

BY WAYNE ROSENKRANS

# LINE UP AND *Wait*

SMS risk assessments convince the FAA that more of ICAO's ATC clearance procedures and phrases can be adopted safely.

Clashing perspectives of U.S. progress in optimizing air traffic control (ATC) procedures and phraseology to reduce collision risks on airport surfaces emerged in December 2009 during the U.S. Federal Aviation Administration (FAA) International Runway Safety Summit in Washington. Time devoted to this issue paled in comparison to other layers of defense on the agenda (ASW, 2/10, p. 14; 9/08, p. 46; 11/07, p. 44). Nevertheless, U.S. National Transportation Safety Board (NTSB) and FAA talking points at the summit suggested that since 2007, a variety of new factors have persuaded the FAA to adopt elements of safety recommendations traceable to accident investigations more than a decade ago.

Deborah Hersman, NTSB chairman, criticized FAA progress in this area as too slow or unfinished. “In July 2000, the NTSB issued six safety recommendations to the FAA<sup>1</sup> ... to amend various U.S. ATC procedures that, in the NTSB’s judgment, unnecessarily added to the risks associated with airport surface operations,” she told summit attendees. “All but one of those six recommendations are still open, with FAA responses in varying states of completion, and the remaining recommendation regarding limitations on the use of ‘position and hold’ procedures<sup>2</sup> has been [designated] ‘closed — unacceptable action’ after the FAA declined to make the recommended changes.

“We were recently advised that the FAA soon plans to adopt a single change, the use of ‘line up and wait’ instead of ‘position and hold’ to instruct pilots to enter a runway and wait for take-off clearance. ... Some of the FAA’s responses [to NTSB safety recommendations] have asked for more time for further analysis.”

FAA publications in mid-2009 described pertinent changes in ATC procedures and phraseology at various stages. “[The FAA] conducted a safety risk analysis of explicit taxi clearance instructions, explicit runway crossing clearances, takeoff clearances and multiple landing clearances (including landing clearances too far from the airport),” the agency said. “We published and distributed detailed taxi instructions to the field in May 2008 with implementation through the summer of 2008. ... Among related tasks to accomplish are to ‘Publish guidance requesting positive clearance to cross any runway — all crossings of any runway must be confirmed via air traffic control clearance.’”<sup>3</sup>

## Current FAA Activity

Michael McCormick, FAA director of terminal safety and operations support, explained recent FAA decision making on ATC procedures and phraseology as a panelist during the runway safety summit’s closing session. “The first change that went into play [in 2008] was explicit taxi instructions or detailed taxi instructions ... to mitigate the risk of aircraft taxiing in the



**'Detailed taxi instructions ... mitigate the risk of aircraft taxiing in the wrong direction or wrong place.'**

wrong direction or wrong place," he said. Input from the Air Traffic Aviation Safety Action Program (ATSAP; ASW, 7/09, p. 12) already has prompted reevaluation, however.

"We are reanalyzing [although] we thought we had made a positive change in the system," he said. "If there are unintended consequences now, we need to ... look at what additional risks there are and how we mitigate, change or refine that process to make it work for everybody."

The second change, implemented in August 2008, affected ATC clearances after crossing a runway. "[Controllers now] cannot issue a 'cleared for takeoff' clearance until after an aircraft has crossed the active runway and

taxied onto the runway from which the aircraft is going to be cleared for takeoff," McCormick said. "That mitigates the [possibility of the pilot] misunderstanding and an aircraft turning onto the wrong runway and actually taking off either in the wrong direction or on the wrong runway. Runways that are less than 1,000 ft [305 m] apart are exempted from that procedure."

The third change, still in the works, would eliminate "taxi to" from ATC taxi instructions. "Controllers will just issue the runway number, and then the instructions on how to get to the runway," he said. "That puts up an automatic 'stop sign' so that pilots can't cross any runways because 'taxi to' ... now authorizes the pilot to

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cross all runways and taxiways to get to the runway. When the change is implemented, pilots will have to have a ‘green light’ [an explicit clearance] before they can cross any runways.”

The fourth change, still in development, affects how ATC manages multiple runway crossings. “Controllers can only issue a clearance across one runway at a time, and then once the aircraft is clear of that runway, the pilot will be issued a clearance across the next runway,” McCormick said. “[This] would preclude pilots misunderstanding that they have been cleared to cross all intervening runways.”

The third and fourth changes have been cleared by the FAA Air Traffic Organization’s Safety Risk Management Decision (SRMD) Panel, and final approval has been requested. The SRMD Panel had to resolve concerns about injecting more risk into the existing ATC system, McCormick said. Examples of risks to accept or mitigate were multiple pilot-controller communications and additional coordination between the tower local controller and the ground controller. “After the pilot clears a runway, and is going to be cleared onto the next runway, that requires another series of communications between a pilot and a controller, which increases the opportunity for an incorrect clearance or an incorrect readback,” he explained.

To implement “line up and wait” in the United States, the question of how to change the habits acquired by all U.S. controllers and pilots became significant. “It probably took me just about a week of feeling uncomfortable to get used to this phrase [taxiing in countries that use ‘line up and wait’],” McCormick said. “However, this is a dramatic change for the entire workforce of [15,000] U.S. controllers and the flight crews that will need to adjust.”

As of December 2009, “line up and wait” was in the post-SRMD Panel stage. “[FAA] document change proposals are already drafted, procedures already have been drawn up, and we are waiting for the final approval,” he said. “Once that is done, we are going to kick off at least a 150-day training period.”

## ICAO Audit Influence

In 2008, the International Civil Aviation Organization (ICAO) audit of the U.S. civil aviation system found that although the FAA Air Traffic Organization had a runway safety program, a safety management system (SMS) would not be fully implemented until March 2010.<sup>4</sup> Concerning the program, the audit finding said that a number of provisions in ICAO standards for readback of clearances and procedures for aerodrome control service had not been incorporated into this runway safety program but could “form part of effective runway incursion prevention measures.”

The audit finding added, “The FAA should revise its runway safety program to: require readback of clearances in accordance with ICAO Annex 1 [*ICAO Standards*, 11.3.7.3]; apply clearances to land in accordance with *Procedures for Air Navigation Services—Air Traffic Management [PANS-ATM]* Chapter 7 [‘Procedures for aerodrome control service,’ 7.9.2]; apply the phraseologies for taxiing aircraft in accordance with *PANS-ATM* Chapter 12 [‘Phraseologies,’ 12.3.4.7 through 12.3.4.10]; and [require] explicit clearances to cross or hold short of a runway when a taxi clearance contains a taxi limit beyond the runway in accordance with ... *PANS-ATM* Chapter 7 [7.5.3.1.1.2].”

The FAA’s corrective action plan in response to the audit finding also said, “Currently, FAA is in the process

of completing a safety risk management document ... to explicitly require clearances to cross runways.” The plan to establish safety risk management work groups by November 2008 was accepted by ICAO.

## Long Evolution

The February 2010 edition of its *Most Wanted* list indicates that the NTSB still urgently wants the FAA to “require specific [ATC] clearance for each runway crossing” after more than nine years of correspondence and meetings between staffs of the two agencies. The pace of decision making has been attributed to several issues.

In April 2002, for example, the FAA told the NTSB that proposed changes in controller phraseology had been considered by a government-industry work group — using input from nine regional runway safety workshops and a national summit on runway safety — and that the work group’s recommendations were still being reviewed.

In January 2003, U.S. controllers implemented the shortened phrase “position and hold” to reduce radio frequency congestion and confusion for non-U.S. pilots unaware of the difference between the ICAO phrase “taxi to holding position” (off the runway) and the prior U.S. phrase “taxi into position and hold” (on the runway). In February 2004, the NTSB learned that the FAA work group had “determined that the surface phraseologies in FAA Order 7110.65, *Air Traffic Control*, and ICAO [*PANS-ATM*] were as closely matched as possible.”

The work group advised the FAA that substituting “line up and wait” for “position and hold” in the United States would be confusing for U.S. pilots because “hold” in all other taxiing instructions means stop the aircraft at a

particular point (as in “hold short”), do not proceed any further or wait for further instruction. “These two phrases are equivalent in meaning and intent,” the FAA said, agreeing to examine only “the possibility of developing a human factors study for adoption of ‘line up [and wait]’ and ‘taxi to holding position.’”

In April 2006, the NTSB learned that the FAA expected to reach a decision about ATC procedural and phraseology changes using advice from a contracted linguistics and phraseology expert on “line up and wait” and “taxi to holding position.” The effort was superseded as of October 2007, however, by the ICAO audit and the Air Traffic Organization’s SMS requiring SRMD Panel analysis of all proposed changes to the National Airspace System.

“Under the SMS, we will conduct [an SRMD Panel] assessment of the procedures and phraseologies associated with the [NTSB’s safety] recommendations,” the FAA told the NTSB. “The [SRMD Panel] process will permit us to define hazards and mitigate any safety risks prior to the implementation of procedural/phraseology changes.” For example, the assessment of “line up and wait” led the FAA to conclude that risks from the change could be managed at an acceptable level by implementing eight mitigations.<sup>5</sup>

The convergence of the FAA’s SMS methodology, the ICAO audit corrective action plan and the commitments from the 2007 runway safety summit led to expedited review of policies for issuing taxi clearances, and the agency scheduled a six-month SRMD Panel assessment of FAA and ICAO surface phraseologies and multiple landing clearances.

In August 2008, as noted, the FAA said that it had implemented a new runway-crossing procedure. “Notice JO 7110.487 ... requires that all runways along the taxi route that lead to the departure runway are crossed before a takeoff clearance is issued,” the FAA said. “This procedure ... excludes airport operators with airport configurations that do not allow for an aircraft to completely cross one runway and hold short of the departure runway.”



Notes

1. NTSB. Safety Recommendations A-00-66 through A-00-71. July 6, 2000.
2. FAA. Order JO 7110.65T, *Air Traffic Control*, paragraph 3-9-4, “Taxi Into Position and Hold (TIPH),” effective Feb. 11, 2010.
3. FAA. *National Runway Safety Plan 2009–2011*. June 2009.
4. ICAO Universal Safety Oversight Audit Program. “Final Report on the Safety Oversight Audit of the Civil Aviation System of the United States of America (5 to 19 November 2007).” August 2008. <[www.icao.int/fsix/auditrep1.cfm?s=1](http://www.icao.int/fsix/auditrep1.cfm?s=1)>
5. “Line up and wait” mitigations require the FAA to “combine a local control position only with another local control position (local control shall not be combined with a non-local position, i.e., ground control or flight data position); ensure facility directives detail [line up and wait] operations, facility procedures, memory aids, etc.; enhance coordination between local and ground control for intersection departures; [perform] coordination either via verbal means or flight progress strips; prohibit simultaneous [operations] on the same runway unless a local assist/monitor position is staffed; mandate traffic advisories for departing and arriving aircraft on intersecting runways; emphasize on-the-spot corrective actions by supervisors/controllers-in-charge and managers during [these] operations; disseminate information to pilots via Web sites, pamphlets, etc.; and, advance awareness to pilots through national and local outreach efforts.”

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