls. . .prompting the pilot to abort." *Newsday* reported: *FEDS: THE CREW REALLY BLEW. . .* [Kleissas] inadvertently pushed a button that caused the 737 to decelerate." A nearly identical AP lead was carried in papers around the world. My own opening paragraph was also along these lines. Kleissas was cast in our accounts as a kind of Captain Peachfuzz, the error-prone officer in the old Bullwinkle TV cartoon series who, in oft-shown episode, idiotically hits the "reverse" button on a control panel, causing a remote-controlled vehicle driving in "forward" to rip in two.

The "button" story came from a news briefing by acting NTSB chairman James Kolstad, who mentioned among many other facts that Kleissas had hit the wrong switch, disengaging the auto-throttle and requiring Captain Martin to move the throttle manually. Kolstad drew no inferences about the crash causes, but it was late at night, near deadline, and reporters were desperate for a lead. They dashed for the phones, the phrase "wrong button" on many a lip.

Next morning came a day of reckoning. NTSB officials, objecting to the coverage, said the co-pilot's error had, at worst, probably been only a momentary distraction during the takeoff. They pointed out that Kolstad never said the copilot's error had contributed to the crash in any way, nor had he ruled out mechanical error as the ultimate cause. Oops. It seems, in retrospect, that it was we reporters, not Kleissas, who most resembled Captain Peachfuzz, whose trademark was to do the exact opposite of what a prudent and sensible person would in any given set of circumstances.
A pamphlet called "Air Accidents & The News Media" (published by the Aviation/Space Writers Association) sets out all the prudent and sensible precautions a crash reporter should take. "Don't jump to conclusions," it says. But we did. "Avoid oversimplification," it implores. We did not. "Attribute statements and conclusions," it advises. If we had done this more carefully, we would have realized that Kolstad had drawn no conclusions regarding the causes of the crash. NTSB officials never do at such an early stage in the investigation.

- The DWI explanation. A huge headline in the September 27 *New York Post* declared: *CRASH PILOTS MAY HAVE BEEN DRINKING*. The story cited police sources, who, in turn, cited an informant who supposedly had been out "bouncing" with the pilot and co-pilot. The report continued: "Investigators believe Martin and Kleissas may have spent as many as five hours of their six-hour layover in LaGuardia area bars." Patricia Goldman, a USAir senior vice president who heads the line's public relations office in suburban Washington, said she told the paper's reporters before publication that the story was flatly wrong, the crew's movements were accounted for and they had been in no fixed location for five hours on the crash day. Despite that warning, the Post went with the article, which was picked up by television, radio, and the wires and spread around the world. "When we heard about that story we knew it was false," says the NTSB's Lopatkiewicz. "I spent all day discounting it and the next day it disappeared." But not before some heavy damage was done to the pilots' reputations.

(As the crash news disappeared into the back pages, reporters took up the theory that an improperly set rudder switch may have caused the plane to swerve, prompting the effort to abort, a thesis the NTSB said it was probing.)

Coverage of the USAir crash was not an isolated example of reporters leaping to conclusions to "explain" a crash, nor was it the most flagrant case on record. That probably came in August 1987, when a Northwest Airlines plane went down in Detroit just seconds after takeoff, killing over 150. In the course of just a few days, reporters grabbed at evidence to support one theory after another, blowing sketchy information out of proportion, then reversing themselves to race to the next explanation-a phenomenon which aviation experts call "cause du jour" journalism.

First came the prominently displayed articles on engine failure, many based on eyewitness accounts of flames billowing from one engine before the crash– Baltimore *Sun*, Knight-Ridder (both August 18) and *Detroit Free Press* (August 19). But investigators immediately began raising doubts about a pre-crash engine problem.

Then there was the sabotage thesis, based in part on reports that disgruntled employees had vandalized equipment in the past and might have tampered with the plane. (See *USA Today*, August 17: "Seconds after takeoff, left engine explodes and plane crashes… FBI agents were sent to check reports [of sabotage].") Investigators quickly scotched the sabotage account. Next was the weather theory, as in *WIND-SHEAR WARNING WAS ISSUED* (*Detroit Free Press*, lead headline, stripped across top of page one, August 19). Wind-shear, too, was quickly played down by investigators. At last, on August 20, news organizations hit upon the explanation that officials probing the crash ultimately accepted: the plane's wing flaps were not extended prior to takeoff. I guess this all goes to show that if you fire enough rounds you might eventually be lucky enough to hit a target.

Journalists are reputed to be a skeptical lot. Why, then, do those assigned to air accidents so often give credence to half-baked theories?

There are plenty of other, less egregious examples of questionable accident coverage. For example, when a plane crashes, newspapers frequently will print a list of earlier mishaps involving the same make of aircraft-a feeble stab at explaining what might have happened before anyone knows if there is any linkage between past mishaps and the crash in question. Thus, when a French UTA DC-10 disappeared over Africa last fall, the *Washington Post* account (September 20, 1989) mentioned an earlier DC-10 crash in Sioux City that had been traced to a faulty engine disk. That article was twinned with an account of how the FAA had been ordering tests of DC-10 engine disks to probe for flaws. The wisdom of this emphasis on engine flaws was almost immediately shown to be lacking when the French government announced that a bomb had destroyed the aircraft.

When Pan Am Flight 103 went down in Lockerbie, Scotland, *The New York Times* (December 24,1988) reported that mechanical and structural flaws could have caused the Boeing 747 to break apart in midair. The sources were sound, but evidence that a bomb had destroyed the plane quickly became so overwhelming that the paper's editors may eventually have regretted devoting an entire article to the non-bomb theory.

Journalists are reputed to be a skeptical lot. Why, then, do those assigned to air accidents so often give credence to half-baked theories? In many cases, the reason may be inexperience. Each crash is a big local news event, drawing dozens or hundreds of newspeople who have never covered aviation before and are unfamiliar with the pitfalls of accident reporting. "They might have been covering the opening of a shopping mall the day before, they don't have the background, and of course the first thing they want to do is find out what caused the accident," says Lopatkiewicz.

A second reason is that rivalry can breed recklessness-the more intensely news organizations fight for a story, the greater the likelihood that reporters and editors will hype up that day's information to out-dazzle the opposition. (*The Detroit News-Free Press* circulation war may thus have been a factor in the excesses of the Northwest crash coverage.) Lopatkiewicz says that with the expansion of satellite and cable hookups, the number of TV crews pitted against each other has surged. He counted thirty-six camera crews at one recent briefing following an accident in Sioux City, called simply to announce that the investigating team had arrived.

A third reason may be that crash reporters feel so driven to assuage the readers curiosity, to provide what Paul Harvey calls "the rest of the story," that they lose sight of the need to base a report on solid information and will settle for supposition. Lopatkiewicz recalls a young reporter who stormed up to an NTSB official in Hawaii after a briefing on an accident in which an airliner's cargo door blew off, killing nine (February 24, 1989). The reporter castigated the NTSB for refusing to speculate on what caused the crash, as if the board were depriving the public of some inalienable right to official surmise and conjecture. ("We don't have the responsibility to speculate, we have the responsibility *not* to speculate," notes Lopatkiewicz.)

It would, of course, be wiser if journalists covering crashes simply followed the admonition made by Sergeant Joe Friday of Dragnet: Just the facts Ma'am.

In some respects, reporters faced with paltry data on what caused an accident confront pressures akin to those that bedeviled sportswriters on the old Paris *Tribune*, as described by William Shirer in his memoir, *20th Century Journey*. The paper's American readers wanted vivid, play-by-play narrations of the college football games, but the only information the sportswriters could get was a meager ticker report on the score after each quarter. What to do? They simply conjured up entire games to fit the scores, "great end runs, off-tackle smashes, forward passes, blocked punts, and spectacular drop kicks…" Crash reporters do not resort to fiction (with possible exceptions—see 1950's *AIRLINER LANDS WITH 97 SKELETONS ON BOARD*, *Weekly World News*, November 14, 1989), but at times they draw such sweeping inferences from such sketchy information, in order to fill the gaps in their own narrations, that the resemblance to reality is marginal. Facts mutate into "factoids"—assertions with an element of truth that grow quasi-fictional through distortion.

It would, of course, be wiser if journalists covering crashes simply followed the admonition made by Sergeant Joe Friday of *Dragnet*: Just the facts Ma'am. After all, simply getting the basic facts straight can be difficult enough in the chaos following a crash, Robert Sterling, a veteran aviation writer, recalls a United Press lead years ago reporting that a "twin engine, DC-8 Super Constellation" had made an emergency landing in Florida. In fact, a DC-8 is not twin-engined-it has four. What's more, a DC-8 is not a Super Constellation, according to Sterling: it was a Convair 540 prop jet. The plane *had* made an emergency landing in Florida, which gave the wires some reason to be thankful. According to *Facts on File*, the Associated Press once reported that a plane had arrived safely at an airfield in northern Rhodesia (September 18, 1961)—UN Secretary General Dag Hammerskjold's flight, to be precise. Embarrassingly enough, the plane had actually crashed, killing Hammerskjold and fourteen others. Following the USAir accident, newspapers across the country, including *The New York Times* (page one), the Los Angeles Times, and the *Chicago Tribune* ran photos taken on the runway of a man in a pilot's uniform, identified in captions as Captain Michael Martin. It was not Martin. It was in fact a Pan Am pilot who just happened to be riding on the plane. New York *Newsday* avoided that particular pilot error. Instead it ran a front-page photo of ALPA attorney James Johnson, with this caption: "Pilot Michael W. Martin arrives last night in Jamaica Hospital."

Many mistakes of this type result from incautious reliance on eyewitnesses, who, as the pamphlet on crash coverage points out, are frequently "untrained observers who may not know what they are looking at." Eyewitnesses have been known to misidentify people, to report what never happened (the phantom engine fire in the Northwest crash), and to provide less-than-helpful descriptions. Here, for instance, is how one New York police officer involved in the LaGuardia rescue described the scene to me: "It was utter chaos. It was eerily calm." His partner tried to amplify: "It was pretty calm, except there was a lot of screaming."

A final warning to crash reporters: the stress of covering an air accident may temporarily affect the journalists' brain function, including the capacity to take in basic information. For example, at the start of one NTSB briefing on the USAir mishap, Lopatkiewicz announced that acting chairman Kolstad's name was spelled K-o-l-s-t-a-d. As I recall, one of the first questions was: "Mr. Kolstad! Can we have the spelling of your name?" the spelling was given again. Before the gathering broke up, that question had been asked and answered several more times. Even so, a reporter from one major wire service opted to spell his name "Kholstad," suggesting that a natural skepticism about official versions had run amok, possibly as a result of too much adrenaline in the system. This example should not cause practicing journalists undue alarm. In most cases, such a problem can be corrected by deep breathing or visualization exercise combined with a mild sedative. But if the condition persists, be sure to consult your physician. ◆

Reprinted courtesy of ISASI Forum Volume 23, No.3 December 1990

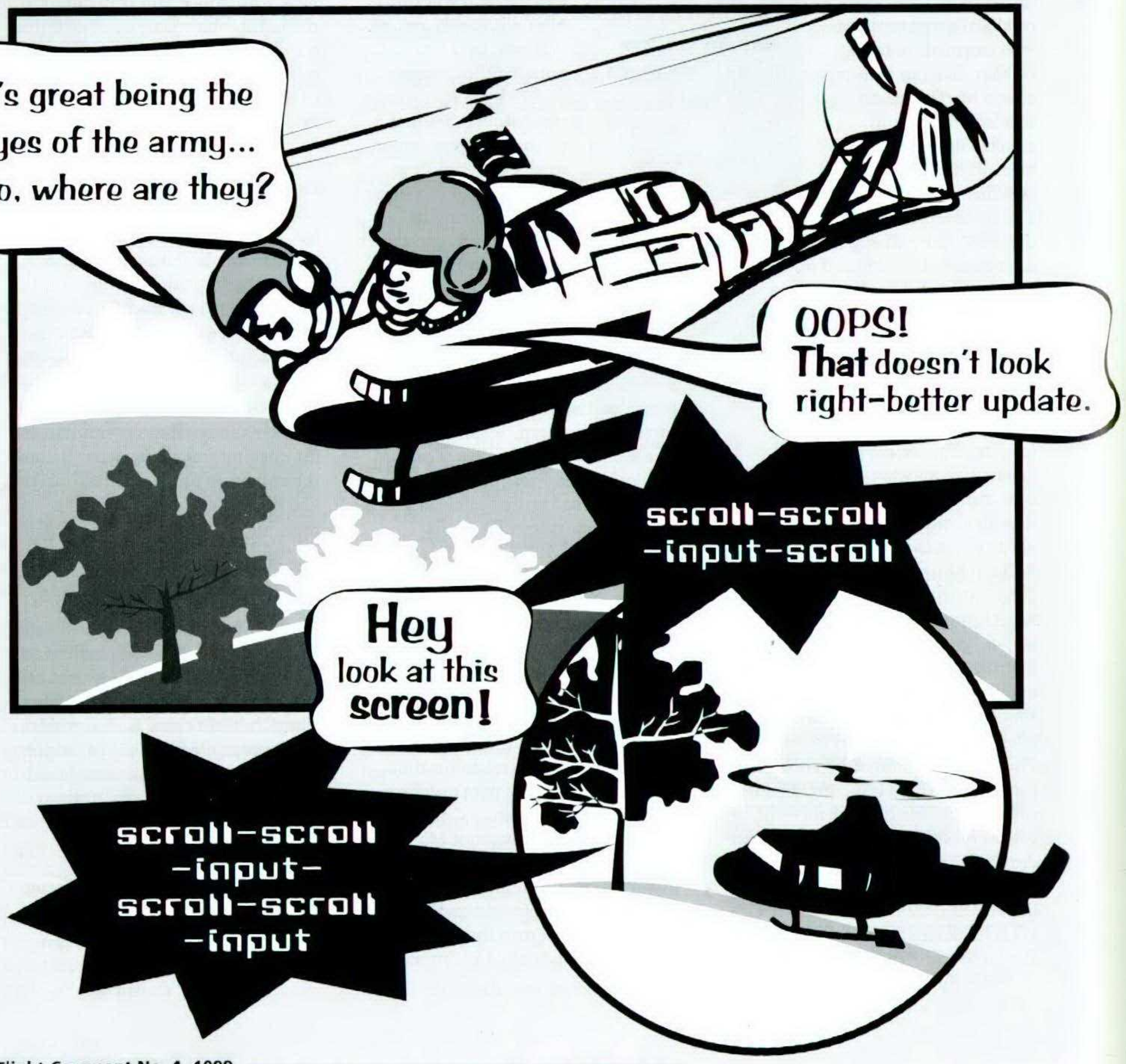
Scroll, Scroll, Scroll, CHUNK

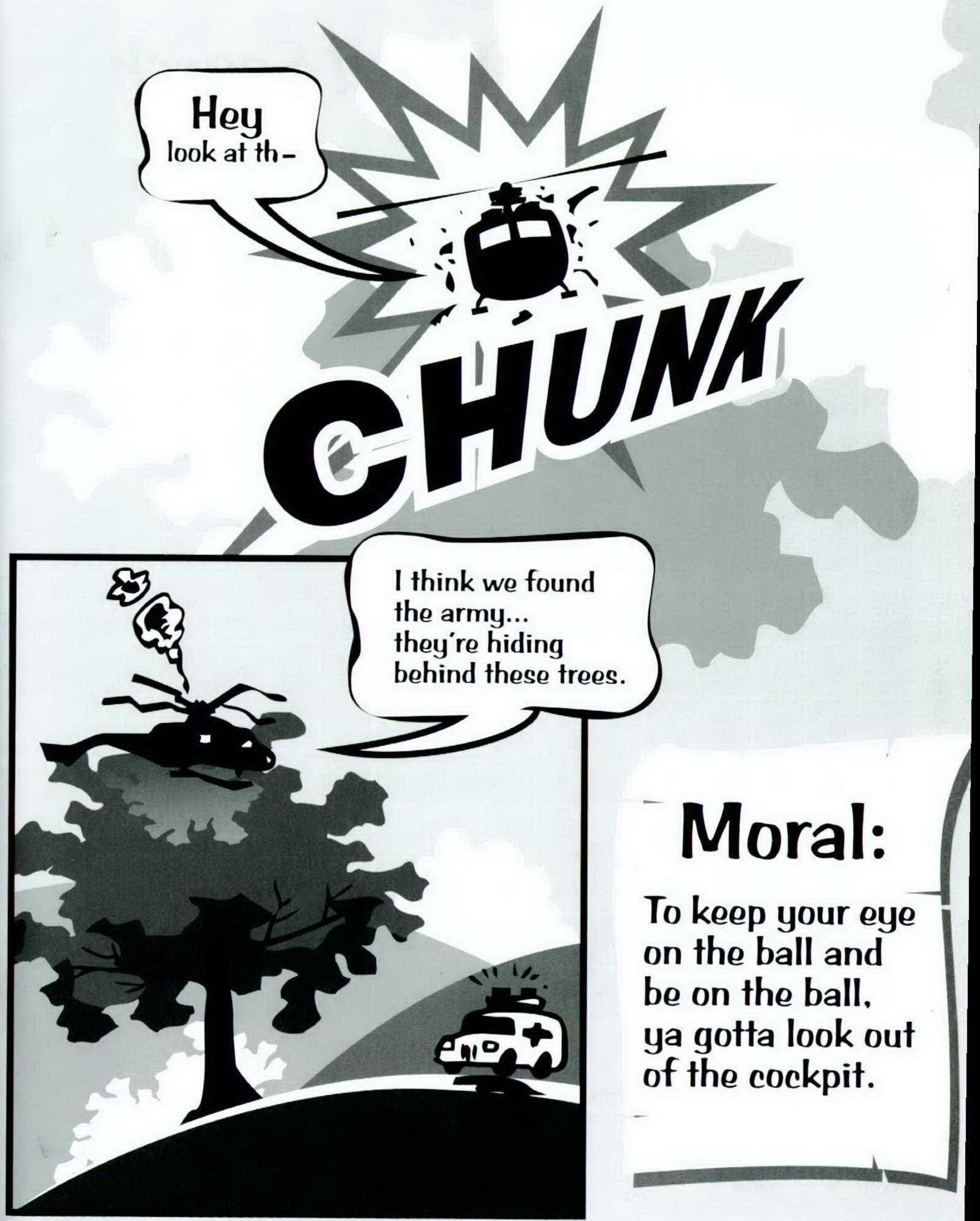
or

Everything You Wanted To Know About Finding The Army*

AIRSOP'S FABLES

*they hide in the woods, you know





Flight Safety Word Search

By Captain J.J.P. Commodore

D	S	D	R	A	W	E	R	T	S	E	T	C	G	G	C
E	A	A	T	I	B	A	H	Y	V	S	I	A	U	A	S
F	H	Y	L	U	S	S	D	R	R	N	D	N	I	B	U
E	P	L	D	T	A	E	E	I	O	B	L	A	D	E	B
N	M	I	H	R	G	S	F	I	N	I	S	H	E	M	M
C	U	G	C	A	E	F	B	N	M	E	D	A	L	A	I
E	I	H	R	R	A	A	O	W	K	C	A	H	I	T	S
L	R	T	U	T	N	E	M	E	T	A	T	S	N	U	S
U	T	A	S	H	N	T	S	I	M	E	M	B	E	R	I
F	T	S	H	R	U	I	M	V	N	P	O	N	S	E	O
E	R	K	E	E	A	I	W	I	N	G	S	E	M	A	N
T	E	E	D	A	L	S	U	F	F	E	R	I	N	G	S
A	S	D	E	T	A	M	I	T	L	U	N	I	Q	U	E
R	C	O	H	C	E	R	O	T	S	E	R	E	S	A	L
G	U	P	I	H	S	R	E	N	T	R	A	P	U	S	H
D	E	P	A	R	T	M	E	N	T	E	S	I	V	D	A

HINT (7 letters) "Attention to safety"

ADVISE
ANNUAL
BAG
BIND
BIONIC
BLADE
CRASH
CRUSHED
DAYDREAMING
DAYLIGHT
DEFENCE
DEPARTMENT
ECHO
ENSURE
FINISH
FIRST
GRATEFUL
GUIDELINES
HABIT
HACK
LASER
LIGHTS
LIMIT
MATURE
MEDAL
MEMBER
MIST
NAME
NEON
PARTNERSHIP
PEACE
PUSH
RESCUE
RESERVE
RESTORE
REWARDS
STAFF
STATEMENT
SUBMISSIONS
SUFFERING
TASKED
TEST
THREAT
TRAGEDY
TRIUMPH
ULTIMATE
UNIQUE
VIEW
WILL
WINGS

could have been fatal

This joke

This immersion suit had "loser" written on it with a ballpoint pen.

The suit tested unserviceable for leaks caused by the pen tip. Anyone having to use this suit after a ditching would have had his or her chances of survival significantly reduced.

Any defacing, vandalism, or willful damage to survival or personal life support equipment is a criminal offense.

Who's the loser

National Defence Défense nationale

DGPA