



European Air Traffic Controllers Assert Influence to Prevent Runway Incursions

Prevention requires teamwork by controllers, pilots, airport operators and others, but a European action plan also recommends that controllers promote compliance with ICAO standards, correct phraseology and wider use of aviation English.

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FSF Editorial Staff

Taking cues from a common action plan, most major airports in Europe recently have expanded their activities to prevent runway incursions, defined as “the unintended presence of an aircraft, vehicle or person on the runway or runway strip.”¹ Among professional groups tasked with these activities are air traffic control (ATC) specialists (controllers), who play an influential role on runway-safety teams while implementing ATC-specific safety recommendations.

The action plan was published in May 2003 by the European Organization for the Safety of Air Navigation (Eurocontrol), based on work by a European task force in 2001 and 2002. After specialists from participating professional groups and organizations endorsed the action plan at a September 2002 conference, the Runway Safety Working Group was formed to implement the recommendations with strategic guidance from a steering committee.²

“Of 15 million operations in the core central European region during 2002, only 207 runway incursions are known to have occurred, which does not provide a great deal of data for the Runway Safety Working Group,” said Paul Wilson, head, Airport Throughput Business Division, Eurocontrol.³ “To develop the recommendations in the *European Action Plan for the Prevention of Runway Incursions, Release 1*, we therefore supplemented information gleaned from analysis of data with professional judgment and our own experience. The problem of data collection must be resolved — at the moment, Eurocontrol is actively advocating a blame-free, open-reporting system.”

The context of the airports’ expanded activities is an increased awareness of runway incursion accidents and incidents in Europe.



Major European airports typically have established runway-safety teams, unless they had another existing group that has the same function, Wilson said.

“Over recent years, there have been a number of runway incursions across the European region, which resulted in two actual collisions, with a significant loss of life,” the action plan said. “Analysis of the available data indicates that there may be one runway incursion every three to four days within the region.”

The action plan was distributed to 41 national aviation safety authorities; their response to the recommendations has varied, Wilson said. Airport operators, air navigation service providers, aircraft operators and other task force participants also were asked to expedite implementation of the action plan at the earliest opportunity.

“In addition, we have distributed information on several thousand compact discs as an awareness tool, and release 1.1 of the action plan will be ready in a few months with updated references and more human factors information,” Wilson said. “Huge flexibility is required because some states have small, quiet single-runway airports, while others have major airports with multiple closely spaced parallel runways. So far, some airport authorities have adopted regulations, others have suggested actions, and others have given the action plan to their air navigation service providers to make decisions. Although we do not know for sure what all airports have done, none said that they would not implement the action plan. Many local runway-safety initiatives have been complemented, and generally supplemented, by more detailed guidance in the action plan.”

Eurocontrol will report on efforts to implement surface-movement safety technology — such as advanced surface movement guidance and control systems (A-SMGCS) and airport-surface surveillance radars with automatic alerting functions — as they occur in Europe.⁴

“We’ve found that in the typical runway incursion, often there are multiple causal factors with a sequence of events involving controllers, pilots and airport operators,” Wilson said. “Under the preventive methods the task force has recommended, these roles have not changed, but we are encouraging much greater teamwork and understanding of each other’s problems. By and large, the role of the aerodrome ground controller in preventing runway incursions remains the same.”

A significant factor in the European runway incursions studied has been an “almost invariable” breakdown in teamwork and communication, he said. One focus of Eurocontrol therefore has been to develop a program like “an airport version of CRM [crew resource management],” Wilson said.

The action plan calls for controllers to be active in local runway-safety teams and awareness campaigns; among recommendations that significantly involve/affect ATC are the following.

“Improve situational awareness, when practicable, by conducting all communications associated with runway operations using aviation English.”

The consensus of European specialists — based on practical experience — is that using aviation English for all communication related to runways reduces risk. Nevertheless, cultural differences, inadequate training and misunderstanding of the purpose of this recommendation may come into play, Wilson said.

“Although, in certain circumstances, the use of local language is allowed, this has been identified as a contributory factor in the causes of some runway incursions,” the action plan said. “The use of aviation English in a busy and complicated environment should be encouraged as much as possible. ... Conducting and comprehending radiotelephony communications requires competence with standard phraseology as well as general proficiency in the language used for communications.”

“From the aircrews, there is a strong wish for all runway-related communication to be conducted in aviation English,” Wilson said. “We’re not talking about full fluency in English, but use of a core language subset of aviation English, which gives the greatest situational awareness for everyone. Otherwise, when another language is used, some aircrews have no idea what is happening around them. The part that controllers play is simply to speak in aviation English for common enhancement of situational awareness.”

Nevertheless, caution is required to avoid premature implementation — which could increase risk — before vehicle drivers (and others) attain the minimum required skill level

to use aviation English, the action plan said. A date was not established, pending further work by the International Civil Aviation Organization (ICAO).

“Improve situational awareness, when practicable, by conducting all communications associated with runway operations on a common frequency.”

The reason is to maintain situational awareness during runway operations so that landing/departing aircraft, crossing aircraft, crossing vehicles, runway inspectors and all other users hear all this communication. (Frequencies on ultra-high-frequency [UHF] radio equipment should be coupled with frequencies on very-high-frequency [VHF] radio equipment, if required, the action plan said.)

“Frequently, the pilot on the runway is talking to the tower controller, and a vehicle driver typically is talking to a ground controller — there is no situational awareness,” Wilson said. “One pilot told our task force, ‘Controllers have no idea how disconcerting it is to be lined up for takeoff on a runway and to have a vehicle cross the runway in front of me — I have no idea how or why this has happened, or whether the crossing was authorized by a ground controller. If I could hear the vehicle driver’s request to cross and the controller’s authorization on the same frequency I am using, I would hear and know what is happening.’”

“Verify the use of standard ICAO RTF [radiotelephone] phraseologies.”

“When nonstandard phraseology creeps in, for example, it causes a lot of difficulties,” Wilson said. “We have not invented any new phraseology; rather, we strongly advocate the use of standard ICAO phraseologies and readback procedures, which also act as a checking mechanism.”

Standard phraseologies for aircraft, vehicles and ground stations are essential to avoid misunderstanding the intent or content of spoken messages, and to keep these messages brief, the action plan said.

“The most common phraseology problem for non-European-based aircrew is the fundamental difference between the North American phraseology ‘taxi into position and hold’ (which has the same meaning as the ICAO standard phrase [‘line up’ or ‘line up and wait’] and the standard ICAO phraseology ‘taxi to holding position’ (which means taxi to, and hold at, a point clear of the runway ...),” the action plan said.

“Use the ICAO readback procedure (including drivers and other personnel who operate on the maneuvering area).”

“The demanding environment associated with aerodrome operations on a runway requires that all participants accurately receive, understand and correctly read back all the clearances and instructions being transmitted,” the action plan said. “While this

readback requirement is not an ICAO mandatory requirement for drivers, it is considered best practice to apply it.”

Moreover, controllers’ “hearback” completes the voice-communication loop. The action plan cited ICAO standards requiring that controllers check “the completeness and accuracy of the readback” and challenge failure of aircraft pilots to include their call signs in the readback.

“Whenever practical, give ATC en route clearance prior to taxi.”

This recommendation was developed because current European practices vary from state to state.

“Some controllers issue en route clearance while the aircraft is at the gate, other controllers do not have a clearance ready to issue until after the aircraft has been taxied away from the gate — which can mean an increase in workload for aircrew at what is already a very busy time,” Wilson said. “As pilots taxi near a runway, ideally the routine tasks would have been completed, allowing time to concentrate on the runway operation.”

If issuing the en route clearance before taxi is impossible, controllers can help prevent distraction by avoiding times when pilots are engaged in complicated taxiing maneuvers near the runway, the action plan said.

“Do not issue line-up clearance to an aircraft if this aircraft will be required to hold on the runway for more than 90 seconds beyond the time it would normally be expected to depart.”

This is based on data from several serious runway incidents in which the aircraft had been held on the runway, Wilson said.

“European data were supported by data supplied by the U.S. Federal Aviation Administration [FAA],” he said. “Ninety seconds is a very long time in this environment; there can be a high degree of controller distraction, and there can be instances where the controller forgets about one aircraft holding on the runway.”

“When using multiple line-ups, do not use oblique or angled taxiways that limit the ability of the flight crew to see the runway threshold.”

Positioning multiple aircraft at multiple runway-taxiway intersection points is an allowed technique for high-density runway operations, Wilson said.

“If the angle of view from the cockpit is greater than 90 degrees, however, a waiting aircrew possibly can see no one on short final and no one conducting a takeoff,” he said. “When this involves a reciprocal high-speed turnoff, where pilots would have to look 150 degrees over their shoulders, it’s virtually impossible; they cannot see the threshold, so one of the safety nets is taken out of the system.”

“Use full aircraft or vehicle call signs for all communications associated with runway operations.”

Behind this recommendation is a recognition that aircraft in Europe frequently have very similar call signs, increasing the risk of confusion, Wilson said.

“The use of full call signs of all traffic operating on or in close proximity to a runway has been identified as a critical element in enhancing safety for runway operations,” the action plan said. “While the ICAO provisions allow for use of abbreviated call signs in certain circumstances, it is deemed best practice not to apply any shortening of call signs in this situation.”

“Aircraft shall not be instructed to cross red stop bars when entering or crossing a runway unless contingency measures are in force (e.g., to cover cases where the stop bars or controls are unserviceable).”

Local contingency plans might include ATC closing the affected taxiway and instructing the aircraft crew to taxi on a taxiway with a functioning stop bar, or instructing the aircraft crew to taxi behind an airport guide vehicle.

“The objective of this recommendation is to maintain the integrity of the stop bars, which are intended in this case to protect the runway,” the action plan said.

“To ensure that the complete traffic situation is included in a handover, the use of a handover checklist should be considered.”

The action plan recommends controller handover checklists because there has been a relatively high incidence of runway incursions in the first few minutes after one controller has accepted a handover from another.

“Perhaps this occurs before the second controller has generated a mental picture of the traffic, or the controller has not received full details of the traffic,” Wilson said. “Our idea is to encourage more structure in every handover — perhaps providing the 10 most important handover details using a checklist just to be sure the controller does not omit any.”

ATC-related misunderstandings involving holding positions and takeoff clearances also must be prevented. Mitigating such misunderstandings requires a clearance limit in taxi instructions (i.e., clear identification of holding position for an intersection departure) and explicit clearance to cross a runway, or an instruction to hold short, even if the runway is not in use.

“Communication with any aircraft using the runway for the purpose of taxiing should be transferred from the ground controller to the aerodrome controller prior to the aircraft entering/crossing a runway,” the action plan said. “It is strongly advised, when practicable, to use standard taxi routes [and progressive taxi instructions to minimize the risk of pilot confusion on/near a runway].”

Among examples of recent products developed by European airports' runway-safety teams are hot-spot maps⁵ and related practices used by Brussels (Belgium) International Airport (which are published as a model in the action plan), the hot-spot map for London (England) Heathrow Airport and a runway-incursion-prevention leaflet issued by Malpensa Airport (Milan, Italy), which comprehensively depicts complex intersections and guides pilots taxiing to the closely spaced parallel runways.

In early 2004, national/regional action plans for prevention of runway incursions were compared by specialists from Air Services Australia, Eurocontrol and FAA in the interest of harmonizing them.

"Although slight differences are a concern, we want others to join us in contributing to a global action plan on runway incursions to be produced by ICAO, hopefully, by the end of 2004," he said. The global action plan is expected to include one international definition — versus more than 15 current definitions of what constitutes a runway incursion — and globally harmonized taxonomies and severity classifications as drafted by the ICAO Air Navigation Commission in October 2003, Wilson said. The global action plan is not expected to contain new ICAO standards or procedures, however, he said. ♦

Notes

1. International Civil Aviation Organization (ICAO) Annex 14, *Aerodromes*, Volume I, defines a runway strip as "a defined area

including the runway and stopway, if provided, intended to reduce the risk of damage to aircraft running off a runway; and to protect aircraft flying over it during takeoff or landing operations."

2. European Organization for the Safety of Air Navigation (Eurocontrol). *European Action Plan for the Prevention of Runway Incursions*. May 2003. The July 2001 joint runway safety initiative was launched by the Group of Aerodrome Safety Regulators (GASR), European Joint Aviation Authorities (JAA), ICAO and Eurocontrol.
3. Wilson, Paul. Telephone interview by Rosenkrans, Wayne. Alexandria, Virginia, U.S. March 19, 2004. Flight Safety Foundation, Alexandria, Virginia, U.S.
4. FSF Editorial Staff. "Methods of Preventing Runway Incursions Evolve in Europe and the United States." *Airport Operations* Volume 26 (July–August 2000). Advanced surface movement guidance and control systems (A-SMGCS) are being developed in Europe to provide automated vehicle guidance and aircraft guidance for low-visibility surface movement control. The concept of A-SMGCS is to augment or replace voice communication with visual information in the cockpit or vehicle. These systems may include active guidance lighting, alerts and warnings, data-linked guidance messages, cockpit/vehicle map displays, and precise monitoring by ground controllers of aircraft/vehicle paths and deviations on the surface to detect potential collision situations.
5. Hot spots depicted on special airport maps are "unique or complex intersections and runway crossings where runway incursions have taken place in the past, or areas of the runway or associated taxiways which are not visible from the control tower," the action plan said.

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Airport Operations

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