KEY NOTE ADDRESS TO ISASI 20O12
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Thank you, Frank (Del Gandio). You know, Frank and I have met before. Each time he introduces me, he is more and more gracious.

Most of you know that Frank recently retired from the FAA, but, fortunately, he did not retire from volunteering his time to ISASI. Frank, I know it is not always easy, but we really appreciate how much time and effort it takes for you and all the other volunteers to bring us together for these annual seminars.

Since we met in Orlando, we've seen some changes at the NTSB as well. With Tom Haueter's retirement this summer, John DeLisi now directs the Office of Aviation Safety with Dana Schulze as the Deputy Director.

For two years we've had a wonderful, full complement of board members. My colleagues will all be here this week, and they are remarkable. I appreciate Members Sumwalt and Weener being here this morning.

And finally I want to recognize Lorenda Ward and Frank Hilldrup, who most of you know replaced Bob MacIntosh as our international advisor, they have been instrumental in working with ISASI and our international colleagues to form four investigative panels moderated by each of our Board Members.

At my first ISASI in Orlando, it was Bob MacIntosh who introduced me to many of you. Last night during the reception, I felt as if I were with good friends. Thank you —all — for welcoming me to the ISASI family. I see and would like to salute him for his years of service to the international aviation community. Thank you, Bob, for your excellent counsel.

As Frank [Del Gandio] mentioned, one of my priorities is strengthening international relationships. We have stepped up our involvement with organizations like ICAO and the International Transportation Safety Association.

Our greater involvement with this year's ISASI seminar stems from last year's board meeting where we outlined the many benefits of international cooperation.

I'm honored to share keynote assignments with Wendy Tadros (Canada, TSB) and Jean-Paul Troadec (France, BEA). With delegates from more than 35 countries and Accident Investigation Board heads from five continents — this year's seminar clearly reinforces the international nature of accident investigation.

Today, there is no such thing as a domestic accident. That concept is as outdated as a foil recorder. And, we can no longer rely on 20th century techniques to investigate 21st century accidents.

We must use all the tools available — retaining the tin kicking, but also enhancing laboratory equipment and taking advantage of tools that mine data to map trends and hot spots — so we can move "From Reactive to Predictive," as this year's theme states.

How many of you were in Paris 18 years ago? That year your seminar theme was "Detecting and Eliminating the Hazard."

Later that year, an undetected hazard led to the crash of USAir flight 427 near Pittsburgh, Pennsylvania.

I know there are many attendees here who worked on that investigation.

Flight 427 provides an excellent example of just how much has changed in accident investigation between the end of the 20th century and today.

Tom Haueter, the IIC for the investigation, said his immediate challenge was setting up telephones at the command center. Today, I suspect it's not a lack of telephones, but rather their proliferation, that is the challenge for IICs.

At four-and-one-half-years, flight 427 was the NTSB's longest investigation. Investigators developed, pursued, and eliminated one theory after another. The NTSB worked with Boeing to develop complex flight simulations to derive flight-control positions from the limited FDR data. Investigators created simulations for malfunctions of the rudder system, flaps, slats, engines, spoilers, thrust reversers and more.

The major breakthrough was serendipitous. While conducting tests to look for a dual-jam, the systems group found a reversal could occur and cause an uncommanded rudder hardover.

Fifty-four months of investigation ... ten safety recommendations ... a flawed rudder design corrected in *thousands* of Boeing 737s.

In short, increased safety for *countless* air travelers.

What if a flight 427 crash happened today? How long would the investigation take?

Look at the data and tools now available. Flight 427's airplane only required five FDR parameters. Today's minimum requirement is 88 parameters. And, manufacturers deliver aircraft with hundreds-to-thousands of parameters, including crucial flight-control data.

In 1994, there were zero U.S. Flight Operational Quality Assurance, or FOQA, programs. Today, dozens produce mountains of data.

Eighteen years ago, there were no Aviation Safety Action Programs. Now, they number more than 200 ... and represent pilots, mechanics, dispatchers, and flight attendants.

In 1994, ASIAS wasn't even an acronym. Today, the program includes data from 43 airlines and a number of other sources.

With today's data and tools, solving a puzzle like flight 427 would be quicker — perhaps narrowing in on the upset's cause in weeks or months. Not years.

But, what about your theme: From Reactive to Predictive? Could today's data and tools help predict an accident like 427?

That is the question.

We know that hindsight is 20/20. It's easy, looking back, to know what you should have looked for ... and the questions you could have asked.

Looking ahead is harder. All the data points in the world won't necessarily connect the dots.

Yet, in almost every accident we see "precursors," data that could have been used to understand breakdowns in safety margins and help predict accidents. But, in real-time, with thousands of flights, figuring out what the data can tell you, and how it might combine with other factors in the operating environment... well, it can be as much art as science.

Connecting the dots without knowing what you are looking for ... is like knowing on the first day of art class which paints on your palette will produce a "Mona Lisa."

It takes skill and artistry.

And it takes a proverbial village — a village like the time-tested party system where the AIB gets everyone to the table to gather the facts, and works to obtain alternate viewpoints and feedback. And, a larger community, too, where AIBs also collaborate on standards and best practices through organizations like ISASI and ICAO.

Today, we are increasingly seeing regulators, manufacturers, operators and labor coming together joining forces through the Commercial Aviation Safety Team or through organizations like the Flight Safety Foundation. There's been great success through collaboration — a strong move from reactive to predictive.

Yes, we are in an era of unprecedented voluntary cooperation. And, U.S. aviation is in an unprecedented safe period.

Some even suggest that with today's sophisticated data and tools, accident investigations may become a thing of the past.

However, the reality is that forensic investigation is the foundational tool not only to be reactive, but to be more predictive.

There are four major tools in aviation safety's 21st century toolkit: continued emphasis on forensics, data collection and analysis, new and emerging technologies and, to be sure, international cooperation.

First, the time-honored tool: forensics.

We are not just talking about learning from major accidents, but investigating incidents. This provides the opprtunity to be reactive, but also to use available data sources to evaluate the incident against the experience of the fleet to be predictive.

Take the overruns in December 2010 at Jackson Hole, Wyoming, and April 2011 at Chicago Midway. These were both landing incidents that involved delayed thrust reverser and speed-brake deployment. While there were similarities and differences in the factors and causes at play, neither was predicted. But, they happened. And, yes, no one died; no one was injured. But they could have been. That's why we issued safety recommendations.

The second tool in our 21st century toolkit — data — is growing larger every day. Eighteen years ago, could anyone have imagined the dramatic change — from such a deficit of data — a handful of parameters on the FDR and 30 minutes on a CVR — to today's wealth of data?

Yet, that very wealth can make us information rich and knowledge poor.

We need to effectively use data. We need to know the right questions to ask. And, just as important, how do we know what we don't know?

Take, for example, the September 2008 accident in Columbia, South Carolina. A Learjet 60 overran the runway during a rejected takeoff attempt. After experiencing tire failures, the pilot commanded reverse thrust to stop the airplane. However, failure of the air-ground signal, due to wheel-well damage, resulted in forward — not reverse — thrust. The airplane overran the runway at high speed, through a perimeter fence and into an embankment across a road. The captain, first officer and two passengers were killed.

Although a design analysis of the relevant systems had been performed during the airplane's original certification in 1993 and again in 2001, following an accident, this design vulnerability went unaddressed until the subsequent 2008 accident.

It goes back to all those data points and connecting the dots. Not being able to predict, much less prevent accidents, can be the inability to consider what could happen, rather than what should happen.

We must continuously engage in the processes of identifying hazards, assessing risk, making adjustments and evaluating performance.

But, we all know, it's not just a matter of being objective analysts. There are many complicated realities, such as who gets to decide which questions to ask. If the industry and/or the regulator are the gatekeepers and some issues are uncomfortable, do they avoid the hard questions? Can a single veto keep the group from moving forward?

Here's another issue: How do we most effectively navigate the massive amounts of data while addressing the landmines of legal implications and personal privacy that are so important?

The Safety Information Protection Task Force, through ICAO, has been looking at the various sources of safety information, the diverse requirements of member states regarding public transparency and personal privacy, and the different civil and criminal justice systems. The goal: Develop a policy to enhance safety, which all ICAO members can agree with.

Aviation safety's technological and analytical hurdles can seem small compared with the policy challenges. We recognize the task has not been as easy one and we look forward to their final report.

Turning to the third tool: technology. We must continue to exploit new sources of information, such as non-volatile memory, and use new tools, like Geographic Information Systems, which the NTSB will discuss in a conference this December.

Just like in your AIB, our labs have been steadily developing new capabilities.

For example, our scanning electron microscope can examine parts in greater detail than ever before. It has an ion-beam feature that allows engineers to cut specimens to show the condition of the material below the surface. This microscope was extremely helpful in the recent Boeing 737 fuselage rupture where it was used at 300,000 times magnification. At that magnification, a human hair would appear to be the size of the Washington Monument.

And, we must be open to new ways of doing things. Can we learn from other transportation modes or industries? For example, the International Maritime Organization adopted Safety Management System requirements years ahead of aviation.

Just as no accident is domestic anymore, no industry has all the answers when it comes to safety.

Yes, we must use all the tools available — forensics, data and technology. But, the last tool is perhaps one of the most effective: Our counterparts and colleagues.

We must continue to help each other and share what we know. Our professional relationships lead to improved collaboration, better understanding and more effective recommendations.

This May, I asked Chairman Tadros and the TSB to lead the investigation into a mid-air collision involving airplanes operated by an NTSB employee and an FAA employee. TSB graciously agreed. The strong relationship Wendy and I enjoy extends across our organizations and investigators.

And, I am sure everyone is anxious to hear from Jean-Paul Troadec on Thursday about Air France flight 447. He and the BEA team just completed one of the most difficult investigations in recent history and their ground-breaking efforts will inform investigative work for years to come.

We are together here in Baltimore — and in so many places around the globe — because we value the contributions that each individual and organization makes. We are professionals who recognize that none of us can do it alone. Sometimes we may have differences, but at the end of the day, we know that, whether it is on scene at an accident, in the lab, or reviewing accident data, aviation safety has no borders.

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