Achievements and Results of Traffic Management Services in the CORVETTE Project

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1. Introduction

The CORVETTE Euro-Regional ITS project area stretches from the German region of Bavaria in the north to the North-Italian region in the south and from Switzerland in the West to Austria in the East. The geographical location within the central Alpine area demands from every CORVETTE region to always consider transit traffic streams when initiating traffic related projects since the transit traffic contribute a major part to the traffic streams in the regions. Because of the geographical peculiarities in the CORVETTE area, namely having only a limited number of routes allowing the traffic to pass through the Alpine Arc region and also facing difficult weather conditions, to name just a few, international cooperation among regions is imperative in order to increase safety, minimizing travel times and thus reduce the adverse impact of the traffic streams on the regions. Traffic management services in CORVETTE include the continuous development and deployment of traffic control measures at the strategic level (traffic management plans) and at the tactical level (detection and control infrastructure: line-control systems, variable message signs, lane shoulder usage and access control; safety measures for critical sections and incident detection and management tools and measures). The paper provides an overview of progress and evaluation on the key traffic management measures deployed in CORVETTE within MIP I (2001-2006) period.

2. Traffic Management Plans Development and Deployment

For traffic management plans (TMPs), work is well in progress to develop and implement the institutional arrangements at the regional and cross-border levels to validate and deploy the TMPs and to develop the operational level of these TMPs. Activities for traffic management with other Euro-Regional projects have been set-up with concrete results including joint TMP development and validation and long-distance corridor demonstration with CENTRICO, SERTI, ARTS and CONNECT. TMP work in CORVETTE includes:
- development and validation of traffic management strategies for the CORVETTE Alpine corridors in CH, IT, BY and AT
- Set-up of national and cross-border organisational structure for validation of TMPs and linking available road-side and TIC/TCC implementations.
- Development and validation of traffic operational measures in the Brenner Corridor between Austria, Italy and Bavaria.
- Acceptance of Brenner TMP strategies and measures and pilot testing cross-border TM communication and co-ordination of on a regional and cross-border level
- Pilot phase of Brenner cross-border TMP operation starting from June 2007

In Switzerland, work is underway to develop the necessary organisational and technical infrastructure for developing and operating Traffic Management Plans at the regional, national and cross-border levels. As of 2008, under new federal road regulations, traffic management on national road network will be done at the federal level by Federal Roads Office in co-ordination with the various cantons and police. First TMPs will be operational in 2008 with the set-up of the national traffic management centre.

3. Key Examples of Traffic Control Measures Deployment

For traffic control on the TERN, the planning and deployment of innovative ITS systems is well underway in order to increase the services for a smooth informed traffic flows on the CORVETTE network. Traffic safety measures deployments on the CORVETTE TERN and in tunnels are continuing.

* on behalf of ASFINAG Verkehrstelematik GmbH (Austrian Motorway Company), Austria
Incident detection and management measures in terms of quick incident detection, accident reconstruction, traffic situation forecasting, road-side incident management measures and integrated control and incident management are continuing with the target to detect and manage incidents on the road in a timely and efficient manner through the deployment of a variety of hardware and software tools at the road-side and TCC levels.

The following sections are examples of key traffic control measures deployed in the various CORVETTE regions:

1) Traffic Management Systems in Austria

Traffic management and control on the Austrian motorways is done exclusively by ASFINAG Verkehrstelematik GmbH (VTG). Its core areas include:
- Implementation and service-technical operation of TTS networks and services (area TNS)
- Planning and construction of TTS infrastructure (area TIS)
- Development and extension of the system technology/software in combination with the operation of traffic management and further control systems (area BF)

On Austrian motorways the categories of Traffic Control Units (TCU) are divided into:
- **TCU light** (less than 50000 Veh/24h; low accident rate) for Corridor management; alternative route guidance; variable message signs
- **TCU medium** (50000 - 80000 Veh/24h; average accident rate). Traffic route control (monitoring of speed); optimised routing of tunnel traffic
- **TCU heavy** (more than 80000 Veh/24h; high accident rate). Intersection control; inflow regulation; emission control of noise and pollutants
  
The following figures provide an overview of traffic control and management deployments on the Austrian motorways with the implementation schedule started in previous CORVETTE phases and continuing on for 2007-2013 and beyond.

The heart of the traffic management and information system in Austria is the Traffic Management and Information Centre (TMIC) in Wien-Inzersdorf. From here:

- Traffic control units, systems for ensuring the compliance with noise and pollutant emission limit values, systems for dynamic speed and lane control, ramp metering, construction site management and for VMS are observed and controlled,
- Traffic relevant data of the entire ASFINAG network is acquired, processed and displayed,
- Traffic information services for in-house and external customers are developed, brought to the market and managed.

![Traffic Management Systems on ASFINAG road network](image)

An evaluation of the Traffic Management System in the Tirol area showed an annual benefit of over 11 million Euros.

![Evaluation Results of Traffic Control Deployments in Tirol, Austria- Annual Results](image)

2) **Traffic Management Systems in Italy**

a) The “T3 – MARCO” project on the Venezia ring.

The “T3" project, deployed by the Società delle Autostrade di Venezia e Padova in the 10km long beltway of Venice, represents an emergency solution during the period of time required to complete the new road system, capable of improving traffic flow on the Mestre Ringroad, which is often packed with in-transit and local traffic.

The Società delle Autostrade di Venezia e Padova implemented “MARCO”, a system that has been designed to regulate vehicle traffic on the Ringroad, helping to reducing traffic jams and increasing safety. The second activity has concerned the implementation of the “T3” system, designed to manage the use of the emergency lane as a third lane, in order to increase the Ringroad capacity while ensuring a high safety level to all drivers. The third phase will concern the construction of a new road network to extend the highway system and to improve the use of the Ringroad for urban traffic.
In summary the entire system developed and deployed shows an “intelligent” integration of different technologies, related to traffic monitoring, user information, management tools and software.

Figure 5. The T3 System on the Mestre Ring Road in Venice

b) The Automatic Incident Detection System applied on the Brescia-Padova motorway

The related study and implementation activities in 2001-2006 on the Brescia-Padova motorway achieved today a situation particularly relevant both for quantity and quality of installed equipment: along the 182 kms of the motorway stretches A4/Brescia-Padova and A31/Vicenza-Piovene: 85 monitoring posts with 124 fixed video cameras, black and white for the AID, and 85 remotely movable video cameras, in colours for the TCC video wall, a set of images analysers at the technical room of the Traffic Control Centre in Verona, together with a sophisticated Automatic Incident Detection system, built with a gradual personalisation of its function in order to make it more and more effective and adequate for the needs of traffic management on the motorway based upon a complex and efficient telecommunication network based on fiber optics for the images and signals transmission.

Figure 6. Automatic monitoring and incident detection on the Brescia-Padova Motorway

3) Traffic Management Systems in Bavaria

Bavarian road construction authority has been actively involved in planning and deploying state-of-art ITS measures to provide a considerable contribution to increase the capacity, the road safety, the environmental protection and the optimization of the entire transportation system. Especially the conurbations of Munich and Nuremberg are limited for an extension of the infrastructure because of environmental and spacious conditions. The intelligent use of the traffic infrastructure offers in such regions often the only option to prevent and to defuse considerable traffic congestion. About 600 km of carriageways of the 2.300 km long Bavarian motorway network are equipped with lane control systems and approximately 400 km are equipped with variable direction sign systems. Such systems, which are standard on highly loaded motorways these days – at the A9 in the north of Munich peaks of till 200.000 vehicles/24 hours were detected – concentrate on the conurbations in Bavaria. The traffic control centre in Munich-Freimann (region Southern Bavaria) and the traffic control and operation centre Nuremberg-Fischbach (region Northern Bavaria) are responsible for the traffic management systems on the motorways in Bavaria. The nomination of Munich and Nuremberg as
venues for the FIFA World Cup Germany 2006 and the therewith expected additional load of visitors was another big challenge, during the daily rush-hour traffic and the vacation traffic always to full capacity working, infrastructures of both conurbations. This is why further improvements concerning traffic telematics and management systems have been planned and tackled already for some years before the FIFA World Cup 2006 next to additional measures in road constructions.

Figure 7 Traffic Management Systems in Bavaria

Characteristics of the traffic management:
- Co-operative traffic management between different authorities at the urban/inter-urban levels
- System integration (unification of system operation and control)
- Advanced traffic control computer (ÜSR)
- Manual/automatic control of developed strategies by the operators
- Multi vision wall: comfortable visualisation and control
- Advanced tunnel control techniques
- Integration of incident detection and traffic control

Because of the positive results, the Bavarian road construction authority will extend their traffic telematics system during the next years to improve safety and level of service.

4. Conclusions

The paper provides a detailed overview of progress and evaluation on the key traffic management measures deployed in CORVETTE within MIP I (2001-2006) period. Work will continue in the following period (2007-2013) to develop and deploy traffic control measures to improve the level of service and safety in the CORVETTE region and provide the necessary mobility services for both regional and cross-border travel.

References:
- CORVETTE Project Documents: Workplans, Domain 3 Technical Reports, Final Reports