BY NICHOLAS A. SABATINI

Managing Safety From the Inside Out

When Jerry Lederer started Flight Safety Foundation in 1947, U.S. air carriers averaged a major accident every 16 days, for a fatality rate that approached 2,000 fatalities per 100 million people flown. Today, that rate is down dramatically to an average of 2.5 fatalities per 100 million people flown. While the overall rate is higher on a global scale, the strong safety record in most regions of the world is a remarkable achievement.

Yet, we can never rest. With aviation's vital importance, we must build on this achievement. The U.S. Federal Aviation Administration (FAA) is taking a two-pronged approach to manage risks and keep improving safety. To begin, the FAA is managing risk from the "inside out." The FAA's Aviation Safety Organization has been undergoing a rigorous self-examination — looking at how it is organized, at processes, and at internal measures and accountability. At the same time, the FAA must focus outward on the entities and individuals that it regulates.

In his book, *Managing the Risks of Organizational Accidents*, James Reason

discusses the importance of such an inside-out approach. He says you must manage risks from inside because an organization, such as the FAA, could unwittingly contribute to an unsafe condition or unsafe practices.

Organizational risk is not new in aviation. It was present at Kitty Hawk with Orville and Wilbur Wright and machinist Charlie Taylor. It was present in the 1940s with accidents every 16 days. Yet, organizational risk was largely undetected because it was overshadowed by greater risks — such as engine failure, controlled flight into terrain, loss of control, and approach and landing accidents. Now that we have fundamentally addressed those common causes, we need to identify and address other vulnerabilities, including organizational risk, which now may pose greater concern. Metaphorically, organizational risk is taller due to the flatness of the surrounding terrain.

As a regulator, the FAA requires regulated organizations to operate with a safety management system (SMS)

and to have a safety culture. It is essential that the FAA hold itself to the same high standards to which it holds industry. The FAA's Aviation Safety Organization — with its nearly 7,000 employees and many more designees who act on behalf of the FAA administrator — is moving to an SMS. The organization developed an SMS doctrine in concert with industry and

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is moving ahead with an implementation plan for an integrated system safety approach across the organization.

SMS is built on the foundation of a quality management system (QMS), which the Aviation Safety Organization implemented through ISO 9001 standards in 2006. QMS addresses processes — their standardization and consistency — as well as continuous improvement. It is essential to add safety management to assure that risk management is incorporated into key processes. Yet, both QMS and SMS are processes executed by humans. For safety's sake, processes must exist in a safety culture. Getting the culture right is more important than the systems used. This is what is most important about managing from the inside out.

What about the second prong — the regulator's essential external focus? What can we do to manage risk more effectively across civil aviation? With an air carrier fatality rate of 2.5 per 100 million people flown, some might think the accident rate has reached such a low level that we should no longer expect sudden and sustained breakthroughs in future rates.

I disagree. The aviation community is on the threshold of the next level in aviation safety. This will be possible by managing risk far more effectively. The way to do this is through gathering and sharing key safety data, using sophisticated data analysis to identify precursors and detect emerging risks, and prioritizing and measuring mitigations.

Today, with the Aviation Safety Information Analysis and Sharing (ASIAS) initiative, the FAA is gathering crucial safety information from a number of data sources. Furthermore, with sophisticated analysis tools, we are detecting trends, identifying precursors and assessing — and addressing — risks.

Here's an example of how data analysis and sharing can make a big safety difference. In 2007, several airlines reported that their digital recorder data, or flight operational quality assurance data, showed that they were getting warnings from their terrain awareness and warning systems (TAWS) at several airports with adjacent mountainous terrain in Northern California.

That was one data point: the finding that several airlines received TAWS warnings in the same area. ASIAS analysts reviewed multiple data sources to get a clearer and fuller picture of the problem. They analyzed minimum vectoring altitudes (MVAs), plotted TAWS warning locations in relationship to these MVAs and overlaid radar track data from arriving flights to reveal a relationship. Then, they overlaid the terrain database combining, or fusing, it with the MVA and TAWS data.

With all of this, the analysts were able to see a causal relationship that could not be seen from any one data source. The experts call what they did "fusion." The single data point — the TAWS warnings — was just that: a single piece of information. But fusing the data sources, including the MVAs, radar track data and more, provided a larger picture, a more complete understanding of the issues, and enabled the FAA Air Traffic Organization and Aviation Safety Organization to work together based on solid objective information.

From those TAWS warnings in Northern California airspace, thanks to data gathering, sharing and analysis, FAA is making flying safer — in the way it designs MVAs, how it vectors traffic, the design of TAWS software and much more.

With ASIAS, we are making a game-changing move from gathering data after accidents, in what has been termed a "forensics" approach, to *preempting* accidents. The more complete data, coupled with advanced analysis, help us find emerging threats and identify precursors — precursors that could be buried in terabytes of safety data. This gives us advance warning and a tremendous advantage in preemptively managing risk.

Years ago, Jerry Lederer said, "Risks are ever-present, must be identified, analyzed, evaluated and controlled." In today's interconnected world — with far greater demand and vastly increased complexity — Lederer's guidance is more prescient than ever. The aviation community must manage risk. It is imperative that we manage risk together. ✈

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