

BACKGROUND

A disturbing number of “Controlled Flight Into Terrain” (CFIT) accidents continue to plague the helicopter industry, where VFR flight at low altitudes in uncontrolled airspace is the rule rather than the exception, and where flights are often conducted in marginal weather conditions. A review of 148 helicopter EMS (HEMS) accidents that occurred between 1998 and 2009, revealed that 62 of them meet the strict definition of CFIT, with 30 of those accidents clearly associated with marginal weather conditions or darkness, or both.

And, air medical helicopters are only a subset of the rotor-wing aircraft that have been caught in the CFIT snare. In a recent FAA Notice of Proposed Rule Making (NPRM), the FAA stated,

Helicopter accidents, however, have not been limited to the air ambulance industry. The FAA identified 75 commercial helicopter accidents, occurring from 1994 through 2008 with causal factors that are addressed in this proposal. These accidents involving commercial helicopter operations resulted in 88 fatalities.¹

Still, the typical HEMS transport includes variables and complicating factors that are unique to air medical operations. The flight crew consists of not only the pilot, but also two medical team members who typically have only basic training relative to the risks of flying in conditions of reduced visibility. While the pilot has sole responsibility for the safe conduct of the flight, significant emphasis is placed on proactive participation by medical crewmembers, to the extent that the air medical industry has adopted its own version of Crew Resource Management, dubbed AMRM (Air Medical Resource Management). In general, this standard three-person collaboration provides numerous safety benefits. The widely accepted slogan of “Three to Go - One to say No” asserts that only one of the three on board is required to raise the red flag to either decline a flight request or to abort a flight while en route if the risks exceed agreed upon standards.

Unfortunately, the added psychological dynamics that exist within air ambulance flight crews while transporting a critically ill or injured patient may compel them to accept what would otherwise be unacceptable risks. The internal and external pressures placed upon the flight crew to accept or to complete a flight in marginal weather conditions can influence decision making in a negative manner. NEMSPA has conducted surveys during the last five years that identify pressures which stem from various sources. These include pressures from management, the rescue mentality (White-knight Syndrome), inflated compassion for certain patient-types, and a host of personal pressures, including financial concerns and an ego-driven desire to succeed in spite of challenging circumstances. When these influences line up just right (or just wrong) a crew may make a decision to accept a level of risk on a flight when they would have readily declined or aborted the flight if one or more of these pressures had not been active at some critical decision point.

Although formal Operational Control procedures have done much in recent years to mitigate the issue of faulty pre-flight decision making, the responsibility of en route risk assessment and decision making

¹ **Docket No. FAA- 2010-0982; Notice No. 10-13**

still rests with the crewmembers on board, and ultimately with the pilot. In 2009, NEMSPA introduced the “No Pressure Initiative” to the air medical industry. This initiative recommends three layers of accident prevention which focus, respectively, on the organizational culture, a careful pre-flight risk assessment, and a clearly defined en route risk assessment and decision making procedure.

PROPOSAL

It is that third layer that is the focus of this proposal. NEMSPA and associated supporters in the air medical transport community purport to define and validate an industry-standard protocol to assist pilots to assess and respond to encounters with the kind of deteriorating en route conditions that have prevailed in nearly every CFIT accident that has occurred in air medical transport operations. Although there has been some discussion in the industry on what an En route Decision Point protocol might look like, the basis for this project is to define the parameters of such a protocol, and then to employ a series of simulator trials using subject pilots to validate those parameters. The ultimate goal is to establish and validate an objective procedure that can be used by any helicopter pilot to apply a well defined and easily recognizable set of conditions to trigger pre-determined actions that will prevent the aircraft and occupants from entering into the conditions that are so often associated with CFIT accidents.

The challenge that we are targeting is illustrated in the following scenario, which is typical of many helicopter air medical transports:

A pilot and medical team are transporting a patient either from an accident scene or from a small community hospital to a major trauma center in marginal weather conditions. The pre-flight weather check reported ceilings and visibilities for all legs of the flight at slightly above the established minimums. Unfortunately, accurate weather reporting facilities are not available for much of the en route portions of the flight and the pilot must rely on either an area forecast or an interpolation of the reports from the weather reporting facilities nearest to the intended flight path. Midway through the flight, the visibility begins to deteriorate. The toddler on the stretcher is critically injured and will likely die if advanced medical interventions are not provided within the next hour. The destination hospital is still over 30 miles away. The pilot knows that visibility is probably very near the 3-mile minimum, but reasons to himself that it could be as much as 4 miles and could just as likely improve as worsen. So he continues, even though he has instinctively slowed his airspeed and descended closer to the surface in order to insure visual contact with the terrain. The medical team offer encouragement, stating that, “This looks just like the flight we made two weeks ago, and that one turned out OK.” Is the visibility 3 miles or 2 miles, or even less?

In fact, the majority of such high risk flights are completed successfully. But too many others have resulted in flight into inadvertent IMC conditions. A recent NEMSPA sponsored survey verified the notion that many, if not most, EMS pilots have little confidence in their ability to recover from such an encounter. As indicated earlier, fatal accidents have been the unfortunate outcome in too many cases.

While the FAA has specific objective parameters for continued flight in marginal weather, the actual ceiling and visibility must be evaluated solely by the pilot in command, with no other resources than his

own experience, and subjective judgment – judgment that can easily be influenced by any one or more of the suite of pressures that are unique to the air medical transport mission. A survey of HEMS pilots conducted by NEMSPA in 2010 showed that 75% of HEMS pilots are not confident that they can accurately judge the actual visibility in marginal weather. Only 3% of the 579 who responded were very confident in their ability to distinguish between two and three miles of flight visibility. What is clearly needed for these high-risk scenarios is a protocol based on objective criteria that are independent of any pilots ability to accurately estimate current conditions. The determination and scientific validation of those criteria is the goal of NEMSPA's proposed research project.

In the same manner that an airline pilot on an ILS approach to an airport knows exactly what he must do if he arrives at the Decision Altitude (DA) and the runway environment is not in sight, NEMSPA proposes the conduct of a series of simulator trials to provide data on how a helicopter pilot operating under VFR in uncontrolled airspace in marginal conditions can objectively identify the point in time and space when he can no longer proceed on the present course. It has been an ill-considered decision to proceed on the present course that has led to nearly every CFIT accident on record. The proposed protocol would explicitly remove that option and require the pilot to either divert, or transition to IFR flight (if possible), or return to the point of departure, or simply to land the aircraft at the nearest appropriate location and call for a ground ambulance to continue the transport.

Many HEMS providers may assert that this is already the established procedure in such circumstances, and has been all along. But what has been lacking are objective and easily identifiable parameters that pilots can use to unequivocally determine that the en route decision point has been reached. NEMSPA believes that the proposed research project can provide that criteria for the nationwide air medical transport community. We also feel strongly that the consistent implementation of the resulting protocol will be very effective in reducing the occurrence of CFIT accidents in helicopter air medical transport, as well as for all other types of commercial and private helicopter flying.