DIREC - DIgital Road for Evolving Connected and Automated Driving

CEDR Programme: Call 2020 Impact of CAD on Safe Smart Roads
Project Duration 09.2021 – 08.2023
Partners: TRL (Coordinator; UK); ARUP (Ireland); TU Delft (The Netherlands); VTI (Sweden); VTT (Finland); FEHRL (Belgium)

Connected and Automated Driving (CAD) is an important area of digital technology that will bring disruption to individuals, economies, and societies. Most forms of CAD require some level of infrastructure support for their safe operation. Additional infrastructure and services to support CAD have the potential to improve safety even further, and to bring other benefits such as increased capacity or reduced congestion. However, the infrastructure requirements from OEMs are not always clear, and it is difficult for NRAs to predict and plan for the future levels of support needed for CAD given rapidly evolving technology and uncertain projections of future CAD demand. There is a need for better dialogue among NRAs, OEMs and service providers to articulate those requirements and to define a roadmap and responsibilities for achieving safe and smart roads through CAD.

The DiREC project will establish a CAV-Ready Framework (CRF) around which that dialogue can take place. The CRF will be based on a level of service approach to defining the needs of CAD and defining the infrastructure and services that NRAs could provide to support them. This infrastructure can be a mix of physical and digital infrastructure and operational policies and procedures. The aim of DiREC will be to establish a CRF that incorporates a wide range of components that affect CAD and the ability of highway infrastructure to support it, including machine readability of physical infrastructure, digital services, connectivity, in addition to aspects such as governance of the infrastructure and services, and legal and regulatory requirements. Together these components influence the ability of the NRA to become a digital road operator.

The CRF will also develop indicators to measure the extent to which a road network supports CAD. Indicators will be proposed to measure the machine-readability of infrastructure, the extent and quality of digital infrastructure, and the types of service available. The CRF will also include tools and methodologies to conduct cost-benefit analyses to help plan and develop different types and levels of service to support CAD. These tools and methodologies would provide guidance for NRAs not only to plan infrastructure projects, but also to develop a long-term strategy for their networks in terms of the types of infrastructure and services they will provide, including digital mapping, localisation, navigation and other services around traffic management.

The DiREC project will thus provide a common vision and framework for NRAs, service providers and OEMs in support of CAD. It will consolidate and combine standards, research and recommendations from other projects such as INFRAMIX and MANTRA. It will extend research into new areas such as creating a common vision for digital twins among NRAs, understanding connectivity and bandwith requirements to support digital services and analysing how these can be met, reviewing the quality management processes around digital data, and documenting existing legal and regulatory frameworks in all areas relating to CAD. It also recognises that the CRF will have longevity well beyond the end of DiREC project, and so considers the future governance of that framework.

DiREC provides a basis for developing innovative strategies within NRAs to meet the challenges presented by CAD on their network. Establishing a CRF will put the spotlight on what is important to NRAs and their partners when baselining and planning their own infrastructure adaptation, helping to ensure they remain in control of their networks and the (autonomous) traffic on it. NRAs and their partners will also benefit from having a framework that will support a clear roadmap for the next steps on this journey - both in focussed areas such as Digital Twins and the wider area of becoming a Digital Road Authority.