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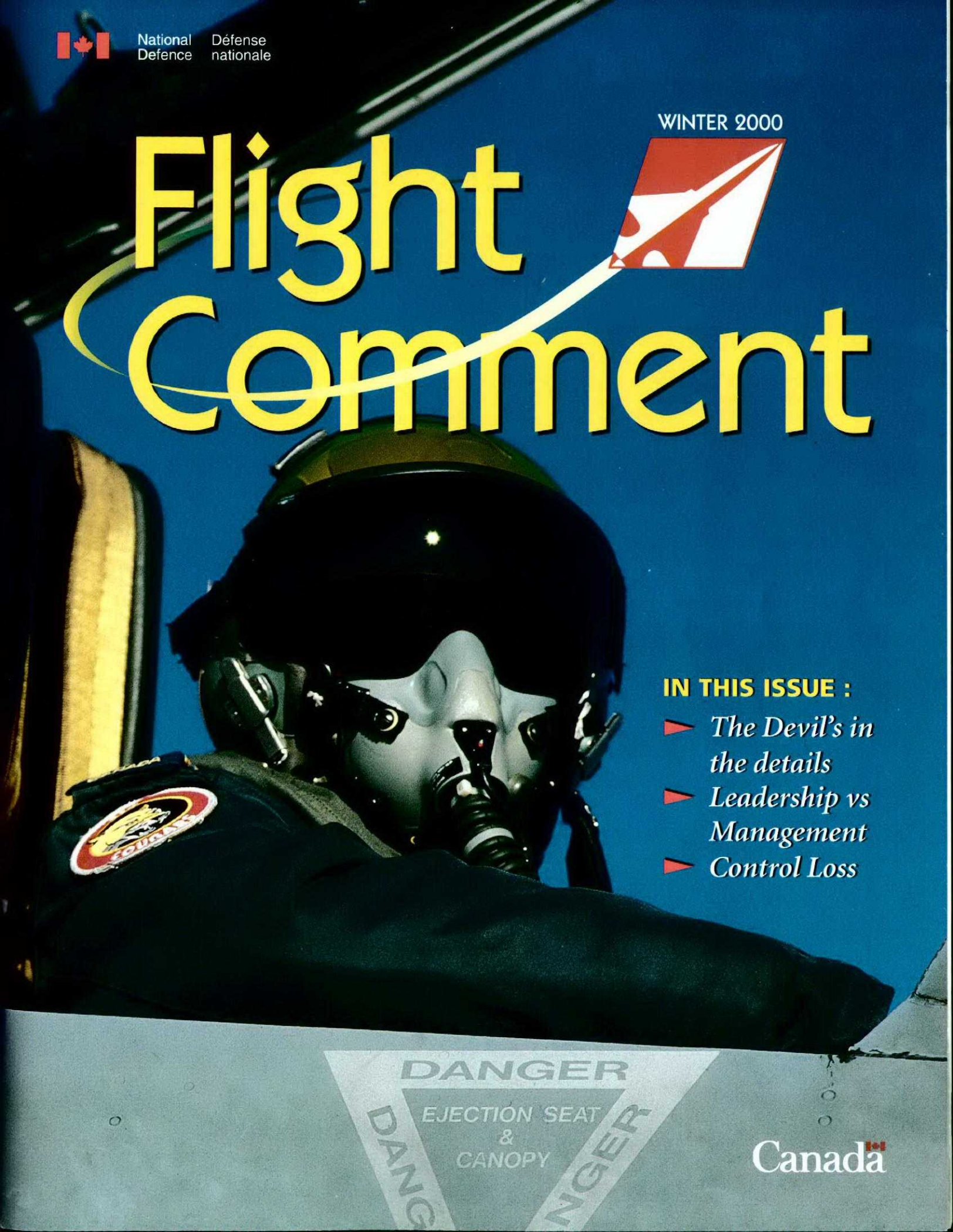
Flight Comment



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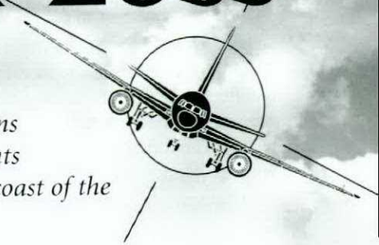
Erroneous Airspeed Indications Cited in Boeing 757

Control Loss



Investigators concluded that the airplane had a blocked pitot tube and that, during departure, the flight crew became confused by false indications of increasing airspeed and did not respond to a stall warning. All occupants were killed when the airplane struck the Caribbean Sea off the northern coast of the Dominican Republic.

About 2347 local time on Feb. 6, 1996, a Boeing 757-225 (B-757) struck the sea off the northern coast of the Dominican Republic about five minutes after takeoff from Gregorio Luperon International Airport in Puerto Plata. The airplane was destroyed, and all 189 occupants were killed.

In its final report. the Dominican Junta Investigadora de Accidicentes Aéreos (JIAA) said that the probable cause of the accident was "the failure on the part of the flight crew to recognize the activation of the stick shaker as an imminent warning of [an] aerodynamic stall and their failure to execute proper procedures for recovery [from] the control loss."

The report said, "Before activation of the stick shaker, confusion of the flight crew occurred due to the erroneous indication of an increase in airspeed [on the captain's airspeed indicator] an a subsequent warning."

The report said that the erroneous airspeed indication and the erroneous overspeed warning were caused by an obstruction of the airplane's left upper pitot tube.

The airplane was operated by Birgenair, a charter company based in Istanbul, Turkey for the Dominican airline Alas Nacionales.

The airplane was scheduled to be flown to Frankfurt, Germany, with stopovers in Gander, Newfoundland, Canada, and Berlin, Germany.

"[The B-757] mechanical failure… required a change of equipment and the crew that was attached to the flight," said the report.

Twelve B-757 crewmembers reported for duty at Airport about 2215.

"There was an additional delay of an hour because of a delayed airline flight attendant," said the report.

Because of the duration of the flight, three pilots were required: a captain (pilot-in-command), a relief captain and a first officer.

The captain, 62 had 24,750 flight hours, including 1,875 flight hours in type. He had type ratings in the Boeing 707, 727, 737, and 757/767, the Douglas DC-8 and the DC-9, and the Vickers Viscount 794. His last training occurred March 12, 1995, and consisted of B-757/767 flight simulator training at United Airlines Flight Training Center.

The relief captain, 51, had 15,000 hours, including 122 flight hours in type. He had type ratings in the Airbus A300-B4 and A310, Boeing 727, 737, and 757/767, Douglas C-47 and DC-9, and the Transall C-160. His last training occurred Jan. 28, 1996, and consisted of B757/767 flight simulator training at Pan Am International Flight Academy.

The captain and relief captain were Turkish citizens. The report did not include detailed information about the first officer.

"The three flight crewmembers had proper medical authorizations indicating their abilities as flight crewmembers," the report said. "However , the captain was 62 years old, which in certain countries [with age limits for flight crewmembers] excludes him from being the pilot-in-command.

"The investigation was not able to verify the activities of the flight crewmembers during the time before reporting for the flight. Postmortem examinations were not available; therefore, no physiological evaluations could be conducted."

The report said, "It is possible that the flight crew was not physically or mentally rested and prepared to fly the trip due to the unexpected call of the crew during scheduled free time."

The airplane was manufactured in 1985 and had a Turkish airworthiness certificate. The airplane had accumulated 29,269 service hours and 13,499 cycles. It had not flown for 20 days before the accident.

"There were no abnormalities noted during routine, recommended maintenance while the aircraft was on the ground in Puerto Plata," said the report. The maintenance included an inspection and ground test of the engines.

"Investigators believe that the engine [covers] and pitot covers were not installed before or after the engine ground test," said the report.

The airport had light participation, "good" visibility, scattered clouds at 1,800 feet and a broken ceiling at 7,000 feet. Surface winds were from the east-southeast at 10 knots. The report said that "some storm cells of major intensity" were south and northeast of the airport.

"The existing meteorological conditions and the forecast for the area were favorable for the flight, [and were] not considered a contributing factor to this accident," the report said. "The dispatch procedures, including weight-and-balance [calculations] and performance calculations, were appropriate for the departure airport and within the limitations of the aircraft."

The captain and first officer began the takeoff about 2342:08. At 2342:16, the first officer called "80 knots."

The captain said "checked." He then said, "My airspeed indicator's not working."

The first officer said, "Yes, yours is not working.

The captain said, "Is yours working?"

The first officer said that his airspeed indicator was working.

The captain said, "You tell me." The report said that this meant that the captain wanted the first officer to call out airspeeds based only on the first officer's airspeed indicator.

Five sources of velocity information were available to the crew. They included the captain's airspeed indicator, the first officer's airspeed indicator, a standby airspeed indicator in the center of the instrument panel, a groundspeed readout on the captain's electronic flight information system (EFIS) display and a groundspeed readout on the first officer's EFIS display.

"The purpose of doing a check at 80 knots [during takeoff is among other things, to verify the proper functioning of the engines and flight instruments," said the report. "The captain underestimated the lack of indication of airspeed and, contrary to the established procedures, he continued the takeoff.

"Performance calculations made after the accident showed that the aircraft would have required only 2,280 feet of runway to decelerate from 80 knots [and that] the captain would have been able to accelerate to V1, [takeoff decision speed] and abort the takeoff leaving sufficient runway [to stop the airplane]."

At 2342:35, the first officer called "vee one." One second later, he called "rotate." The airplane lifted off the runway four seconds later. The captain and first officer confirmed a positive rate of climb, retracted the landing gear and engaged the autopilot lateral navigation (LNAV) mode.

At 2343, the captain said that his airspeed indicator had begun to operate. At this time, the airplane was at 576 feet, and its groundspeed was 121 knots. (The flight data recorder [FDR] recorded groundspeed from the airplane's inertial reference units; the FDR recorded indicated airspeed from the captain's air-data computer [ADC].)

The flight crew turned off the windshield wipers, set climb thrust, engaged the autopilot vertical navigation (VNAV) mode, retracted the flaps and completed the after-takeoff checklist.

At 2344:07, the captain told the first officer to engage the center autopilot. The airplane was at 3,500 feet, and groundspeed was 273 knots.

At 2344:25, the captain said, "Rudder ratio, mach airspeed trim." The report said that he was referring to two messages that had appeared on the engine indication and crew alerting system (EICAS) display; the simultaneous appearance of the messages "rudder ratio" and "mach/speed trim" is an indication of a possible discrepancy between the reading on the captain's airspeed indicator and the reading on the first officer's airspeed indicator.

"There is something wrong; there are some problems," the captain said. About 15 seconds later, he said, "OK, there is something crazy. Do you see it?" The airplane was in a 15-degree nose-up attitude, and the captain's airspeed indicator showed 327 knots.

The first officer said, "There is something crazy there. Right now, mine is only 200 and decreasing, sir." The report said that the first officer was referring to the indications on his airspeed indicator, which showed that the airspeed was 200 knots and decreasing. Neither pilot made reference to the standby airspeed indicator or to the groundspeed readouts on their EFIS displays.

"There was much confusion in the cockpit, which interfered with the [crew's] analysis of the discrepancies of the airspeed and the choice of the appropriate course of action," said the report. The captain believed that both his airspeed indicator and the first officer's airspeed indicator were providing erroneous indications.

"Both of them are wrong," the captain said. "What can we do?" He then said, "Let's check their circuit breakers." FDR data showed that the airplane was at 5,344 feet and that the captain's airspeed indicator showed 327 knots.

At 2344:59, the captain said, "Alternate is correct." The first officer concurred that the alternate (standby) airspeed indicator was providing correct indications. There was no discussion among the pilots, however, about using the indications Provided by the alternate airspeed indicator to check those provided by the captain's airspeed indicator and the first officer's airspeed indicator.

"Although the affirmations of the captain and the first officer indicated that both crewmembers recognized that the indications of the alternate [airspeed] indicator were correct, they did not seem to understand the importance of comparing the three [airspeed] indicators," the report said. "None of the three flight crewmembers suggested the appropriate course of action to compare the indications or to switch the instrument selector [to the alternate source] to derive airspeed information from the [first officer's] ADC and its pitot system. The alternate source [could have provided airspeed information] for the autopilot system.

" The failure of the flight crew to realize the right course of action and to understand the reduction of displayed groundspeed information on the EFIS screens indicated a lack of knowledge of the aircraft systems and a lack of crew resource management (CRM) in the cockpit.

"Instead of taking definitive action to determine a valid reference for airspeed and to control the increasing pitch attitude, the captain initiated a discussion that forced the crew to rationalize the disparity of airspeed information."

The aircraft captain said that abnormalities could be expected because the airplane had not been flown for awhile.

"As the aircraft was not flying and on the ground, something happening is normal…such as elevator asymmetry and other things," said the captain.

Then, referring to the "rudder ratio," and "mach/speed trim" messages on the EICAS, the captain said, "We do not believe them."

"His analysis prevailed in the cockpit, and a period of 19 seconds of silence followed," the report said. "The relief captain then said, "Shall I reset its circuit breaker…to understand the reason?" The captain told the relief captain to reset the circuit breaker. The report does not provide information on which circuit breaker was reset.

The B-757 Operations Manual contained procedures for conducting a flight with an untrustworthy airspeed indicator. The procedures included recommended pitch attitudes and throttle settings for climb, cruise and landings.

"While the flight continued to climb, the crewmembers did not discuss or demonstrate that these procedures were available," the report said. "They never focused their attention on the enormous pitch attitude that developed or the alternate sources of velocity information that were present in various indicators in the cockpit.

"During the final two minutes of the flight, the crew did not take proper actions necessary to prevent the loss of control of the aircraft."

The airplane was at 6,688 feet, and the captain's airspeed indicator showed 352 knots when, at 2345:28, an overspeed warning sounded. At this time, the airplane's groundspeed was 199 knots.

The captain said," OK, it's no matter. Pull the airspeed; we will see…"

The report said that the captain's statement, "pull the airspeed," was a command to pull the circuit breaker for the overspeed warning system, so that the overspeed warning could be silenced. The overspeed warning stopped at 2345:39. At this time, the airplane was at 7,040 feet, the captain's airspeed indicator showed 349 knots, and the pitch attidtude was 14.8 degrees nose-up.

"Had pitch attitude been reduced, complete recovery was possible," said the report.

At 2345:46, the crew disengaged the autopilot's VNAV mode and engaged the autopilot's vertical-speed indicator. The crew then disengaged the autothrottles, reduced power- from a setting of approximately 1.6 EPR (engine pressure ratio) to 1.1 EPR- and moved the control column aft. The pitch attitude increased to 18 degrees.

At 2345:52, the stall-warning stick shaker activated. The airplane was 7,132 feet, and the captain's airspeed indicator showed 323 knots. Five seconds later, power on both engines was increased to approximately 1.6 EPR. Pitch attitude increased to 21 degrees, and the autopilot disengaged automatically. The airplane began to descend.

"The automatic pilot disengaged [because it had reached] the limit of its operational authority," the report said. " For almost one minute after the disengagement of the automatic pilot, the aircraft maintained a positive pitch attitude (nose up)…and continued to descend."

At 2346, the relief captain said "ADI." He said, "ADI" again 31 seconds later. The report said that the relief captain's reference to the ADI (attitude director indicator) was intended as a suggestion that the captain and the first officer maneuver the airplane to an appropriate nose-down pitch attitude.

At 2346:07, the first officer said "nose down." Sixteen seconds later he said, "thrust." The captain then asked if the autopilot was disconnected, and the first officer confirmed that the autopilot was disconnected.

At 2346:31, power on both engines was reduced to approximately 1.1 EPR. At this time, the airplane was at 5,984 feet, groundspeed was 194 knots, and the pitch attitude was 14.4 degrees nose-up. Groundspeed then decreased to approximately 140 knots, and the airplane abruptly pitched nose-down.

The captain said, "Not climbing? What can I do?"

Postaccident tests in a flight simulator showed that a recovery from the stall might have been achieved with application of full power and proper positioning of the flight controls.

The Boeing [Co.] informed the investigators that engineers, during flight, had inadvertently entered into a similar flight profile during the development tests of the aircraft and that they were able to regain control of the aircraft by using normal recovery techniques for the stall," said the report.

At 2346:43, the first officer told the captain, "You should level off. Altitude (is) OK. I am selecting altitude hold, sir." The captain concurred with the first officer's decision to select the autopilot altitude-hold mode.

"However, the [FDR] indicated that the automatic pilot was no longer connected and, for the reason, the altitude-hold function was not available," the report said. "The atmosphere of confusion continued between the three pilots while the aircraft [descended]."

At 2346:52, the captain said, "Thrust levers, thrust, thrust, thrust, thrust."

The first officer said, "Retard."

The captain said "thrust", and then told the first officer four times not to pull the throttles back. The first officer then confirmed that the throttles were open.

At 2346:57, EPR on both engines increased to approximately 1.6. Two seconds later, left-engine EPR was reduced to approximately 1.2; right-engine EPR remained at approximately 1.6.

At 2347:02, the reserve captain said, "Sir, pull up."

The captain said, "What's happening? Oh what's happening?"

At this time, the airplane was 3,520 feet, in a 53.3 degree nose-down pitch attitude and a 99.8-degree left bank. Ground speed was zero.

At 2347:09, the cockpit voice recorder (CVR) recorded ground-proximity warning system (GPWS) warnings: "sink rate, whoop, pull up, pull up." The airplane was at 2,368 feet, in a 17.6-degree nose-down pitch attitude and in a 9-degree left bank. The GPWS warnings continued until the CVR stopped recording at 2347:17.

The airplane was in a 34.3-degree nose-down pitch attitude and a 34.6 degree left bank when it struck the ocean 14 nautical miles (26 kilometers) northeast of Puerto Plata. The aircraft was destroyed by the impact with the water.

"Due to the severity of the impact, it is believed that no one would have been able to survive this accident," said the report. Toxicologic tests showed that none of the airplane occupants had inhaled vapors or carbon monoxide.

"This indicates ... that there was no fire [and] no combustible leaks before the impact, thus discarding the possibility of a pre-impact fire or explosion," said the report. "There was no evidence of fire in the wreckage found [or] in the recovered cadavers."

The wreckage sank to a depth of 7,200 feet. On Feb. 28, 1996, the CVR and FDR were recovered by a U.S. Navy remote-control submersible vehicle and analyzed by the U.S. National Transportation Safety Board.

"The inspection of the taped information in the recorders indicated that the taping system was operating normally, but ... the values of calibrated airspeed [did] not correlate with the other recorded parameters," the report said. "These calibrated airspeeds correlated with a total block of the captain's pitot tube."

As the airplane climbed and the pressure of the outside air decreased, the air trapped in the pitot system expanded and caused the false indications of increasing airspeed.

"When an aircraft has a blocked pitot tube, as the altitude increases, the indicated airspeed will also increase; the airspeed indicator will eventually be able to exceed the maximum operational airspeed, and the affected [ADC] will generate an overspeed warning," said the report.

When investigators conducted flight simulator tests of a B-757 with an obstructed pitot tube, they encountered erroneous airspeed indications that were similar to those recorded during the accident flight.

"The overspeed warning and stick shaker [activation] occurred in a similar pattern to that of the actual flight," said the report.

Because the wreckage of the accident airplane was not recovered, the cause of the pitot-system obstruction was not determined.

"The probable source of obstruction in the pitot system was mud and/or debris from a small insect that was introduced in the pitot tube during the time the aircraft was on the ground in Puerto Plata," the report said. "The aircraft ... was not flown for 20 days before the crash [and] was returned for service without a verification of the pitot-static system as recommended by the manufacturer's maintenance procedures.

"If this inspection had been completed as a part of the return to service, it may have discovered the blocked pitot-tube system, and the [problem] would have been corrected before the flight.

"The obstructed pitot tube was not the probable cause of the accident; however, it was a contributing factor."

The report said that Birgenair's flightcrew training did not include CRM training and that the accident flight crew's training had not prepared the pilots to recognize the malfunction and to respond properly to the malfunction.

"The flight crewmembers were qualified 'on the record,' but did not demonstrate the necessary basic knowledge of procedures, aircraft systems and crew discipline to recognize and restore trustworthy information to the [captain's] airspeed indicator or [to the] autopilot system," the report said. "Equally, they did not refer to [the section on] 'flights with an untrustworthy airspeed indicator' [in] the B-757 Operations Manual or to the section dealing with recovery from an aerodynamic stall. Moreover, there was a complete failure of the administration of crew resources in the anomalous handling of the aircraft.

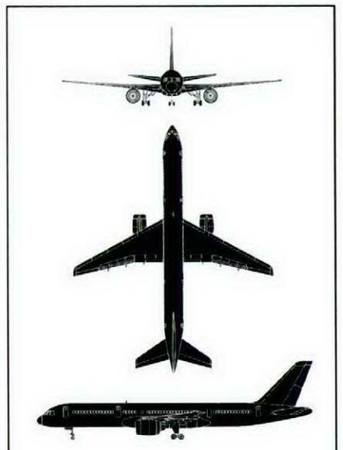
"This accident is an indicator that international requirements for flightcrew training have not been maintained at a level consistent with the growth and modernization of the air-transport industry and the development of modem aircraft."

As a result of its accident investigation, JIAA made the following recommendations to the International Civil Aviation Organization:

- "Issue a directive requiring that the flight manual of the [B-]757/767 be revised to notify the pilots that simultaneous activation of the warnings 'mach/speed trim' and 'rudder ratio' may be an indication of discrepancies in airspeed [indications];
- "Require [The Boeing Co.] to modify the B-757/767 alert system to include an advisory ('caution alert') when an erroneous airspeed is detected;
- "Require [The Boeing Co.] to modify the operations manual of the B-757/767 to include in the emergency procedures section information about identification and elimination of an erroneous airspeed indication;
- "Issue a flight standards information bulletin directed to all operations inspectors to assure that the operations manuals of B-757/767 operators contain procedures about identification and elimination of an erroneous airspeed indication;
- "Issue an aeronautical information bulletin notifying the inspectors of the circumstances of this accident, to assure that in training there will be an emphasis on the importance of recognizing a malfunctioning airspeed indicator during the course of takeoff;
- "[Ensure] that all training in the B-757/767 includes a scenario flight in the simulator where the pilot is trained to respond appropriately to the effects of a blocked pitot tube;
- "[Ensure] that each air business has a manual of specific training and is specialized for the type of operations specific to that airline without taking into account the generic training of the flight crew offered by businesses dedicated to the sale of training (academies, schools, etc.);
- "Establish as a requirement of all commercial air businesses a program of flight crew training in [CRM]; [and]
- "Revise the existing training requirements to gain better efficiency for flight crews."

***[Editorial note:** This article, except where specifically noted, is based entirely on the factual report and the cockpit voice recorder (CVR) transcript in the Junta Investigadora de Accidentes Aéreos of the Dominican Republic Director General of Civil Aeronautics* Final Aviation Accident Report: Birgenair Flight ALW-301, Puerto Plata, Dominican Republic, February 6, 1996. *The factual report and CVR transcript were translated into English, reprinted and distributed by the Air Line Pilots Association, International.]*

Reprinted courtesy Flight Safety Foundation, *Accident Prevention* Volume 56 Number 10 October 1999.



Boeing 757

The Boeing 757-200 series is a medium-range airliner designed to carry 186 passengers in a typical mixed-class configuration. The B-757 can accommodate up to 239 passengers in charter service, putting its capacity between that of the boeing 737-400 and the Boeing 767. A longer range version and freighter configuration of the B-757 are also available.

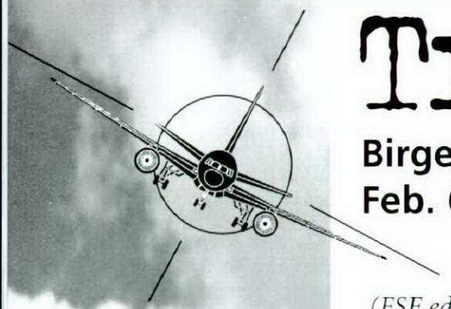
The B-757-200 is powered by two turbofan engines mounted in underwing pods. Engine pairs for the B-757 are provided by Pratt & Whitney (PW 2037 or PW 2040) and Rolls-Royce (535 series). The engines differ slightly in their static thrust.

The aircraft has a maximum takeoff weight of 104,325 kilograms (kg;230,000 pounds [lb]) and engine thrust is rated between 170 kilonewtons (kN; 38,200 lb) and 197.1 kN (43,100 lb) At maximum takeoff weight with 186 passengers, the B-757 has a range of between 5,222 kilometers (km; 2,820 nautical miles [nm]) and 5.519 km (2,980 nm), depending on the engine installed. The B-757 has a top speed of mach 0.86 and a normal cruising speed of Mach 0.80.

The two-pilot cockpit of the B-757 has a computerized, fully integrated flight management system (FMS) that provides automatic guidance and control of the aircraft from immediately after takeoff to final approach and landing. The FMS controls navigation, guidance and engine thrust to ensure that the aircraft flies the most efficient rout and flight profile.

Source: Jane's All the World's Aircraft

Cockpit Voice Recorder



Transcript,

Birgenair Flight ALW-301, Feb. 6, 1996

(FSF editorial note: The following transcript is as it appears in the Junta Investigadora de Accidentes Aéreos of the Director General of Civil Aeronautics of the Dominican Republic accident report, except for minor column rearrangement and addition of notes defining some terms that may be unfamiliar to the reader. Times are local.)

CAM	=	Cockpit area microphone
HOT-1	=	Captain
HOT-2	=	First officer
CAM-3	=	Relief captain
*** * * ***	=	Unintelligible
ADI	=	Attitude director indicator
EPR	=	Engine pressure ratio
GPWS	=	Ground-proximity warning system
LNAV	=	Lateral navigation
VNAV	=	Vertical navigation

Source: Junta de Accidentes Aéreos of the Director General of Civil Aeronautics of the Dominican Republic

Time	Source	*Content*
2341:40	HOT-2	Have a nice flight
2342:08	CAM	(sound of increasing engine noise)
2342:09	HOT-1	EPR select
2342:10	HOT-2	EPR
2342:16	HOT-2	Power's set
2342:18	HOT-1	OK, checked
2342:23	HOT-2	Eighty knots
2342:24	HOT-1	Checked
2342:26	HOT-1	My airspeed indicator's not working
2342:28	HOT-2	Yes
2342:29	HOT-2	Yours is not working
2342:30	HOT-2	One twenty
2342:32	HOT-1	Is yours working?
2342:32	HOT-2	Yes sir
2342:33	HOT-1	You tell me
2342:35	HOT-2	Vee one
2342:36	HOT-2	Rotate
2342:43	HOT-1	Positive climb, gear up
2342:43	HOT-2	Positive climb
2342:44	CAM	(sound of landing gear handle being moved)
2342:46	HOT-2	Gear is up
2342:50	HOT-2	LNAV?
2342:51	HOT-1	Yes, please
2342:52	HOT-2	LNAV
2342:59	HOT-1	Yes
2343:00	HOT-1	It began to operate
2343:02	HOT-1	Could you turn off the wipers?
2343:03	HOT-2	Okay, wipers off
2343:05	CAM	(sound of windshield wipers stops)
2343:08	HOT-1	Climb thrust
2343:09	HOT-2	Climb thrust
2343:10	HOT-1	VNAV
2343:11	HOT-2	VNAV
2343:16	HOT-2	Okay, flap speed
2343:17	HOT-1	Flaps five
2343:24	HOT-1	Flaps one
2343:25	HOT-2	Flaps to one
2343:30	HOT-1	Gear handle off
2343:32	HOT-2	Gear handle's off
2343:33	HOT-1	Flaps up
2343:34	HOT-2	Flaps up
2343:36	HOT-1	After takeoff checklist
2343:38	HOT-2	After takeoff checklist, landing gear up and off, flaps are up, checked up, altimeters later, after takeoff completed
2343:47	HOT-1	Okay
2344:07	HOT-1	Center autopilot on, please
2344:08	HOT-2	Center autopilot is on command
2344:10	HOT-1	Thank you
2344:12	HOT-1	One zero one three
2344:13	HOT-2	One zero one three
2344:25	HOT-1	Rudder ratio, mach airspeed trim
2344:27	HOT-2	Yes, trim
2344.28	HOT-1	There is something wrong, there are some problems
2344:43	HOT-2	Direct Pokeg
2344:44	HOT-1	Okay, there is something crazy… do you see it?
2344:46	HOT-2	There is something crazy there…right now mine is only two hundred and decreasing, sir
2344:52	HOT-1	Both of them are wrong, what can we do?
2344:54	HOT-1	Let's check their circuit breakers
2344:55	HOT-2	Yes
2344:57	HOT-1	Alternate is correct
2344:59	HOT-2	The alternate one is correct
2345:04	HOT-1	As the aircraft was not flying and on the ground, something happening is normal
2345:07	HOT-1	Such as elevator asymmetry and other things
2345:11	HOT-1	We don't believe them
2345:23	CAM-3	Shall I reset its circuit breaker?
2345:24	HOT-1	Yes, reset it
2345:25	CAM-3	To understand the reason
2345:27	HOT-1	Yeah
2345:28	CAM	(sound of aircraft overspeed warning)
2345:30	HOT-1	Okay, it's no matter
2345:39	HOT-1	Pull the airspeed, we will see…
2345:39	CAM	(sound of overspeed warning stops)
2345:40	HOT-2	Now it is three hundred and fifty, yes?
2345:47	HOT-1	Let's take that like this…
2345:50	CAM	(sound of four warning alert tones)
2345:52	CAM	(sound of stick shaker starts and-continues to end of recording)
2345:56	CAM	(sound of four warning alert tones)
2345:56	HOT-1	* * * *
2345:57	HOT-2	* * * *
2345:59	HOT-2	Sir
2346:00	CAM-3	* ADI
2346:05	HOT-1	* * * *
2346:07	HOT-2	Nose down
2346:19	HOT-2	* * * *
2346:22	CAM-3	Now *
2346:23	HOT-2	Thrust
2346:25	HOT-1	Disconnect the autopilot, is the autopilot disconnected?
2346:25	HOT-2	Already disconnected, disconnected sir
2346:31	CAM-3	* ADI *
2346:38	CAM-3	* * * *
2346:39	HOT-1	Not climbing? What am I to do?
2346:43	HOT-2	You should level off, altitude okay, I am selecting altitude hold, sir
2346:47	HOT-1	Select, select
2346:48	HOT-2	Altitude hold
2346:51	HOT-2	Okay, five thousand feet
2346:52	HOT-1	Thrust levers, thrust thrust thrust thrust
2346:54	HOT-2	Retard
2346:54	HOT-1	Thrust, don't pull back, don't pull back, don't pull back, don't pull back
2346.56	HOT-2	Okay open, open
2346:57	HOT-1	Don't pull back, please don't pull back
2346:59	HOT-2	Open sir, open
2347:01	HOT-2	* * * *
2347:02	CAM-3	Sir, pull up
2347:03	HOT-1	What's happening?
2347:05	HOT-2	Oh, what's happening?
2347:06	CAM-3	*
2347:09	CAM	(sound of GPWS, sink rate, whoop whoop pull up warning starts and continues until the end)
2347:13	HOT-2	Let's do like this
2347:14	CAM-3	*
2347:17		(end of recording) ◆

Leadership vs. Management: Some food for thought

*FM 22-100 defines **leadership** as "the process of influencing others to accomplish the mission by providing purpose, direction, and motivation." Webster's defines **management** as "the act, art, or manner of handling, controlling, or directing."*

Let's not miss the important difference here:
*Through motivation, leadership **inspires** performance;*
*through control, management **mandates** it.*

The Corporate Approach

Over the years, constant attrition of resources — especially of experienced personnel — has systematically molded the character of the Army's everyday operations to follow a more corporate approach. In many cases, this has slowly but surely allowed "management" to displace "leadership." As aviators and crewmembers, we need to be aware that this can have a tangible and very serious impact upon the safe conduct of our mission. We need to understand what has changed and how those changes have placed new demands upon our individual responsibilities.

In the Real Army of today, values have shifted: the "process," in many instances, has become far more important than the results it was intended to achieve. For example, during my recent Bosnia tour, notification of genuine emergency medevac missions first mobilized an administrative team dedicated to recording times and summaries of significant events. Some teammembers worked on large presentation easels for one after-action briefing, while others feverishly transferred the information into a series of PowerPoint slides for another briefing to be held at a higher level. Often, important minutes ticked painfully by as aircraft running at full rpm waited for a higher-echelon, nonaviation commander to be located and briefed so "launch authority" might be granted (and the precise time recorded).

For commanders, "control" is and has always been — a primary objective; however, management has lately replaced leadership as the dominant means of achieving it. "Effective leadership" is now often judged — and leaders rated by how completely and how intensively control is exerted.

"Flatlining"

Flatlining (elimination of as many variables as possible, personally managing details down to the lowest possible level, ensuring everything unfolds as precisely and predictably as planned to provide the next higher commander with a smooth, flawless after-action briefing) seems to have become an unofficial cornerstone of many real-world Army operations. While the commander-as-flatliner might serve well when, say, meticulously managing supply statistics, it can be radically different story when applied to aviation. Despite this, it happens — and happens often.

Imagine this: Worried about higher headquarters tracking the number of deficiencies on unit aircraft, a commander personally examines every logbook and demands a justification for each write-up from the crew chief. He or she then imposes a "solution" that results in restating, interpreting, waiving, or eliminating the deficiencies such that the statistics "improve" without, in some cases, any work being done to the aircraft. Would this be "effective management" (i.e., systematic evaluation to bring documentation into line with regulations and perhaps produce a more accurate picture)? Very likely. But how many crew chiefs waiting with logbooks, decide to distort that picture by understating problems to avoid being harangued? And how many subsequently hold off reporting discrepancies they know might bring unwanted attention?

Unnecessary Stress

Imagine this: During real-world operations, the commander assails a pilot-in-command during the daily flight operations briefing for reporting the actual number of hours of sleep he got the previous night. Why? The real number would drive up the numerical value of the mission risk assessment and call attention to the statistic. In front of his colleagues, the aviator receives serious rebuke from his commander (and senior rater) for telling the truth in a document designed to provide a realistic evaluation of life-critical risk. The PC, an IP and highly experienced aviator, grudgingly revises upward the number of hours he slept.

Stress? What would you have done? What might you do the next time? Be honest, now.

An important bottom line is that once through translational lift, aviators enter an environment where the certainty of physics displaces even the most fashionable management model. Demands in this environment never change, and neither must the aviator. Aviation is very likely the most unforgiving of human activities, and this is especially true as aircraft and systems have grown increasingly powerful and complex. In today's more "corporate" atmosphere, the requirement for aviators and other crewmembers to realistically assess and deal with their environment has never been greater.

"Team Playing"

In three decades as an Army aviator, I've served under a lot of commanders and observed a myriad of leadership — and management — styles. More and more in today's Army, I'm seeing that commander-managers are increasingly likely to believe that just because someone has passed the checkride, they're "good to go." Seemingly far more important to some commanders than flying ability nowadays is how individual aviators couple with nonaviation goals; i.e., is this person a "team player?" With the decrease in flying hours and actual aviation activities, emphasis appears to have shifted to additional duties and how compliant and productive an individual might be relative to the constantly changing requirements of everyday administration. This encourages the "Well, if you can't do it, I'll just get someone who can" syndrome.

Imagine this: Higher has requested that two aircraft launch to a remote base late at night and in bad weather. It's not an emergency, and en route conditions are reported below minimums. Crews openly resist attempting it while, pressured from above, the commander and the next higher echelon insist they go. Meanwhile, similar pressure is applied to the weather forecaster as an 0-5 personally requests that the forecaster make a "special observation." Finally, as the new, bare-minimum special observation arrives, the commander substitutes the unit SP for the PC who's been most vocal about the obvious hazards. At the same time, the commander decides to personally take the place of a far more experienced PI on the second crew since that PC is a proven "team player." All this unfolds amid bitter argument in Flight Operations and in front of most unit aviators. The mission launches encounters the previously reported below-minimum conditions at the halfway point, and has to "feel" its way back.

Though what I've described isn't supposed to happen, it has happened and continues to occur. However, Army aviators and other crewmembers have a genuine responsibility to maintain a clear and unmistakable sense of personal integrity identify and sovereignty despite attempts at flatlining anywhere in the command chain. Aviators, as distinct from most other line officers, face a unique and unyielding requirement to address and quickly deal with situations whose edges are at best ill-defined and where the penalty for incorrect assessment can be deadly.

Summary

As leadership has deteriorated into management, the climate has grown increasingly hostile to individuality and calculated risk-taking, replacing it with structured review and carefully controlled response, perhaps imposing risks that might be wholly unnecessary. Statistically, this approach might prove cost-effective in some broader sense, but, in aviation, situational demands and immediacy make it unrealistic. What will ultimately show itself most productive is still uncertain; learning and change go hand-in-hand, but neither happen overnight.

In the meantime, as Army aviators and crewmembers, we must discipline ourselves to retain our individuality and independent thought processes that form the foundation of effective risk management. We must be prepared to make informed decisions and stick by them.

This is nothing new. More than 50 years ago, General George S. Patton summarized it well: "When everyone is thinking alike, no one is thinking."

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Risk Management

LESSONS LEARNED

War Stories

The Devil's in the details

Since, technically, a war story should have something to do with war, here's the tale I use to introduce my aircrew coordination classes. Some quick background. It was late April 1970. One night an armored cavalry squadron got cut off and hewed up by the 17th North Vietnamese Army Division. The senior advisor called for an urgent medevac; what he got was me and my merry killers …

Sometimes somebody with only your best interests at heart will try to get you killed.

It **really was** a dark and stormy night. We — a crew of six — were flying a UH-1H Nighthawk gunship (minigun slaved to a xenon searchlight and a .50-cal on the right, twin 60's and a grenade launcher on the left) through a midnight monsoon at 500 feet. It was, after all, an **urgent** medevac.

Believe it or not, we had actually managed a flight brief before takeoff and a crew brief en route — a sort of Jurassic version of aircrew coordination, but with a crew of six (four of them heavily armed), I didn't want any solo players. My Firefly flare ship took up a five-rotor-disk staggered-right after confirming that he could see my steady-dims with no problem (no, child, NVGs hadn't been invented yet).

I won't bore you with the details of torrential rain, lightning, turbulence, and popping in and out of clouds we never did see or the cheery, "Radar contact lost; last observed heading was *skrrrk*. See you *skrrrk* you get *skrrk*…", or the water leaking from the overhead panel or the intermittent radio contact with our folks on the ground (it made FM homing a real chore until we finally made visual contact — we could tell where they were laagered by all the green and white tracers converging with all the mortar explosions).

I will, however, bore you with two very important details. My Peter-Pilot's only previous night flight had been at an Alabama stagefield, and his only previous flight in the Land Of The Two-Way Gunnery Range had been **yesterday's** in-country checkout flight. But earlier in the evening, I had observed that he could fly instruments like a 'Thirties mail pilot'. Oh, frabjous day! The boss had finally paired me up with a copilot who wouldn't try to kill us in the clouds.

And now for the part you've been so patiently awaiting.

At a half-mile out and 200 feet above mud level, the opposition stopped firing into the laager and began putting random bursts into the sky. Heh, heh — not even close! One hundred meters out and 75 feet up, I could see armored personnel carriers skulking in the murk. Thirty meters out and 30 feet above the mud, I was nice and slow, picking my way through the antennas, raindrops and rice straw beginning to swirl in the rotor wash — the Zippo lighter in the steel pot began to flicker, marking my touchdown spot.

Question. If you were shooting a night approach into an Alabama stagefield, what is the very first thing you would expect an Army aviator to do? Conversely, if you were shooting a night approach into the middle of a firefight, what is the very last thing you'd expect said Army aviator to do? If you answered, "Turn on the landing light," to both questions, you're absolutely correct. Care to guess what my instrument ace did? Unannounced?

The troops in the laager nipped back inside their APCs, the raindrops and rice straw turned into a million points of light swirling in a million different directions; the bad guys reoriented their fire with commendable speed, and lovely green basketballs now joined the tumbling mirth of rain and straw 2 feet from my face. My previously dark-adapted eyeballs uncaged, and I got a screaming dose of vertigo.

I won't bore you with the details of transitioning to instruments, starting a climbout, transferring the controls to my thoroughly contrite copilot ("I thought it'd help you see the antennas!"), making calls to Firefly, and trying to figure out why the direction "up" had suddenly acquired the gift of bilocation. At least I didn't have to turn the landing light off; one of the other team's superstars shot it out for me — along with my chin bubble. I won't bore you with the details of what happened when I disgustedly hollered, "Aw, SHOOT!" and the fearsome foursome in the back opened up with full left and right suppression. And I certainly won't bore you will all the details of our **second** voyage into the laager to pick up the wounded that Firefly couldn't extract. (Everybody we hauled out lived, which is the best part of the story!)

Would a really, really thorough crew brief have reduced the thrill factor? That's kinda hard to say. I'd been Nighthawking for months, and it would never have occurred to me that a pilot would **touch** the landing-light switch, never mind turn the — blasted thing ON in a hot LZ. So just where does aircrew coordination come into play here?

Well, for starters, how about "situational awareness for two" — the newbie not being fully aware of just what "combat zone" really meant, and the old guy not being fully aware of just **how** unaware a newbie could be. And, oh yeah, the "halo effect": "Kid's great on the instruments-this should be a no-sweat mission." And let's not overlook "sudden loss of judgment." Did I make his comfort zone a wee bit **too** comfortable with my piece-of-cake briefing?

Details, details, details.
The Devil's in the details.

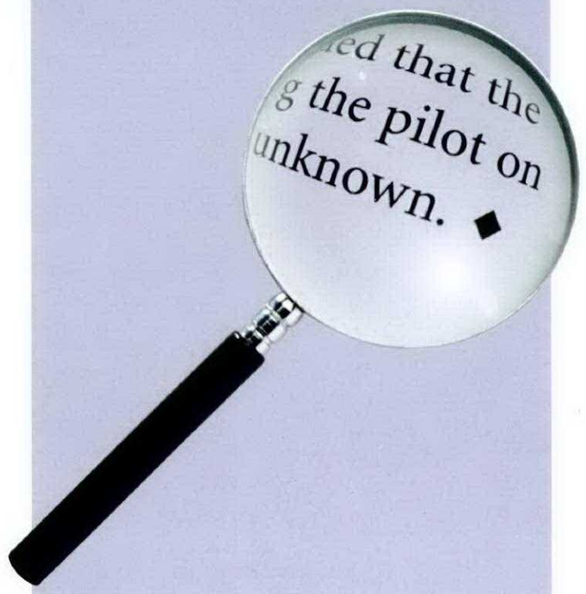
— *CW4 13111 Tuttle, Army Aviation Support Facility #1, NJARNG, West Trenton, NJ*

Reprinted courtesy of US Army *Flightfax* Vol. 27, No. 3 March 1999 ◆

From the Investigator

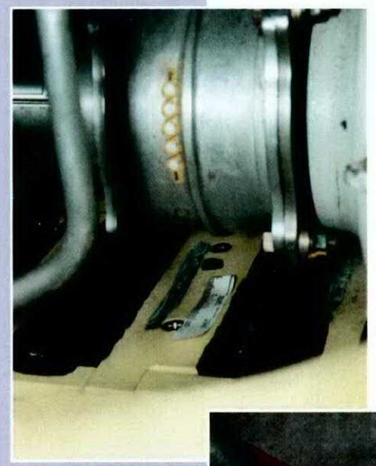
TYPE: **MIG-21 N9242N**
DATE: **24 August 1999**
LOCATION: **N 49:14 W 126:53**

This US registered aircraft was operating under contract to support testing of the Track Management System on HMCS Algonquin. The aircraft departed Victoria International Airport on the morning of 24 Aug 99 with one person on board. It then proceeded to an exercise area approximately 17 nautical miles West of Vancouver Island, British Columbia to conduct supersonic profiles for the ship. After contacting the Naval vessel, "MIG 21" proceeded with a pre-briefed profile. Approximately 6 minutes after the profiled supersonic run was commenced, the aircraft vanished from radar. It was conducting a high "G" right hand turn at 12,000-ft Above Sea Level (ASL) at the time. A search was initiated by RCC. Some aircraft debris, fuel in the water and a fuel/oil slick was located. The search recovered some aircraft wreckage, which was positively identified, and some human remains which were sent for DNA analysis. It has been concluded that the aircraft crashed into the water killing the pilot on impact. The cause of the mishap is unknown. ◆



TYPE: **JET RANGER 139313**
LOCATION: **Grabber Green, Southport, MB**
DATE: **23 August 1999**

During a VFR Lesson Plan, the instructor and his student experienced a hard landing while attempting to overshoot from a 250' turning autorotation. The student pilot sustained minor injuries and the aircraft damage was assessed as B Category.



The instructor had established the aircraft on a right hand downwind for the autorotation area (Grabber Green), at 250' accelerating to 100 Kts. He then passed control to the student, who had already completed four satisfactory autorotations of various types.

On entry, the student used approximately 60 degrees of bank, the ball was out to the right and the speed decayed rapidly to 55 Kts. In an attempt to preserve airspeed, he applied forward cyclic pressure, but was late lowering the collective. He then noticed that the Rotor RPM (Nr) was decaying through 90%. The instructor took control as the aircraft passed through 90 degrees of turn and approximately 150 feet AGL.

The instructor initiated the overshoot by applying full throttle and rolling the aircraft towards a level attitude. Two to three seconds later, with torque indicating 120% (gauge maximum), the aircraft hit the ground slightly nose-high and right skid low. The airspeed at impact was approximately 40 Kts.

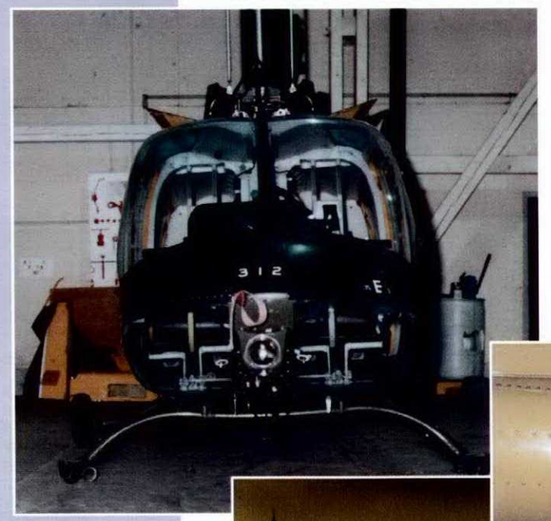
The aircraft then bounced 30 feet vertically while continuing forward. The instructor applied full left pedal and full right cyclic to regain control of the aircraft, which nevertheless reached 30 degrees of right yaw and 30-45 degrees of left bank. The Nr then normalised and the instructor landed the aircraft approximately 80 metres from the point of original ground contact.

Initial inspection suggested minor damage, so the aircraft was towed back to Southport for closer inspection and repair. The aircrew did not undergo medical screening until the following day and no toxicological screening was conducted.

The investigation is focussing on human factors, as well as medical and maintenance procedures subsequent to an occurrence. ◆

TYPE: **JET RANGER 139312**
LOCATION: **Southport, MB**
DATE: **29 October 1999**

The crew departed Southport, at 1445Z on a Clearhood 7 mission. The lesson plan for this flight focused on circuit work with the student flying most of the sequences himself for the first time. On arrival into the training area, the instructor demonstrated a circuit pattern and approach to a hover. He then had the student perform the same manoeuvre. Once back into the hover, at approximately four feet above ground, the instructor asked the student to prepare to return to base. While conducting a 180 clearing turn he experienced some difficulty maintaining a steady hover. The clearing turn placed the aircraft in a downwind position and the student allowed the wind to lift the tail of the helicopter. The student overcompensated with aft cyclic which resulted in some rearward motion of the aircraft as well as a corresponding drop in the tail. While concentrating on correcting his error, he allowed the helicopter to descend slightly from the four-foot hover height. He attempted to regain his height by lowering the collective slightly; this only aggravated the situation. Thinking that his first correction was not sufficient, the student lowered the collective more aggressively, resulting in the aircraft hitting the ground. This sequence of events occurred over a very short period of time. Initially, the instructor allowed the student to correct his faulty collective application and was anticipating the second collective input to be in the upward direction. Following the student's second downward collective input, he did not have sufficient time to prevent ground impact.



The landing gear was splayed-out noticeably due to the impact force. This resulted in both cross tubes being bent downward approximately 2 inches at mid section. The stinger was compressed into the rubber bumper, approximately 1/2 inch, but no deformation occurred to the stinger or vertical fin. The transmission spike shows a gouge on the front left side but the isolation mount is undamaged. The preliminary damage assessment has been categorised as 'C' due to the fuselage deformation. The aircraft must be verified on a jig to establish if the airframe has been distorted.

Initial investigation revealed that the student probably experienced "control reversal". The student lowered the collective instead of raising it, a common error on initial conversion from fixed wing flying. The follow-on investigation will focus on instructor training as it pertains to the issue of when to take control. ◆

From the Investigator

TYPE: CH124A SEA KING 12404
LOCATION: 12 Wing Shearwater NS
DATE: 19 July 1999

Aircraft 12404 had just returned from a crew operational readiness exercise (COREX) and the crew was in the process of shutting down on the Shearwater ramp.

Following completion of the engine wash procedure the crew shut down engine #2 and were commencing the blade fold sequence when smoke and flame developed in the area of the rotor brake assembly on the forward part of the main gearbox.

The groundcrew advised the pilot of the fire and an emergency shutdown was performed.

The groundcrew commenced fighting the fire using 50 lb dry chemical extinguishers retrieved from the surrounding area. The wing firefighters arrived shortly thereafter and extinguished the blaze.

The aircraft suffered considerable damage to the engine compartments and main gearbox area, and B category heat damage to the airframe. There were no injuries to either the aircrew or groundcrew.

Initial investigation revealed a leak in the utility hydraulic pressure line connected to the rotor brake assembly. QETE is conducting a detailed analysis of the damaged areas, focussing on possible sources of the fire and cause of the leak. ◆

The Creation of a Healthy Cooperative Work Environment

By Gisele Richardson
Richardson Management Associates, Ltd.

When I learned that I would be speaking to a maintenance group rather than Flight Operations at this meeting, I decided to change the topic I will address today. Perhaps the most important current issue for flight crews is managing attention and communication in the cockpit; while interruptions in judgment occur, of course, with engineers as well, the most important current issue in maintenance departments is what I call "psychological fitness for duty" — the degree to which the maintenance department is informed about the impact of personality and emotions in the workplace, and how they act upon that information to ensure that the maintenance department is a healthy working environment: a place that is conducive to performance, commitment, well-being and safety.

The ideas I will present apply equally to flight crews or management.

There has been, historically, a great deal of ignorance about psychology in aviation as a whole. Flight Operations have begun to deal with these issues in the last few years; by and large, maintenance people are late starters in this area. Why have Flight Operations awakened to the importance of these issues — personality, psychology, emotions — well before maintenance people have? I can think of at least two reasons: one, as I mentioned earlier, the clear indication that the biggest potential improvements in safety depend on a better understanding of human error in the cockpit; secondly, that as a rule, when things go wrong, pilots bitch and mechanics suffer in silence. Since the squeaky wheel gets the oil, pilots get attention before mechanics do because they ask for it.

In short, I say that the fact that mechanics are normal neurotics like the rest of us is gradually gaining recognition, together with the fact that attention to their needs, too, is important in the creation of a healthy workplace. In other words, individuals require systematic preventive maintenance for optimal performance, just as machines do.

My presentation today has three main objectives: one, to urge you to take seriously the need to inform yourself in this area, and to give it as much importance as you give to technical training and knowledge; two, to inform you that there are practical and economical ways of getting the psychological information you need to do your job better as a manager — our workshops on The Human Element in Aviation are one source, as is our work with teams within the maintenance departments. And thirdly, to give you some information about what **you** can do to make the area for which you are responsible a healthier one, one where the employees are motivated and have a strong commitment to each other, to their job and to their company.

Characteristics of a Healthy Cooperative Work Environment

How do we know whether we have a truly healthy and cooperative work environment? By that I mean, an environment where people bring up problems to find a solution rather than bring up problems to find a scapegoat; where competition for attention and promotion is conducted in a straightforward way and is not destructive to the objectives of the organization; where individuals know that they are valued, that they are important in the scheme of things. Well, there are some characteristics that are necessary for such an environment to develop.

These are Trust, Provocability, Forgiveness, Clarity, and Lack of Envy.

TRUST means that I expect others to deal fairly with me, to care about my well being; it means that I behave in a trustworthy way, and I care about the well-being of the people who surround me. It is difficult to have one without the other. If I'm not trusting, I will not be trustworthy. I worked with a pilot once who said to me, "My wife is terribly jealous and possessive." "Is she justified?" I asked. "Not a bit," he replied indignantly. "She knows nothing about my affairs." Clearly, her well-being was not high in his priorities. Someone else said, "The key is sincerity: once you've learned to fake that, you've got it made."

Well, that doesn't work.

There is, rightly, much emphasis at the moment on ensuring good cockpit communications. Communication in the cockpit is important, but it is like sex in marriage: it doesn't take place in a vacuum and it can't be 'fixed' in isolation. If you beat your wife or criticize her all day long, if you don't let her know you're late for

dinner, if you discount what's important to her, you're in for long cold nights, and sex therapy is not going to help much. What I'm saying is that the only way to have optimal communication in the cockpit is to ensure that relationships in the flight department are healthy.

Likewise, trust is not available on demand, nor is it a convenience; your job as a manager is to take the steps to ensure a genuine **grounding** for trust among your staff, between them and you, between you and your counterparts and boss, between maintenance and flight operations.

PROVOCABILITY is the willingness to deal, in a direct way, with breaches of trust, with non-compliance, with repeated failures such as lateness. It implies the willingness to get appropriately angry, to set deterrents to repetition of the undesired behavior in a straightforward and immediate fashion. Too often, this element is missing in the maintenance department where people tend to think of themselves as "nice guys."

If the culture of the department does not allow personality problems or other behavioral issues to be discussed explicitly and in a timely manner, then the result is likely to be either a lot of gossip where problem-people are talked **about** instead of being talked **to** (this is a very prevalent disease in aviation departments as a whole). Or, alternately, as the Brazilians say, "swallowing toads"; and when you have swallowed enough toads without saying anything, then you are "justified" in giving yourself a "guilt-free explosion." This rarely is the best way to find a solution to a problem.

FORGIVENESS is the willingness to put the past to bed. If someone has done you dirty, and you have reacted appropriately and set things straight, the incident is forgotten. There is no "gunny-sacking," where events that are five years old are brought up again, where a person who made a mistake is crucified forever by everyone else's memory of it. In one of our couples' sessions, a wife said to her husband, "Seventeen years ago, on our wedding night, you said to me bimph-blmph-blmph, and I have never forgotten it! " What can he do about something he said seventeen years ago? And how many times has the poor devil heard this?

In a healthy environment, then, things are dealt with and people move on; people are given credit for gaining wisdom, for improving, and there is a willingness to acknowledge personal change and growth, and to recognize the person for what he is today.

CLARITY is simply the willingness to say what we think and feel and mean, at the time we think and feel and mean it. One manager said to me that one of his employees had committed an unforgivable mistake three months earlier. "Did you tell him what you're telling me?" I asked him. "Not in those words," he replied. "But I have just taken away from him a large project that I know he enjoyed doing, and he knows what I mean." If he does, he has a crystal ball! "Not in those words" usually means, "No, I haven't told him."

Clarity means talking straight; clarity means that people who hear you don't need a decoder; clarity means no messages are delivered through sarcasm; clarity means everything important is on the table, in a timely manner. Mechanics, more than most, often act as though they believed that ESP is a reliable form of communication.

LACK OF ENVY means celebrating our colleagues' successes as well as our own. It means genuinely rejoicing in attention, achievement and growth that others are experiencing. It is easier to do if there is enough recognition to go around in the department. This is rarely the case in maintenance departments, where John Wayne rides again, where Real Men are not supposed to need appreciation and recognition, where you wouldn't want to "embarrass" them or yourself by telling them they are valued employees. The point I am making here is that the less recognition one receives, the more difficult it is to enjoy and give credit to others for **their** achievements.

Another element in an environment characterized by lack of envy is the acceptance that everyone is different, that everyone needs different kinds of rewards and satisfaction, that everyone has their own definition of "success" — and one where these varied definitions are all respected. If there is only ONE way to do it, then there must be unhealthy competition for "it" whatever that is — or else a withdrawal from the race, i.e., individuals isolating themselves and "doing their own thing" with little reference to the rest of the work group.

These, then, are the characteristics of a truly cooperative work group. You might look at them all again and rate your own department on these traits. You might look at them as a way of assessing the quality of relationships within your department, between flight crews and maintenance, between maintenance and management. It is a useful way to focus on **what is there** that you want to enhance, **what is missing** that you want to inculcate.

You can also use this matrix to look at yourself and other individuals in your department to assess whether you and they are genuine team players. Which of these characterize you?

We tend to have clusters of these strengths, and a common division is Provacability and Clarity without Trust, Forgiveness or Lack of Envy; these characterize the Tough Guy (he's sometimes called The Coconut). Trust, Forgiveness and Lack of Envy without Provacability or Clarity characterize the Nice Guy who has difficulty dealing with conflict. He's sometimes called The Avocado. The process of maturing requires that The Avocado discover his strength and his clarity and be willing to express it without undue fear of others' reaction, just as the Coconut's developmental process requires his discovering his softness and his sweetness, and allowing himself to express them in ways that are comfortable for him, in ways that don't appear to him to be a betrayal of some of his fundamental values. That is to say, both of these persons, if they are to develop their full potential as a man, as a manger, as a husband, as a colleague, as a friend, must deal with their missing parts and find ways of giving them a legitimate and congruent place in their personality.

So if these are the characteristics of a workgroup that makes the best use of its people's talents, and that gives its people the best opportunity to develop their potential as well, are we talking about motherhood and apple pie, or are there ways to make this happen? Well, there are. Creating such an environment is the essence of the programmes we conduct with aviation departments, with flight crews, with maintenance groups, as well as with management.

Elements Necessary for a Healthy Cooperative Work Environment

While there is no time to give you an in-depth description of our process, I will present three pillars that support a healthy environment, that provide some of the preventive emotional maintenance I mentioned earlier. And I will indicate how you can use this information to at least start assessing how much or how little you and your work group are addressing these issues, and how you might begin bringing about change if you desire it.

They are: Control, Internal Support, and External Support.

CONTROL relates to the sense of mastery or lack of it which the individual experiences over his environment. This includes his competence to do his job, and his sense of being able to manage what affects his area of responsibility, his sense of being able to influence what affects him and his life in general and his ability to predict the short-term future.

INTERNAL SUPPORT relates to the quality of the individual's relationship with himself, an area which has perhaps been least explored in your industry.

EXTERNAL SUPPORT refers to the quality of an individual's relationships in his work environment and in his family, and its impact on his energy, on his well-being, on his ability to find support and encouragement when he needs it, on his willingness to innovate and to make his work more productive and more satisfying.

CONTROL: Clearly, the person who is competent to perform his job well is in a better spot than one who is over his head. The person who masters his job has a sense of being in charge, of being able to make things happen the way he wants them to and when he wants them to, unlike the person who is over his head in his work, who faces each day in fear of situations he can't handle, who experiences no sense of security.

Likewise, the person who has a clear area of responsibility and clear accountability for it, whose turf is not subject to invasions by his boss or by his peers, has a healthier work environment than one whose boundaries are fuzzy. The more predictability he has in his career, in his working conditions, the more comfortable he is likely to be, and the less likely anxiety will be draining away some of his energy. The more he knows that his suggestions and opinions are respected, the more freedom he has to use his intelligence, his judgement and his experience, the greater his sense of control.

It is clear that good management practices, such as clean delegation, thorough performance appraisals, on-going feedback,open channels of communication both up and down, all contribute to a sense of control and therefore to well-being in the workplace.

Change Undermines Control

Relevant to the issue of control is the fact that in recent years, the most frequent problem with which our clients approach us has to do with **change**: Managers have become aware of the fact that the pace, the pervasiveness and the magnitude of change which is affecting them and their people is constantly increasing and sometimes threatening to overwhelm them. In fact, in my opinion, **the task of managing change is the manager's greatest challenge today**. Managers approach us to help them develop in their people (and in themselves) an increased capacity for resilience in the face of change that is IMPOSED upon them, and at the same time to find new ways to encourage them to INITIATE appropriate change themselves if their operations are to be effective, and, indeed, in some cases, if their operations are to survive.

In other words, even if considerable attention were being paid to increasing the individual's control over his work environment — which it usually is not — our sense of control would still be rapidly eroding in the face of accelerating change, with the result that more and more stress is being felt. Neglecting this aspect of the workplace often results in a kind of cannibalizing of the individual by the organization, as more and more demands are made on him without

compensating mechanisms, as the individual is forced more and more to live off his reserves, often at considerable cost to himself.

Another point is that change, whether it is sudden and dramatic or an accumulation of small events, can create significant dissonance between what a man believes he must do and what he feels forced to do. Pressures for change, for speed, for image building for the organization, for cost-cutting, may lead an individual to take short cuts which run counter to his sense of conscientiousness, for instance, and that loss of control may result in significant stress in the form of guilt or self-criticism or unexpressed anger. A tragic and very public example was the Challenger disaster. Many of the people involved lost control over their work; they were making decisions that did not fit at all with their value system, they were forcing themselves to overlook fundamental questions which they knew to be important. One hopes they dealt with themselves compassionately in the aftermath.

How We Jeopardize Our Own Sense of Control

Some of these external pressures are beyond our ability to affect. There are, however, ways in which each one of us maintains blind spots about our potency to effect control over our environment, blind spots which cost us dearly in terms of our sense of security and in terms of our energy level. Among others, these relate to a number of issues — how we define problems, our sense of control over our feelings and behavior.

There is a very interesting approach to **problem-formulation** which distinguishes between a "difficulty" and a "problem." A difficulty is a situation we cannot affect; our task is to accommodate to it. A problem, on the other hand, has a solution, and our task is to find it. Many people spend their time trying to find a solution to a difficulty — that leads to on-going frustration — while a lot of people accept problems as though they were a difficulty, that is to say, as though they were unsolvable — and that leads to helplessness. Both are psychological habits that are very costly in terms of energy, motivation, joy, and results. So part of maturing is being able and willing to distinguish between what we can affect and what we must accept — and allocating our energy accordingly.

Now, part of our sense of control deals with ourselves. Do we feel in control of ourselves? Some people are not in control of their finances. Some people feel out of control of their families. But even more personally, some people believe that their own **feelings** are beyond their control. "He provoked me, so of course I got angry," as though he had no other choices of response. They may spend short or long, sometimes intensive, periods locked into what they feel is an **inevitable** feeling of frustration or anxiety or depression. That is to say that they are **unable** to shift their attention and energy to more positive outcomes. (There are a number of ways in which we can recognize what our favorite bad feelings are, how we came to select them, how we cultivate them, and how to spend less time wallowing in them. This, again, is part of the curriculum in The Human Element in Aviation.)

Likewise, many of us believe that we have less control over our behavior than is the case. Or, at times, we **say** we have no control over our behavior when it suits us to do so. I'm reminded of a man who was brought in for counseling by his wife because of his philandering which she no longer wanted to tolerate. A very handsome man, pepper-and-salt hair. A great deal of presence, very distinguished-looking and charismatic. As he sat down, he shrugged his big shoulders and said, "Is it my fault that nature made me so handsome?"

At times our helplessness seems real to us, although analysis would prove otherwise. For example, have you ever heard someone say, "What else could I do?" "He gave me no choice." "I had to..." "The only way to handle the situation was to..." "I couldn't help myself ..." "Under those circumstances, how could I say 'NO'?" In each case, the chances are that he had a number of options but is seeking support for the choice he has made.

How Much Change?

It is a fact that as human beings, we need a certain level of stimulation. Stimulation is brought about by change, by new experiences, chosen or enforced. Too much is stressful, too little is stressful. In our search for fitness for work, one of the areas to examine is how much control we exercise over the **quantity and quality of stimulation** to which we are subjected, how well we know what is for us the appropriate balance between change and stimulation and stress, on the one hand, and on the other, their counterparts: permanence, roots, control, stability and predictability. For each of us, this is a personal examination which we neglect at our own risk, and yet in our workshops, working with intelligent and successful people, we find that very few of our clients have even a vague measure of their optimal level of stimulation, and that most of them are insensitive to their early cues of excessive stress and, indeed, sometimes, insensitive to relatively dramatic cues of excessive stress.

Surely there are some genetic differences intolerance for stress. We have little control over **them**. But I believe that the person who normally provides solid internal support for himself has a much better chance of dealing with stress without high costs than does one who is deficient in this key element: this is entirely within our control. That is to say, the person who trusts and understands himself, who likes himself, who does not criticize himself excessively, has a much better chance of dealing with the stress of intense or cumulative change without high cost than does one who is deficient in this key area. We will deal in some depth with that in a moment.

Psychological fitness for work, then, implies a sense of control over one's life in general, and it differs at different periods of our life. For instance, for older men, this includes a willingness to view retirement as a normal part of life, and to accept it as a new and interesting experience rather than to see it as an event which wrenches their life out of their control; their psychological task is to welcome it and make it rewarding — not an easy one for the man, for instance, who has made a minimal investment in his personal life and finds his later years relatively bankrupt without the structure provided by his job.

To conclude on the subject of control, one of the easiest and most overlooked ways that you can increase the control you yourself have -and that you can provide for your people — is **information**. The more people know about what's going on around them, the more people know about how their job, their department, their company is being affected, what's coming down the pipe, the better for them; the more information they have about how they are doing, how their performance is viewed, the better. Aviation departments are, for instance, often deficient in giving clear performance appraisals. In some organizations, no one ever hears any bad news. If there are any complaints or criticisms, they are swallowed. In other organizations, where **"NIGYYSOB" (NOW I'VE GOT YOU, YOU S.O.B.)** is the style, any perceived mistake is jumped on and every deficiency is **criticized**, but no one is ever told what they are doing well. Other organizations are run on the basis of "no news is good news."

Hans Selye, the great expert on stress and distress, describes the most stressful environment: It is, he says, one where appreciation is nonexistent, and criticism is always imminent.

In many departments, there is an unwritten rule that says, "If you don't know, guess: don't ask." If this disease affects the manager as well, if the manager is unwilling to ask in a straight way for the information he needs from his superiors for his own reassurance and information, the department as a whole will be deprived. I find this especially prevalent in departments where the manager is unsure — sometimes almost apologetic — about the justification for the existence of the flight operation. Under those circumstances, he sometimes tippytoes around the company's commitment to the department, may not seek appropriate assistance from Personnel and other relevant departments; he may not defend the department well within the corporation and, of course, he will not be able to provide reassurance and support for his own people.

Employees need feedback. So part of your job as a manager is to **learn how to be comfortable** with intimate discussions so that you can give good feedback, appropriately and in an ongoing fashion, and be comfortable with, and supportive of, free and open communication, including comments on the quality of **your** leadership and decisions.

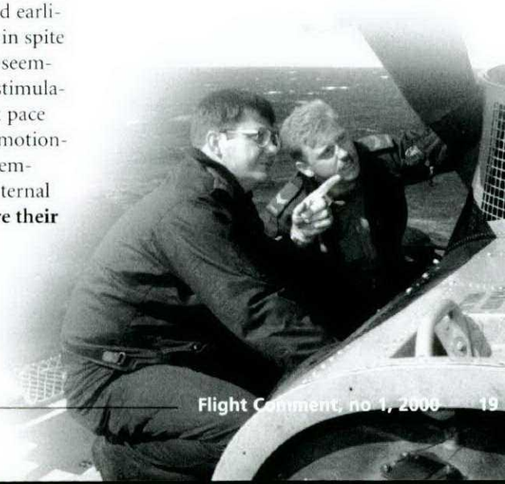
INTERNAL SUPPORT: And now, let's go on to the question of **internal support** It is my belief, as I said earlier, that those who don't suffer in spite of cumulative, consistent, and seemingly excessive change, stress, stimulation — those who live at a fast pace without negative physical or emotional consequences — provide themselves with a special kind of internal support. That is to say, **they are their friend, not their enemy**.

Are you aware that the person you speak to and hear from most often is sitting in your chair? This may come as a relief to some of you — yes, we all talk to ourselves.

Most of us are not aware — do not monitor — the content and tone of those silent conversations with ourselves, although **all of us spend most of our waking hours engaged in dialog with ourselves**. Some of our internal dialog is directed toward problem-solving, some of it towards assessing situations, and a large part of our internal dialog is directed to or at ourselves — an ongoing judgement of how we are doing.

What form does this judgment take? We know that people who are tough on others are still tougher on themselves. We know that people who are kind to others are often tough on themselves. Some people criticize themselves unceasingly, and in ways they know would be harmful were they to use them on others.

The quality of this dialog is partly dependent upon the kind of exchanges we had early in our life. Those of us who were more deprived, those of us who were more abused psychologically or otherwise, are more likely to have more cruel internal dialog. Surprisingly, though, even those of us who were brought up by caring parents have the habit, more or less consciously, of treating ourselves in ways that don't make sense; most of us confess, when pressed, that we are unnecessarily hard on ourselves.



In our workshops with aviation groups, we discover that very few of them are conscious of this internal dialog and even less of its impact on their well-being. A good deal of our work with them consists in helping them realize that **they are in charge of that communication**. In other words, we can all learn to monitor and modify the quality of our internal exchanges and by doing so, greatly affect our self-confidence, our level of comfort in life, and our fitness for duty. We can reassure ourselves in the face of change, foreseen and unforeseen, by increasing our ability to trust ourselves, that is to say, by recognizing that we have in the past dealt with change, with new situations, with unexpected events, in ways that turned out to be positive and successful, and that we can continue to do so. Our sense of security depends on our ability to predict events, and to predict that we will be able to cope with foreseeable and unexpected change.

We pay a high price if, on the other hand, our ways of speaking to ourselves reinforce anxiety and insecurity, if our internal dialog is permeated with expressions like "Who do you think you are", "You'll never be able to get this done on time", "You're lazy", "You're stupid", "Dummy", "What did you do that for?" "You can't do it", "There you go again", "You'll never change", "You'll make a mess of this and ruin your whole career", "You've bitten off more than you can chew", "You were stupid to take so much time to get this done", "Why can't you keep your mouth shut?"

Stop for a moment, and think of the last time you made what you considered to be a serious mistake. What did you say to yourself? One of the great thinkers in management development, Likert, explains that each of our encounters with another person is either **ego-building** or **ego-destructive**, and suggests that managers be measured on whether their impact on their staff is ego-building or ego-destructive. That is to say, each time we have an exchange with someone, important or insignificant, long or short, casual or intensive, we are inviting that person to feel better or worse about himself, to feel more competent and capable and positive, or to be demotivated and to lower his self-esteem. Let us apply that concept to our internal dialog: Our comments to **ourselves** are either ego-building or ego-destructive, and they are a measure of how we provide support for ourselves. Do **you** practice internal child abuse?

How did we get all bent out of shape in this fashion? An American university recently did some research that explains some of it. They sent students as observers into family homes. The students' only task was to watch what was going on, and to click one counter for every positive encounter the mother had with her children, and another counter for every negative encounter the mother had with her children. An "encounter" might be a look, a smile, a frown, a conversation, a gesture, a caress or a slap — any physical or symbolic exchange. We can assume that having an observer in the house would bias the mother's behavior at least in some minimal way — she is likely to want to be seen as a "nice mother," and if there is any skewing of her behavior, one would assume that it would be a positive skew. The results averaged out per week between a mother and her child as 231 positive encounters, 4,392 negative! These figures are not exact, but the proportion is roughly **1 to 20**. Since this is how we were taught, it is not surprising that we tend to do the same. How does that proportion compare to a description of your contact with yourself? With your employees, your kids, your wife on a day-to-day basis?

High achievers often believe that self-administered criticism is the foundation of their success. They think their productivity is ensured by regular criticism and demands. This may work for the short term, providing the prodding is followed by a successful, nourishing experience. The kick is equivalent to borrowing against hoped-for future income. But a kick followed by another kick, followed by another kick, without any reward can be kept up for only a certain amount of time before the energy bank account is overdrawn — even though each individual kick may feel like motivation, based on that person's past experience and their belief system. This pattern, repeated long enough, accounts for much of the depression that is experienced during the mid-life transition when the piper finally has to be paid. That is to say, for some men at mid-life, the cumulative depletion of emotional reserves reaches a critical point where it can no longer be ignored and may result in physical breakdown or other destructive behavior that often characterizes the mid-life transition.

The single most important source of stress is self-induced: it is our on-going unwillingness to like and accept ourselves as we are. We set unattainable standards of performance for ourselves, unrealistic standards of goodness, of noble behavior, of intelligence, of prescience, and beat on ourselves when we don't meet them. We have an eagle eye for analytical examination of our behavior, but it is hopelessly skewed to seeing and exaggerating the negative. Few of us are conscious of the cost of these crazy rules. Only **we** have the cure: It is the permission we can grant to ourselves to recognize our achievements and to enjoy them, to acknowledge our progress over the years as we

acquire wisdom and maturity, and to respect ourselves at least as much as we respect others.

Your ability to set realistic standards for others and for yourself, standards that at once truly challenge and yet that can be achieved without burnout is **a measure of your ability to manage human resources**. The person who is relentlessly faced with reproaches from himself no matter what he accomplishes, whose life is experienced as a series of failures no matter how much external appreciation there is for his achievements, is highly vulnerable. And compounding the misery, that person is likely to lay on his staff and family the same implacable demands, the same miserliness of appreciation, that he provides for himself.

In short, all of us have rules in our heads that we impose on ourselves and on others. These rules provide stability and reflect the underlying philosophy that generally governs our behavior so that each decision does not have to be made on its own merit — that is to say, a lot of our decisions are automatic once our basic philosophy and assumptions have been established. However, the test is whether these rules result **in guidance or in regimentation**, whether they are appropriate or excessive, whether they lead to flexibility or rigidity, whether they help or hinder us in the conduct of our life. These rules govern our well-being, as well as our performance, and must adapt to changing mores, to changing circumstances, and to changes in ourselves as we go through life.

An essential part of our process of maturing is to do some periodical house-cleaning in our rules. That is to say, to recognize that beliefs that were appropriate for us when we were twenty may no longer be when we're forty; attitudes towards money when we were struggling to survive may continue to create anxiety when our financial security is no longer in question; rules intended to protect an immature and insecure young man merely limit our capacity for good relationships once the holes in our life experience have been filled.

In short, **internal support is our best protection against loss of control, and against temporary shortages of external support**. Without it we condemn ourselves to perceiving life as a jungle, where no comfort, protection or encouragement is available. Yet, in the early learning period of our life, when our psychological map was evolving, few of us had good models to learn from, and fewer of us were taught to accept and nurture ourselves with anything approaching the tenacity with which we were taught to judge, criticize and punish ourselves. It is, in my opinion, largely as a result of this internal criticism that we do not outgrow the universal inferiority complex that hamstrings us all, some of us less and some of us more, and which causes us so much pain throughout our life. In other words, our ability to examine ourselves objectively and to foster our self-esteem is, for all of us, diminished as a result of our internal judgments which are neither realistic nor compassionate. If we are to attain a more humane acceptance of ourselves — and some of us never do — we are faced with a learning process that must take place relatively late in life. The question is whether we are willing to find the courage to risk the new behavior necessary for us to recognize and fill those needs instead of staying within the narrow, familiar and self-limiting range of permissions we acquired early in life.

One last word about internal support: Self-forgiveness. Few of us have had much practice in this very important exercise for mental health. Now, self-forgiveness is an activity which we are neither taught nor encouraged to practice, yet it is essential to our emotional fitness for work. The burden of guilt is a very draining one; it undermines our self-esteem, drains our energy, and limits our capacity for joy. If you are carrying some old guilt, give yourself a quiet half-hour, review all of the failings and mistakes for which you had been holding yourself responsible -justifiably or not — and wipe the slate clean. Bear in mind that no matter how selfish, cruel, vindictive, exploitative or callous your behavior was at the time, it was the best that you could do then. I have yet to meet a man who in a moment of stress says to himself, "I have six different options here, let me choose the worst one so I can feel guilty about it for the rest of my life." We do the best we can with what we have. Bear in mind that judging an act committed five or ten years ago by the standards of your wisdom and life experience today is not a process that makes sense. Find ways of forgiving yourself, turn a fresh sheet, and free up your energy to deal with the life you have left to live, rather than tying it up in the past.

EXTERNAL SUPPORT: Now we come to the third element, **External Support**. External support comes from our sense of belonging and from our confidence that we matter to the people around us, that they will be there if we need them, that they count on us. A sense of belonging to a group, to a family, is essential for our emotional strength. Groups with solid bonds are more likely to perform well and to survive under difficulty. Aviation is rather exceptional in this sense. As a group, you have very strong ties among you all, a high level of camaraderie and affection, and an assumption that any of your colleagues is okay unless proven otherwise. Under attack, you circle the wagons. That sense of identification is an enormous potential strength for you all.

When I first started working in aviation, I was amazed and admiring at these strong ties that characterize your group. I discovered, however, that most of this support is maintained at a latent level, that is to say, it is rarely expressed. "He knows I'm here if he needs me," is a comment we often hear. We ask, "Have you told him that?" "Not exactly in those

words." For an industry with such a thorough knowledge of radios and other forms of communication, your reliance on mind-reading is surprising.

Aviation departments have a perfect environment in which to create very strong external support: Relatively small groups, together for relatively long periods of time — not unlike a family. That is to say, unlike other managers who can be transferred from Quality Control to Production to Marketing, the staff of a maintenance department generally stays together. As a relatively static group, the question is whether your relationships improve and become more supportive, or whether they become more closed and cautious. Take a moment to think of your own work group, a group for which you are responsible. What is the quality of the relationships among you? Are you, in your contact with your people, ego-building or ego-destructive? Are these people nourishing or noxious for you? Is there a sense of trust among you?

What about your family fife, is it nourishing or noxious to you? If your personal life is currently relatively empty of support, can you find compensation by closeness with your colleagues at work? Or vice versa?

Not long ago, the manager of an aviation department committed suicide by shooting himself. He was a personable man in the prime of life -fortyish — a competent man, a perfectionist. Some of you may have known him. One of his colleagues told me later that everyone in the department was aware that he was giving signs of being stretched, of not behaving normally. Everyone wanted to help him but no one reached out to him. "He knows I'm here if he needs me."

Take a quick scan in your mind right now of the people who call you a friend. Is there one whom you know to be in a period of crisis? Have you told him that you know he's going through a tough patch that you feel for him, that you're available if he needs any help? If you answer with a shuffle, shuffle, "Aw Shucks, he knows," shame on you! This is not a cowboy movie. People around you are needing support and your choice is to be generous with it or to withhold it to their detriment and to yours.

I realize that some of the things I'm suggesting run counter to the culture of the aviation industry, where John Wayne and other Right Stuff personages have been your heroes. It is time to say goodbye to them.

We grow by learning to do things we didn't do before. A good example of this is the level of technical skills and knowledge that you have achieved. Compare what you know now with what you knew and could do at twenty — you can readily see how much you have grown by learning to do things that you couldn't do earlier. Your capacity for learning and risk-taking will stand you in good stead if you decide to experiment and to grow in the area of human relations as well as you have done in the technical fields.

If the level of support in your work group is not what it should be, do you have the courage to find ways of increasing the team spirit, even though it means that you will have to question some of your practices, some of your behaviors, some of your attitudes?

External support depends on trust, just as trust depends on external support. A healthy aviation department is one where mechanics trust each other, where mechanics trust pilots and pilots trust mechanics, employees trust management, and where management trusts their relationship with the rest of the company. The **quality** of our relationships is what I'm talking about.

Bear in mind that we are likely to become like the company we keep. "Birds of a feather...," and so on. Most of us tend to surround ourselves with people who think like us — it's more comfortable — and so deprive ourselves of opportunities to question some of our ideas, to review ways of being that may have suited us twenty years ago but that are no longer appropriate. For instance, the man who values self-sufficiency above all, who typically conceals his feelings from others and perhaps even from himself, is likely to surround himself with emotional illiterates like himself, so that there will be no one around to tell him that he is a fool to bankrupt his life — no one to tell him so, that is, except maybe his wife — and who listens to her? So we wind up sitting with our friends, who look just like us, justifying our crutches, not unlike a room full of stutterers who convince themselves that s-s-s-speaking l-l-l-like t-t-t-this is n-n-normal.

Your Job as a Manager

As a manager, an essential part of your job is to check whether the environment you are creating is psychologically safe, is humane, and is realistic in terms of the needs of the people who depend on you for direction.

As a small example, consider the prevalence of sarcasm in your current everyday conversation at work. The department where sarcasm prevails, where the sharing of any personal information can generate a cruel witty retort, is not an emotionally safe environment. People in those situations tend to say, "Gisele, you just don't understand our sense of humor." In fact, sarcasm is destructive; it limits initiative, innovation, risk-taking, suggestions, support, and it decreases the free flow of information in a work group. Unless those are your objectives, consider the possibility of finding new ways to communicate. Bear in mind its destructiveness not only at work, but at home. If a little boy comes home from school with a good report card and his father says to him, "Son, I'm proud of you," and another little boy comes home from school with a good report card and his father says to him, "I suppose you think you're an Einstein or something," there is a strong likelihood that one of those boys will grow up to be a winner and one to be a loser.

In some organizations we find that employees are fed on psychological bread and water. While these organizations may only be spotted with stress-caused divorces, alcoholism and other sicknesses, the relative lack of breakdown is less a measure of the adequacy of the diet than it is a measure of the remarkable and admirable resilience of the self-motivated individuals who survive in that and environment.

John Wayne notwithstanding, the fact is that all of us experience periods of crisis in our lives. They may be career-related or they may be clearly personal: difficulties in a marriage, divorce, children on drugs, alcoholism of our spouse, incipient alcoholism for ourselves, dependence or sickness of aging parents, and so on. The values of an organization are reflected in the sensitivity with which it responds to its employees in these circumstances. Some of our client companies make a point of identifying employees in difficulty and send them to us for counseling. For instance, we worked with two gentlemen from two different companies whose wives were dying of cancer. The boss of each recognized that his employee was in need of some unusual support during that time, and made some of it available. I have earlier discussed the need for psychological debriefing after an accident or incident. Does your company provide it?

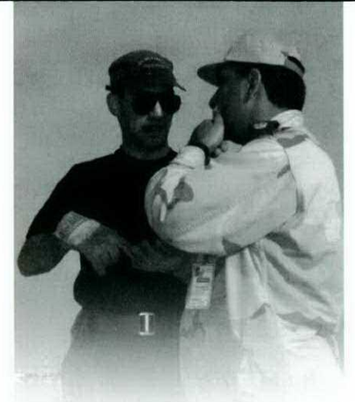
For many of us, there were few models in our early years, at home or at work, that allowed us to develop a sense of freedom and generosity in the explicit support we provide for the people around us. This does not condemn us to a lifetime curse of personal deprivation in interpersonal relationships. It does mean, however, that we need to make an effort to learn now what we could have learned perhaps more easily at an earlier age; the alternative is to continue in a life of relative impoverishment — and equally important, to create another generation of children and of employees who will follow the same path.

Check yourself out. Are your colleagues, is your family, is your support system providing support for you or are they draining you? How are you for them? Are you willing to do some spring-cleaning in some of your relationships as you outgrow them? Are you willing to educate the ones you want to keep so that they will know what you need from them and what you are willing to provide for them? In the work group for which you are responsible, is the discussion of work well done and of deficiencies in performance a legitimate and non-threatening, on-going exercise? Do you provide an open invitation for constructive criticism and appreciation for your work well done and for your deficiencies?

Bear in mind that it is health-producing to choose as friends people who are what you want to be. If you want to learn to play better bridge, don't play with beginners. Look around for "teachers" in the area of human relations just as you looked for "teachers" when you were learning your profession. That means leaving behind some people as you grow. Do your own inventory: Are you flying around with eagles or pigeons these days? Or perhaps with vultures for whom you are providing the meals? Do an inventory of your relationships at work and decide whether some team-building work is required to open up and make available the latent support that is available within the group and, most especially, examine yourself in terms of how **you** are providing support for your employees.

Conclusion

You are accountable for the performance of machines, but your real task is managing people. To do this well, you must take into account the human dimension of the department



for which you are responsible. This means educating yourself about human development so that you become as proficient in dealing with people as you are in dealing with technical problems. And so that you provide the same quality of concern for the well-being of your employees as you do for the airplanes you service.

Doing so might well entail a change of attitude for you, and more importantly, the courage to dive into an area of knowledge in which you may not be well versed. Well, change is with us forever. Without it, we would fossilize. It's often not comfortable, but there is no growth in our comfort zones. Our challenge is to accept the discomfort of change as a constant life companion and to choose growth in spite of it.

My wish for you is that you be willing to seek ways to accelerate your own learning in this area, that you be willing to question yourself and your beliefs and your values even though this requires more courage to do than it does to modify your technical knowledge. In doing so, you will give yourself the opportunity to become the person you can be. In doing so, you will contribute to the emotional growth of the people around you, and you will be remembered by the people who work for you as someone who has touched their lives in a significant way, who was a good example for them.

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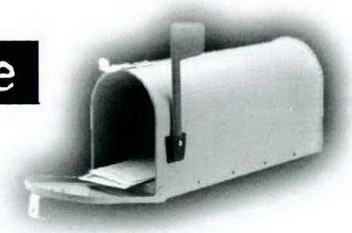
Letters to the Editor



The Editor, Flight Comment

Captain Tony Keene's letter in Flight Comment #3 1999 struck a chord with me. As a civilian at DND for some 14 years, I have often found the use of acronyms and jargon extremely confusing. More importantly, I found we wasted a lot of time trying to figure out what they meant, but my suggestion that we use clearer forms of communications invariably got the response 'that is the way it is done here, get used to it'.

Shortly after arriving in the department, I asked my boss what LCAM stood for. He scratched his head and said "I don't know, but I am one".

It was very common (and still is) to hear someone shout out "Does anyone know what xyz stands for?" and three or four people got up and had a discussion about it.

The invention of new acronyms has become automatic for many people here. I once was given a 10 page document that carefully spelt out about a dozen phrases on page one and defined an acronym next to each in brackets and then didn't use one of the acronyms in the rest of the document.

DND goes so far as saving one single letter by converting the generally understood abbreviation for identification from 'id' to 'i' as in 'i-card'.

A few years ago, I started training for an ultralight permit, and was surprised to find that even in areas where safety was at risk, acronyms and jargon were usually used instead of clear communications.

I found that a large amount of my study time was spent trying to find the meanings of acronyms. To cite one particular case, there was a monthly column in a civilian aviation publication that used "DFTE" in its title. I consulted every list of acronyms and abbreviations that I could find, including all my textbooks and the Canadian Flight Supplement. I asked every pilot I knew. I asked an instructor, an air force officer with 10 years of flight instruction under his belt, to no avail. I saw it in print every month for two years, but never saw the meaning of it spelled out. Oh, I could have asked the author of the column, but I wanted to see how long it would take before it was explained in the publication without my prompting. Two years later I found it, but not in the column in question. I would be curious to know what percentage of your readers — aviation types — know what it means without asking or looking it up in a book. Could you do a quick survey before publishing this?

After much prompting by their clients, NavCanada has recognized that clarity is more important than brevity, and they now issue aviation weather information in plain language because it saves lives. And as a side effect, it saves a lot of time and money as well. People, especially recreational pilots, spend less time calling the Flight Service Centre for an explanation. There will be less need for search and rescue services for planes lost due to misunderstanding the weather. If it becomes commonplace enough, flight schools could even drop the two hours they spend teaching the weather codes in basic ground school and only teach it at higher levels where bona fide needs exist.

There is, of course, an appropriate time to use code words. Acronyms, abbreviations, and other forms of jargon are an excellent way to prevent the spread of knowledge outside of your private group. It takes very little to prevent people from understanding what you are talking about. When you might be overheard by someone you don't want to know, codes are very valuable.

But in most other environments, using such jargon is almost totally counter-productive.

I have heard people giving presentations who lost most of the audience by using an acronym or two at the beginning of their speech.

Such usage can marginalize many members of your audience. Explaining them once when you first use them is inadequate, because most people will forget them very quickly. Even written communications can be very difficult to understand if the reader has to go searching for the page that a term was first used on.

The time required for new staff to get oriented and for all staff to learn new tasks increases with the number of acronyms used. Morale can suffer as people get frustrated. Productivity falls as people get sidetracked and lose their concentration on the original subject. They have to reread a lot after finding the meanings. Often they don't find the meanings and simply carry on, hoping that it doesn't matter too much.

In spite of the statements in so many DND publications and business plans, such as 'our values include sharing ideas, innovations, knowledge and experience with our colleagues and those we serve, placing a strong emphasis on consultation and exchange of information' and our objectives are 'to optimize the sharing of information,' we continue to do things the old way.

I recognize that there really are times when brevity is very important, but the days are long gone when communication lines were 110 baud (teletype speed) and abbreviations were necessary. Even in aircraft communications, where frequencies are shared and time is limited, the excessive use of short terms and codes can sometimes be more dangerous than it is worth. We need to find a balance there (considering bandwidth limits and international standards), but in most other forms of communications, there is little reason for our present level of gobbledegook.

— *Michael Phelan*
DIRPM 2-7-4
993-6539
aa225@issc.debbs.ndhq.dnd.ca ◆

Flight Safety Word Search

By Captain J.J.P. Commodore

HINT 10 LETTERS "PERSON GIVING DIRECTION"

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

AIRSHOW
ALARM
ANNOUNCED
AVIATION

CALM
COMMUNITY
COMPLETING
COST

DAY
DEFENCE
DUTY

FACTS
FLIGHT
FLYING
FUNDED

HAIL
HEADLINE
HONOUR

HOWEVER

INVOLVING

LOCATE
LOOSE

MAINSTAY

NEVER
NEWCOMERS

PERFORM
PHASE
PRIMARY
PRIVATELY
PROGRAMME

REDUCE
REPLACE
REST
ROAD
RUST

SAVED
SCENE
SCHEDULE

TANK
TIME
TOTAL
TRAINING

VEHICLE
VENERABLE
VALIANT

WIND

YEAR

TALON 16

Captain Jason Von Kruse
Lieutenant Barry Leonard
Captain Lee Wendland
Sergeant Phil Moffitt

Talon 16, a Sea King helicopter from HMCS Montreal, was conducting an operational readiness exercise over the Mediterranean Sea. At thirty minutes before sunset weather in the exercise area was reported as being one thousand feet overcast with a visibility of six miles. While departing from the dip the crew heard a loud bang from somewhere on the aircraft. As all engine indications were normal the crew suspected a bird strike. They re-entered the hover to investigate further, but no damage was found. As they again departed the hover another bang was heard accompanied by rumbling and popping noises.

The crew recognized the symptoms of a compressor stall and proceeded to secure the engine and to declare an emergency. HMCS Montreal was thirty miles away. She immediately came to emergency flying stations and began to close on the helicopter's position at maximum speed. The sun had set and visibility was four mile, but decreasing rapidly as Talon 16 reached the ship. HMCS Montreal turned directly into wind at twenty-five knots to give a relative wind of fifty-five knots.

Talon 16's first approach was carried out to a simulated delta hover astern position at two hundred feet above sea level. Having determined they had enough power to maintain delta hover astern, out of ground effect, the crew overshot and set up for their final approach. The aircraft was recovered free deck, with no trap, and no further incident.

The crew of Talon 16 handled a potentially disastrous emergency in a calm, confident, and thoroughly professional manner. Their outstanding airmanship prevented the loss of their aircraft. *Well done!*

Captain Stephen Legassick

Captain Legassick was lead of a two-ship formation of Hornet aircraft. The aircraft were tasked to complete a low-level air to surface tactics mission. Shortly after starting the low-level portion of the mission Captain Legassick's aircraft struck a bird demolishing an entire quarter of the windshield.

Despite being nearly blinded by the liquefied bird remains covering his dark visor Captain Legassick slowed his aircraft and initiated a climb. He next stowed his coloured visor, confirmed the controllability of his aircraft, and proceeded to return to base. Whilst in transit Captain Legassik noticed a large blade-shaped piece of windscreen resting against the standby compass. He became concerned about the possibility of the shard becoming dislodged in the two hundred knot relative wind, flying back, and injuring him. Despite being hindered by the windblast, Captain Legassick was able to remove the plexiglass and stow it within the cockpit — a later inspection revealed other windscreen parts embedded in the vertical stabilator. Captain Legassick then returned to the airfield at a reduced air speed and completed a successful landing.

Captain Legassick demonstrated superior airmanship and considerable sang-froid when confronted with a highly unusual and potentially lethal emergency. His actions resulted in the successful recovery of a valuable aircraft. *Well done!*

Officer Cadet Chris Hill

Officer Cadet Hill was employed as the launch control officer at the Gimli Gliding Centre. The gliders were being winch launched from a mid-field position between the runway and the racetrack. Officer Cadet Hill was attempting to resolve a recurring winch problem and the subsequent delay in launches, whilst monitoring the activities of personnel at the site, parachutists, civilian training aircraft, and transient aircraft.

While coordinating requirements with the winch operator, Officer Cadet Hill noted a twin-engine Seminole positioning for take-off on runway 14. Shortly after the Seminole had begun its take-off roll Officer Cadet Hill noticed an Ag-Cat spray-plane on short final for landing on runway 32. Officer Cadet Hill immediately advised the Seminole to abort its take off and, at the same time, directed the Ag-Cat pilot to commence an overshoot.

Officer Cadet Hill demonstrated exceptionally high situational awareness and decisiveness. His actions severed a chain of events that may have resulted in a mid-air collision and a loss of life. *Well done!*

TRUCKER 12

Major Marty Cournoyer
Captain Jeremy Reynolds
Captain Tom Pilz
Captain Nathalie Frigon
Warrant Officer Frank Payeur
Sergeant Kevin Ward
Master Corporal Rick Barrett
Master Corporal Ralph Quade

The crew of Trucker 12 were scheduled for an intense three-hour tactical training flight. Approximately thirteen minutes into the flight the crew heard a distress call. The civilian pilot of a Cherokee aircraft had become hopelessly lost while on his second cross-country flight and panic was evident in his voice. Well-intentioned advice from ground and airborne stations seemed to only further confuse the Cherokee pilot. He was unable to operate his navigation equipment and unable to locate large visual references on his map when they where pointed out to him. Although the Cherokee pilot could read his fuel gauges he could not translate the quantity of fuel into time of flight remaining. Sensing an unfolding tragedy the aircraft commander of Trucker 12 made the decision to intervene.

The crew of Trucker 12 tracked towards the lost Cherokee using their homing equipment. Upon locating the lost aircraft the crew of the Hercules reduced their speed to ninety-five knots and attempted to steer the disorientated pilot to home base. What followed was an exemplary demonstration of crew cooperation on the part of the Hercules crew. The flight engineer monitored altitude and performance instruments. The navigators maintained a visual fix and supplied simple vectors for the Cherokee pilot to follow. The loadmasters moved to the front of the aircraft and maintained a lookout for traffic and obstacles in the increasingly busy airspace. The co-pilot switched the Cherokee pilot to a discrete frequency and attempted to calm him whilst coordinating with Toronto Centre to keep other traffic clear. As the crew of Trucker 12 approached the Toronto area the Cherokee pilot was vectored around other aerodromes until he was within ten miles of his home base. The Cherokee pilot once again became extremely agitated when unable to raise his destination on radio. Trucker 12 then relayed the distressed pilot the aerodrome advisory and vectored him onto a short final and a safe landing.

The crew of Trucker 12 displayed outstanding initiative, airmanship, and crew co-ordination. Their actions were in keeping with the high tradition of service of the Canadian Forces and likely saved the life of a fellow aviator. *Well done!*

Good Show

AIR TRAFFIC CONTROL TEAM

Captain Grant Humphrey
Captain Mike Benoit
Captain Dean King
Captain Steve Whynott
Captain Dave Haun
Master Corporal Kent Graugaard
Master Corporal John Healey
Corporal Marc Magee
Corporal Bob Johnson
Corporal Mike Dalzell
Corporal Dean Vey

During January of 1999 a single engine Cessna 210 was on an instrument rules flight plan from Peace River, Alberta, to Campbell River, British Columbia. Over the mountains sixty miles northeast of Comox the pilot experienced mechanical problems leading to an engine failure. The aircraft began to lose altitude and the pilot radioed Comox terminal with a mayday message.

Comox and surrounding airports were in instrument meteorological conditions. Mountainous terrain prevented the terminal controller Captain Benoit, and the chief controller Captain Humphrey, from locating the aircraft on radar. Realizing the seriousness of the situation they immediately contacted Comox tower for assistance.

The tower controller, Captain Haun, quickly dialed in the direction finding equipment and was able to determine the bearing of the aircraft. Working closely as a team, and using all available resources, the controllers were able to radar identify the aircraft fifty-five miles northeast of Comox at ten thousand feet above sea level — approximately two thousand feet below the minimum safe altitude. Shortly thereafter the pilot managed to restart his engine, but it failed to produce reliable power. The situation, complicated by icing conditions, was causing the pilot to become disorientated and highly distressed.

The traffic load at the terminal radar unit ranged from moderate to heavy. A decision was made to isolate the aircraft on a separate radarscope and the aircraft was placed under the control of the duty terminal controller, Captain King. The duty arrival controller, Captain Whynott, kept traffic well clear of the emergency aircraft and coordinated a possible SAR mission with an airborne Buffalo aircraft. Corporal Magee, the terminal assistant, coordinated the activation of all emergency services with the tower assistant Corporal Johnson and the ground controller Master Corporal Graugaard.

Captain King vectored the Cessna for an ILS approach to runway 11. On his first attempt the pilot failed to sight the runway and tried to commence an overshoot, but continued to descend beyond the runway and over the ocean. Realizing that the pilot had lost confidence in his instruments and was wary of reentering cloud, Captain King had the aircraft climb to a safe altitude and vectored him downwind for another approach.

Master Corporal Healey, the duty PAR controller, recognized that the most prudent way to get the aircraft on the ground with minimal delay was with a PAR approach. Although the PAR was unserviceable and undergoing corrective maintenance, Master Corporal Healey contacted radar technicians Corporal Vey and Corporal Dalzell and requested that every possible effort be made to reassemble and return the PAR to service. Within minutes the PAR was made operational and Master Corporal Healey assumed control of the Cessna from Captain King. With a calm and reassuring voice, Master Corporal Healy guided the aircraft to a safe landing at Comox.

The members of the 19 Wing air traffic control team demonstrated outstanding diligence, initiative, and technical expertise. Their team effort saved the life of an aviator in extremis and brought credit to themselves and the air force. *Well done!*

For Professionalism

Corporal Marc Chiasson

Corporal Chiasson was reviewing an undersea and hyperbaric medical society newsletter when he noticed an article pertaining to aluminium oxygen regulators. There had been sixteen reports of aluminium regulators used with oxygen cylinders burning or exploding in the past five years. A recall of certain types of these regulators had been co-recommended by the United States Food and Drug Administration and the United States National Institute for Occupational Safety and Health.

Corporal Chiasson recognized that one of the regulators named in the article was widely used throughout the Canadian Forces medical system and on board search and rescue aircraft. Having identified the hazard, Corporal Chiasson documented his research and promptly contacted the Wing Hospital. Hospital staff subsequently contacted the Division Surgeon and an advisory message directing the quarantining of the regulators was issued.

Corporal Chiasson's exceptional attention to detail and professional attitude resulted in the identification and removal potentially lethal hazard within the Canadian Forces medical and SAR communities. *Well done.*

Corporal Alain Fortin

During routine maintenance of the flight control system of a Hornet aircraft Corporal Fortin noticed two unusual BLIN codes. The appropriate technical manual stated that the codes were to be ignored. A number of days later, while conducting work on a special inspection to verify the rigging of the mechanical mode flight control system, Corporal Fortin noticed that the same unusual BLIN codes were still present. Not content to accept the status quo he decided to investigate further.

Corporal Fortin consulted all available publications and a representative of the contractor to no avail. He then contacted the engineering department of the manufacturer and was informed that the codes were directly related to improperly adjusted mechanical mode flight controls. The controls were re-rigged and the BLIN codes disappeared. Corporal Fortin then submitted the appropriate documentation to amend the technical orders.

When required, the correct operation of the Hornet's emergency flight control system is absolutely essential. Corporal Fortin's attention to detail and perseverance resulted in a properly rigged aircraft and the correction of a major deficiency in the technical orders. *Well done.*

Corporal Ghislain Aubin

Corporal Aubin, an avionics technician, was assigned to the start of a Hornet aircraft. While awaiting the arrival of the pilot, Corporal Aubin elected to carry out a quick, general inspection of the aircraft. During his examination he detected what appeared to be something unusual about the right-hand aileron shroud-arm cam-follower. Corporal Aubin decided to consult a qualified aviation technician.

An in-depth inspection revealed that the roller had broken in the cam. As there was no retaining device there was nothing to prevent the shroud from coming loose and contacting or jamming the aileron. The aircraft was immediately grounded until the part could be replaced.

Corporal Aubin demonstrated superior initiative and professionalism by undertaking an inspection when none was required. His exceptional attention to detail allowed him to discover a significant safety hazard in a cramped and poorly lit area. *Well done.*

Corporal Linda Stojanowski

Corporal Stojanowski was tasked to carry out an AB inspection on a Hornet aircraft. During her inspection of the left main-wheel well she discovered a damaged hydraulic line. Despite being hindered by poor lighting, Corporal Stojanowski initiated a detailed inspection of the area.

Corporal Stonjanowski's examination revealed another dented hydraulic line. The damaged lines were components of the landing gear retraction and emergency extension systems. The hydraulic lines had apparently been dented for some time and the abnormality had not been noticed during numerous other checks.

Corporal Stojanowski's alertness and professionalism resulted in the discovery of a significant unserviceability. Had the fault continued to go unnoticed the aircraft's emergency gear extension system may have failed to operate when required. *Well done.*

Mister Jamie Jack

Mister Jack, a sheet metal technician at Boeing Canada Technology Incorporated, was carrying out polishing operations on a Labrador helicopter. During the course of his work he noticed a very small flaw protruding from the sealant on the upper starboard side of the fuselage to pylon attachment area. On his own initiative Mister Jack decided to investigate further.

Closer examination revealed two major cracks in the area — one being four inches in length and the other being two inches long. Mister Jack immediately notified his supervisor. The opposite side of the aircraft was then stripped of sealant and paint and another significant crack was discovered.

The damage Mister Jack discovered was extremely difficult to detect, as the aircraft had not been paint stripped during its inspection. Mister Jack's professionalism and superior attention to detail resulted in the discovery of a fault that undetected could well have compromised the structural integrity of the aircraft. *Well done.*

Corporal Scott Jack

Corporal Jack was working on the tail section of a Dash 8 aircraft when he noticed a minor skydrol leak originating from the drain hole in the port wing root. He decided to open an upper wing panel to investigate further and traced the leak to a swage joint on a hydraulic line. Concerned that there was a possibility of other swage joints leaking, Corporal Jack opened an additional wing panel to complete a further check.

Although there were no other hydraulic leaks present, Corporal Jack discovered a four-foot long unsecured wire bundle located directly below a flight control quadrant. The wire bundle had been left unsecured by a contractor. The wire bundle had the potential to become entangled in the flight control quadrant and could have contributed to a loss of control of the aircraft while in flight.

Corporal Jack's alertness and initiative mitigated a significant flight safety hazard and prevented the potential loss of an aircraft and crew. *Well done.*

Captain Glen Maxwell

Captain Maxwell was monitoring a VOR/DME approach to runway 26 at Brandon airport as part of a student pilot's final instrument test. The King Air had descended to minimums after passing the final approach fix. While the aircraft was maintaining minimum descent altitude Captain Maxwell noticed that the clearance over a set of high tension wires appeared to be minimal.

Upon completion of the flight, Captain Maxwell phoned the Instrument Check Pilot School in Winnipeg and verified that the required clearance height was two hundred and fifty feet above the wires. Captain Maxwell then contacted the electrical company and discovered that a new set of wires had been placed near the aerodrome. The new set of towers and lines were one hundred feet taller than the older ones. Captain Maxwell relayed the information back to the Check Pilot School where a NOTAM was issued through Nav Canada raising the minimum descent altitude on the approach.

Captain Maxwell's professionalism has resulted in a safer flying environment. His attention to detail broke the chain of events that could well have led to an accident. *Well done.*

Corporal Mike Grimard

Corporal Grimard, a qualified aviation technician with a background in safety systems, was assigned to supervise the on-the-job training of two unqualified aviation technicians replacing the firing release pin on a Tutor canopy remover. All specified safety procedures had been complied with and technical orders were present on-site. As Corporal Grimard was demonstrating the technique for removing the firing release pin he encountered greater than anticipated resistance. Knowing that the situation was highly unusual he immediately ceased all work on the charge assembly.

Corporal Grimard consulted technical orders, but they contained no information to address the problem he had encountered. Corporal Grimard then queried other experienced technicians who agreed with his supposition that the charge assembly had to be considered unsafe. The charge was secured and was placed in an explosives lock-up to await safe disposal. Local changes to procedures were implemented and a submission to formally amend orders was made.

Corporal Grimard demonstrated superior professionalism when confronted with a volatile and dangerous situation. His attentiveness and diligence likely prevented a serious accident. *Well done.*

For Professionalism

CREW 1
415 (MP) SQUADRON

Captain Wagstaff
Captain Woodworth
Captain Hanes
Captain Larsen
Captain Kearly
Captain Carnegie
Sergeant Santerre
Master Corporal Way
Master Corporal Smith
Master Corporal Saunders

While conducting a routine training flight over the Bay of Fundy, Crew 1 received a request for assistance from the Greenwood control tower. Air traffic control was maintaining intermittent communications with a civilian aircraft that was obviously in distress. The Aurora crew were asked if they could attempt to locate the lost aircraft.

Crew 1 commenced their search and almost immediately the radar operator located the target. A short time later the Aurora reached the scene and the civilian aircraft was spotted visually. Captain Wagstaff, the crew commander, quickly determined that the civilian pilot was completely disoriented and was in danger of running out of fuel. Captain Wagstaff calmed the pilot and briefed him for a landing at the Liverpool airport. The light aircraft was vectored to the Liverpool airport where it landed safely despite having its engine fail on final approach because of fuel exhaustion.

Crew 1's professionalism and resolve to assist a fellow aviator likely prevented a needless loss of life. *Well done.*

Corporal Mike Pelletier

While conducting a normal twenty-five hour inspection on a Griffon helicopter, Corporal Pelletier noticed abnormal rotational play in the crank assembly of the tail rotor control counterweight. Further inspection revealed that play on the static stop was also excessive. Corporal Pelletier immediately suspected that the retainer nut had worked loose.

Corporal Pelletier found that the retaining nut could be turned by hand. Technical orders specify that the nut should be tightened to nine hundred inch-pounds. The only thing restraining the assembly was its lock-wire.

Corporal Pelletier's alertness and professionalism resulted in the detection of a significant safety hazard. Had the situation remained unnoticed and unresolved a serious accident was likely to occur. *Well done.*

Master Corporal Denis Plourde

During the third week of a field deployment Master Corporal Plourde was conducting a pre-flight inspection of a Griffon helicopter. During the exercise a significant amount of dust and grime had accumulated on the helicopter. The combination of dirt and the helicopter's effective camouflage made the detection of abnormalities very difficult.

While cleaning the forty-two degree gearbox oil-quantity indicator-lens, Master Corporal Plourde noticed that the lens-retaining ring was missing. He promptly notified the aircraft commander and the helicopter was immediately grounded for repairs. Had the lens cap fallen off, all forty-two degree transmission fluid would have been lost and failure of the tail rotor drive would have eventually resulted.

Master Corporal Plourde's alertness and attention to detail resulted in the detection and correction of a potentially lethal aircraft unserviceability. *Well done.*

Photograph Caption Contest

Try your hand at giving this photograph a witty caption. E-mail your submissions to the editor. I'll print the best entries in the next issue of Flight Comment. All published captions will be credited.

Photograph Caption Contest

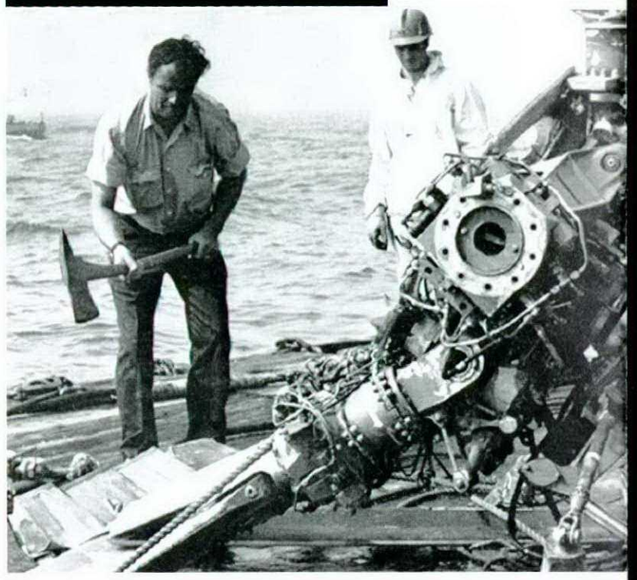
There are some profoundly witty people in our organization. As judged by our exceedingly small panel of experts the

winners are:

9 *"CH-124 Sea King: The 'Cutting Edge' of military technology"*
— HOTEF Sea King drivers

8 *"The standing philosophy of Operational Test & Evaluation: 'Measure it with a micrometer, mark it with a crayon, cut it with an axe.'"*
— HOTEF Sea King Drivers

7 *"Tactical Evaluation Team preparing the Aircraft Battle Damage Repair"*
— Maj O'MAN Baus



6 *"I don't care how Red Green found out about our secret repair tape, just don't let him know how much we rely on this tool for delicate work, OK?"*
— Micheal Phelan

5 *"Maintenance cost, I'll cut maintenance costs alright. When's the other one back?"*
— MCpl Rick Franke

4 *"Trade amalgamation, dis'll learn em, dey won't be sending out no more armors ta clean da windows"*
— MCpl Rick Franke

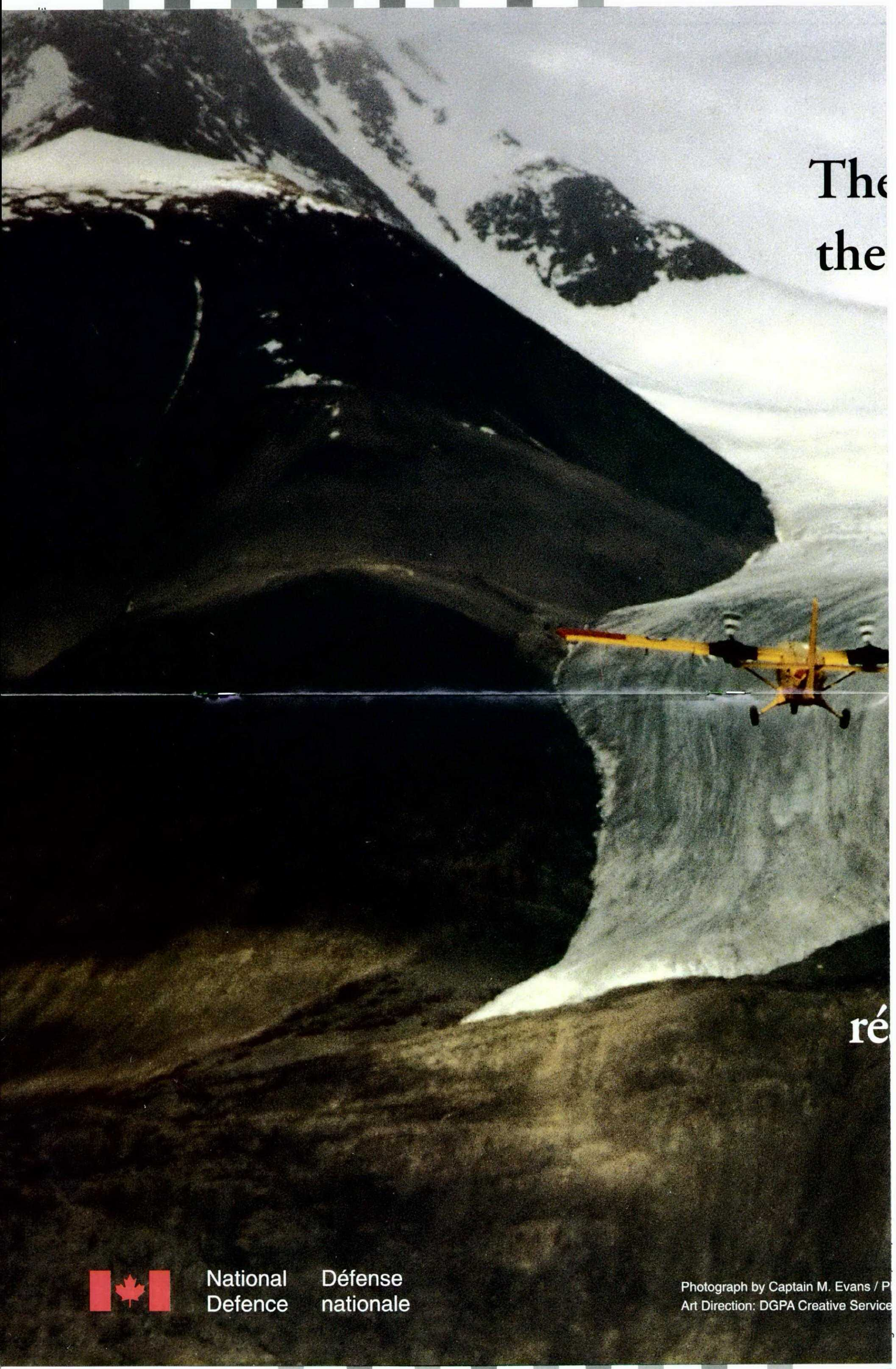
3 *"What is wrong with this picture? The tech conducting normal Sea King Maintenance is not wearing his cranial protection. WEAR YOUR CRANIAL!"*
— Maj JC Brown

2 *"After the recent retirement of the Sea King several were given to charity and used in a 'Buck A Hit' drive to raise money. Here we see Jason Curleigh, grandson of one of the first Sea King pilots, having a go for grand-dad."*
— Maj JC Brown

1 *"Hey boss, I think they said "Top up the chopper'"*
— MCpl Rick Franke

Thank you to everyone who participated:

Christina Coleman
Capt N.J. McKenna
MCpl Real Arsenault
Capt Koester
Lt N.J. Williams
Bob Bloomfield
Joe Scoles
Dave Lever
Mike Barnucz
WO Abbott (ret'd)
Capt W.W. Duffy
Maj Kem Hur
Cpl Girardeau
Sgt J.R. Calmès
Capt Mott
B.D. Pilon
Capt S.L. Oakes
R.G. Day
MWO Louis Emond
WO Guidry
MS W. Sparling


The
the
ré
National Defence
Défense nationale
Photograph by Captain M. Evans / P
Art Direction: DGPA Creative Service