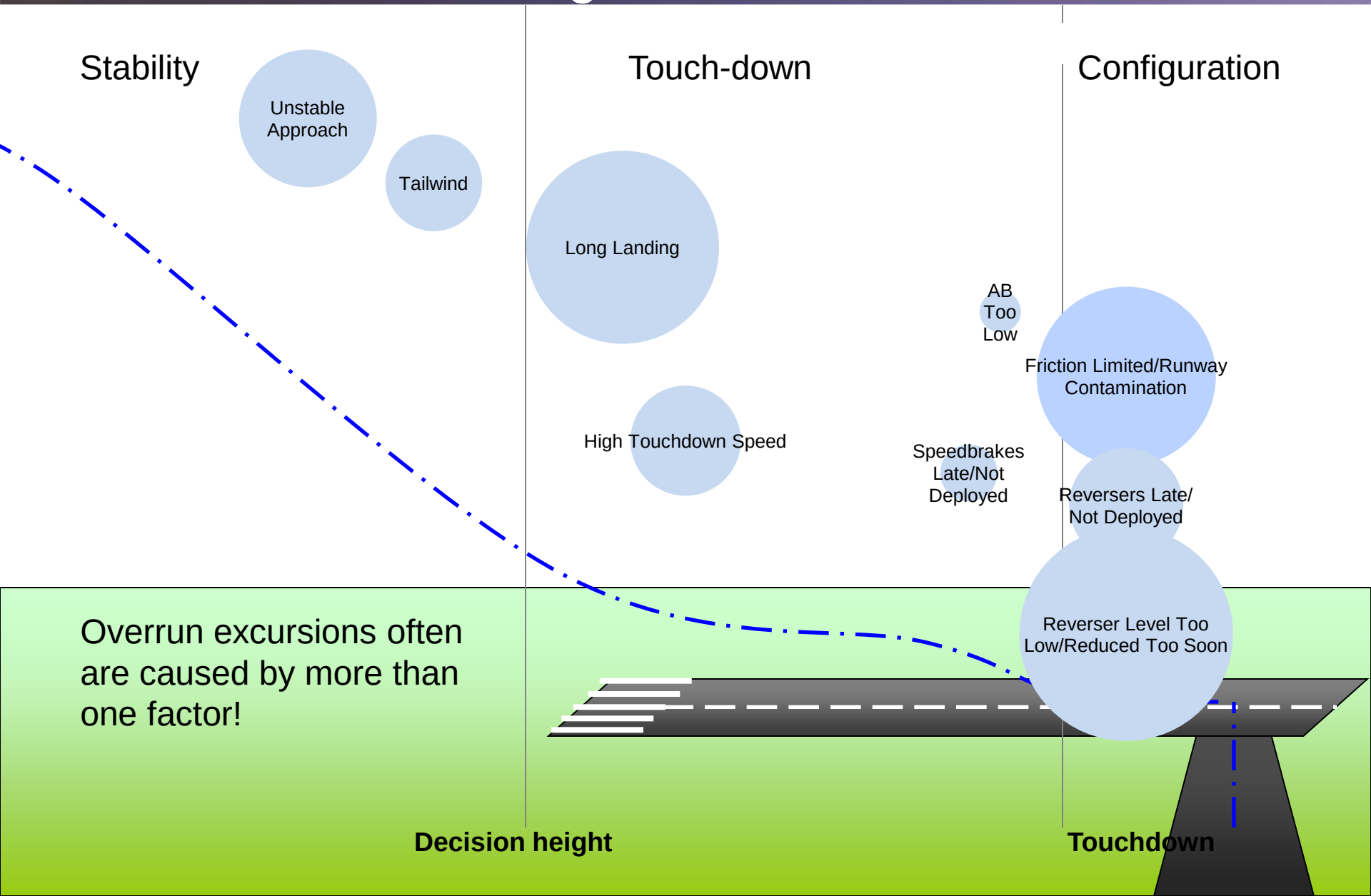
# Runway Situation Awareness Tools

The Boeing Company


# Runway overrun excursions

- Runway excursions are the *first* leading cause of aviation accidents and the *third* leading cause of transport airplane fatalities
- Boeing Safety - A top issue
- U.S. NTSB - Runway safety - top 10 issue since 1991
- Flight Safety Foundation - A top issue
- IATA - Recognized accident issue
- ICAO GRSS in May 2011 - A top issue

# Overrun Contributing Factors

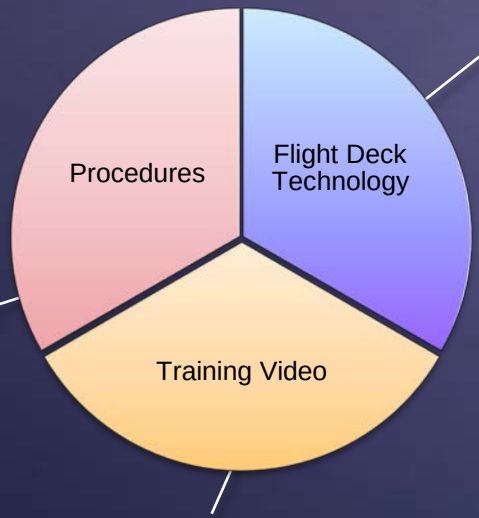


# Boeing and Embraer: overrun solution

## Runway Situation Awareness Tools

**For every landing**

- Perform a landing distance calculation
- Calculate and brief a go-around point
- Use appropriate Speedbrake/Thrust Reverser callouts




***Approach and Landing Training* video**

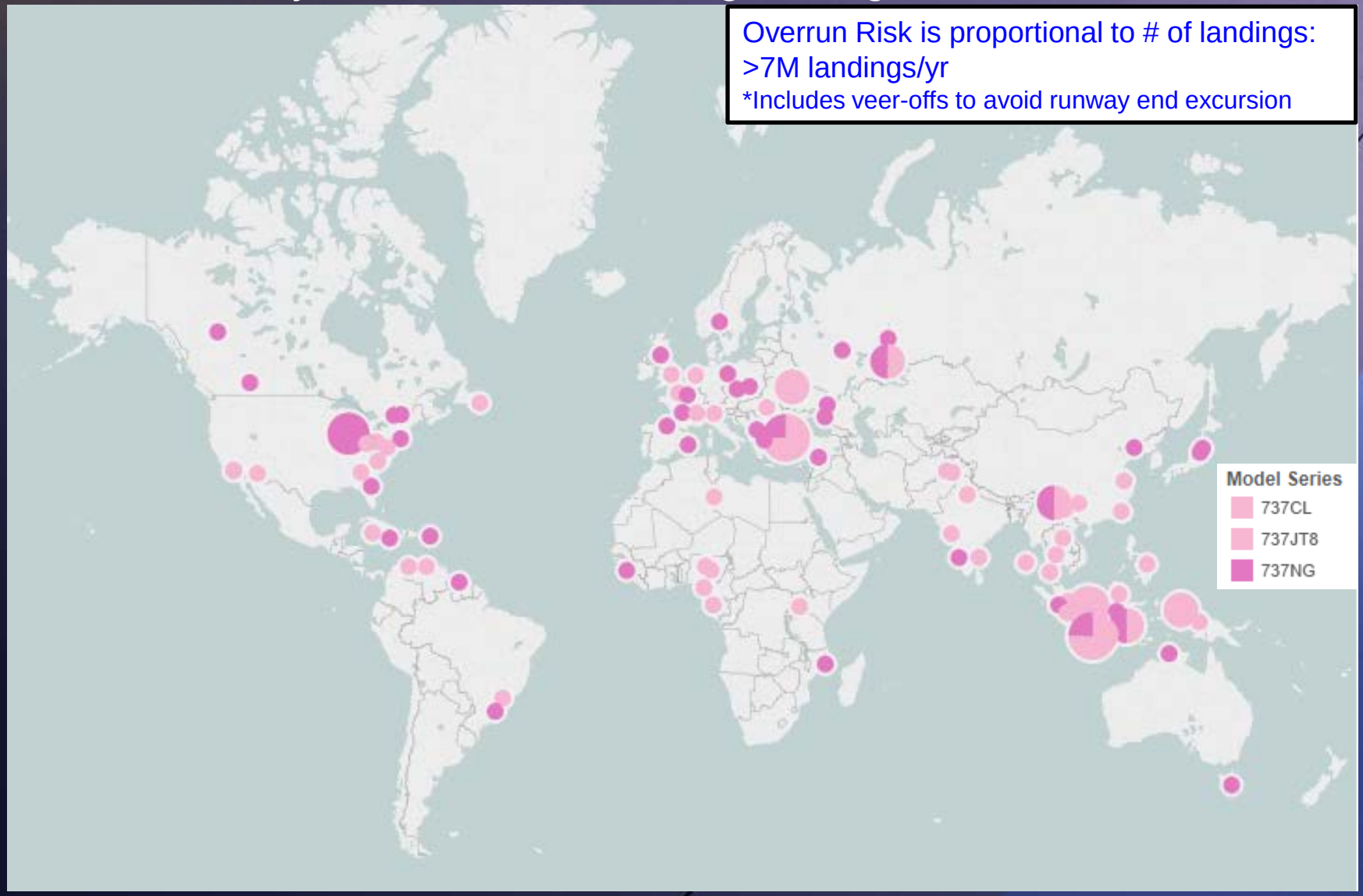
- Flying a stable approach
- Runway contamination or friction
- Checking runway length available versus required
- Reported conditions that vary from actual
- Approach speed additives and effect
- Proper, timely use of all deceleration devices

**Technology**

- Enhanced approach planning tools
- Aural and visual runway positional awareness and alerting
- Stability guidance and alerting
- Predicted runway stop location display
- Overrun alerting

# 737 Excursions: A Global Perspective

## Known Runway End Excursions during landing: 1991-2016



# Planning – Tablet app QRH Landing distance

**Approach planning** | **Approach** | **Flare** | **Deceleration**

Displayed landing distance – dry or contaminated runways

Assessment of runway available versus required

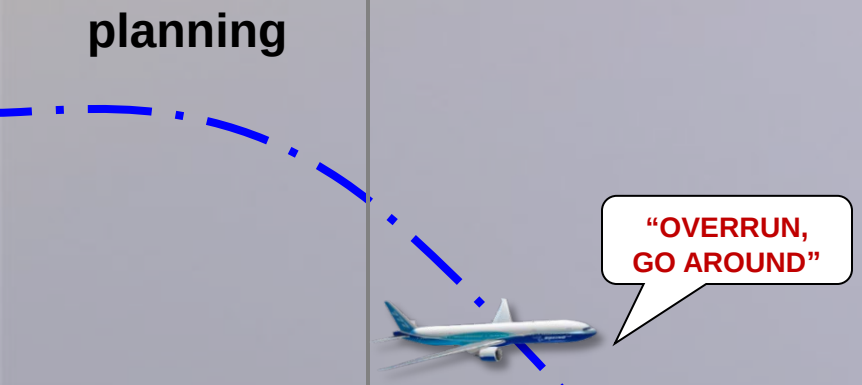
# Approach - RSAT

**Approach planning**

**Approach**

**Flare**

**Deceleration**





- Overrun alerting
- Perspective Runway

# Flare - RSAT

**Approach planning** | **Approach** | **Flare** | **Deceleration**

- Landing and flare guidance
- Runway positional awareness



**“*X* THOUSAND REMAINING”**

**“OVERRUN, GO AROUND”**

# Landing and Rollout - RSAT

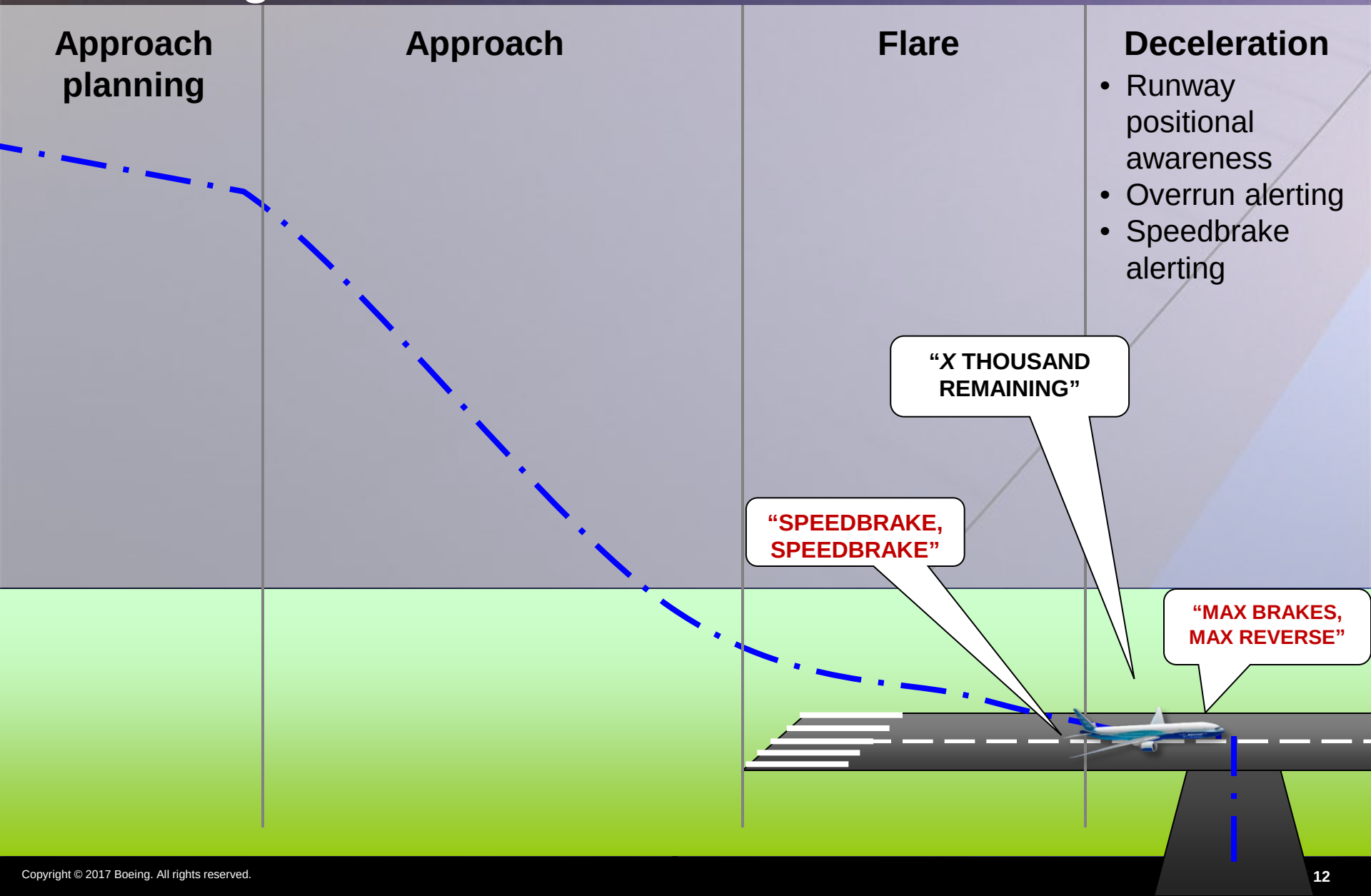
**Approach planning**

**Approach**

**Flare**

**Deceleration**

- Runway positional awareness
- Overrun alerting
- Speedbrake alerting



# 737 Program | RSAT, Features

EIS 3Q15

## Planning

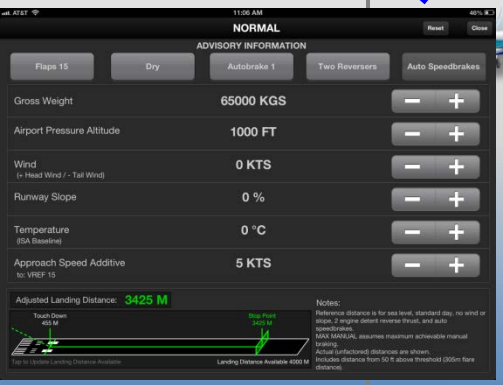
Tablet Planning Application

## Approach and Flare

Runway Positional Awareness
Integrated Flight Path Vector on PFD
Instability Alerting

## Deceleration

Runway positional awareness
Overrun alerting
Speedbrake alerting





GO AROUND

MAX REVERSE

"*X* THOUSAND REMAINING"

SPEEDBRAKE

# Runway Alerting and Awareness System (RAAS)

## - Primarily Runway Incursion Reduction

| Capability/Feature | Boeing RAAS |
|---|---|
| Approaching Runway (on Ground) | Callout |
| Approaching Runway (in Air) | Callout |
| On Runway | Callout |
| Extended Holding | Callout |
| Distance Remaining (Landing & Rollout) | Callout |
| Distance Remaining (Rejected Takeoff) | Callout |
| Runway End | Callout |
| Taxiway Takeoff | Caution |
| Short Runway Landing | Caution |
| Short Runway Takeoff | Caution |