

# Facilitating the deployment of highly and fully automated vehicles in road traffic along the Asian Highway Network

Study Report 2022

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## Abbreviations:

<b>Abbreviation</b>	<b>Full Name</b>
AADT	Average annual daily traffic
ADAS	Advanced driver assistance systems
ADS	Automated driving system
AL	Automatization level (of an automated vehicle)
ATMS	Automated traffic management systems
BRI	Belt and Road Initiative
CITS	Cooperative intelligent transport systems
CEN	Comité Européen de Normalisation (Committee of European standards)
CT	Committee of Transport of Kazakhstan
DRT	Directorate of Road Transport of Kazakhstan
EAEU	Eurasian Economic Union
ERA-GLONASS	State Automated Information System in Russian Federation
ETSI	European Telecommunications Standards Institute
FOC	Fibre optical cable
FSUE	Federal State Unitary Enterprise (a legal form of state-owned company)
GOST	National standard in Russian Federation
GPRS	General Packet Radio Service
HFAV	Highly and fully automated vehicles (both trucks and cars)
ICT	Information and Communication Technologies
ISO	International Organisation for Standardisation
ITC	International Transport Corridor
ITS	Intelligent transport system
LTE	Long-term evolution (wireless broadband communication standard)
MIID	Ministry of Industry and Infrastructure Development of Kazakhstan
ODD	Operational design domain
OICA	Organisation Internationale des Constructeurs d'Automobiles
V2C	Vehicle to cloud
V2I	Vehicle to infrastructure
V2V	Vehicle to vehicle
V2X	Vehicle to everything

## 0. Executive Summary

This report assesses the current connectivity status along the Asian Highway 9 (the AH route 9 or the West Europe – West China International Transport Corridor) identifying policy, infrastructure and technology gaps and challenges for seamless international connectivity for highly- and fully automated road vehicles (HFAV) in China, Kazakhstan and the Russian Federation (the target countries).

In addition to the feasibility analysis, the report also offers possible directions for future development and use of HFAV along the AH route 9 in the target countries in terms of policies and regulations, road infrastructure, smart transport systems and onboard vehicle devices.

This report consists of five Chapters organised in the following way:

- Chapter 1 introduces the purpose and the scope of the Study;
- Chapter 2 presents basic backgrounds for the existing technologies in ITS and autonomous driving covering the definitions and concepts of automated vehicles, connected vehicles, cooperative-ITS and smart cities;
- Chapter 3 discusses the general technical and operational conditions for the use of HFAV along the AH route 9 in the target countries, including current status and development plans for their physical and smart infrastructures, representative R&D initiatives and application experiences of automated vehicles, as well as legal and regulatory frameworks and challenges;
- Chapter 4 summarises key findings of the Study and provides policy recommendations to help to streamline the deployment of HFAV along the AH route 9 in the target countries; and
- Chapter 5 concludes the report.

The report has been prepared by the Secretariat based on inputs of individual consultants and national experts engaged by UNESCAP in 2020-2021.

# 1. Introduction

## 1.1. Overview of the AH Route 9

The Asian Highway 9 (AH route 9) is a land route connecting Chinese seaport Lianyungang with Saint Petersburg, the “north capital” and seaport of the Russian Federation, across the territories of China, Kazakhstan and the Russian Federation.



*Figure 1. AH9 route: Intergovernmental Agreement on Asian Highway Network, Annex I*

The total length of the AH route 9 is 8,445 km of which 2,233 km run through the territory of the Russian Federation, 2,787 km through Kazakhstan, and 3,425 km through China.

The route represents a continental alternative to the Trans-Siberian Railway and the maritime traffic through the Suez Canal aiming to reduce the travel time from 45 days required for sea freight shipping and 14 days for freight transport along the Trans-Siberian Railway to 10 days by road.

In China, the route is known as “the Lianyungang–Khorgas Expressway” (Lianhuo Expressway, G30) whereas in Kazakhstan and in the Russian Federation it is referred to as “the West Europe – West China International Road Corridor”. It encompasses several core national highways across the target countries as it traverses their national boundaries and huge territories.

The scope of analysis of the study will give particular focus to highly and fully automated vehicles (HFAV) and smart transport systems along the AH route 9.

## 1.2. Rationale, Purpose and Scope of the Study

The use of highly and fully automated vehicles (HFAV) and smart transport systems (also referred to as ITS) can significantly reduce the economic, social and environmental costs of passenger and freight transport, while enhancing its overall quality and resilience. Although this potential contribution is widely acknowledged, their implementation in Asia and the Pacific in general, and in the target countries in particular, is lagging behind due to various factors, including low awareness of the role of smart transport systems, limited capacity for implementation and a lack of regional cooperation, hindering the exchange of best practices and experiences.

The use of highly and fully automated vehicles on international road corridors will depend on the progress made by countries in implementing smart transport technologies at the national level. At the same time, highly and fully automated vehicles for international transport will depend on achieving a common understanding at the regional level of the principles of using smart transport systems, as well as on the willingness and ability of countries to jointly address issues related to transport infrastructure and operational needs along highways or at border crossings. As the implementation of any emerging technologies must come with relevant laws and policies, the development of the autonomous vehicle industry is also inseparable from the support of the legal system.

This Study has been launched by ESCAP with the purpose to facilitate the deployment of highly and fully automated vehicles in road traffic along the AH route 9 within the territories of China, Kazakhstan, and the Russian Federation, and assist other countries of the region by sharing lessons learnt and knowledge accumulated to date to increase the common understanding and awareness of current initiatives, challenges and advantages related with the introduction of HFAV in road traffic at national, regional and global levels.

In this regard, the scope of the Study includes collection and analysis of available information and data on the AH route 9 within the target countries and in a broader regional context to assess potential operability of HFAV along the AH route 9. Respectively, the research subjects of the Study include: (i) current status and development plans for road infrastructure and smart systems along the AH route 9 within the territories of the target countries; (ii) ongoing and planned national initiatives related to the development and introduction of HFAV in road traffic; and (iii) availability and usage of ITS and other smart technologies along the AH route 9 which can support smart HFAV operation.

Based on the findings of the Study, the overall adequacy of the existing infrastructure and operational connectivity was assessed and existing conditions and gaps of technologies and infrastructure were identified.

The subject of the Study is highly relevant to support the efforts of the target countries in developing their smart infrastructure in line with the global trends that would allow a seamless operation of automated freight road vehicles along the AH route 9 in the future. In this sense, improving the sustainability performance of international road transport by using highly or fully automated vehicles, can contribute to the delivery of the region's sustainable development agenda.

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