Curing

Incursions

Much has been said about stopping runway incursions, but the safety board wanted to find out what has been done.

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Washington, D.C. — While relatively rare, runway incursion accidents can be exceedingly lethal, as was demonstrated 30 years ago in the Canary Islands when two 747s came together on the runway at Tenerife and 583 people died in what remains the world's deadliest aircraft accident. Advances in procedures and technology since that tragic day have reduced the risk of fatal incursions, but, according to industry experts, the big advances needed to achieve a substantial reduction of risk remain uncompleted.

Testifying at the Runway Incursion Forum held by the U.S. National Transportation Safety Board (NTSB) to publicize the progress, or lack of progress, in reducing the risk from incursions, U.S. industry leaders seemed in agreement that sought-after technologies and procedures seem to be nearing reality.

NTSB Chairman Mark V. Rosenker opened the forum by declaring that the U.S. Federal Aviation Administration's Airport Movement Area Safety System (AMASS) — essentially airport surface radar based in the airport control tower — "will not prevent an incursion in all situations. It takes too long for the warning to get to the pilot." The needed solution, proved by simulations, "is something that goes directly to the cockpit."

But short of that technological solution there are other steps that, if taken, provide some risk reduction, speakers said.

Capt. Robert Bragg, first officer of the Pan Am 747 involved in the Tenerife accident, listed the low-tech lessons he took away from that day:

- Anyone can make a mistake, no matter how qualified;

- Communications must be effective and readily understood;

- When in doubt, don't;

- Check, double-check and re-check; and,

- Continue emphasis on crew resource management (CRM).

Speaking to his final point, Bragg said, "Probably today this accident would not have occurred due to the emphasis on CRM, which is fantastic," referring to the fact that the very senior captain flying the KLM 747 that day 30 years ago was questioned by both his first and second officers about his decision to start the fatal takeoff run.

BY J.A. DONOGHUE

After discussing subjects as varied as runway stop lights, distinctive airport surface markings and systems that sense aircraft on runways and blink approach lights to warn landing aircraft, most of the speakers eventually turned to in-cockpit information and warning systems.

Capt. Mitchell Serber, chairman of the Air Line Pilots Association airport ground environment group, summed it up: "Most of the CAST [Commercial Aviation Safety Team] 2002 recommendations are not yet implemented." Among those CAST items still not available, Serber listed moving-map displays of the airport surface with own-ship position, adding traffic to the display, runway occupancy advisories, graphical/text display of taxi and clearance limits and, for the tower, Airport Surface Detection Equipment-X, which, the Federal Aviation Administration (FAA) said, is only installed at nine airports, while 26 more await the system to upgrade existing AMASS installations.

Given that the original CAST report said, "The Runway Incursion JSIT [Joint Safety Analysis Team] determined that the moving-map display systems were the most powerful intervention for runway incursion prevention,"

members of the forum were encouraged when Jeffrey Loague, from the FAA office of runway safety, said that FAA recently approved a quicker certification process for a Class II electronic flight bag with an airport moving-map and own-ship position. With the publication of certification standards for the moving-map display due by the end of April, Loague estimated that products could be available "as early as this summer."

While own-ship position can be derived from Global Positioning System data compared to an airport surface chart, the addition of automatic dependent surveillance-broadcast (ADS-B) data from other aircraft would allow the depiction of surrounding surface and nearby airborne traffic on the same display, speakers said. With FAA's recent formal adoption of ADS-B as its navigation system for the future, some vendors are itching to obtain approval for the technology in the near term.

ACSS, which has been participating in a UPS ADS-B development program at the airline's hub in Louisville, Kentucky, is pushing hard to gain such an approval for its moving-map system.

Some uncertainty was expressed about moving maps. Mont Smith, director, safety,

This chart details the aircraft types involved in all U.S. incursions and the most hazardous incursions, listed as category A&B.

Runway Incursions, a Comparison of Commercial Involvement

Fiscal Year	Total Runway Incursions (RIs)	Total Number of A&B RIs	Percent of All RIs Involving at Least One Commercial Aircraft	Percent of RIs Involving Both Commercial and General Aviation Aircraft	Percent of A&B RIs Involving Both Commercial and General Aviation Aircraft	Number of A&B RIs Involving at Least One Commercial Aircraft	Number of A&B RIs Involving at Least One General Aviation Aircraft	Number of A&B RIs Involving No Commercial Aircraft
2001	407	53	31%	16%	2%	28	31	25
2002	339	37	31%	16%	2%	8	31	29
2003	323	32	38%	14%	1%	9	24	23
2004	326	28	26%	16%	2%	6	27	22
2005	327	29	37%	20%	1%	9	23	20
2006	330	31	39%	18%	1%	10	24	21

Notes:

Total category of A&B runway incursions for Fiscal Year 1998 through Fiscal Year 2000 were 59, 69 and 67, respectively.

As of March 6, 2007, there were 5 category A&B incursions in Fiscal Year 2007. On March 6, 2006, there were 9 A&B incursions in Fiscal Year 2007.

Data prior to Fiscal Year 2001 contained many records with insufficient information to determine aircraft mix or severity.

Source: U.S. Federal Aviation Administration

Table 1

for the Air Transport Association, expressed airline reluctance to invest in expensive new hardware only to see it superseded or made irrelevant by FAA policy changes, adding that ATA favored "low-cost airport surveillance technology."

Dave Lotterer, Regional Airline Association VP—technical services, said that while moving-map displays have great safety enhancement potential, unresolved issues include the system's potential to get pilots "head-down," looking inside the cockpit while taxiing. Further, "there is a major disconnect between airport operators and charting suppliers, air traffic control uses government-produced charts while operators use commercial charts, and airports have no formal process for communicating changes to government and users. Moving maps lack reliability unless the charting process improves."

The need for clear and unambiguous communications and standardized communication procedures was emphasized by both Mont Smith and Darren T. Gaines, air safety investigator with the National Air Traffic Controllers Association (NATCA). Both men identified the dangers of embedded taxi clearance limitations, in which a pilot is cleared to his destination, but in the same clearance is told to hold short of a runway. Gaines called this single clearance with two clearance limits a "phraseology trap." He said that NATCA recommends that each controller/pilot communication contain a single clearance limit, and that complex taxi clearances be given in progressive instructions.

Smith agreed, noting the further confusion created by U.S.-sanctioned phraseology differing from what is recommended by the International Civil Aviation Organization. Serber, a Comair pilot, said differences even between the United States and Canada create problems, with U.S. pilots creating violations when they forget that in Canada each runway crossing clearance must be acknowledged.

Discussing the need to evolve phraseology to eliminate misunderstanding, Gaines raised the point that FAA no longer seeks or uses

Another View

Speaking as co-chairman of the newly constituted Runway Safety Initiative, Earl Weener, a Flight Safety Foundation Fellow, pointed out that the worst U.S. incursion accident took 34 lives. "Incursions are part of the new breed of safety issues — there are not a lot of accidents, but there are numerous incidents," he said.

Pointing out that the Runway Safety Initiative is looking at runway excursion and runway confusion combined with the incursion issue, he noted that worldwide in the 2002—2006 period, out of 512 total accidents there were only three incursion accidents — 0.6 percent of the total — in which 17 people died. However, there were 13 runway excursion accidents that caused 283 deaths, he said.

—JAD

controller input in the design or modification of systems and procedures. "NATCA has zero safety influence with FAA," he said.

Serber immediately volunteered that FAA controllers are working in a poor safety environment. "Controllers need an ASAP [Aviation Safety Action Program]. We can't maintain an aviation safety culture under a punitive environment."

Gaines agreed: "Controllers desperately want, desperately need a non-punitive environment," he said, adding that FAA is the only large air traffic control provider that has not adopted the non-punitive safety culture model.

Talking about the importance of airport design, Serber noted the benefit of runway and taxiway layouts that eliminate so-called "hot spots," where the risk of inadvertent incursions is increased. He also urged the construction and use of "end-around" perimeter taxiways that provide the option of going around a runway instead of crossing it.

A recurring theme with most speakers was that the solution to runway incursions was not just a single system or program, but the construction of a structure consisting of "layers of information and alerts," as Serber described it: moving-map displays, runway status lights, surface movement radar, perimeter taxiways, training and communications, and visual aids, combining to provide multiple layers of protection. ●

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