



# Airbus Runway Safety Technologies

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**AIRBUS**

2008

**Where were we 9 years ago?**

Today

**How far have we come?**

Tomorrow

**Where are we going?**

# Information & Preparation for Landing in 2008

## CONFIGURATION FULL

		ACTUAL LANDING DISTANCE (METERS)									
WEIGHT (1000 KG)		46	50	54	58	62	66	70	74	78	
RUNWAY CONDITION	DRY	655	690	740	795	855	925	1000	1085	1170	
	WET	940	1000	1060	1120	1180	1245	1315	1385	1460	
	COVERED WITH	6.3 MM (1/4 INCH) WATER	1230	1320	1410	1510	1620	1730	1840	1960	2080
		12.7 MM (1/2 INCH) WATER	1200	1280	1370	1460	1560	1670	1780	1890	2010
		6.3 MM (1/4 INCH) SLUSH	1210	1280	1360	1440	1520	1610	1700	1810	1920
		12.7 MM (1/2 INCH) SLUSH	1180	1250	1320	1400	1480	1560	1650	1750	1850
		COMPACTED SNOW	1210	1280	1350	1420	1490	1570	1640	1710	1780
ICE	2610	2730	2860	2990	3130	3270	3410	3645	3690		

## CORRECTIONS

	CORRECTION ON ACTUAL LANDING DISTANCE								
	dry runway	wet runway	runway covered with						ice
			1/4 inch water	1/2 inch water	1/4 inch slush	1/2 inch slush	compacted snow		
per 1000 ft above SL	+ 4 %	+ 4 %	+ 4 %	+ 4 %	+ 6 %	+ 6 %	+ 5 %	+ 6 %	
per 10 kt headwind	No correction for headwind due to wind correction on approach speed.								
per 10 kt tailwind	+ 14 %	+ 20 %	+ 21 %	+ 21 %	+ 20 %	+ 20 %	+ 18 %	+ 27 %	
forward C.G.	+ 2 %	+ 2 %	+ 6 %	+ 6 %	+ 6 %	+ 6 %	+ 6 %	+ 3 %	
2 reversers operative	- 2 %	- 5 %	- 11 %	- 10 %	- 11 %	- 10 %	- 9 %	- 27 %	
Per 5 kt speed increment (and no failure) add 10 % (all runways)									

NOTE : - THE ABOVE DISTANCES ARE GIVEN FOR USE IN FLIGHT  
- BEFORE DEPARTURE REFER TO FCOM

## Runway 28

- Center 140ft
  - 40% bare and wet
  - 50% wet snow trace
  - 10% compacted snow
- Remaining width
  - 100% dry snow 3 inches

# Information & Preparation for Landing Today

ICAO State Letter Ref.: AN 4/1.1.55-15/30

... the use of an enhanced **global reporting format for assessing and reporting runway surface conditions**

## The Goal

All over the world, flight crew should be able to receive the runway condition information and have it mean the same thing:

EGLL 02170055 09L 3/2/2 75/100/100 05/04/04  
WET SNOW/SLUSH/SLUSH

Runway condition description	Runway condition code (RWYCC)
<b>DRY</b>	<b>6</b>
<b>FROST</b> <b>WET</b> (The runway surface is covered by any visible dampness or water less than 3 mm deep.) <b>SLUSH</b> (less than 3 mm depth) <b>DRY SNOW</b> (less than 3 mm depth) <b>WET SNOW</b> ( less than 3 mm depth)	<b>5</b>
<b>COMPACTED SNOW</b> (Minus 15°C and lower outside air temperature)	<b>4</b>
<b>WET</b> ("Slippery wet" runway) <b>DRY SNOW</b> (3 mm and more depth) <b>WET SNOW</b> (3 mm and more depth) <b>DRY SNOW ON TOP OF COMPACTED SNOW</b> (Any depth) <b>WET SNOW ON TOP OF COMPACTED SNOW</b> (Any depth) <b>COMPACTED SNOW</b> (Higher than minus 15°C outside air temperature)	<b>3</b>
<b>STANDING WATER</b> (Water of depth equal to or greater than 3 mm.) <b>SLUSH</b> (3 mm and more depth)	<b>2</b>
<b>ICE</b>	<b>1</b>
<b>WET ICE</b> <b>WATER ON TOP OF COMPACTED SNOW</b> <b>DRY SNOW OR WET SNOW ON TOP OF ICE</b>	<b>0</b>

# Information & Preparation for Landing Today

EGLL 02170055 09L 3/2/2 75/100/100 05/04/04  
WET SNOW/SLUSH/SLUSH

The screenshot displays a flight management system (FMS) interface. At the top, it shows the flight status: "My Flight", "LANDING", "F-A320", and "A320-214". The time is 17:48 and the battery level is 70%. The main display is divided into several sections:

- IN-FLIGHT**: A table of current flight parameters.

EGLL/LHR	HEATHROW
RWY	09L
WIND °/kt	(120/2)
OAT °C	5 (ISA -10)
QNH hPa	1010
RWY COND	1-Poor
LW T	60
LDG CG	Basic (STD)
LDG CONF	AUTO CONF
AIR COND	Off (STD)
A-ICE	Off
APPR TYPE	Normal (STD)
GA GRADIENT %	2.1 (STD)
VPilot kt	0
LDG TECH	MAN-A/THR on (STD)
BRK MODE	Manual (STD)
REV	Yes (STD)
- 09L**: A table of landing performance data.

LDG CONF	CONF FULL
VAPP	136 kt
EO GA SPEED	135 kt
EO GA GRADIENT AT 1583 ft	6.9 %
MLW (PERF)	90 T
- Vertical Profile**: A graphical representation of the descent path. It shows a vertical scale from 0 to 2430 meters. Key points include:
  - F-LD 2430 m
  - LD 2113 m
  - A 3901 m marker with a 250 m scale bar below it.
  - A "margin 1471 m" indicated by a green dashed line.
  - A runway threshold marker labeled "09L" at the bottom.
  - Two green arrows labeled "1" and "2" pointing to the right, indicating a crosswind component.
- Buttons**: At the bottom, there are buttons for "MEL 0", "CDL 0", "ECAM 0", "CLEAR", and "MODIFY".

# Information & Preparation for Landing Today

SPJC 02170055 15 2/2/2 100/100/100 04/04/04  
 STANDING WATER/STANDING WATER/ STANDING WA

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<b>SLUSH</b> (less than 3 mm depth)	
<b>DRY SNOW</b> (less than 3 mm depth)	
<b>WET SNOW</b> ( less than 3 mm depth)	
<b>COMPACTED SNOW</b> (Minus 15°C and lower outside air temperature)	<b>4</b>
<b>WET</b> ("Slippery wet" runway)	<b>3</b>
<b>DRY SNOW</b> (3 mm and more depth)	
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<b>ICE</b>	<b>1</b>
<b>WET ICE</b>	<b>0</b>
<b>WATER ON TOP OF COMPACTED SNOW</b>	
<b>DRY SNOW OR WET SNOW ON TOP OF ICE</b>	



# Information & Preparation for Landing Tomorrow

1. For an airport to make a runway condition report, they need to close the runway

2. How “slippery” is the runway?

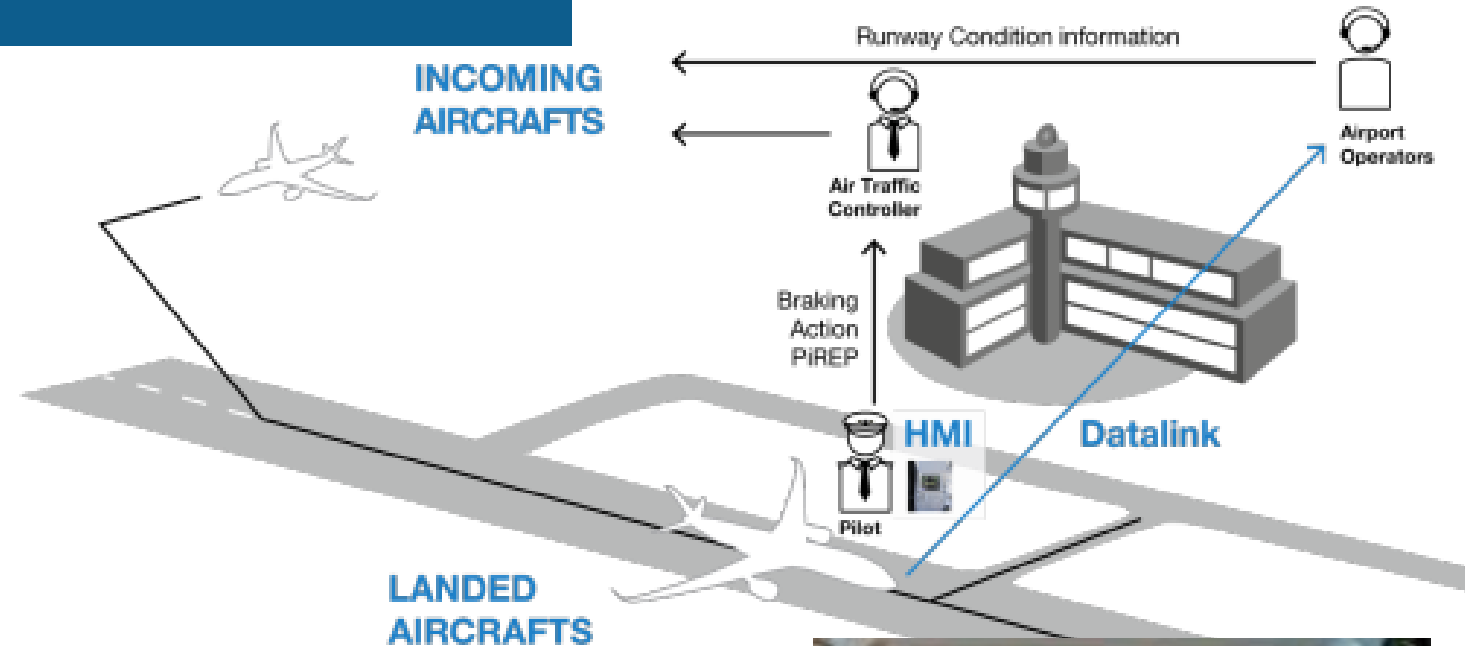
The interaction between contaminants and the runway are not always the same

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# Information & Preparation for Landing Tomorrow

## Aircraft as a Sensor for Slippery Runways

- Feedback to the Pilot & Data to the Airport
- Use the aircraft as a sensor to determine where on the runway slippery conditions are occurring and how slippery it was
- Display the information to the pilot to help with Pilot Reports
- Send data message to NAVBLUE servers for distribution to stake holders



**AVAILABLE  
2018**



**AIRBUS**



# Runway Overrun Prevention System in 2008



RUNWAY  
TOO  
SHORT



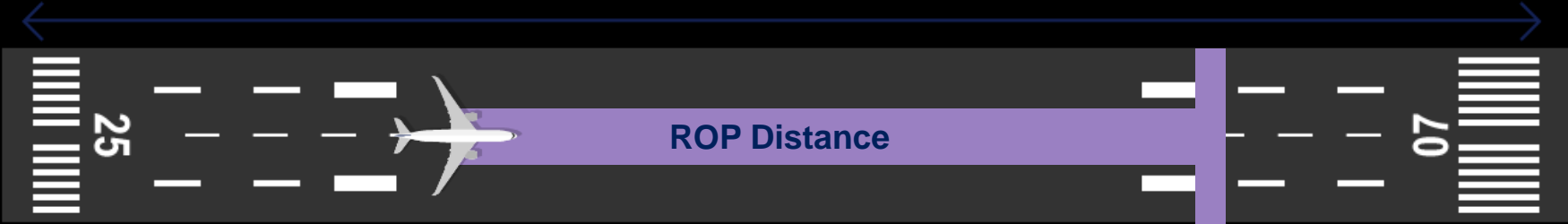
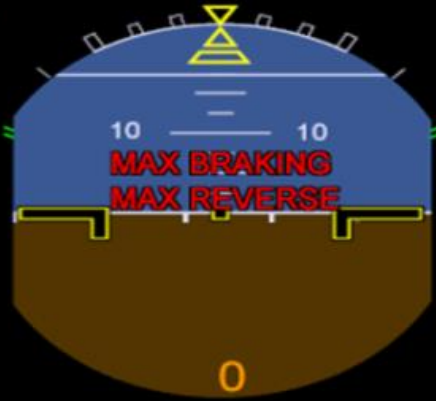
# Runway Overrun Prevention System in 2008



**BRAKE,  
MAX  
BRAKING**



**SET MAX  
REVERSE**



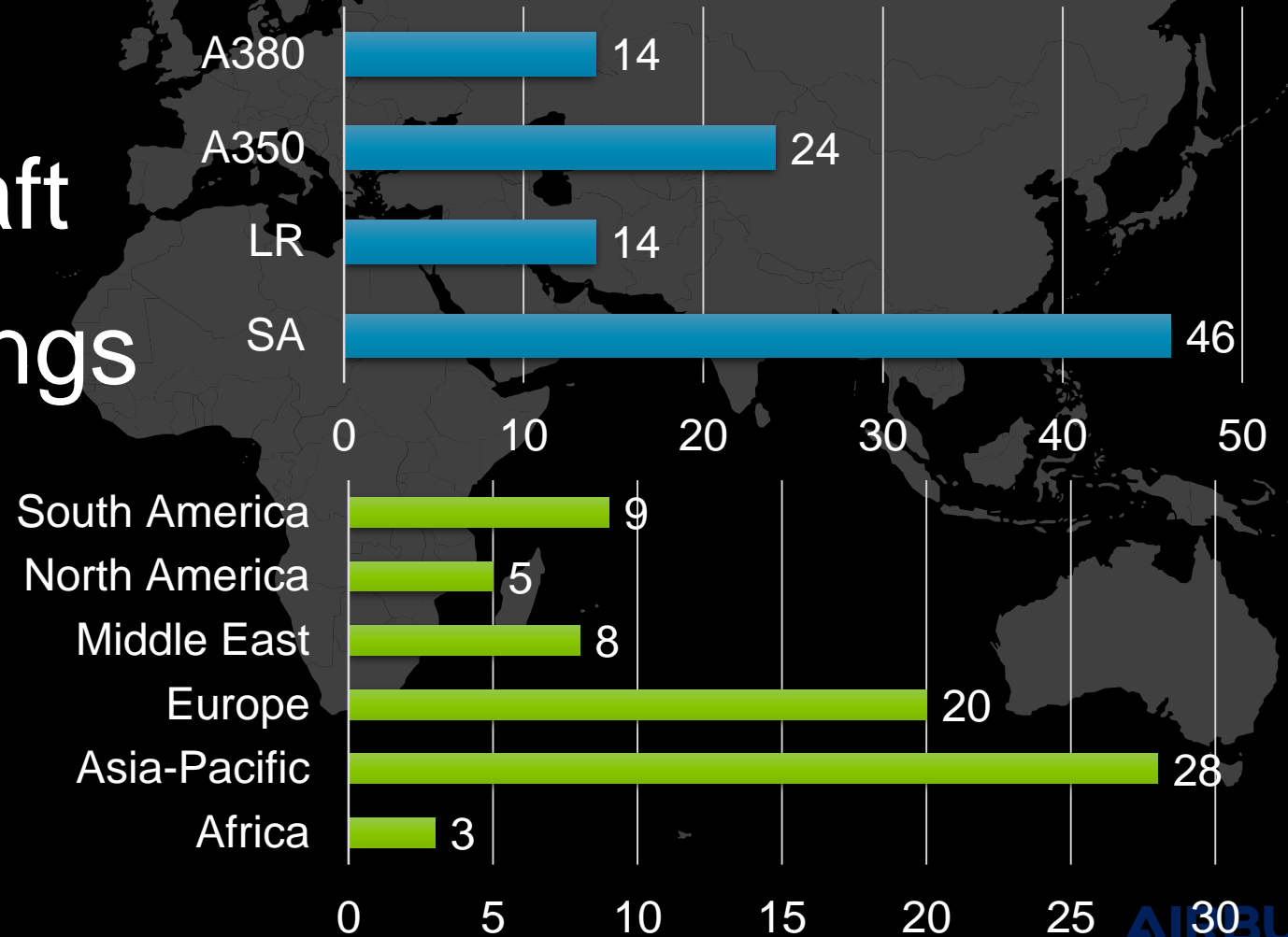
# Runway Overrun Prevention System in Today

860 Aircraft

1,355,000 Landings

A380  
A320  
A350  
A330

## Airlines



# Runway Overrun Prevention System Tomorrow

ROPS keeps getting better

Worldwide standard to facilitate adoption



Cooperation



**Lufthansa Honeywell**  
Aerospace

## Conclusion

- Runway Safety Technologies have come a long way in the last 9 years
- The safety benefits they bring to the aeronautical community are proven
- Nevertheless we need to continue to push forward and grab the low hanging fruit

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Thank you