Comments to EASA NPA 2013-09: "Reduction of runway excursions"

General Comments

Thank you for giving us the opportunity to comment on this NPA.

IATA is concerned that the proposed regulation is too prescriptive and appears to have been written to mandate one specific technical solution to prevent runway excursions (i.e. Airbus Runway Overrun Protection System). IATA would strongly recommend that EASA reconsiders its current rulemaking project and convenes a rulemaking group consisting of all major stakeholders with the aim to develop a more practical rulemaking proposal independent from any particular technical solutions.
IATA could support a regulation for newly designed aircraft (EASA CS-25) provided that any such rule allows for competition between different suppliers. It is therefore also advisable that an ARINC standard is developed for such equipment before any EASA rule/standard is imposed. Such an ARINC Standard would not only promote competition between different suppliers, but would also create a standard which enables usage on multiple types of aircraft. Any EASA rule/standard should be harmonized with the US FAA and as such form the basis for a global ICAO standard.

Furthermore, it should be noted that technological means (such as the Airbus ROPS or Honeywell Smart Runway System) are only one possible element to reduce the risks related to runway excursions along other measures. Airlines are continuously reviewing the means best adapted to their operations as part of their individual Safety Management Systems (SMS). Premature rulemaking by EASA should therefore be avoided, in particular in the absence of global (ICAO) standards or corresponding rules from the US FAA.
An EASA rule for newly delivered aircraft would be premature and would create problems in relation to mixed fleet flying (possibly forcing airlines to retrofit their entire fleets in order to avoid negative human factors issues) and should therefore be avoided.

IATA does not support a premature EASA retrofit rule, bearing in mind the fact that such systems are still in their infancy and therefore could lead to a questionable return on investment as far as safety and finance are concerned. Mandating a new system, before collecting enough real-life operation data about this new system may bring unexpected negative results. An example of this from the past is the EASA mandate to install AOA conic plate applications on Airbus aircrafts; these were mandatory installed to eliminate a problem. The field experience on the aircraft revealed that they would cause more trouble than the flat plates and the operators have now been mandated to remove them.

However, EASA should facilitate the certification process for voluntary installation of runway excursions prevention systems in order to gain more in service experience. In this context, it is also of utmost important that EASA certification procedures are not biased towards products of certain suppliers.

With reference to the specifications of available technology, it is worth comparing the Airbus ROPS with Honeywell's RAAS: Honeywell RAAS System is an advisory system. As emphasized in the operations manuals, that RAAS shall not be used for navigation purposes.

If the ROPS becomes mandated for new delivery Wide Body aircrafts, it is not clear if it would be mandatory to obey to its instructions or it would be an advisory system.

Considering that all the ROPS instructions are dependent on up to date Terrain Data Base information, it is worth noting that Data Base update periods are not regular and there is not yet a well-developed system to provide terrain Data Base Providers with information about runway changes. In several cases airlines have reported spurious warnings to the Providers in order to have their Data Base updated accordingly. In some instances, there is a considerable time before the data base is updated with new information. The period between the updates is not standard and the updating procedure can be fairly complex for the Operators. Considering all of the above, it is clear that the Terrain Data Base should become more reliable before any Go-around or full braking decision is based on them.

Specific comments

1. Predictive alert and automated means for runway overrun

The proposal for CS 25.705 states that:
"(b) The system must provide the crew with :
(1) on-ground predictive alert, or
(2) automated means for runway overrun protection during landing"

However, the definition of terms in Book 2 is not in accordance with this proposal. The definition for predictive alert being:
c. "predictive alert" means the alert is provided before a problem arises and not during the landing roll, with the appropriate consideration of the aeroplane configuration, the runway characteristics and the prevailing environmental conditions (e.g. dry of wet runway).

This definition corresponds to in-flight predictive alert but is not applicable to on ground predictive alert.

The causes of runway overruns are multiple, but we can attribute runway overruns to two main families of factors:

- Flight path: excessive speed (due to unstable approach, tail wind), deep landing … in all those situations, the energy at touchdown point is not compatible with the remaining runway length, taking into account the runway state.
- Ground roll: inadequate braking performance which may due to delayed spoilers or thrust reversers deployment, delayed manual braking, inadequate autobrake selection or runway contamination state worse than expected (example : runway contaminated by standing water while expected wet).

The risks of runway overruns due to flight path are addressed by the in-flight predictive alert and the appropriate response by the crew: rejected landing. In the existing systems (ROPS) two different alerts are generated "IF WET TOO SHORT" (Visual alert) and "RUNWAY TWO SHORT" (Visual alert and aural warning).

The second family of factors must be addressed by on-ground predictive alert and/or automated means for runway protection during landing.

As a general remark, an automated means for runway overrun protection during landing can only use automatic braking at maximum efficiency to avoid a potential overrun. The existing systems (ROPS) uses both an active automated protection in autobrake mode (autobrake at maximum efficiency, as in RTO mode) and a crew alert ("MAX REVERSE, KEEP MAX REVERSE" associated with "MAX BRAKING" when in manual braking mode). In some situations, such as contamination state and braking action much worse than expected, the automated protection (maximum braking) is not efficient since braking action is limited by runway friction : the only way to increase deceleration is to keep maximum reverse thrust until full stop (or until there is sufficient runway remaining to stop using idle reverse).

On contaminated runways, when braking action is poor, one can assume that maximum braking is already applied and the only way to increase deceleration is by use of maximum reverse thrust. The development of automated means of protection using reverse thrust adds complexity and may involve certification issues, so any automated means of protection must also include an alert engaging the crew to take action by the use of maximum reverse thrust.

To summarize: any system must include an alert on ground. An automated protection system on ground should be considered as an option to increase efficiency in some cases (mainly on non-contaminated runways).

On new aeroplanes to be certified, an automated system should be considered but, on existing aircraft, an automated system requiring a complete redesign of the braking system will increase the cost of the ROAAS, with a limited added value, when compared to predictive alerts.

We thus propose to change the wordings of the last part of CS 25.705 as follows (and to modify draft opinion Part 26-205 accordingly:
(b) The system must provide the crew with on-ground predictive alert of runway overrun risk, which may be associated with an automated means of protection during the roll-out.

AMC 25-705 § 4 c should also be modified as follows:
c. "in-flight predictive alert" means the alert is provided before a problem arises and not during the landing roll, with the appropriate consideration of the aeroplane configuration, the runway characteristics and the prevailing environmental conditions (e.g. dry of wet runway).

The following paragraph AMC 25-705 § 4 e should also be added to AMC 20-705:
e. "on-ground predictive alert" means the alert is provided during the landing roll, when the system detects a risk of runway overrun.

2. ROAAS availability

The crew should be informed when the ROAAS is not available.

The non-availability of the ROAAS may be due to:
(a) An internal failure, which should be indicated to the crew by a specific alert.
(b) The failure of a system affecting the ROAAS availability (for example failure of all GNSS receivers). In this case the non-availability of ROAAS should be documented in

the AFM and this information should be provided to the crew when the associated abnormal procedure is performed.

(c) On-board runway data not available for the landing runway. This information should be available to the crew when the landing runway is selected in the FMS.

3. Data availability

The efficient use of such a system requires several conditions:

(a) The system is designed according to the certification process, to allow safe operation and to ensure that the system operation will produce safety benefits.
(b) There is an efficient data production process to guarantee accuracy and integrity as well as availability of on-board runway data.
(c) Crews are properly trained to use the system, in order to be able to react in a timely and adequate manner to alerts generated by the system (cf. next paragraph).

Paragraph 8 of AMC 25-705 addresses the accuracy and integrity of the on-board data, but the two other points: data availability and crew training are not addressed and their economic impact is not taken into account in the regulatory impact assessment.

Concerning the on-board data, there are several possibilities:
(a) ROAAS uses the airport navigation system data base (which is the case for ROW/ROPS on A380). In this case, there is no additional data base costs, the data base is regularly updated according to AIRAC cycles, but this data base covers a limited number of airports (usually the destination airports and a limited number of alternates).
(b) ROAAS uses the EGPWS, which is a worldwide data base (used for TAWS TCF function as well as for RAAS), but with less frequent updates. In this case, there is no additional costs but impact of the data update or of missing and/or incorrect data (in case of new runway or runway works) should be considered.
(c) ROAAS uses its own data base, and, in this case, the issue of availability and cost (data base purchase and distribution costs) must be considered in the Regulatory Impact Assessment.

4. Crew training and mix fleet flying

The safety benefits of ROAAS depend on the crew response: go-around in case of in-flight predictive alert, and appropriate action (such as applying maximum reverse thrust) in case of on-ground alert. Adequate crew response is not guaranteed if crews are not properly trained.

As a consequence, we cannot assume that the system will effectively increase safety if operational aspects such as crew training are not properly addressed.

When a new aircraft type is delivered with a new system such as ROAAS, specific training for this system training is integrated into the type rating course. This was the case with the introduction of BTV/ROW/ROPS in A380: description of the system was integrated in the A380 CBT and specific simulator exercises were designed to train pilots involving realistic scenarios (in-flight alerts as well as on-ground alerts) and pilot were trained to take action following alerts.

When newly delivered airplanes are equipped with a new system and operators fly a mix fleet with equipped as well as non-equipped aircraft the situation is different. Usually, simulator modifications are available several months (more than one year is not an unusual delay) after delivery of a new system? If only a small part of the fleet is equipped with the ROAAS, simulator equipment may not be available.

- If a small part of the fleet is equipped with ROAAS and the training is limited to CBT, with no realistic simulator scenarios, pilots may not react according to procedures in case of real alert. The efficiency of the system may be limited due to lack of adequate training and lack of familiarization due to the limited number of equipped aircraft.
- If a large part of the fleet is equipped while a small proportion remains without ROAAS equipment, and pilot trained to react to ROAAS alerts, we have to evaluate the impact of the ROAAS equipment on the non-equipped airplane. In the long term, any alerting system changes the behavior of pilots since the absence of alert may be associated with a safe situation. Will the risk of runway overrun increase in the non-equipped part of the fleet?

Our opinion is that the regulatory impact assessment leading to the decision to amend CS-25 and CS-26 to mandate installation of ROAAS into large airplanes produced after a certain date, should be revised and amended to take into account the training and operational factors associated with the introduction of this new system:

- Include training costs in the RIA : simulator modifications (the cost of installation of a system in a simulator is similar to the cost of installation on an aircraft), so we have to include the "fleet" of flight simulators of new aircraft types as well as existing types still in production.
- The impact of mix fleet on the benefits of ROAAS must be evaluated: we cannot consider that the system efficiency will be identical when an operator entire fleet is equipped and when only part of the fleet is equipped. The safety benefits are not linear and proportional to the percentage of equipped airplanes. This impact should also take into account the possible availability of retrofit solutions at a viable economic cost for operators.

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