Two Stories of Making a Difference in Aerospace Medicine with AsMA

Philip J. Scarpa, Jr., M.D., M.S.

This month there are two stories on how AsMA played an important role in making a difference in Aerospace Medicine. The first is by Phil Stepaniak on the lessons learned from an AsMA presentation that improved a program's mishap readiness. The second is by Pete Mapes on the power of an AsMA resolution to influence an important issue. Both have been submitted to our journal for publication.

Lessons Learned from an AsMA Presentation

At our 1998 AsMA scientific meeting in Seattle, the U.S. Armed Forces Institute of Pathology (AFIP) presented a panel on the 1996 TWA 800 in-flight mishap off Long Island, NY, one of the deadliest U.S. aviation accidents of all time. Lead pathologists of the AFIP Joint Committee on Aviation Pathology chaired discussions of the lessons learned by response and recovery teams, the medical and legal challenges of the mishap investigation, and the interaction between the many federal and local agencies involved. AFIP discussed the recovery of wreckage and human remains from the ocean, processing of remains, DNA identification of tissues, and results of forensic analyses of victims. Members of NASA's Contingency Medical Group (CMG) in attendance were impressed by the panel's findings and recognized the relevance to spaceflight operations. They resolved to include those lessons in medical contingency plans for future NASA spacecraft mishaps.

In 1999 the CMG held a meeting with AFIP personnel and toured the Port Mortuary at Dover Air Force Base, Delaware. NASA and AFIP agreed that casualties resulting from the loss of a spacecraft would be examined by AFIP.

On February 1, 2003, Space Shuttle Columbia underwent a high altitude, high velocity breakup during the entry-to-landing phase of its spaceflight. NASA immediately activated its Mishap Investigation Team, which included NASA flight surgeons and medical contingency members. The methods employed by this team utilized those well remembered lessons from the 1998 AsMA conference and the resulting coordination with AFIP.

Subsequent aeromedical lessons learned from the Shuttle Columbia accident were presented at three AsMA scientific meetings and published in a recent NASA publication entitled "Loss of Signal" posted on the AsMA website. Learning these valuable lessons and making these useful changes in NASA's mishap readiness is a direct result of attendance at an AsMA meeting.

The Power of an AsMA Resolution

In February of 2004 an A-10 pilot leading a flight of four out of Eielson AFB in Alaska suffered spatial disorientation and lost control of the aircraft. The aircraft impacted terrain a few seconds later and the pilot was killed.

Despite many technological attempts to prevent controlled flight into terrain (CFIT) with manual warning systems, U.S. Air Force (USAF) Fighter aircraft maintained a long history of CFIT with rates unchanged since 1969. By the 1980s, the USAF Research Laboratory had developed software to prevent CFIT with automatic recovery of aircraft so late in the sequence of events that no nuisance recoveries would occur. This software is known as the Automatic Ground Collision Avoidance System (Auto-GCAS).

Mishap boards recognized the value of Auto-GCAS but in 1999, the USAF determined that it was not cost effective. CFIT data on all fighter/attack mishaps from 1992 through 2003 were examined and showed that CFIT was the leading cause of death in USAF fighter pilots. These data made the case for the need for automated recovery. The data were publicly released through the Defense Safety Oversight Council and presented at the 2005 AsMA meeting. Based on these data, an AsMA resolution (05-01) was proposed supporting the implementation of Auto-GCAS in digital electronic flight controlled aircraft.

The data and the AsMA resolution were briefed at the highest levels in the USAF and in less than a year the Auto-GCAS program was funded by the U.S. Secretaries of Defense and the Air Force. Auto-GCAS became a funded program in the Block 40+ F-16s, the F-35 and F-22. It remains funded in all but the F-22 today.

In 2014, an F-16 pilot in combat became target fixated and failed to initiate a timely pull away from the ground. At the last possible fraction of a second, Auto-GCAS engaged and flew the pilot and aircraft to a safe recovery. Auto-GCAS saved two pilots in the test community during its development but **this was the first combat save of an operational aircraft**. Over the next 30 years, Auto-GCAS will preserve over $5.7B in airframes and about 150 lives.

The AsMA resolution endorsing Auto-GCAS was a critical factor in publicizing the science and effectiveness of this life saving technology.

CONTACT DETAILS:
Email: President@asma.org • **Web site:** www.asma.org • **Facebook:** Aerospace Medical Association • **Twitter:** @Aero_Med