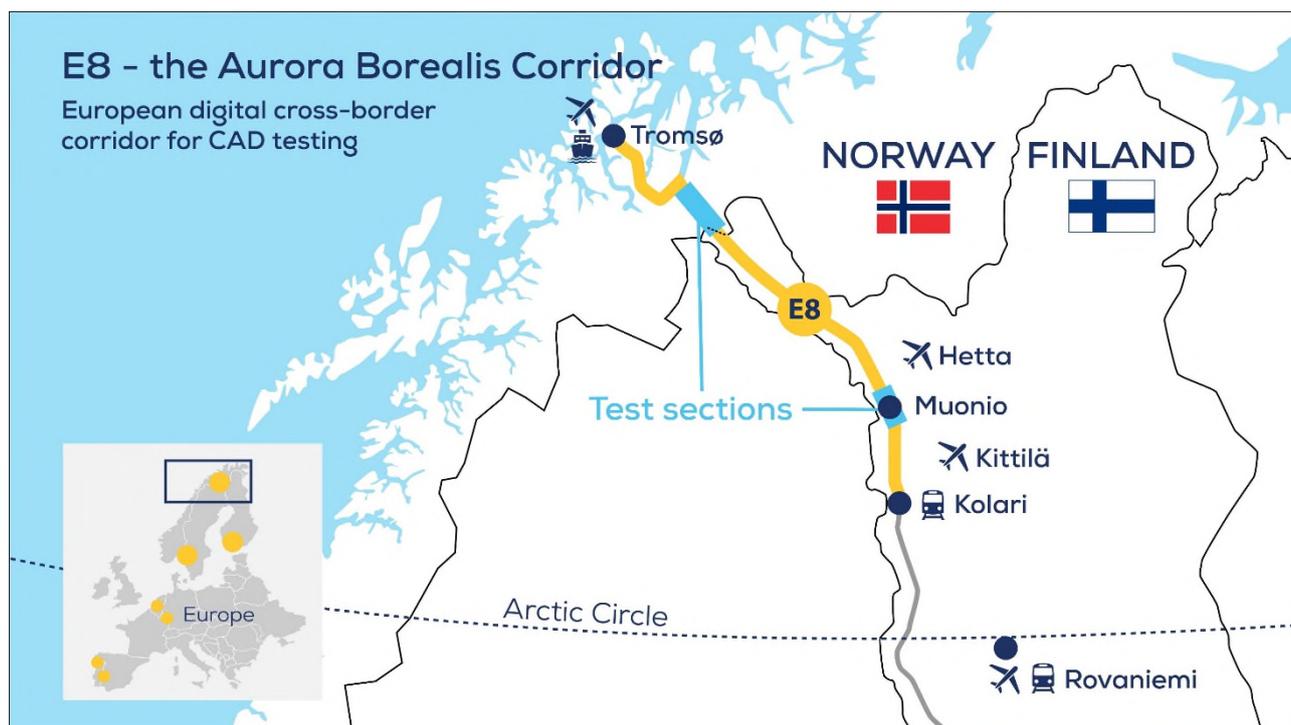


# Using in-vehicle information services to improve road safety - The Arctic Challenge Project

## 1 Abstract

With individual vehicle data becoming more widely available, the Aurora Arctic Challenge project in Finland provides a first glance at how in-vehicle services perform and provide benefits to road authorities and users under winter conditions. Emerging central ITS platforms are positioned to link traffic management centres to road users to provide real-time services which focus on enhancing safety and traffic flow. Together with research partners and the Finnish Transport Authority, Dynniq has been testing services in sub-zero conditions to provide learnings on the operation of these services on a key logistics corridor between Norway and Finland. Results of testing and a first public demonstration share insight on how such services can be tested in both urban and inter-urban environments in the UK, following initiatives such as Intercor and the ITS-Corridor projects.

## 2 The Aurora Borealis corridor



The Aurora Borealis Corridor is one of several testbeds currently active in Europe for infrastructure and vehicle technologies. It aims to promote development of connected and cooperative ITS applications, vehicle autonomy/driver assistance and asset management. The testbed ecosystem includes:

- > Precise positioning service, accuracy of 5cm
- > Wireless dedicated 4G network/ITS-G5
- > Pre-5G testing possibilities

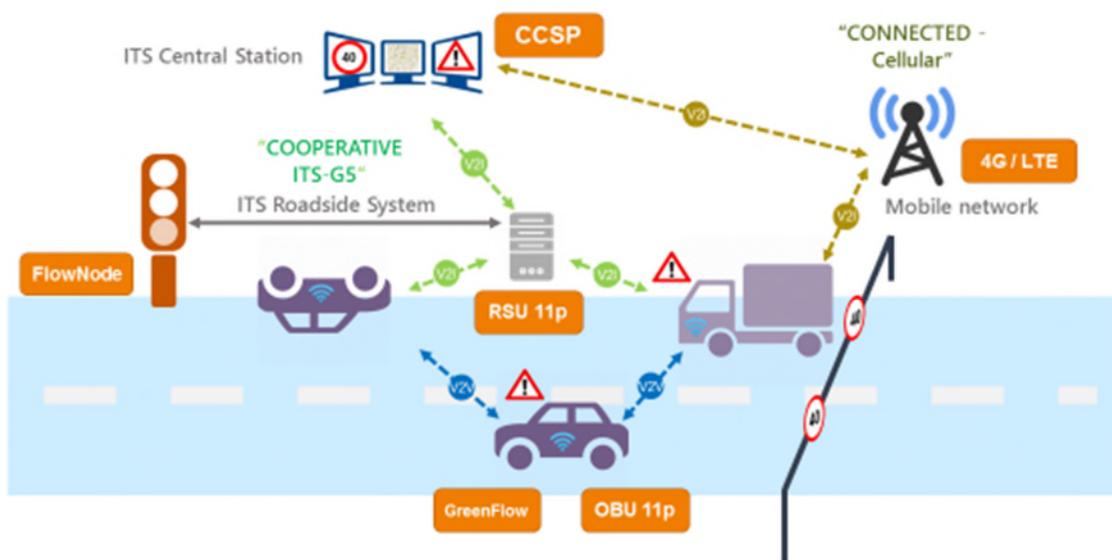
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- > HD map services
- > High accuracy road weather information

The entire route is inside the Arctic Circle, providing the opportunity to test equipment and solutions in some of Europe’s harshest conditions.

### 3 Dylnniq’s C-ITS ecosystem

Dylnniq have developed a complete ecosystem of C-ITS products based on the extensive development by European Telecommunications Standards Institute (ETSI) of the ITS-G5 protocol and message types. We are no seeking to work with road authorities to trial our equipment in real-world scenarios and refine it based on genuine operational use cases.



#### 3.1 CCSP – Connected and Cooperative Service Platform

The CCSP is a back office system which handles the creation and routing of C-ITS messages through the RSU/4G network. It also handles the collection of data from vehicles. The CCSP is the key connection between multiple local C-ITS networks and traditional traffic control systems such as UTM and UTC.

#### 3.2 RSU – Roadside Unit

The Roadside Unit handles transmissions and receipt of messages to and from vehicles within range. It also provides interfaces into local traffic signal controllers allowing it to share information on the signal phase and timing as well as utilise vehicle data for signal detection. RSUs can be run in isolation or networked, connecting back to a central CCSP.

#### 3.3 OBU – Onboard Unit

The Onboard Unit handles the formation and transmission of C-ITS messages by a vehicle as well as the receipt of messages from other units. This function will be built in to future vehicles but in order to address present and near future customer needs, as well as to test the end-to-end solution, Dylnniq has created its own OBU.

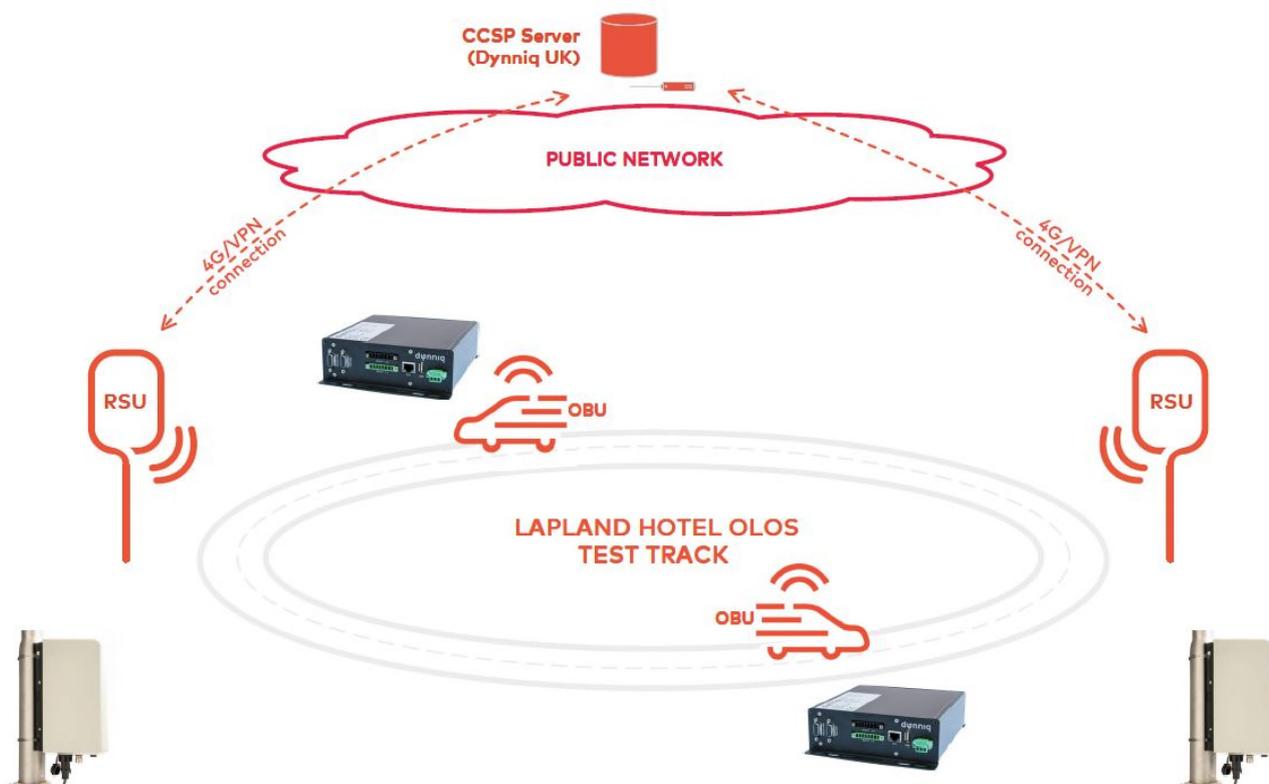
### 3.4 GreenFlow

GreenFlow is Dylnniq’s end-user application for the drivers of C-ITS enabled vehicles. It currently runs on a tablet in the vehicle, in future it would run on the in-vehicle system. It processes data received by the OBU to provide on-screen incident warnings, information and signal timings.

## 4 The Aurora TestFest

<https://www.youtube.com/watch?v=WfbkpPS-qss>

The Aurora TestFest was conducted on a short circuit in Muonio with an automated vehicle driving the circuit and sending and receiving ITS-G5 messages via Dylnniq Onboard and Roadside Units (OBUs and RSUs). We were able to successfully demonstrate our implementation of stopped vehicle warnings. The whole setup was managed by Dylnniq’s Connected and Cooperative Services Platform (CCSP) which was hosted remotely in our UK datacentre.



## 5 What next?

### 5.1 The Artic Challenge continues...

Dylnniq are still working on the Aurora Borealis corridor to further test and demonstrate our C-ITS.

- > Interface CCSP with Infotripla to connect traffic management system data, allowing incident and other data from traditional sources to be communicated over C-ITS channels
- > Provide 4G communications to the vehicle (in combination with ITS-G5)
- > Enable additional Day 1 services

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- Reindeer Warning
  - Roadworks Warnings
  - In-vehicle Signage
  - Incident and Accident information
- > Expanding onto Aurora E8 test section

### 5.2 ...and C-ITS scales up

