Fighting Human Error
Training program targets ‘small cracks in personal airmanship armor’ that compromise safety

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The highly automated, advanced-technology aircraft of the 21st century demand a new, rigorous approach to training air and ground crews. The challenge is twofold: to create safe pilots, mechanics and air dispatchers, and to produce them in large numbers to meet the huge demand in fast-growing aviation regions of the world. Over the next eight pages, Aviation Week explores some of the efforts underway in the military, airline, maintenance and business-aviation sectors.

Civil aviation pilots will soon be able to sign up for human error-reduction training based on a program that significantly lowered the U.S. Marine Corps accident rate and is a requirement for Marine aviators.

The Pilot Reliability Certification course, to be launched next month, is based on the “Global War on Error” human factors program. In contrast with the team-centered Crew Resource Management (CRM) industry model, G-WOE focuses on the individual.

The program took root in mid-2004, when the Marine Corps asked why pilots were still making “dumb mistakes” after the service had spent millions of dollars on crew resource and operational risk management. The corps said those mistakes caused its high mishap rate of 5.2 per 100,000 hr. USMC data show that in the five-year period ending September 2005, 86% of Marine aviation mishaps involved human error.

G-WOE is the brainchild of Tony Kern, CEO of Quantico, Va.-based Convergent Knowledge Solutions. Kern, a former B-1B bomber pilot, is an education specialist and human factors author. Convergent, a veteran-owned company, also is involved in reducing human error in high-risk industries such as health care.

Kern insists that G-WOE is not anti-CRM: “The initiative is designed to be synergistic with new technology, with the FAA’s Safety Management System approach and team training.

Research has ... demonstrated that errors are indeed predictable, and people can be taught to correct them.” He notes that “CRM, along with technology, has made huge advances in combating human error. But CRM has to come after people have learned why they make errors. Then [flight deck] communication is that much more effective.”

“We needed to give them the tools to break the mishap chain before it’s too late,” says Lt. Gen. John G. Castellaw, USMC deputy commandant for aviation.

To that end, Convergent started developing G-WOE with help from the Defense Dept., which provided $300,000. Kern and partners Pat Daily and Spence Byrum set out to tell it to the Marines. Daily is a former U.S. Air Force Test Pilot School instructor, and Byrum was a U.S. Coast Guard C-130 search-and-rescue pilot.

Their first audience was the Marine Aviation Weapons and Tactical Sqdn.-1 (the USMC equivalent of the Navy’s Top Gun Fighter Weapons School) and the 4th Marine Aircraft Wing. The 4th MAW is a reserve unit comprising professional airline pilots, most of whom have been steeped in CRM training. Commanders and certain ground support personnel, such as bomb loaders, also participated in G-WOE, as did aviators preparing for deployment to Iraq and Afghanistan.

“We thought, If we treated error as the enemy, how would we attack it?” says Kern. As a result,
the course is punctuated with military terminology, such as reference to Red Threats posed by the enemy and Blue Threats, which are created by internal risks such as fatigue and ego—i.e., human error. One Convergent analysis of high-risk industries shows that 8 of 10 accidents/incidents involve human error.

Instructors use lectures, videos, texts, and web-based materials to teach pilots how to identify and repair what Kern calls “small cracks in personal airmanship armor” that could compromise safety. First, participants learn how and why errors are made. They’re taught, for example, to recognize error-producing conditions—one of which is “normalization of deviance,” when a “wrong” action is repeated and accepted as the norm because there are no negative consequences (see box, p. 47). Students also learn to recognize hazardous attitudes, including a sense of invulnerability. As Kern often points out, “even Superman was vulnerable to kryptonite.”

However, facing one’s human fallibility can give rise to resistance, especially in a room of high achievers. An instructor asked one group, “List three things you do poorly.” After 1.5 min., only 15-20% admitted to three. Another 40% listed zero items. One aviator declared, “I’m good at everything.”

G-WOE is designed to appeal to high achievers’ competitive spirit. “Warfighters are assured they can get the enemy, but their biggest worry is the pilot sitting next to him,” says Kern. “However, they respond positively when they realize G-WOE enables them to reach their maximum potential as a professional aviator, thus giving them that competitive edge.”

To help them apply their new knowledge, students are required to keep a daily error-tracking log in which they list the incident, error-producing conditions, potential/actual consequences of the mistake, and follow-up “fix-it” actions. (The log entries remain private.)

In addition, the course employs humor (sometimes dark), says Kern, about what errors might bring a pilot “one step closer to meeting Elvis.” In contrast to most human factors training, participants—who by this time have linked the cause and effect of personal errors—deconstruct an accident and analyze what crew errors might have led to it.

However, to gain the most from G-WOE training, Kern stresses that it must be incorporated into one’s lifestyle.

Since 2004, approximately 2,300 Marines have attended the G-WOE workshops, and about 41% of the 4th MAW (the reserve group of career pilots with CRM training) deemed it the “single best human factors training” they had ever received, according to USMC Col. Mark Schulte, 4th MAW director of standards. The end result: The USMC had reduced its mishap rate to 1.50 per 100,000 flight hours by Fiscal 2006 from 5.20 in Fiscal 2004. The 4th MAW had reduced its Class A mishap rate to zero in Fiscal 2005 and Fiscal 2006 (ending Sept. 30) from 9.96 per 100,000 flight hours in Fiscal 2004. (Class A mishaps are those that result in fatalities, disabilities, aircraft destruction or damages more than $1 million.)

This success led the Marine Corps last month to require G-WOE training for all Marine aviators. Joe Angello, deputy undersecretary of Defense for manpower and readiness development, called the initiative a “high return on investment” and expressed interest in moving the concept across the Defense Dept. into other high-risk areas.

In January, Convergent will launch the Pilot Reliability Certification (PRC) version of the course for pilots in the civil sector (for details, see www.convergent-knowledge.com). The program is specially designed for distance learning so pilots can study the self-management techniques online or by mail, and be tested at their own pace. Plans for seminars and workshops are also underway.

PRC is strictly a voluntary improvement program and targets individual sign-ups rather than large groups. G-WOE modules, taken to a deep level, are part of Bombardier Aerospace’s proprietary “Leading Edge” training package delivered on request with new business aircraft.

Tuition for PRC distance learning is to run about $300 per participant, and the cost will be higher for seminars and workshops, depending on venue and group size. The course may be completed in less than a year, although an aggressive learner could complete it in three months, according to Kern. The “certification” is issued by Convergent but is not FAA-endorsed. It verifies that the pilot has gained the necessary competencies to combat error. And there’s a financial benefit: insurance companies are offering discounts to course participants.
Convergent also has been working with the U.S. Coast Guard since 2004 in developing flightcrew interfaces, such as checklists and Automation Airmanship Training, designed to help aircrews transition to the advanced C-130J flight deck from the legacy C-130.

The company also is designing a program focused on reducing errors in motor vehicle operations. And it plans to pursue law enforcement and fire-fighting areas. In aviation, other prime targets include air dispatchers and maintenance, as well as a recurrency training course.

G-WOE has met, and may continue to encounter, resistance from universities, airlines and large organizations: Either they may not want to adopt a new program or exceed FAA requirements for cost reasons, or they view G-WOE as a threat rather than a complement to existing human factors programs.

To critics who assert that G-WOE is a return to a “blame” culture, Kern responds: “If you’re going to blame someone, you’re only going to point the finger at yourself—and that’s not blame, that’s personal accountability.”

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**WANTED: Human Error**

**DESCRIPTION:** Accidents, incidents, lapses in judgment, poor decision-making, slipups

**BIRTHDATE:** Dawn of mankind

**PLACE OF BIRTH:** Individuals, teams, environments, situations

**PROCEED WITH EXTREME CAUTION.**

Errors made in a high-risk environment are armed and dangerous, cost lives and billions of dollars in damages. Among those conditions that increase the probability of error:

- **Time compression.** When multi-tasking beyond cognitive capacity leads to procedural shortcuts and attention-management problems

- **Normalization of deviance.** When individuals or organizations routinely ignore existing guidance

- **Low signal to noise ratio:** When important cues are lost in the mental “background noise” and prevent recognition of the problem and corrective action

*Source: Convergent Knowledge Solutions*