Dear Participants,
Dear Speakers,
Dear Colleagues,

I am pleased to be here today to conclude this Symposium organized by the STAC on the *Assessment and Reporting of Runway Surface Conditions*. I am delighted that so many of you were attending this important event. Thank you for coming and participating. The audience was diverse with many nationalities and wide-ranging stakeholders.

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Following various incidents and accidents related to misreported or misleading runway surface characteristics[1], it quickly became obvious in 2006 that a common runway surface condition description was needed between:
-Those who report the conditions (Aerodromes) ;
-Those who transmit the information (Air Traffic Services) ;
-Those who provide airplane performances data (Manufacturers) ;
-Those who use the runway surface conditions and the aeroplane performance data to assess landing performance capability (flight crews).

This task had to be led at an international level since an aeroplane can move all around the world and is supposed to operate on almost all kinds of paved runways.

The amendments of ICAO provisions adopted by the Council in March 2016 for application in 2020 fulfill this need with the introduction of a globally-harmonized terminology for the description of the runway surface characteristics in terms of presence of contaminants, along with tools like the *Runway Condition Report* (RCR), the *Runway Condition Code* (RWYCC) and the *Runway Condition Assessment Matrix* (RCAM). These tools meet a goal, eagerly expected by most of stakeholders within the aviation sector. The methodology proposed by the ICAO will significantly improve aviation safety worldwide.

The French DGAC formerly applauds the efforts of ICAO Air Navigation Commisssion, Aerodrome Panel and Friction Task Force, as well as FAA and TALPA-ARC for their works to progress this matter to such an achievement.

The French DGAC expects considerable benefits for of a more harmonized format when reporting runway surface conditions. It will allow almost real time communication by the aerodrome operator of the surface conditions to flight crews, with a clear terminology, directly related to aircraft performances.

For all these reasons, I gave my full support to the Civil Aviation Technical Center of DGAC (STAC) for its participation in the technical discussions needed to elaborate these ICAO provisions and for the organization of this Symposium. For a number of years now, DGAC has indeed maintained a high level of expertise in STAC in the field of assessment

[1] For instance the landing overrun of a Boeing 737-700 at Chicago's Airport in December 2005. This accident led to the formation of the TALPA-ARC (Take-off and Landing Performance Assessment – Aviation Rulemaking Committee) to provide recommendations for rulemaking to address the identified safety risk.

of runway friction characteristics, and more recently their link with braking performances of aircraft.

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A fundamental aspect of the assessment of the *Runway Condition Code* (RWYCC) is related to the use of a key tool called the *Runway Condition Assessment Matrix* (RCAM). Primarily centred on the description of contaminants (type, coverage, thickness), the RCAM has been studied through several international trial programs organized all around the world: US, Japan, UK, Switzerland, Italy and France.

Those experimentations represent real opportunities to check the usability of the RCAM for aerodrome operators and to establish recommendations and training programs. The objective is also to verify the consistency of the RWYCC with the *Pilot Reports* (PIREPs) which are so far the most accessible and simplest way to evaluate the actual braking performances of aircraft. It is shown that the correlation results differ according to the weather conditions and the type of contaminant which is encountered. By the way, recent mild winters have made the correlation exercise more tricky.

It has to be recalled that the first efforts were conducted by our FAA colleagues with the establishment of the TALPA-ARC matrix which was tested during two consecutive winters in the USA (2009-2011). The fact that USA is going to put soon the TALPA matrix into operation is reassuring. FAA has recently published an advisory circular (150/5200-30D) which provides guidance to aerodrome operators in assessing and reporting the runway surface conditions. This circular will undoubtedly be a basis for other States to establish their own guidance.

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The RCAM provides a global framework compatible with usual inspection practices which are generally visual (temperature readings, use of a graduated rule, etc.). The objective is now to investigate by 2020, date of application of the amendments, complementary tools and procedures which could make the assessment of the RWYCC more reliable, objective and up-to-date while remaining consistent with the RCAM principle. It is a common challenge for all stakeholders and innovation will arise from their collaboration.

Various initiatives have been presented during the Symposium. Some of them are led in the framework of research and innovation projects like *H2020 Future Sky Safety* project or the *SESAR* European multi-annual program. Let me list:

- The implementation of runway built-in sensors able to describe contaminants in a more reliable, robust and automatized manner. Technologies exist, and are already used in the road field and even by some aerodromes; however the performances of the measuring systems in terms of accuracy, range of measurement, capacity of providing real time information and feasibility of installation in a runway, must be studied and assessed in relation with ICAO requirements. Innovation actions will certainly have to be undertaken.

- The predictive modeling of runway surface conditions according to weather records. In particular, developments are expected regarding the prediction of water thickness by taking into account the dynamic nature of rainfalls and the topography of the runway.
- The use of braking data provided by on-board systems. The general goal is to help pilots in the realization of their Pilot Reports (PIREPs) and to participate in runway condition assessments by considering the aircraft as an airborne friction measuring tool.
- -The development of ground friction measuring devices able to emulate the braking conditions of aircraft (by taking into account specificities regarding tyres, weight, anti-skid braking systems, etc.). Moreover models are currently in development to physically correlate ground friction coefficients to real stopping performances of aircraft.

Aerodrome operators dispose of multiple cues to determine a consolidated and reliable Runway Condition Code. To guide them, there is a need of decision support models able to compile all available indicators from the traditional to the complex ones. Such approach requires an effective information sharing between all stakeholders.

Beyond the objective of improving safety and situational awareness of runway conditions, these efforts are aimed at optimizing the planning and use of runway capacity thanks to more precise information.

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Your discussions about maintenance have been fruitful. I note that the road field and the aviation sector face similar challenges: harmonization of friction readings, repeatability, reproducibility and time-stability of measurements, management of uncertainties, and of course the way to address a definition of the minimum friction level below which maintenance actions have to be planned. In both sectors, the principle of regular inter-comparisons seem a sound practice to address those challenges.

I am glad to observe that each domain gains from the other by sharing research results and participating in collaborative projects. This is all the more satisfying that I am familiar with both due to my current responsibilities and my passion for airplanes and flying, but also my previous duties as Director of road infrastructures in the ministry . Of course, each domain keeps its own specificities. The road network is so diffuse that it cannot be monitored in an exhaustive way whereas this is almost possible with a runway. The braking properties between a car and a measuring device are close whereas they are definitively different between an aircraft and a friction measuring machine due to clear distinct weights, operating modes of braking, etc.

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I did note that the round table gave the opportunity to share the perspectives of the various stakeholders about the road map and agenda for implementation.

- ICAO guidance will be prepared in 2016. ICAO recommendations will be provided at a high level in order to allow flexibility in the implementation.

- Nonetheless attention should be paid to the need for every stakeholder to make the necessary adjustments in their management and operations, including development of additional means, methodologies and procedures, in their operational information systems and their training programmes with tight interaction between the various adjustments. Timelines for training of all personnel are crucial.
- The establishment of a *RCR dedicated Implementation Team* is recommended to ensure proper planning and coordination. In France for instance, I have mandated STAC to take charge of this mission.

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We can be proud since we have converged to a high level of agreement. This broad consensus must lead us now to grasp the challenge of implementation. Four years won't be excessive. I hope that this Symposium will have enabled to initiate actions of coordination and collaboration in order to be ready in 2020 with this common objective of the improvement of safety in the most efficient way.