



Runway Weather Information Systems (RWIS)

*EUROCAE WG-109*

Niklas Jost, 11.12.2019, Frankfurt am Main



# Introduction

## Runway Condition Reporting



- Runway contamination is a key factor for aircraft performance
- Ineffective braking due to runway contamination is a key risk factor in landing excursions
- Previous events demonstrated a lack of standard and accurate means to assess surface conditions, in order for pilots to determine landing performance

→ **New requirements (apply by 11/2020)**



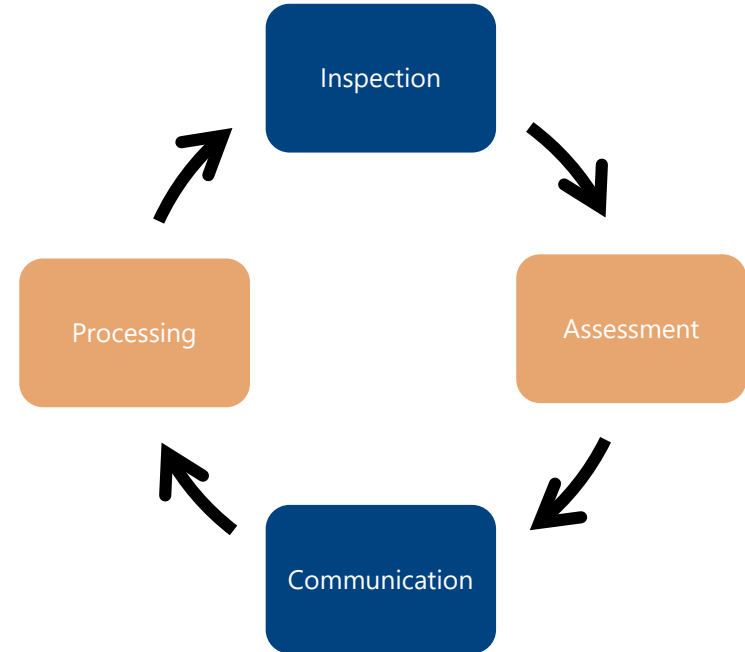
CHICAGO MIDWAY / WN B737-700 – DEC 8<sup>TH</sup> 2005 – CREDIT: GABRIEL WIDYNA

# Introduction

## Runway Condition Reporting



- Today`s runway condition assessment and reporting is mainly based on visual inspections
  - Discontinuous measurements/update frequency
  - Subjective/reproducibility
  - Runway closures
- **RWIS can provide relevant data in order to improve safety and airport operations**
  - **Reliability**
  - **Predictions**



# Introduction

## Standardization

Symposium on Runway Surface Conditions  
(Paris, 2016):

*"Significant gap between the abilities of the equipment (RWIS) and the needs of aerodrome operators."*

Call for participation EUROCAE (Paris, 2018):

*"No approach (RWIS) meets acceptable performance levels regarding ICAO`s RCAM."*

→ **EUROCAE WG-109**



# Standardization processes

International effort for standards



## **WG-109 Runway Weather Information Systems**



*(in progress)* Minimum Aviation System Performance Standards for Runway Weather Information Systems

## **E-17 Vehicle/Pavement Systems**



**E3188-19** Standard Terminology for Aircraft Braking Performance

*(in progress)* Friction Limited Aircraft Braking Measurements & Reporting

*(in progress)* Minimum Equipment Requirements for Mobile Surface Contaminant Classification & Measurement Equipment

## WG-109...

...was created in March 2018.

...is tasked to develop Minimum Aviation System Performance Standards (MASPS) for RWIS.

...has gathered more than 30 participants from 25 organizations in 11 countries.

...consists of the subgroups „Technical capabilities“ and „Airports needs“.

...is working under strong coordination with ASTM E-17.

Civil Aviation Authorities

Airport Operators

Sensors & Systems Manufacturers

Aircraft Manufacturers

Flights Crews

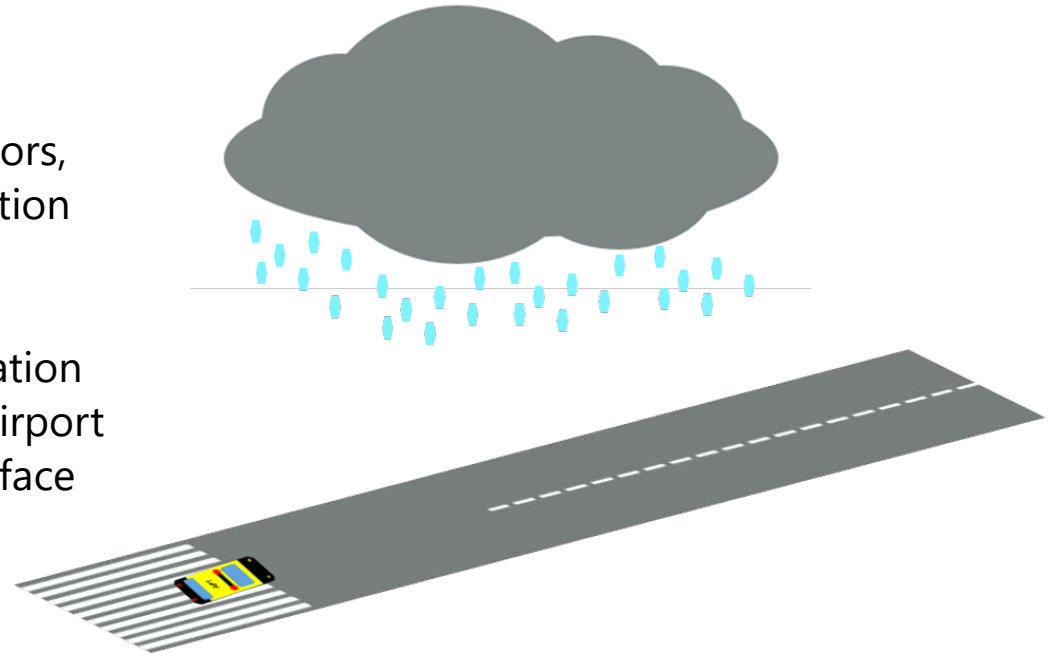
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## Standardization Process



WG-109 should work on

- information systems, combining sensors, models and algorithms, and visualization components
- that need to provide relevant information (including accuracy/confidence) for airport operators to assess their runways surface condition according to ICAO's Global Reporting Format guidelines
- at current time, and possibly for short-term prediction



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## Subgroup: Airport needs



- Development of use cases:
  - Runway Condition Reporting
  - Winter operations
  - Visual inspection
  - (Training)
- General requirements, minimum performance requirements for every use case (AO's view) and Performance evaluation procedures
- Survey on runway surface condition assessment
  - 31 questions
  - Results will be used for establishing the MASPS
  - <http://enqueteur.stac.developpement-durable.gouv.fr/index.php/73153>



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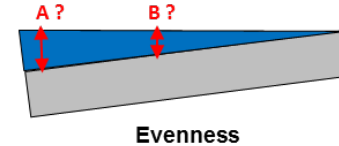
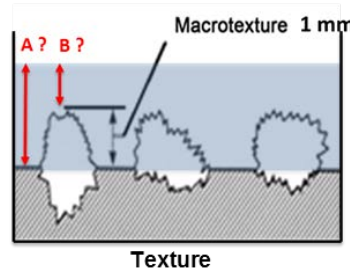
## Subgroup: Technical Capabilities



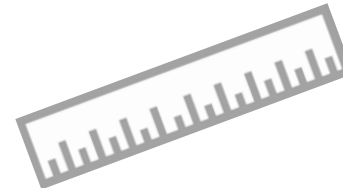
- Contaminant types
  - Physical criteria are needed to distinguish between contamination types
  - Determination of reference values



- Contaminant depth
  - Macro-/Microtexture?
  - Reference values?



- Tests
  - On-site/Laboratory
  - Influencing factors
  - Statistical criteria
  - Performance indicators



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## Minimum Aviation System Performance Standards



- Development until Q4/2020 (?)

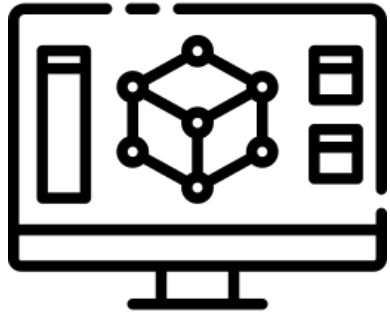
- **MASPS**

- *Performance Requirements*
- *Design requirements*
- *Laboratory test procedures*
- *On-site test procedures*
- *Quality processes*



SOURCE: EUROCAE

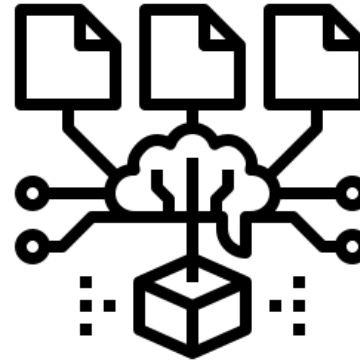
# What is next?



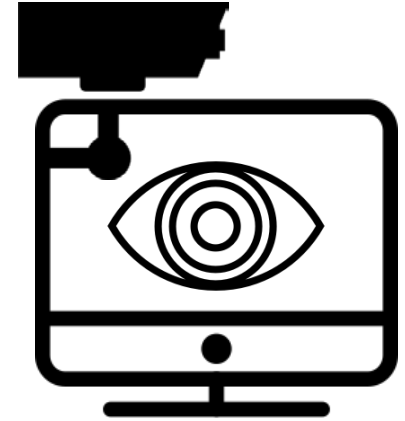
**Physical Modeling of Contamination**



**Aircraft as a Sensor**



**Big Data & Artificial Intelligence**



**Computer Vision**

# *Gute Reise!*

# *We make it happen*



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