ASSIST - ADVANCED SNOW PLOUGH AND SALT SPREADER BASED ON INNOVATIVE SPACE TECHNOLOGIES

Jan Ölander
Senior Consultant
Swedish Transport Administration
Do we really need all new technologies to move some snow or remove some ice?
3.1 Study Objective

The objective of the feasibility study is to determine the technical feasibility and economic viability of space based services that supports winter road maintenance. The focus shall in the first hand be on services assisting drivers of snow ploughs in finding the way and spreading suitable amounts of salt and abrasives, although other related areas may also be considered. Key will be to find a suitable trade-off between cost and sophistication taking market demands into account. Also a suitable model for service provisioning needs to be determined. The service and system need to build on already existing and mature components as far as possible.

An important part of the study is the Proof-of-Concept, whose main objective is to verify and validate critical issues. This shall include a demonstration.

In addition to the users brought to the feasibility study by the tenderer, the Swedish Transport Administration and the Norwegian Public Roads Administration will be involved as users in the study. The study itself shall also take a wider market into account (at least a European perspective). Involvement of users and other stakeholders shall be secured for a follow-on demonstration project.

Space based → utilization of at least two space assets, e.g. satellite communications, Earth Observation, satellite navigation (GPS, Galileo, GLONASS)
THE ORIGINS...

Invitation to Tender (ITT) issued by the European Space Agency (ESA) for a 1-year Feasibility Study dealing with the winter road maintenance

Space Based Services for Winter Road Maintenance

Statement of Work
ASSIST CONSORTIUM AND PARTNERSHIP

FUNDED by

ESA funds ASSIST in ARTES 20 Integrated Application Promotion (IAP)

PROJECT PARTNERS

ISTITUTO SUPERIORE MARIO BOELLA

GILETTA S.p.A.

GEOVILLE

ALPHA CONSULT

ENGAGED USERS

TRAFIKVERKET
The Swedish Transport Administration (Trafikverket)

Statens vegvesen
The Norwegian Public Roads Administration (NPRA)
WHAT IS ASSIST?

A project that aims to evaluate the convergence of multiple space assets from both technical and economic point of view. It aims to trade off the most efficient solutions with respect to the identified user needs and requirements for the winter road maintenance operations according to a user driven approach.
ASSIST OPERATIONAL SCENARIOS

- Snow plowing
- Anti- and De-icing
- Airport Maintenance
- Re-opening Mountain Passes
- Winter Convoys
ASSIST ARCHITECTURE

- GNSS and IMU integration
- Position performance enhancement by means of EDAS augmentation
- Compliance with CEN standards
- Data transfer from the WSM to the OBUs for pre-route and on-route information
- Telemetry and Missions management
- Augmentation provisioning

Winter Services Middleware (WSM)

Vehicle Equipment
- Corrections over RTCM protocol

Satellite Navigation Augmentation
- Local Area Systems (DGPS Network)
- Wide Area Systems (EGNOS/EDAS)

Earth Observations
- Weather Forecasts and Snow Information
- Road Weather Information
- Digital Information (i.e. road boundaries, bus stops)

Users Interface
- Road Management Systems (i.e. Highway Systems)

Third Party Systems
- Traffic Information (from road systems)
- Road Database
- Geo Information (e.g. aerial images)
## ASSIST SERVICES

<table>
<thead>
<tr>
<th>Services</th>
<th>Level of Services</th>
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<tbody>
<tr>
<td>Snow Plow Control Assistance Service</td>
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<tr>
<td></td>
<td>1</td>
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<tr>
<td>Road Icing Control Assistance Service</td>
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PILOT-DEMONSTRATIONS AREAS

THE USERS AND STAKEHOLDERS

- 4 different end-users
  - Private highway concessionaires
  - Contractors

- 4 different Countries

- 3 different «regions»
  - Nordic (Scandinavia)
  - Alps
  - Central Europe
THE ARCHITECTURE TO BE DEPLOYED
Pilot Demonstration vehicle in Sweden
RSI – Road Surface Information
Volvo car-to-car slippery road detection
Thank you for your attention

More and updated information at:
https://artes-apps.esa.int/projects/assist-fs