Predictive Landing Performance System

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EBAA Safety Summit

November 2019

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Need for PLPS

"*Runway Excursions Most Common Type of Bizav Accident*"
– Aviation International News, March 2017

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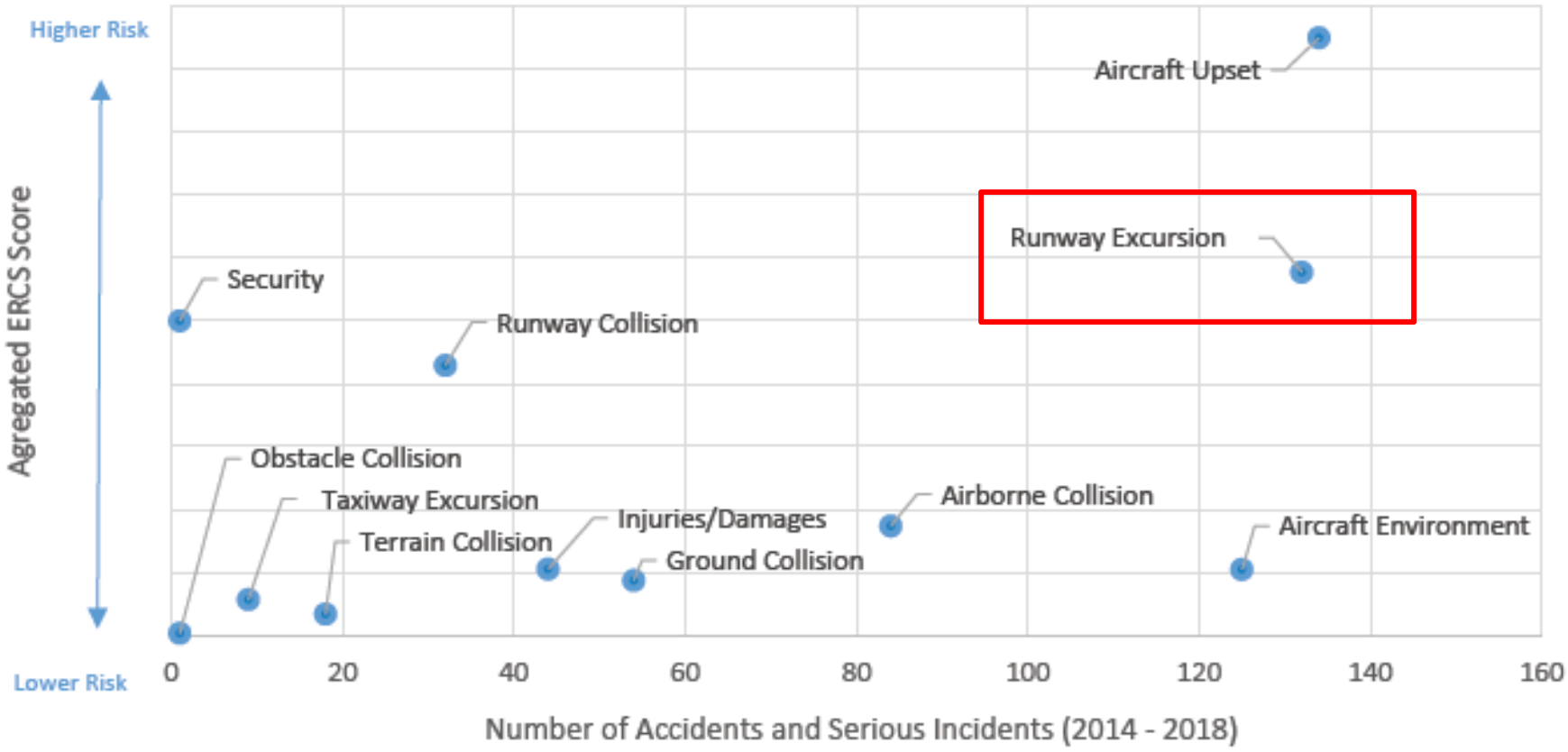
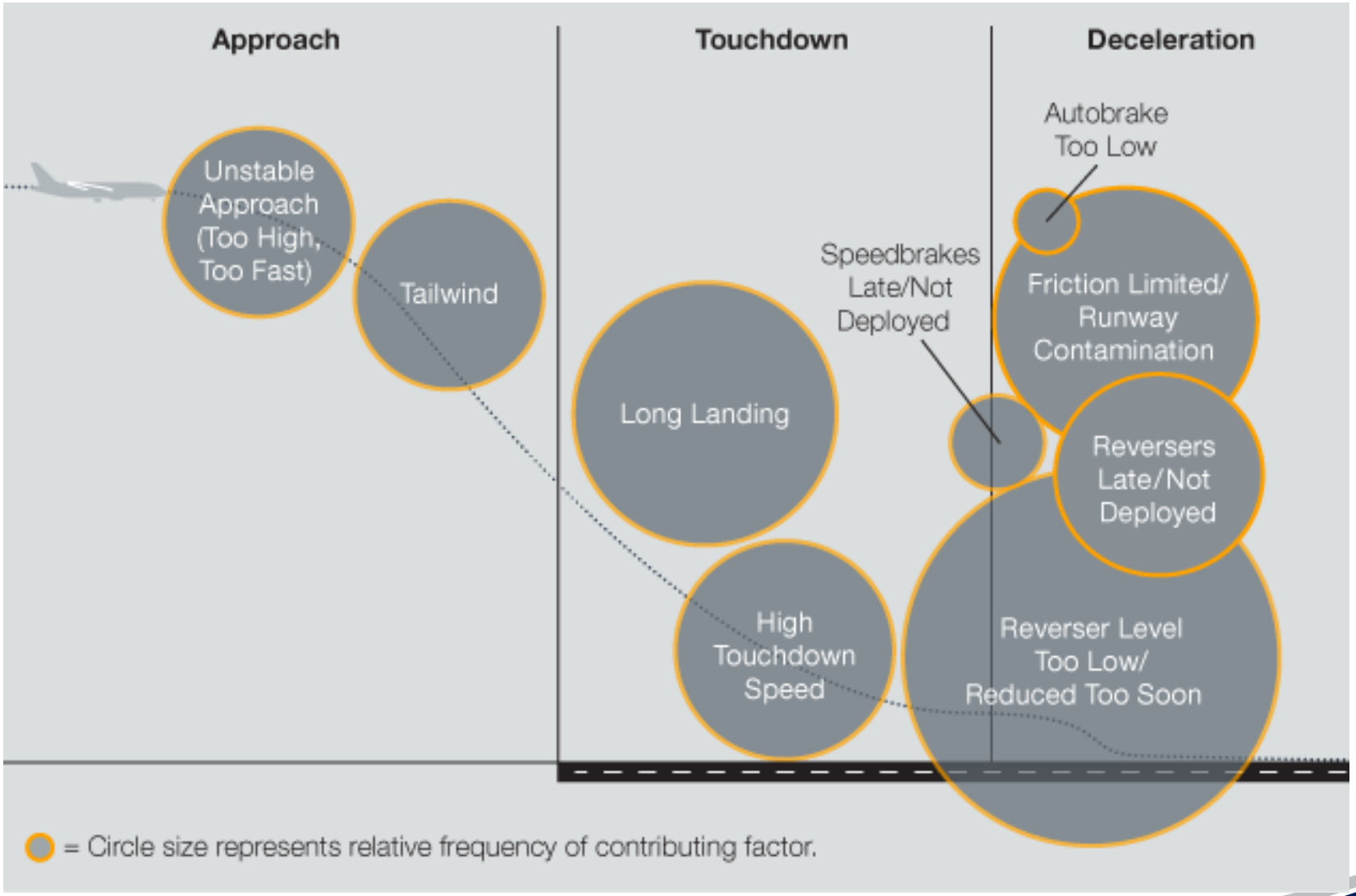
EASA Annual Safety Review, 2019



Runway Excursions during Landing – Top Factors



Source: Boeing AERO QTR_03 2012 , overrun events 2003-2010

Rulemaking and Industry activity

- Airbus ROPS ca 2006
- Boeing RSAT/SAAFER ca 2018
- EUROCONTROL European Action Plan for the Prevention of Runway Excursions, January 2013
  "On-board real time performance monitoring and alerting systems that will assist the flight crew with the land/go-around decision and warn when more deceleration force is needed should be made widely available."
- EASA Notice of Proposed Amendment 2013-09, "Reduction of Runway Excursions"
- EUROCAE ED-250, "Minimum Operational Performance Standard for a Runway Overrun Awareness and Alerting System", December 2017
- EASA Notice of Proposed Amendment 2018-12, "Reduction of runway excursions"
  - New Commercial Air Transport aircraft – starting 3 years after adoption

PLPS Overview

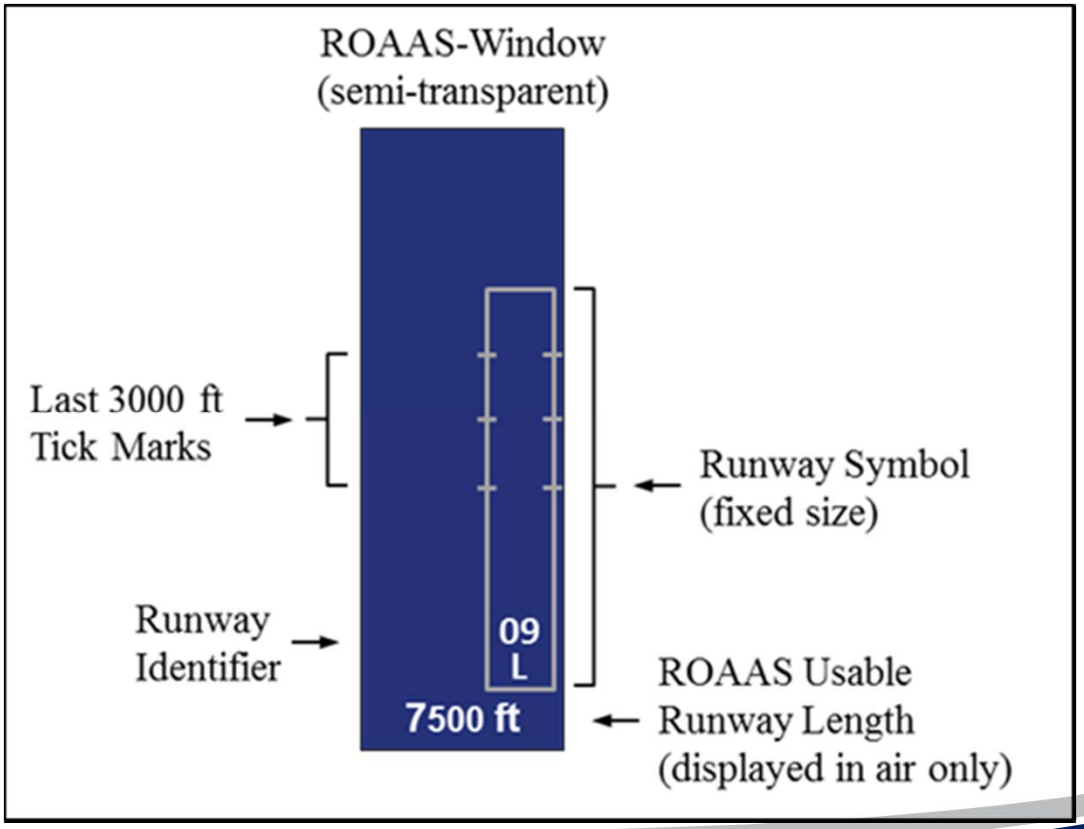
- Gulfstream and Honeywell have developed a *Predictive Landing Performance System* to…
  - Aid to flight crew awareness of aircraft stopping-point(s) relative to the approaching runway, based on real-time aircraft energy state.
  - Aid to flight crew decision making for go-around and for timely use of all available stopping devices during a pending runway overrun situation.
- PLPS uses the selected runway conditions from the FMS to perform calculations…**no new flight crew inputs**

Landing Distances

- Three different braking techniques and actual achieved braking performance corresponding to predicted stopping point for:
  - Maximum manual braking stop
  - Autobrake stop using low, medium, or high setting
  - Use of thrust reversers only
  - Actual stop based on sensed aircraft deceleration (on ground only)
- Primarily based on:
  - Approach and runway data from database (glideslope angle, slope, elevation)
  - Pilot-entered runway data (runway condition)
  - Aircraft height relative to glidepath
  - Aircraft ground speed
  - Autobrake setting
  - Aircraft flight path angle
  - Aircraft weight (thrust reverser stop only)
- Not equal to AFM landing distances for a given aircraft gross weight and altitude, but are *real-time* calculated distances

Symbology

- Integrated into the PFD
- Landing runway, distance available, predicted stopping points on a semi-transparent window
- Automatically displayed on PFD

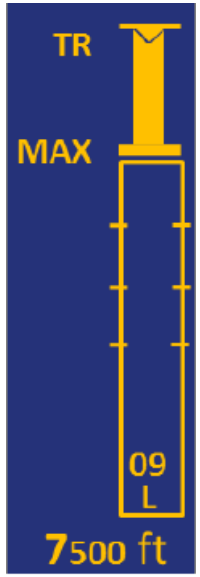


PLPS Windows and Alerts – In Air

Above 450 ft

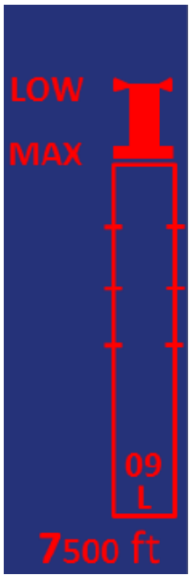
CHECK AUTO BRAKES

Below 450 ft
Above 200 ft



LANDING DISTANCE

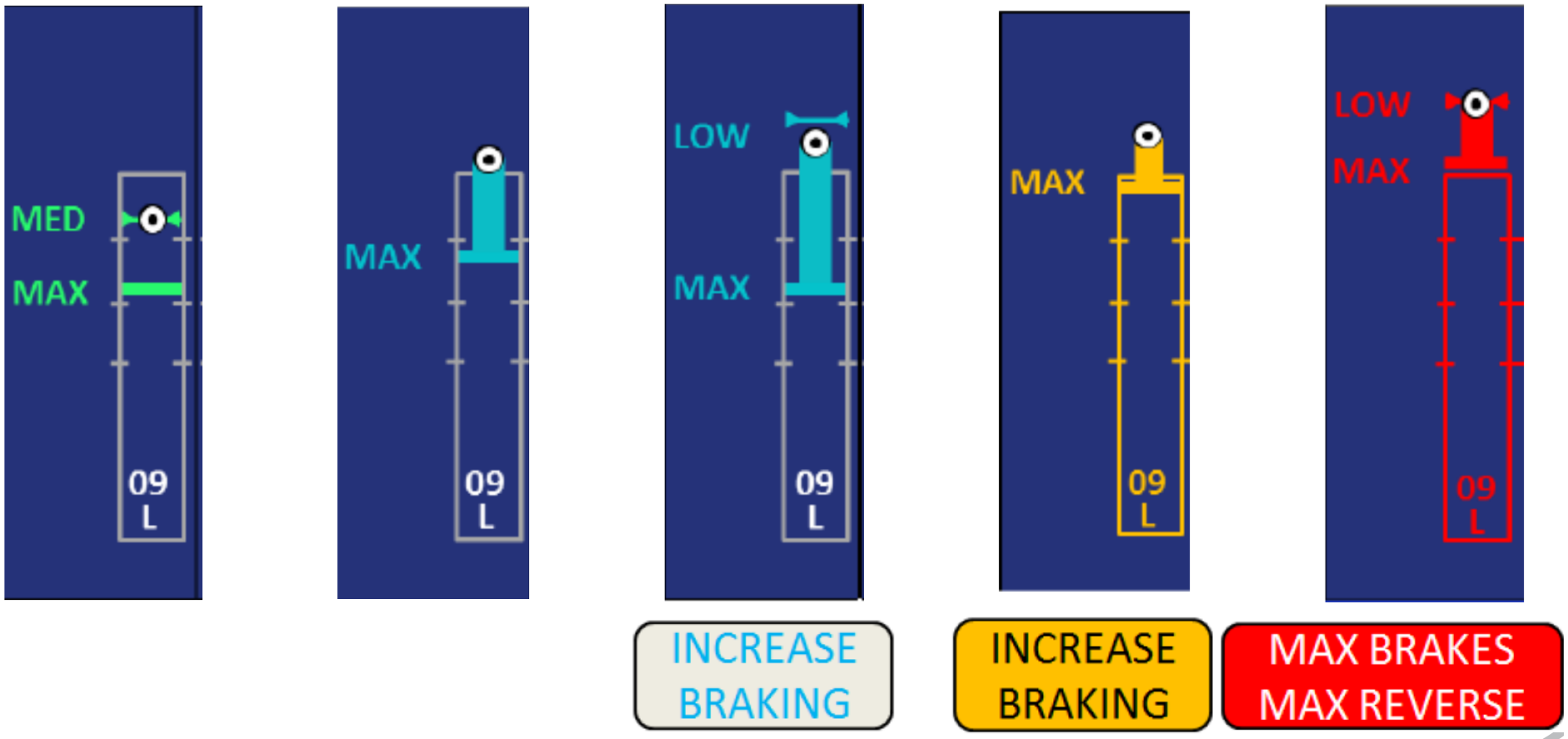
Below 450 ft



GO AROUND

Below 200 ft

PLPS Windows and Alerts – On Ground



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Questions?

For more information:

https://www.researchgate.net/publication/326015711_Development_of_a_Predictive_Runway_Overrun_Awareness_and_Alerting_System