AIRBORNE LAW ENFORCEMENT ASSOCIATION

The Safety Wire

July 2015

Situational Awareness

can be lost one of three ways:

1. We fail to detect information about the situation around us.

2. The information about our environment is perceived, but we fail to correctly interpret, understand or accept it.

3. The situation is perceived and understood correctly, however we do not properly project how the current situation will influence the future.

Photo courtesy of Josh Goldschmidt

Most of our safety efforts focus on the first one, failing to detect information about the situation. This is well placed attention, as it is the leading factor is loss of situational awareness (SA), with some estimates as high as 80%. Some of the mitigations we put in place to counter this issue involve training and equipment to help collect and display important data. In recent years, some of the avionics and training resources available to public safety aviation have truly been amazing. However, none of it does us any good if we fall victim to two key elements of #2 and #3 above: accept and project.

Consider this excerpt from an NTSB accident report (full report at the end of this newsletter):

`The pilot reported that he noticed the illumination of the low engine oil pressure warning light. He noted that the oil pressure gauge was also showing low pressure but that there was no rise in the oil temperature or the exhaust gas temperature. Because the pilot had recently experienced an intermittent oil pressure gauge` problem in another helicopter, he assumed the accident helicopter was experiencing a similar problem and continued toward the intended destination. Several minutes later, the pilot noticed a low-torque indication but no rise in the oil temperature or exhaust gas temperature. About 25 minutes after departure, the pilot saw a rise in the exhaust gas temperature and lowered the collective to reduce power. The engine experienced a total loss of power before the helicopter reached the open field; the pilot performed an autorotation, and the helicopter landed hard.


Photo courtesy of Damian Orihuela

Here, the pilot 'detected' the pertinent information needed to understand the situation, but failed to correctly process it, or possibly *accept* it. Even after 25 minutes of receiving constant information about the developing emergency, SA was never attained.

This loss of SA trap is also well illustrated by our old foe – Inadvertent Flight into Instrument Meteorological Conditions (IIMC). All of the instrumentation and training in the world will do us no good if the pilot does not utilize them at the right time. There is reluctance in IIMC situations for even instrument-trained pilots to abandon visual flight and transition to instruments. There is no time for such delay when responding to emergencies such as IIMC, which is an emergency in any aircraft if the 'inadvertent' aspect is in play. At the bottom of this newsletter are two reports where very well trained pilots, flying extremely well equipped aircraft, fell victim to IIMC.

Crew Resource Management (CRM) is a fantastic solution to all three categories above. A second crewmember can help identify critical information, confirm proper interpretation and push perception through the haze of denial towards a timely response. It requires the second crewmember be properly trained. In the first example, a trained crewmember likely could have helped the pilot accept that landing as soon as possible was a better option than continuing the flight.

For IIMC, my agency has addressed this with the first item in the TFO's IIMC checklist: "Transfer to IFR flight – BOTH Verbally Confirm."

TFO IIMC Emergency Procedures				
1	Transfer to IMC Flight		Both **Verbally** Confirm	
2	*Monitor aircraft attitude/airspeed ----		Call out deviations:	
	Pitch	> 5 deg		
	Bank	> 15 deg		
	Altitude	> 100 feet		
	Airspeed	> 10kts		
3	Enter Approach/Tower frequency		120.3	0630-2300hrs
			121.1	Approach
4	Make freq active			
5	*Monitor aircraft attitude/airspeed			
6	Enter Destination			
7			Airport ID	(KABC)

Avionics and pilot training are two great solutions to improving situational awareness. They are not fool proof though. Even if they were, the cost involved is often prohibitive. A properly trained TFO and good CRM training that includes crew-based emergency procedures training is an extremely effective solution that is easily within our grasp.

"Ability will never catch up with the demand for it."

Practical SMS

As a reminder, if you are working on setting up a Safety Management System at your agency, please look through the new SMS Installation Guide, which is available through the link below. It has references to the original SMS Toolkit, PSAAC Accreditation Standards and a series of sample documents and policies to get you started. If you have questions, comments or feedback, please let me know.

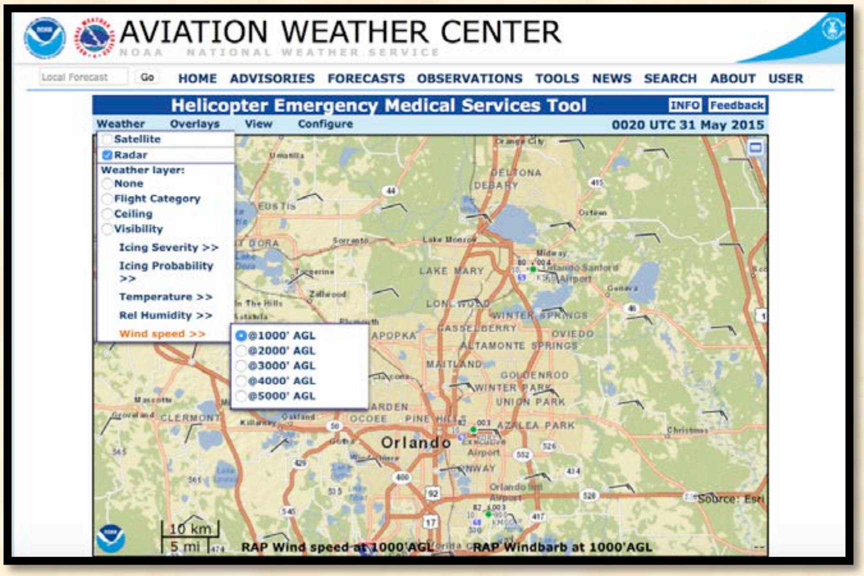
http://aleaprod.ungerboeck.com/sms-installation-guide
(note: *You must be logged in to the website first*)

One item that is addressed in the policy section of the installation guide is establishing the authority for the safety officer to jump the chain of command in certain circumstances. While rarely needed, the right to do so is very important and needs to be written down in the policy manual. It is sometimes difficult to get management to agree to put this in print, especially if it is a new concept. A suggestion is to spell out exactly when, and why, such a right would be exercised. The following excerpt is taken from the sample SMS Standard Operations Policy manual in the SMS Installation Guide:

i) The ASO will be given written authorization to contact levels of supervision above that of the aviation unit's top supervisor. This is only to be done in extreme circumstances, when:

(1) Unit management has been unresponsive to a 'high risk' item, as defined by the risk assessment procedure in the unit SMS. Additionally, the lack of response to that item is without legitimate explanation. This period of 'unresponsiveness' must be beyond the strategy timeline defined by the safety committee.
(2) The unit manager is directly related to the cause of the problem, and attempts to talk to them about it have been unproductive.
(3) The unit manager is acting in a reckless and negligent manner in a way that endangers the safety of unit members.
(4) In all cases, the proposed communication to parties above the immediate chain of command is approved by at least one other member of the safety committee.

Low-Level Weather Tool Updated!



The very popular helicopter EMS low-level weather tool has finally been updated. The new link can be found on NOAA's aviation weather (ADDS) webpage. It is a web-based tool now, which means it can be used on iPads in the cockpit as well as computers that had trouble using Java-based applications. If you have never used it before, it is a phenomenal weather resource that allows you to look at weather down to 1000 feet AGL in localized areas instead of traditional weather resources designed for higher altitude, cross country operations.

http://www.aviationweather.gov/hemst

"If people only knew how hard I work to gain my mastery, it wouldn't seem so wonderful at all."

~Michelangelo

Resources

Embry Riddle Aeronautical University is offering another free MOOC (Massive Open On-line Course) for aircraft accident investigation. Check out the links below for more information.

http://worldwide.erau.edu/newsroom/spotlights/embry-riddle-worldwide-offering-another-mooc#sthash.LZIoZoD7.dpuf

http://worldwide.erau.edu/degrees-programs/free-online-courses/

Safety Officer Mutual Aid

The next ALEA safety online meeting will be on August 18th at 2:00 pm EDT (1800UTC). Please send me an email if you are not on the mailing list and would like to attend. The minutes from previous meetings are also available.
safety@alea.org

August 18th, 2015
2:00pm EDT (1800UTC)

Photo courtesy of Tom Yeisley

Reality Check...

Note: *The following reports are taken directly from the reporting source and edited for length. The grammatical format and writing style of the reporting source has been retained. My comments are added in red where appropriate. The goal of publishing these reports is to learn from these tragic events and not to pass judgment on the persons involved.*

Two articles covering the March 10, 2015 US Army Blackhawk accident that claimed the lives of 11 soldiers in Florida:

"An investigation found that the two pilots failed to switch from using visual flight procedures to instruments that could have helped them navigate the foggy conditions they encountered"
http://www.reuters.com/article/2015/06/04/us-usa-florida-crash-idUSKBN0OK1R220150604

"Other air crews had misgivings about the poor weather, but chose not to challenge Griffin, the report said. 'During the run-up of both aircraft, individuals exhibited trepidation regarding the weather and the lack of ambient illumination. However, no one spoke up and questioned the wisdom to conduct the mission,'"
http://news.yahoo.com/pilot-error-caused-us-black-hawk-crash-military-183716550.html;_ylt=A0LEV0JqOJhV1N0ASehXNyoA;_ylu=X3oDMTBydDI5cXVuBGNvbG8DYmYxBHBvcwM2BHZ0aWQDBHNlYwNzcg--

Aircraft: MH-65D
Injuries: 4 Fatal
USCG ID- CG6535
http://www.uscg.mil/FOIA/docs/FAAICRASHOFCG6535.pdf

A MH-65D helicopter was lost in Mobile Bay. CG-6535 was conducting a training flight, including approaches to the water, basket hoists, rescue swimmer hoists, and night water hovering/position keeping. The aircrew consisted of a qualified ATC instructor pilot as Pilot-in-Command (PIC), a pilot under instruction as Copilot (CP), a flight mechanic (FM), and a rescue swimmer (RS). Training was conducted as planned, but weather conditions deteriorated during the flight. After the final hoist, the PIC passed the controls to the CP to practice hovering at night. After two minutes of hover work, the PIC elected to depart for ATC [Mobile, Alabama]. Based on cockpit dialog, it appears that Night Vision Goggles (NVGs) were in use by the PIC. The PIC disengaged the HOV-AUG [hover augmentation] mode and the CP initiated an instrument departure toward 1000 feet. Sometime after the aircraft ascended above 200 the PIC noticed they had entered Instrument Meteorological Conditions (IMC) and immediately took the controls. Sixteen seconds prior to the mishap, the PIC stated his intention to slowly come down to try and regain visual conditions. Approximately 2.4 seconds prior to impact, the PIC increased collective pitch and aircraft torque. The aircraft impacted the water with a descent rate of 2,197 feet per minute at 84 knots. All four aircrew members perished.

Weather was not forecast to deteriorate below VMC (visual meteorological conditions) until approximately 2100 local time [crash occurred at 1910hrs]. The crew of CG-6535 commented on the weather being good. During the RS hoisting portion of the event, ceilings had lowered to 400 feet and visibility began to deteriorate. It appears the PIC remained NVG-aided for the remainder of the flight. There are no indications the crew recognized the changes in weather conditions until 23 seconds prior to the mishap when IMC was inadvertently encountered.

Findings:
Inadvertent IMC and lack of established inadvertent IMC entry procedures contributed to this mishap.

1. There are no Coast Guard published inadvertent IMC procedures.
2. FAA published IIMC procedures call for a climb to a safe altitude.
3. Prior to impact, the PIC indicated that his intentions were to slowly descend.

Lack of recent night/NVG over-water operations by the PIC contributed to the mishap.

1. Prior to the evening of 28 February, 2012[evening of the crash], the previous time the PIC had performed night/NVG boat or night/NVG rescue swimmer hoisting was on 19 August, 2011.

Summary:
Absent inadvertent IMC entry procedures, the PICs instinctive reaction was to descend in altitude rather than climb. In this case, the air crew was properly qualified and followed current procedures. Despite the PICs proven skills and experience, CG-6535 quickly entered into an unrecoverable position. We honor the crew of CG-6535 by learning from this tragedy and implementing actions directed herein

Aircraft: Airbus AS350 B2
Injuries: 1 serious, 3 minor
NTSB Identification: ERA13LA421
http://www.ntsb.gov/_layouts/ntsb.aviation/brief.aspx?ev_id=20130920X14012&key=1&queryId=656fc3d3-8f67-4080-ad5e-9f356053f9e7&pgno=3&pgsize=20

As the helicopter departed the helipad, a witness saw dark black smoke coming out of the engine exhaust. (This smoke would not have been visible to the pilot.) The pilot reported that, about 10 minutes after departure, he noticed the illumination of the low engine oil pressure warning light. He noted that the oil pressure gauge was also showing low pressure but that there was no rise in the oil temperature or the exhaust gas temperature. Because the pilot had recently experienced an intermittent oil pressure gauge problem in another helicopter, he assumed the accident helicopter was experiencing a similar problem and continued toward the intended destination while attempting to verify the loss of engine oil pressure. Several minutes later, the pilot noticed a low-torque indication but no rise in the oil temperature or exhaust gas temperature. About 25 minutes after departure, the pilot saw a rise in the exhaust gas temperature and lowered the collective to reduce power. After briefly decreasing, the exhaust gas temperature began rising again, and the pilot located an open field to perform an off-airport landing. The engine experienced a total loss of power before the helicopter reached the open field; the pilot performed an autorotation, and the helicopter landed hard.

Postaccident examination revealed that the engine oil tank was empty and that the engine had sustained heat damage consistent with overtemperature due to oil exhaustion. An obstruction of solidified oil carbon was found in the rear bearing chip detector housing union, which would have restricted the oil scavenge of the rear bearing. According to the engine manufacturer, failure to scavenge the oil in the rear bearing would cause overpressurization of the rear bearing housing area, which would force engine oil out of the rear bearing vent line. In addition, oil overpressurization could overcome the labyrinth seal of the piston shaft, which would allow oil to flow into the gas exhaust path. It is likely that this occurred because oil flowing into the exhaust path would result in black smoke coming from the engine exhaust as was observed by the witness. The continued operation of the engine in this condition likely resulted in the depletion of the oil reservoir, the illumination of the low engine oil pressure warning light, and, subsequently, as the flight continued, a total loss of engine power.

A review of data recovered from a flight recorder installed in the helicopter indicated that, about 2 minutes after departure (about 26 minutes before the accident), the oil pressure dropped from about 4 bars to about 0.2 bar, which would have illuminated the low engine oil pressure warning light. The flight manual and the cockpit emergency checklist both directed that, when the low engine oil pressure warning light was illuminated and the engine oil pressure gauge indicated low oil pressure (as reported by the pilot), the procedure was to land immediately. If the pilot had followed this procedure instead of continuing the flight with the warning light illuminated, it is likely that the accident would have been prevented.

Review of the helicopter’s maintenance records indicated that, about 12 flight hours before the accident flight, the engine’s 2nd-stage turbine disk (T2) was replaced. During the replacement of the T2, the maintenance technician determined that the rear bearing was “clean”; therefore, he did not clean the rear bearing even though the maintenance procedures required a systematic cleaning when the T2 was replaced regardless of the condition of the bearing. If the cleaning had been performed, as called for in the maintenance procedures, it is likely that the oil carbon deposit in the rear bearing chip detector housing union would have been discovered and removed, thus averting the accident.

There are no new ways to crash an aircraft…

…but there are new ways to keep them from crashing.

Safe hunting,

Bryan ‘MuGu’ Smith

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