

EASA Runway Friction and Braking (RuFAB)

Summary of Findings and Recommendations

- Taxonomies and Definitions
- Functional Friction Measurement
- Operational Friction Measurement
- Runway Condition Assessment
- Condition Reporting
- Condition Measurement Technologies.

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Summary of Findings and Recommendations

- There are a lot of **knowledge gaps**
 - Manufactures specs for aeroplane performance on contaminated surfaces
 - Ground friction measuring device correlation
 - Taxonomies
 - And more ..



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Summary of Findings and Recommendations

- Cooperation is the key to progress
 - TALPA-ARC has much to offer – let's learn
 - Review the background material
 - Monitor the trials
 - Conduct similar trials
 - ICAO-FTF can bring unified progress
 - Definitions
 - Standards.



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Summary of Findings and Recommendations

- Runway Condition Assessment - Needs work

- Runway access



- Training

- Improved rules are needed

- Measurement should replace estimating



vs.



- Condition Reporting

- Improved rules are needed

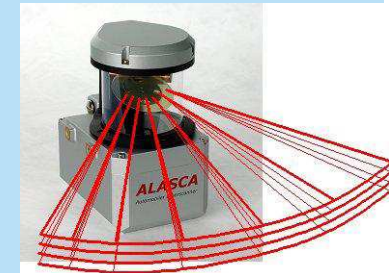
- NOTAMs from the inspection vehicle bring consistency and timeliness.



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Summary of Findings and Recommendations

- Condition measurement technologies
 - No COTS equipment at present
 - Highways and previous airport R & D have promising technologies
 - No one technology is the answer but combinations show strong potential
 - Aviation and airport developed specs. and fostering will guide industry in development.



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Summary of Findings and Recommendations

Friction Measurement

- DO WE NEED IT?
 - Functional + Operational
 - Different objectives need different policies support
- Functional
 - Pavement evaluation
 - Then correlation with aeroplane performance
- Operational
 - Provide runway surface friction measurement as input into aircraft TaLP calc.s
 - Decels and CFMEs advantages and disadvantages
- High Level design criteria needed.



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Summary of Findings and Recommendations

Functional & Operational Friction Measurement

- Previous CFME models and harmonization attempts did not include sufficient requirements for:
 - Accuracy
 - Consistency
 - Uncertainty
 - Testing frequency
 - Threshold values
- CFME performance spec.s, compliance, calibration and QA certification should be regulated
- ICAO Annex 14 table A-1 should be amended.

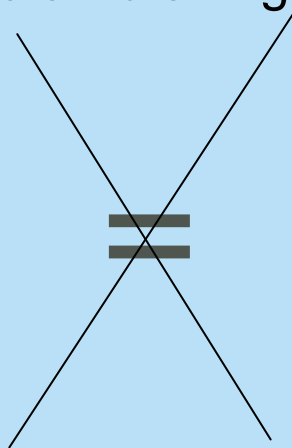


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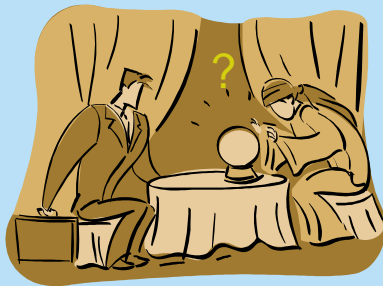
Operational Friction Measurement

- A clear understanding of the difference between friction measurement and aircraft braking performance is needed

Friction
Measurement



Braking Action



RIs don't have
crystal balls !

- Friction measurement does not account for:
 - Impingement drag
 - Residual lift
 - Aerodynamic drag
 - Displacement drag
 - Etc.

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Operational Friction Measurement



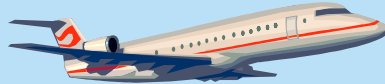
- ‘Under a shadow’ but single-system jurisdictions like it
- Friction measuring devices potentially can provide valuable operational friction assessment
- Current limitations have to be addressed
 - correlation
 - use on all surfaces
- Current devices are not fully meeting requirements
- If there is to be improved operational friction measurement we need high level criteria.



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Aircraft Derived Braking

PiREP Database
could contribute
significantly to
aeroplane TaLP
understanding



Field trials of a system for utilizing **aircraft data collected during previous landings** for near real-time determinations of surface coefficient of friction could add another dimension.



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Seasonal Reports of Runway Conditions

Winter

The need is well understood

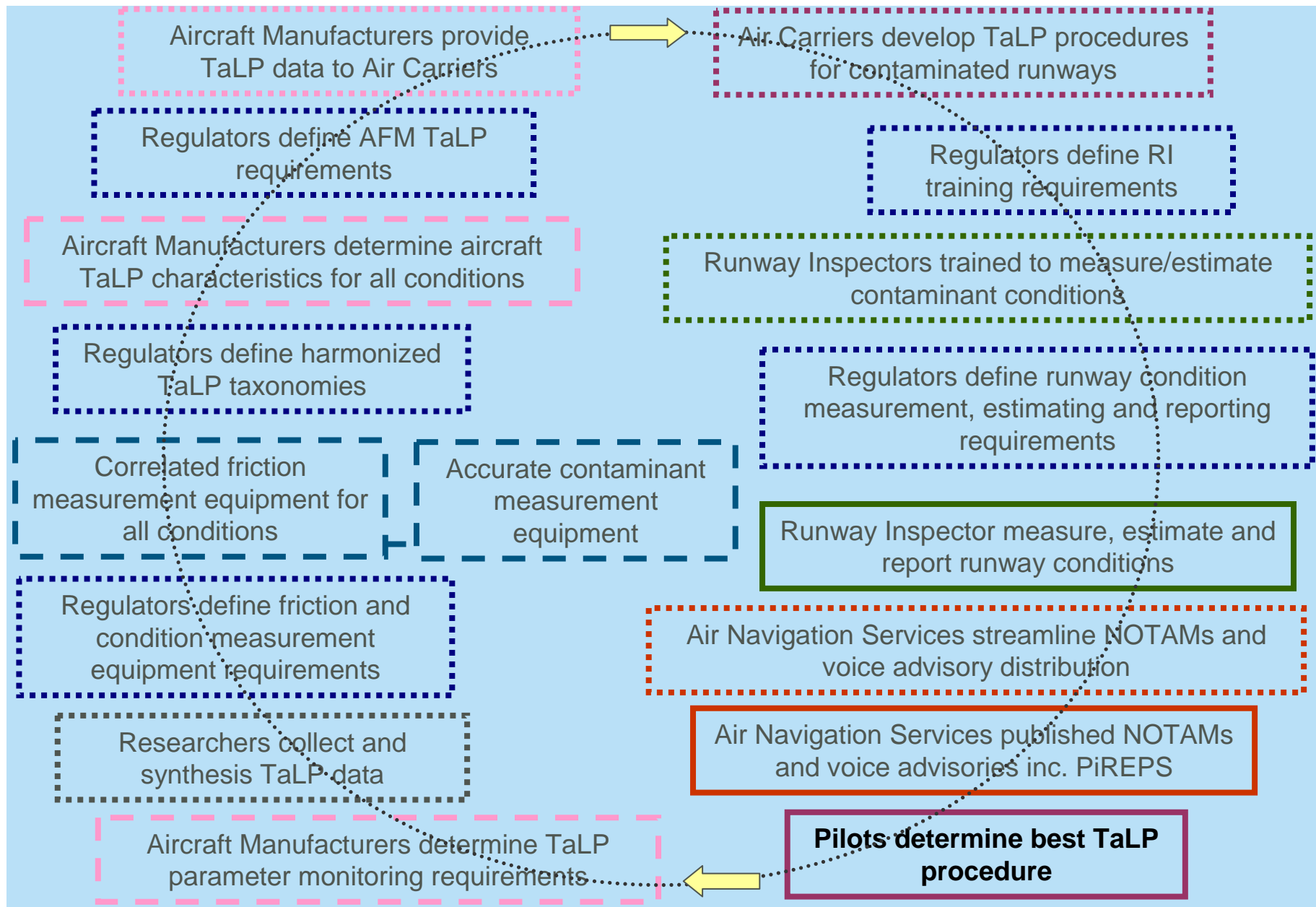


Where were you when I needed you!!

Summer

There is also an operational need !





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Thanks!

- George Comfort
- Zoltan Rado
- Al Mazur
- Terry Townshend

Any questions?