

Ireland

Network Intelligence and Management System (NIMS)

Kapsch TrafficCom was contracted in 2020 by Transport Infrastructure Ireland (TII) for the implementation of a new Network Intelligence Management System (NIMS) under an innovative program known as enhancing Motorway Operation Services (eMOS).

The Kapsch DYNAC® solution combines mission critical performance, reliability, security, scalability, and a data-centered architecture with the latest software technology.

The objectives of the eMOS program and the NIMS project are to:

- reduce the adverse impact of traffic growth
- support the management of incidents to reduce the level of disruption and journey time variability
- enhance the safety of road users and road workers
- implement coordinated multi-agency event responses
- improve public information dissemination
- enable and promote future technology



Overview

To this end, TII is committed to continuously improving its technology, infrastructure and the level of service it provides to the public. Through the realization of NIMS, TII is seeking to more effectively manage traffic flow and optimize the performance of the motorway network, capture and disseminate traffic and network performance information, and coordinate incident response capabilities. Additionally, TII will gain improvements by supporting affiliated services. These will help improve maintenance of the road network infrastructure, manage the receipt and approval of road space bookings, manage events, and respond to public and stakeholder calls or requests for assistance and operational engagement.

NIMS will replace the current Active Traffic Management System (ATMS) as well as other legacy supporting systems. NIMS will also be integrated with other TII central systems and existing field equipment that will be retained and with new field equipment brought into service through other works performed under the eMOS program. As the project involves a significant integration with existing legacy field equipment and new roadside technology, the migration to NIMS operational control of the road network and its related services will follow a phased implementation and rollout approach. The phased cutover is designed to minimize disruption to normal motorway operations, maintain network safety, and optimize traffic flow for the public.

A separate but integrated part of the NIMS project is a dedicated and fully integrated C-ITS pilot funded by the European C-ROADS initiative. All of the C-ITS pilot deployments will take place along the European Core TEN-T corridors. The Irish C-ITS deployment will enable TII to analyze the impact of utilizing new technology and determine the benefits of innovative solutions.

The delivery of the NIMS solution is expected to be completed in four stages. Following the first Go-Live stage of NIMS, Kapsch will undertake operations support and maintenance services over the term of the base contract period through the end of project year 5. Provisions are included for optional support and maintenance renewals for up to an additional 5 years (2+2+1 years). The total contract value including the base contract and support period renewals is nearly EUR 20 million.

Project Scope:

- Replacement of the existing ATMS to manage the national road network under TII responsibility
- Information dissemination to the public & stakeholders via motorway signs and signals, TII website
- Traffic management and congestion management for the M50 and parts of the M1 through new lane control signals (LCS), slip road signals (SRS) and tactical variable message signs (VMS)
- Automatic Incident and Congestion Detection (AICD) for advisory and mandatory/enforceable sign and signal settings
- New implementation of the Kapsch back-office Journey Time Management System (JTMS)
- C-ITS Pilot project funded by the European C-ROADS initiative along the Core TEN-T corridors
- Development, implementation and support of the new TII traffic website
- Integration with the existing Asset and Fault Management System (AFMS)
- Management of the receipt and approval of Road Space Bookings
- Management of ad-hoc and planned Events including work zones approved via the Road Space Booking system
- Deployment within the Authority's data center environment and IT infrastructure
- Operational support of the new solution for the TII motorway operations

The Challenges:

- NIMS involves the integration of existing and new Intelligent Transportation System (ITS) field assets located throughout the TII National Road Network. These conditions require carefully planned and coordinated implementation stages with migration occurring in phases to maintain continuity of service for motorway operations while ensuring optimized traffic flow and motorway safety.
- Integration of third-party systems with the new NIMS solution.
- Coordination and alignment of works between different stakeholders engaged in the project under separate contracts.



The Solution:

- Kapsch will deploy its DYNAC® ATMS software suite as the core of the NIMS solution. DYNAC® is a high-performance software suite and integration platform proven for vital transportation networks and infrastructure around the world. The Kapsch DYNAC® solution combines mission critical performance, reliability, security, scalability, and a data-centered architecture with the latest software technology. The software's fully integrated suite of applications and highly configurable design allow it to be deployed in a variety of applications including motorways, toll roads, tunnels, bridges, managed lanes, and reversible roadways. Developed by Kapsch, DYNAC® merges real-time data acquisition and control engines with advanced information management services tailored to the needs of modern traffic management and transportation control system operations.
- As part of the C-ROADS funded C-ITS Pilot, Kapsch will deliver its integrated C-ITS central system which has been specifically designed for the Connected Vehicle (CV) ecosystem. The C-ITS system called CMCC (Connected Mobility Control Centre) interfaces with V2X roadside units (RSUs) as well as on-board units (OBUs). The solution was developed to comply with both the European Connected

Vehicle C-ITS standards and International SAE / IEEE standards suite. CMCC's capabilities were extended to include a hybrid virtual roadside (vRSU) front-end according to C-ROADS harmonized specifications.

CMCC is designed as an extremely robust and advanced software solution for operating, managing, configuring and monitoring the V2X roadside equipment. It enables the operator to generate I2V messages, configure road layouts and collect data from vehicles for further processing. CMCC will also provide an extension for hybrid communication utilizing 4G/5G cellular networks via vRSU and addressing mobile subscribers with seamless information authenticity.

The C-ITS Pilot incorporates the Kapsch TrafficAssist mobile app as a vital component. This app provides users with a unified driving screen on their mobile devices, seamlessly integrating a map view with real-time C-ITS notifications and signage. This ensures users stay informed about relevant C-ITS events while on the road.

The C-ITS system enables C-ROADS Day 1 and Day 1.5 use cases, which were captured by the project's C-ITS use cases. CMCC will inform the road users about information, such as speed limits, and warn about hazardous locations and roadworks. Furthermore, it will provide information about electric vehicle charging spots along the roadway

CMCC will be delivered fully integrated with DYNAC® via internal middle-ware, termed Mobility Data Platform (MDP), to enable the next-generation traffic platform for TII. Additionally, cross-border testing will be part of the C-ITS Pilot operation to improve interoperability and mid-term efficiency.

The Kapsch Mobility Data Platform (MDP) will be delivered as part of the NIMS solution and serve as a platform for data services and processing between Kapsch-supplied systems and external systems.

The NIMS solution will leverage the MDP and Origin-Destination Matrices (ODM) with Travel Time module to satisfy the Journey Time Management System (JTMS) requirements for the project.



The Added Value

- Adaptable for TII concept of operations
- Leverages existing IT infrastructure and systems
- Scalable to adapt to geographic expansion
- Extensible & highly configurable solution
- Future-proofing/innovation roadmap

Kapsch TrafficCom

Kapsch TrafficCom is a globally renowned provider of transportation solutions for sustainable mobility. Innovative solutions in the application fields of tolling, tolling services, traffic management and demand management contribute to a healthy world without congestion. Kapsch has brought projects to fruition in more than 50 countries around the globe. With one-stop solutions, the company covers the entire value chain of customers, from components to design and implementation to the operation of systems. As part of the Kapsch Group and headquartered in Vienna, Kapsch TrafficCom has subsidiaries and branches in more than 25 countries. It has been listed in the Prime Market segment of the Vienna Stock Exchange since 2007 (ticker symbol: KTCG). In its 2020/21 financial year, around 4,660 employees generated revenues of EUR 500 million.

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