ASSIST, Advanced Snow plow and salt Spreader based on Innovative Space Technologies

Feasibility Study and Proof of Concept

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Abstract

In 2013 Swedish Transport Administration (STA) got a request from European Space Agency (ESA) if they were interested to participate in a feasibility study called Space Based Services for Winter Road Maintenance. As STA was interested on host a proof of concept, and after a tender manage by ESA with 8 bidders the contract was awarded to the Italian ASSIT consortium led by Istituto Superiore Mario Boella in Torino, Italy.

The ASSIST Feasibility Study intends to investigate a suite of potential high-end innovative services aiming to support the execution of winter road maintenance (in different operational scenarios, e.g. snow plowing and gritting) and also to provide an effective assistance to the drivers involved in these as well as the management overseeing the operations. These services are enabled by a robust and accurate real-time positioning of the vehicles based on satellite navigation, e.g. GPS and Galileo - and by road geometry information and road weather forecast - through integrating Earth Observation with in-situ technologies.

The architectural design goes in direction to realize an end-to-end solution taking advantages on the space assets domain for advanced winter service provisioning. ASSIST strategy proposed to build up a high fidelity and updated model of the road to clear collecting acquired by external service providers in a cloud-computing platform. Such model allows evaluating analytically the geo localized work parameters (both in terms of salt spreading and snow plow control) in order to maximize the effectiveness of the winter maintenance treatment. The application of such parameters is in charge to a NAV\COM intelligent device mounted on the truck, called On Board Unit (OBU)) that is able to automatically control the mechanical equipment for the effective actuation

Thanks to the conceived intelligent system architecture, ASSIST solution integrates additional function blocks (e.g. tracking\telemetry of the trucks, Intelligent Device Management) that permits to provide a comprehensive support to the overall winter maintenance activity.

The ASSIST Feasibility Study has been concluded in May 2015. A suite of innovative space-based “assistance services” in supporting the major operational scenarios for the winter maintenance has been deeply investigated with positive results. The technical feasibility and the users’ acceptance of such services have been assessed through an actual Proof of Concept that took place in the 2014-2015 winter season as an extensive field test in Sweden and a showcase in Norway, with a direct and active involvement of two Nordic public administration and their contractors.

The viability analysis performed during the Feasibility Study confirmed the ASSIST potential, showing benefits coming from its adoption for all key actors of the winter maintenance value chain. The ten years business plan also showed clear opportunities for all partners, especially for Giletta S.p.A. as equipment manufacturer acting as “ASSIST service provider”.

Following the positive feedback on both the technical feasibility and the market attractiveness, the same partnership is now fully committed in a 24-month Demonstration Project by ESA, with a start 2016, in sight of the roll out of full operational “assistance services” in 4 different European countries; Sweden, Norway, Austria and Italy.