



# SEAMLESS AND SMART CONNECTIVITY ALONG THE ASIAN HIGHWAY NETWORK IN THE TIME OF COVID-19

## Transport and trade connectivity in the age of pandemics

UN solutions for contactless, seamless and collaborative transport and trade

Technical note  
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## Executive Summary

From the transport perspective, COVID-19 not only poses a severe global health threat, it also represents a supply and a demand shock. Transport-related policy measures undertaken by countries to contain the pandemic added operational challenges to the movement of goods on both national and international level, disrupting international transport connectivity and the overall logistics of the supply chain network. Preserving efficient flow of goods and services within and across countries became critical to defeat the pandemic, notably to ensure delivery of essential products such as foodstuff and medical supplies, as well as to ensure speedy and sustainable recovery.

Freight transport operations poses the risks during the pandemic, especially if it is not fully computerized. As documents and goods continue to be subjected to physical checks for customs and other regulatory purposes, crew members and staff at border-crossing points and control terminals are exposed to the risk of contagion by the nature of their work. In this context, the use of information and communication technologies (ICT) and intelligent transport systems (ITS) is directly relevant to the pandemic response and recovery policies. Optimization of automation and digitalization can reduce the need for human interaction, making cross-borders transport safer and more resilient to disruptions.

In this context, this technical note aims to offer policy recommendations for policy responses using new technologies and smart road solutions to preserve the regional transport connectivity in the time of the pandemics and other similar disruptions.

The first part of the technical note focuses on the international road transport of countries along the Asian Highway network in face of COVID-19 pandemic. It highlights the newly operational challenges due to the COVID-19 pandemic, the impact on the global transport industry and the emerging trends in international road transport such as digitalization of cross border transport operations and greater use of technologies.

The second part of the technical note describes a series of technologies and ICT solutions which can help ensure seamless and continuous international cross-borders road transport connectivity and minimize adverse impact during future crisis and its aftermath. Examples of their practical application in the region and beyond are included, where available.

The note shows that policy and technical solutions for seamless and smart connectivity along the Asian Highway Network already exist and many have been implemented by other regions or sub-sets of Asia-Pacific countries. A wide range of proven solutions can make road transport less reliant on physical contacts (contactless solutions) and less exposed to interruptions and costs of documentary and other checks (seamless).

Countries' practices and strategies during the COVID-19 pandemic provided a wealth of good practices and lessons learned, which can further support the momentum for a tangible progress in achieving seamless and smart connectivity along the Asian Highway Network.

This technical note is elaborated as part of analytical and capacity building activities aimed at promising smart transport solutions in COVID-19 under the framework of the United Nations Development Account project on "Transport and trade connectivity in the age of pandemics: Contactless, seamless and collaborative UN solutions".



# SEAMLESS AND SMART CONNECTIVITY ALONG THE ASIAN HIGHWAY NETWORK IN THE TIMES OF COVID-19

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## PART 1 - Operational challenges of international transport along the Asian Highway network in the context of COVID-19

Road transport, in particular, has a fundamental role to play in countries' sustainable development, given that it supports the bulk of domestic and regional trade. It often constitutes the main mode for freight operations and most goods are transported along routes that include at least one segment of road transport, especially when it comes to the first- and last-mile reach and door-to-door delivery.

Road transport accounts for a substantial proportion of all transport in the majority of the countries along the Asian Highway network, including China, Indonesia, the Islamic Republic of Iran, Japan, Kyrgyzstan, Myanmar, the Republic of Korea, the Russian Federation, Tajikistan, Thailand, Turkey and Viet Nam<sup>1</sup>.

In North-East Asia, road transport accounted for 78% of cargo transported in 2018 when measured in freight-tons in China, and slightly more than 90% in Japan and in the Republic of Korea. Rail transport was a distant second for cargo transport. A similar trend also occurred in South-East Asia, where, according to a study published in 2016, roads were the mode of transport for 89% of freight transported in Myanmar, 83% in Thailand, 76% in Viet Nam and a mere 58% in the Philippines, where coastal shipping plays an important role for inter-island connectivity in the archipelago. In Western Asia, 85% of freight is estimated to be transported by road in Turkey and 94% in the Islamic Republic of Iran, according to data estimates for respective countries over the period 2012-2017.<sup>2</sup> In North and Central Asia, road transport accounted for 93.4% of freight movement in Kyrgyzstan and 78% of cargo transported in the Russian Federation, according to 2017 estimates when measured in freight tons. It should be noted, however, that when the distance of cargo movements is taken into consideration, measured in ton-kilometres, rail is the dominant mode of freight transport in North and Central Asia. In Kazakhstan, 61.9% of freight turnover in 2018 was transported by rail, followed by 37.7% by road. A similar modal split was observed in Uzbekistan for 2018, where rail accounted for 62% and road 37%. In that country, road transport is mainly used for short distances while rail is used for long distance transport.<sup>3</sup>

The Asian Highway Network (AH), also known as the Great Asian Highway, is a cooperative project among countries members of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), aimed at developing major transport routes to support regional economic growth and intraregional and interregional trade. It was formalized through the Intergovernmental Agreement on the Asian Highway Network, which entered into force in 2009 and currently counts 30 Parties.

The network currently spans more than 145,000 km in 32 countries, covering the subregions of East and North-East Asia, North and Central Asia, South-East Asia and South and South-West Asia.

### I. Operational connectivity along the Asian Highway Network prior to COVID-19

Operational connectivity along the Asian Highway Network and, notably cross-border and transit transport facilitation, remains one of the major bottlenecks affecting the performance of road transport along the Asian Highway network. This was highlighted in the Regional Strategic Framework for the Facilitation of International Road Transport,<sup>4</sup> adopted by ESCAP member countries in 2012, which underscored six fundamental issues for further facilitation of traffic along the network:

<sup>1</sup> Policies and issues related to the operationalization of the Asian Highway network  
<https://undocs.org/pdf?symbol=en/ESCAP/AHWG/2019/2>

<sup>2</sup> Ibis

<sup>3</sup> Ibis

<sup>4</sup> See: <https://www.unescap.org/resources/regional-strategic-framework-facilitation-international-road-transport>.

- road transport permits and traffic rights;
- visas for professional drivers and crews of road vehicles;
- temporary importation of road vehicles;
- insurance of vehicles;
- vehicle weights and dimensions;
- vehicle registration and inspection certificates.

More recently, the Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific,<sup>5</sup> phase I (2017-2021) included a thematic area on operational connectivity to focus on, among others, the need to harmonize legal requirements and technical and operational standards using new technologies and transport facilitation tools.

In general, the situation of cross-border road connectivity along the Asian Highway network can be described by three categories:

- No cross-border road transport: traffic rights are not granted to foreign vehicles to cross borders for commercial transport and trans loading of cargo takes place at the border areas;
- Quota systems for cross-border road transport: traffic rights are granted to foreign vehicles through the issuance of road permit system. Specific numbers of road permits are granted to road transport operators depending on bilateral or multilateral arrangements among countries. Road permits are usually issued with conditions. For example, foreign trucks are required to use certain border crossing points and follow designated routes upon entering foreign countries. The cabotage is frequently not allowed.
- Liberalized cross-border road transport: Cross-border transport by road permitted and not subject to a quota: there are no quota restrictions on foreign road freight vehicles. This is usually the case when countries enter into a “customs union”, such as the Eurasian Economic Union.

The following sections will give further details on current state of international road transport along the Asian Highway Network.

#### A. Bilateral agreements on permits for international road transport

Within the Eurasian Northern Transport Corridor, all the countries, except those in the Korean Peninsula, the Democratic People’s Republic of Korea and the Republic of Korea, are fully covered by respective bilateral or multilateral road transport agreements. Traffic rights are exchanged at every border crossing with a “single round trip road permit” system as the standard practice along the corridor. Along the Kazakhstan – Russian Federation border, permit-free bilateral transport without restrictions on routes and border-crossing posts applies as both countries are members of the Eurasian Economic Union. On the Korean Peninsula, land borders between the Democratic People’s Republic of Korea and the Republic of Korea are technically closed; transloading takes place at the border areas between China and the Democratic People’s Republic of Korea.

The Eurasian Central Corridor is also almost entirely covered by respective agreements or arrangements. Among the 16 border crossing points along the Corridor, transshipment at the border is only required between Afghanistan and Pakistan. The most common permit system along this Corridor is the “single round trip permit”. There are, however, cases of permit-free bilateral transport arrangements, for example between Turkmenistan – Islamic Republic of Iran, Kyrgyzstan – Tajikistan and Uzbekistan – Kazakhstan. Some countries along the corridor, such as Armenia, Georgia and Turkey, are also parties to the Black Sea Economic Cooperation multilateral permit system which is modeled after the European Conference of Ministers of Transport international road haulage permit system.

In sharp contrast to the Northern and Central Corridors, several countries along the Eurasian Southern Corridor do not exchange traffic rights with neighboring countries. For example, there is no exchange of traffic rights

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<sup>5</sup> See: <https://www.unescap.org/official-documents/ministerial-conference-transport/session/3>.

between India and Bangladesh and Myanmar, and Thailand – Malaysia, though for the latter, there are some special arrangements allowing Thai trucks to transport perishable goods to Singapore through Malaysia. An agreement China – Myanmar has been reached for bilateral transport but to date, no physical operation as of yet.

Traffic rights are mutually granted among the countries of the Greater Mekong Subregion. 89 Bilateral arrangements on the exchange of traffic permits with a set quota are in place among all the countries of the Subregion. For example, Cambodia and Viet Nam grant 500 permits to operators in respective countries. There is also a trilateral arrangement under which Cambodia, the Lao People's Democratic Republic and Viet Nam grant 150 permits to operators for transport among the three countries. Under the initiative of the Greater Mekong Subregion Cross-Border Transport Facilitation Agreement, Greater Mekong Subregion member countries can issue up to 500 road transport permits to foreign operators.

Against this backdrop, there are two more major subregional agreements whose objective is to open segments of the network to international road transport, the Intergovernmental Agreement on International Road Transport along the Asian Highway network and the Agreement of the Shanghai Cooperation Organization Member States on the Facilitation of International Road Transport.

The Governments of China, Mongolia and the Russian Federation signed the Intergovernmental Agreement on International Road Transport along the Asian Highway network in Moscow on 8 December 2016. In doing so, each country agreed to grant the other two countries traffic rights for international road transport on the sections of AH3 and AH4 that connect their respective territories. Through the Agreement, the three ESCAP member States have operationalized the following Asian Highway routes: AH3 from Ulan-Ude in the Russian Federation to Tianjin port in China, through Ulaanbaatar and Beijing, providing access to the sea for landlocked Mongolia; and AH4 from Novosibirsk in the Russian Federation to Honqiraf at the Chinese border with Pakistan, through Urumqi and Kashi in China. This constitutes the first intergovernmental agreement concluded within the framework of the China-Mongolia-Russian Federation economic corridor. At the first meeting of the Joint Committee under the agreement in 2019 it was agreed that each country will issue 200-permits. This exchange of permits under the Agreement is set to ease international road transport on these segments.

The Agreement of the Shanghai Cooperation Organization Member States on the Facilitation of International Road Transport, which entered into force in January 2017, is another example of a legal instrument that operationalizes road transport infrastructure in the region through the provision of traffic rights for international road transport. This Agreement promotes transport connectivity among member countries of the Shanghai Cooperation Organization. The number of parties to the Agreement is eight (China, India, Kazakhstan, Kyrgyzstan, Pakistan, the Russian Federation, Tajikistan and Uzbekistan). The first meeting of the Joint Committee in 2018 agreed that the initial quota of road transport permits for 2019 would be 200 permits per party and took other decisions pertinent to the implementation of the Agreement.

## B. Regional road permit systems: example of the Eurasian Economic Union (EAEU)

The Eurasian Economic Union (EAEU) attaches great importance to integration in the transport sector through the gradual liberalization of transport services between the member states.

The Treaty on the Eurasian Economic Union of May 29, 2014 provides for a coordinated (agreed) transport policy aimed at ensuring economic integration, consistent and gradual formation of a single transport space based on the principles of competition, openness, safety, reliability, accessibility and environmental friendliness. Tangible results have already been achieved in the field of transport, through such measures as:

- Moving of transport (automobile) control to the external border of the Union;
- Allowance of international road transport of goods between other member states (bilateral, transit) without a need for a special authorization.

An important step was the approval by the Heads of State on May 8, 2015 of the program for the stage-by-stage liberalization of the implementation by carriers registered on the territory of one of the EAEU member states of road transport of goods between points located on the territory of another EAEU member state for the period from 2016 to 2025. Its implementation should provide access to the Union's transport companies to the domestic freight market, reduce empty runs, and reduce transport costs for consumers of freight road transport services through the development of fair competition.

Integration processes in the field of international road transport, carried out in accordance with the adopted coordinated transport policy of the EAEU Member States, aims to solve the following tasks:

- creation of a common market for transport services;
- taking concerted action to ensure overall transport benefits and best practices;
- integration of the transport systems of the member states into the world transport system;
- efficient use of the transit potential of the EAEU member states;
- improving the quality of transport services;
- ensuring security in transport;
- reducing the harmful effects of transport on the environment and human health;
- formation of a favorable investment climate.

### C. Admission and control procedures for foreign drivers

The conditions for the admission of carriers to the provision of road transport commercial services, as well as the organization of transport activities, are regulated by countries within the framework of national legislation. These requirements are specific to each country, as they take into account specific aspects and national characteristics that affect the level of safety and quality of transport services provided by national carriers. Admission to transport market can be free without additional registration of activities, but it can be associated with the fulfillment of a number of requirements by the carrier and obtaining a license.

In many countries, admission to transport is licensed. A license or a certificate of admission is issued to a carrier for the right to provide transport services on the territory of the state, including in international traffic, only if the carrier fulfills a number of requirements, for example:

- the ownership of vehicles that meet the established requirements;
- availability of personnel trained in accordance with the requirements, including drivers;
- compliance with the requirements of medical control over the health of drivers before starting work and after its completion;
- ensuring the required control over the observance by drivers of work and rest regimes;
- availability of financial support to cover possible risks;
- absence of outstanding fines or unresolved claims of regulatory and supervisory authorities, etc.

If the carrier does not comply with the prescribed requirements when providing transport services or detecting violations, the license or certificate of admission for the right to carry out commercial road transport activities is terminated.

### D. Technical requirements for road vehicles

Each country in Asia and the Pacific develops and applies national standards for the requirements for vehicles allowed for registration and use on its territory. The level of requirements depends on many aspects, for example, on the level of development of the automotive industry, government priorities and national regulations of the transport system.

Several international standards have been developed to unify the technical requirements for vehicles used in international transport. The main international legal instrument in this area is the 1958 Agreement on uniform conditions of approval and the mutual recognition of the approval of equipment and parts for motor vehicle. This agreement, known as the "1958 Geneva Agreement", harmonizes procedures for the certification of

vehicles, and is constantly being revised and supplemented with new requirements. Another example is the EURO standards in the European Union, which regulate noise levels, emissions, safety and monitoring of the technical condition of vehicles.

Within the ESCAP region, emission standards imposed by ESCAP member countries varies enormously from one country to another, ranging from EURO II to EURO VI while others impose their own national standards which are not totally compatible to EURO standards. There is also big divergence on standards for weights and dimensions of road freight vehicles, i.e. differences in values of limits to length, width, height of a vehicle, gross vehicles weight and axle load; among ESCAP member countries despite it is widely recognized that the harmonization and adoption of standards regarding the weight and dimensions of vehicles engaged in international transport is an important area of technical regulation. The level of restrictions is significantly influenced by the actual state of road strength and the requirements of road infrastructure, as well as the need to unify the useful volume of cargo compartments of vehicles, to ensure conditions for fair competition.

Within this context, ESCAP secretariat implemented a project on “Strengthening the capacity of ESCAP member States to harmonize standards on weights, dimensions and emissions of road vehicles for facilitation of transport along the Asian Highway network” to address the divergence in standards.

Extensive research carried and based on the technical analysis, taking into consideration the technical specificities of Annex II. Asian Highway Classification and Design Standards of the Intergovernmental Agreement on the Asian Highway Network; the study project puts forward technical recommendations for weights, dimensions and emissions for road freight vehicles along the Asian Highway network as reflected as follow in Box 1.<sup>6</sup>

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<sup>6</sup> For further information, please refer to the Study Report on Strengthening the capacity of ESCAP member States to harmonize standards on weights, dimensions and emissions of road vehicles for facilitation of transport along the Asian Highway network. <https://www.unescap.org/sites/default/files/Study%20Report01.pdf>



**Textbox 1 : Recommended standards on weights and dimensions for road freight vehicles along the Asian Highway Network**

Recommended standards on weights and dimensions for road freight vehicles along the Asian Highway Network

Item		Minimum	Maximum	Mode	EU	EAEU	Recommended standards
Maximum Width, mm		2,500	3,000	2,500	2,550 <sup>1)</sup>	2,550 <sup>1)</sup>	2,550 <sup>1)</sup>
Maximum Height, mm		3,800	4,900	4,000	4,000	4,000	4,000
Maximum Length, mm	Rigid truck	9,100	12,200	12,000	12,000	12,000	12,000
	Articulated Vehicle/Road Train	14,000	25,000	20,000	18,750	20,000	20,000
Maximum Gross Weight, ton	Rigid Vehicle	21	44	32	32	32	32
	Articulated Vehicle/Road Train	36	61.5	44	44	40	44
Maximum Axle Load, ton	Single Axle	8	13.5	10	10/11.50 <sup>2)</sup>	11.5	10/11.50 <sup>2)</sup>
	Group Axles	19	31	24	24	-	18 <sup>3)</sup> /24 <sup>4)</sup>

Notes:

1) 2,600 for refrigerator

2) For powered axle

3) For tandem axle

4) for tridem axle

General principles of the application of recommended standards and exceptional circumstances:

Countries are strongly encouraged to continuously improve and maintain roads assigned as part of the Asian Highway network to a minimum of Class II or above level.

Countries are encouraged to align their national standards to the recommended standards, whichever that is higher, to be apply on roads assigned as part of the Asian Highway network, notably on major transport corridors.

Countries may temporarily diverge from the recommended standards in exceptional circumstances, notably due to climate and seasonality changes, such as extreme snow falls in winter months, icy condition, snow melting, extreme heat in summer months etc. However, initiatives should be taken to minimize and mitigate the perturbation.

Source: *Study Report on Strengthening the capacity of ESCAP member States to harmonize standards on weights, dimensions and emissions of road vehicles for facilitation of transport along the Asian Highway network*<sup>7</sup>.

## II. Cross-border freight transport measures related to COVID-19

### A. General overview

Measures to combat COVID-19 in the field of international road transport were guided by the need to contain or prevent the transmission of the disease. Based on the evaluation and trends of changes of basic conditions that influence the risk of uncontrolled spread of the virus COVID-19 at the national level, as well as the development of the situation in neighboring States, each country adopted specific restrictive measures related to cross-border movement of people, vehicles and cargo. Requirements as to routes and travel modes, as well as deadlines and conditions of stay on the national territory varied accordingly.

As the COVID-19 crisis unfolded, it became increasingly difficult to track and monitor national responses, affecting freight distribution, prompting several international agencies, including the World Trade

<sup>7</sup> Ibid.

Organization (WTO), World Customs Organization (WCO) and the United Nations (UN) System and many others, to set up ad hoc monitoring mechanisms for sharing this information. During the crisis, countries, sometimes part of a same economic union or regional free trade arrangement, have issued new policies on trade and transport regulations without warning or consulting their integration partners. Some countries implemented partial or complete lock down of border crossing points or introducing new requirements at the borders, with the potential to increase cross-border transport waiting time and costs, making transported goods less affordable. Rapidly changing new restrictions, new requirements, as well as lack of clarity and limited information compounded the already difficult position of trade and transport operators, already under the strain from the declining demand and uncertain economic climate.

## B. Examples of restrictions on international road transport imposed in relation to COVID-19

The following paragraphs describe the range of restrictions on international road transport imposed by the Asian Highway member countries in Central and North Asia, as part of the pandemic response.

### 1. Full or partial ban on cross-border freight transport

A complete ban on crossing state borders for all foreign vehicles, drivers and cargo is the most severe restriction. It has been applied selectively to some border crossings, particularly exposed to the risks.

For example, the Republic of Kazakhstan temporarily closed from March 17 until July 1, 2020 road crossings on the border with the people's Republic of China to improve the sanitary and epidemiological situation. It restricted the passage of persons, vehicles, cargo and goods, with the exception of persons and vehicles engaged in the transportation of medical products and medicines, food products and goods transported in the framework of investment contracts, humanitarian assistance, public order and empty freight vehicles.<sup>8</sup>

On July 20 2020, China, in turn, has stopped the passage of vehicles from Kazakhstan in connection with outbreaks of coronavirus infection in the Xinjiang Uygur Autonomous region. China decided to review the procedure for moving vehicles across the border, which was the reason for stopping the reception of trucks from the Republic of Kazakhstan. After the bilateral approval of the new procedures, Chinese carriers will have the opportunity to bring the Chinese-made goods cross-border transport and logistics centers of Kazakhstan, which will be used for transshipment of goods to Kazakhstan/foreign transit vehicles for further transportation to the end consumer. It is expected that this measure will eliminate the necessity of departure to Chinese side the greater part of transport and relieve congestion of trucks at AMS "Nur Zholy".

The main reason for the congestion of vehicles on the road from Kazakhstan to China and is idle waiting for two weeks were measures of the sanitary border controls imposed by the Chinese side in the fight against the pandemic COVID-19.<sup>9</sup> In order to prevent the import of coronavirus into China, all foreign cargo vehicles entering China must be unloaded at the cargo terminal. In addition, according to the decision of the authorities, all drivers at checkpoints, both Russian and Chinese, must pass medical control, which includes temperature measurement and testing for a new coronavirus.

In freight operations between China and the Russian Federation, if the procedures related to congestion and waiting take a long time and drivers must stay in strictly designated hotels in the area of the checkpoint. After staying in hotels, the administrator issues the driver a letter authorizing travel to Russian Federation. Without it, drivers will not be allowed back to Russian Federation. Drivers are forbidden to move freely in China, as well as to use taxis. They have the right to move from the border line only by truck to the place of loading (unloading) in the border area. Visiting other places is prohibited. Exit to the Russian Federation is carried out through the same checkpoint through which the entry was made. The vehicle must be left in a special Parking lot for the night. In case of violation of these regulations, fines and placement in quarantine are provided.<sup>10</sup>

<sup>8</sup> <https://www.inform.kz/>

<sup>9</sup> <https://informburo.kz/novosti/kitayskie-gruzoperevozchiki-ne-budut-ezdit-po-kazahstanu-tovar-namereny-razgruzhat-na-granice.html>

<sup>10</sup> <https://www.asmap.ru/detail-news/20200605-ogranicheniya-dlya-gruzovogo-transporta-na-territorii-knr>

In Mongolia, from March 30, 2020 to July 15, 2020, national borders were closed due to quarantine and high alert. Foreign freight motor vehicles engaged in international transportation were allowed to enter Mongolia only through the border crossing points of Altanbulag and Ulaanbaishint. Movement on the territory of Mongolia from the border to the destination had to be strictly accompanied by a convoy. It was not possible to take a return cargo from Mongolia.<sup>11</sup>

In the context of measures taken to prevent the spread of the COVID-19 coronavirus infection in Turkmenistan, from April 1 to May 1, 2020, the state border of Turkmenistan was limited to freight vehicles engaged in international transportation, including the following transit through the territory of Turkmenistan. From March 24, 2020, the transportation of goods arriving in the country by road through the checkpoints "Garabogaz" and "Farap" on the state border of Turkmenistan and further to the country or in transit through its territory was to be carried out by Turkmen carriers. The transfer of goods was allowed in certain places on the border, subject to the principle of no direct contact of people.<sup>12</sup>

## **2. Additional procedures for obtaining visas for drivers**

Another measure aimed at restricting the entry of foreign drivers into the territory of the state is to restrain or expand the procedure for issuing and issuing visas.

For example, the Republic of China, due to the threat of a resumption of the pandemic in the form of a second wave due to the import of the virus from foreign countries, stopped issuing visas to all foreign citizens on March 28. Since March 31, the issuance of visas has been resumed, but only for a certain category of people - doctors, scientists, businessmen. If earlier a foreign driver of a vehicle engaged in the carriage of goods in international traffic used an ordinary visa to enter China, now he needs a special category C visa.

A Type "C" visa is issued to individuals who cross the Chinese border for business purposes, as well as to air personnel, international train and ship personnel, and their families. To obtain a visa, a special package of documents is provided for in bilateral agreements between China and another country.<sup>13</sup>

At the same time, the Chinese consular services are delaying the process of applying for a new category "C" visa for foreign drivers of international vehicles due to the worsening situation with the COVID-19 pandemic.

## **3. Introduction of additional control over handling of transported goods**

The pandemic led to the introduction of control processing of the transported goods by road in international traffic at the places of loading, unloading, processing and inspection. This includes<sup>14</sup>:

- preventive disinfection of cargo and cargo containers with the use of non-corrosive or low-corrosive disinfectants permitted by national law, carried out before loading into the vehicle, reaffirm, if necessary, the issuance of certificates of disinfection;
- checking the results of preventive disinfection of cargo and cargo containers with the preparation and issuance if necessary, of the appropriate certificate;
- periodic sampling over the completeness and quality of preventive disinfection of cargo, cargo containers and packaging in places of loading, unloading and cargo handling; identification of untreated areas potentially dangerous for the spread of viruses COVID-19;
- checking accompanying documents on the cargo to identify the origin or transportation of epidemiologically dangerous regions and availability of relevant safety certificates;
- preventive disinfection of freight compartments of vehicles, premises and equipment used for loading/unloading of freight with the use of non-corrosive or low-corrosive disinfectants permitted

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11 <https://www.asmap.ru/detail-news/ogranichitelnye-mery-v-mongolii-prodleny-do-kontsa-iyunya-2020-goda>

12 [https://www.asmap.ru/detail/turkmenistan-ogranichenie-vezda-gruzovykh-transportnykh-sredstv-v-turkmenistan-vklyuchaya-tranzit-s-?sphrase\\_id=70722&code=turkmenistan-ogranichenie-vezda-gruzovykh-transportnykh-sredstv-v-turkmenistan-vklyuchaya-tranzit-s-](https://www.asmap.ru/detail/turkmenistan-ogranichenie-vezda-gruzovykh-transportnykh-sredstv-v-turkmenistan-vklyuchaya-tranzit-s-?sphrase_id=70722&code=turkmenistan-ogranichenie-vezda-gruzovykh-transportnykh-sredstv-v-turkmenistan-vklyuchaya-tranzit-s-)

13 [https://www.asmap.ru/detail/s-28-marta-2020-g-zapreshchyen-vezd-inostrannykh-grazhdan-v-kitay?sphrase\\_id=70723&code=s-28-marta-2020-g-zapreshchyen-vezd-inostrannykh-grazhdan-v-kitay](https://www.asmap.ru/detail/s-28-marta-2020-g-zapreshchyen-vezd-inostrannykh-grazhdan-v-kitay?sphrase_id=70723&code=s-28-marta-2020-g-zapreshchyen-vezd-inostrannykh-grazhdan-v-kitay)

14 <https://www.mintrans.gov.ru/search?value=covid>

by national law, by the simultaneous processing of air, horizontal, vertical, side surfaces, remote dim, and remote locations, as well as ventilation systems for enclosed spaces and by surface treatments for the open space;

- separate Bulletin boards with background information and regular audio information staff and drivers with consideration for translation into foreign languages on the requirements for compliance with measures of epidemiological safety when working with cargo, the preparation and registration of documents for the cargo in loading, unloading, processing and inspection, compliance personnel social distance.

#### **4. Introduction of additional requirements for the equipment of rolling stock**

Some countries imposed additional requirements on equipment of the rolling stock and the exercise of traffic, such as <sup>15</sup>:

- accommodation in the workplace of the driver in the vehicle skin antiseptics, protective masks, gloves and personal hygiene products for drivers;
- acquisition of the car sets of recommended medicines, medicines for first aid and a thermometer for daily temperature control of the driver;
- provision of non-corrosive or low-corrosive disinfectant that is allowed by national law, for preventive disinfection of the working place of the driver, vehicle and cargo compartments;
- equipment, tools and fixtures for performing daily (every shift) wet cleaning of interior and cargo compartments of vehicles with disinfectant virucidal action, covering all contact surfaces: door handles, light switches, handrails, surfaces, communications and utilities, office equipment, etc.;
- ensuring a supply of detergents and disinfectants, means for personal protection of the driver, instruments and devices for carrying out wet cleaning of interior and cargo compartments of vehicles for the period of the trip, but not less than one week;
- availability of a stock of filter elements and internal ventilation and air conditioning compartment is to comply with in the case prescribed in the schedule forced the replacement of filter elements;
- vehicle options information and background materials and instructions for the drivers of the measures of epidemiological safety, as well as the actions of the driver in the event of threats

#### **5. Introduction of vehicle handling controls**

The measures related to the control of vehicles, including workplace for drivers, included<sup>16</sup>:

- instructing drivers and testing their awareness of:
  - the signs of the disease COVID-19 (high fever, respiratory failure, etc.);
  - the location of possible emergency stop of vehicles and the action to call emergency medical assistance when signs of the disease;
  - the requirements of sanitary safety and hygiene in the transportation process, including when dealing with other drivers, staff, regulatory bodies and objects of a transport infrastructure;
- prophylactic disinfection of vehicles and cargo compartments of vehicles with the use of non-corrosive or low-corrosive disinfectants permitted by national law, by the simultaneous processing of air, horizontal, vertical, side surfaces, remote dim, and remote locations, as well as systems of ventilation and conditioning;
- ventilation of the driver's seat and the vehicle seat at the stopping points;
- equipment of working place of the driver's skin antiseptics;
- daily (every shift) wet cleaning of the driver's seat with disinfectant virucidal action of all contact surfaces: door handles, switches, office equipment and means of communication;

<sup>15</sup> <https://www.mintrans.gov.ru/search?value=covid>

<sup>16</sup> <https://www.mintrans.gov.ru/search?value=covid>

- the control over observance of the prescribed requirements of hygienic procedures;
- to minimize the calculations of the driver for services rendered for cash.

## **6. Domestic restrictions on freight transport movements**

To ensure proper control of proliferation COVID-19, countries imposed requirements on the route, mode of transportation and length of stay on the territory of foreign drivers, vehicles and goods in transit.

Between March 30, 2020 and July 15, 2020, foreign vehicles were only allowed to enter Mongolia through border crossing points Altanbulag and Ulaanbaishint. As additional restrictive measures the movement on the territory of Mongolia from the border to destination and back to the border is strictly the escort. To take a return cargo from Mongolia was not possible<sup>17</sup>.

Pakistan to prevent the spread of coronavirus COVID-19 completely closed the country's Western border with Afghanistan and Iran. This measure was applied during the initial period of 14 days from 16 March 2020.

In the period from March 25 to September 1, 2020, Belarus imposed transit restrictions on the movement of foreign automobile carriers on its territory. Limitations included the following requirements<sup>18</sup>:

- drive only on restricted republican roads;
- stop and parking for rest and meals, refueling vehicles only at special points;
- leave Belarus on the shortest route no later than the day following the day of entry into its territory;
- use the sealing of the navigation compartments of the cargo compartments of vehicles of shipping companies to control the movement of vehicles in Belarus whose drivers violated transit rules.

These restrictions raised concerns due to the inability of drivers to comply with the requirements of the regime due to an excessively short period of time for transit travel, as well as an insufficient number of places in which a stop was allowed for drivers to rest and refuel vehicles. At the same time, it was noted that large-scale quarantine measures were not introduced in the Republic of Belarus in connection with COVID-19, the work of industrial enterprises, educational and preschool institutions did not stop, public, spectacular and sporting events were held, and there was no limit to international cargo transportation to the Republic Belarus. Severe restrictions were imposed solely for the transit of vehicles engaged in international road transport. The Republic of Belarus lifted the restrictions on July 1 2020.

## **7. Additional medical control measures for drivers and other personnel**

All Asian Highway country members have introduced medical and health measures applicable to road transport crews.<sup>19</sup>

For example, Turkey has introduced new rules for crossing the territory of the country of the drivers engaged in international road transport of goods. Truck drivers who passed through the territory of Turkey until the expiration of 14 days after a visit of selected European and Asian countries. Turkish drivers are returning to their country, pass a 14-day quarantine. On the border of Turkey-procedures for the handling of goods on vehicle from Turkey<sup>20</sup>.

According to the new updated measures in Turkey:

- all drivers must undergo a medical examination. Foreign drivers with the symptoms associated with coronavirus COVID-19, entry into Turkey is prohibited. Turkish drivers who have symptoms associated with COVID-19, will be quarantined;

<sup>17</sup> <https://www.asmap.ru/detail-news/ogranichitelnye-mery-v-mongolii-prodleny-do-kontsa-iyunya-2020-goda>

<sup>18</sup> <http://www.government.by/ru/solutions/3845>

<sup>19</sup> <https://www.unescap.org/our-work/transport/transport-facilitation-and-connecting-subregional-transport-networks/monitoring-transport-policy-response-covid-19>

<sup>20</sup> [https://krafttrans.ru/infocenter/news\\_company/2020/o-situatsii-s-gruzovymi-i-passazhirskimi-avtomobilnymi-perevozkami-v-stranakh-v-svyazi-s-rasprostran/](https://krafttrans.ru/infocenter/news_company/2020/o-situatsii-s-gruzovymi-i-passazhirskimi-avtomobilnymi-perevozkami-v-stranakh-v-svyazi-s-rasprostran/)

- foreign drivers who have no symptoms COVID-19 and who are planning to leave Turkey within 72 hours after entry, will not be subject a 14-day quarantine;
- Turkish drivers who have no symptoms COVID-19 will be allowed to leave Turkey without any quarantine procedures;
- foreign drivers must apply to the nearest medical facility if they experience any signs and symptoms COVID-19 (fever, cough, shortness of breath, etc.), developing within 72 hours of their arrival in Turkey;
- a further period of 24-72 hours may be provided to the appropriate custom carrier, taking into account road and weather conditions;
- when entering the country, drivers will be required to agree to a letter of commitment of the Ministry of internal Affairs of Turkey, which stated that they will deliver the cargo directly to its destination without stopping, except in cases of extreme necessity, otherwise will be fined, issued in accordance with the General law of Turkey on health care.

In Turkmenistan, until June 20, 2020, with the possibility of extension, all cargo operations were carried out at the border. All drivers entering Turkmenistan must have a medical certificate confirming the negative status of COVID-19 issued by the competent health authority of their country of residence no later than 72 hours before the date of travel<sup>21</sup>.

In Tajikistan, from June 9, 2020, the Ministry of Transport changed the rules for international road transport in the context of the COVID-19 pandemic. The updates are as follows<sup>22</sup>:

- if the driver has a document on the negative test result for COVID-19, then the driver and the vehicle are allowed to stay in the country for up to 5 days;
- in the absence of such evidence, the driver will be checked at the border by the competent authorities and will be quarantined until the test result is known. If the test is negative, the driver can freely enter the country and get to the destination;
- the drivers of vehicles importing humanitarian aid equipment are exempted from terminal services on the basis of an accompanying document.

In Mongolia, international freight transport by road is free from restrictions, but all drivers of freight vehicles undergo a mandatory health check upon arrival at the border. Drivers of vehicles delivering goods to Mongolia at the Mongolian automobile checkpoint undergo a medical examination without leaving their cab. Customs documents are issued by Mongolian customs officers without the participation of drivers at the border and at the destination, as well as when unloading vehicles.

The Ministry of transport of the Republic of China issued new rules on 11 April 2020, including a notice of further prevention and control of import from abroad, and strengthening the requirements for drivers engaged in international road transport. Special requirements for foreign nationals are as follows<sup>23</sup>:

- in principle, foreign freight vehicles entering the border must be unloaded at the checkpoint. Foreign drivers must leave China on the same day and should not be in contact with the managing staff of the cargo terminal and personnel for the processing of goods during loading and unloading;
- foreign drivers who cannot leave China on the same day, due to existing difficulties, would be audited by the temperature and directly delivered from the checkpoint at the designated place under the supervision of the local authorities responsible for the prevention and control of the epidemic. They will not be allowed to leave the specified place prior to departure from China;
- during the stay in China, foreign drivers must abide by the relevant provisions on the prevention and control of epidemic situation in the place where is located the border checkpoint, to strengthen their own protection and to promptly report any suspicious symptoms such as fever, dry cough and fatigue;

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<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.



- foreign drivers who commit multiple trips with the border crossing should have regular testing (testing for the presence of nucleic acids);
- the drivers who refuse to observe the rules of prevention and fight against epidemics, will be blacklisted.

Republic of China requires the Russian drivers of international road transport, when passing the crossing point Zabaikalsk – Manzhouli providing information about results of tests for COVID-19. The certificates must be issued exclusively by state medical institutions. The validity of these references should not exceed 10 days. According to information obtained from the Office of foreign Affairs in Manchuria, accepted reference on results of tests for COVID-19 for drivers of the vehicle when passing the checkpoint Zabaikalsk – Manzhouli, only from public health institutions.

Republic of Uzbekistan during the period of strengthening of measures to combat the spread of COVID-19 introduced a temporary procedure for international road transport. This new procedure applies to both national and foreign nationals. The movement of freight vehicles can be conducted through specially designated checkpoints across the state border. From 30 April all trucks arriving in Uzbekistan, will be directed to special parking near the border crossings, where drivers will be checked for coronavirus COVID-19. Vehicles and their drivers will remain on these sites until they announced the test results. If the test for the coronavirus COVID-19 is negative, a trip on a confirmed route will be allowed to continue. Drivers must wear protective suits, disposable masks and gloves.

If the test result is positive, the driver will be delivered to the medical institution in accordance with the rules, and the second driver, if any, will be transferred to the quarantine institution.

After the vehicle has been completely disinfected, the transport operation may continue with another driver (who is not associated with the consignor or the recipient of the corresponding transport operation), or the goods transported can be transferred to another vehicle under customs control. In the case of a new driver, the obligations related to the delivery of goods under customs control remain valid for that driver.

Foreign drivers entering Uzbekistan to deliver goods must leave the territory within 10 days from the date of delivery of the goods. If they must pick up the goods for the return stage during this time, they must wait at the specially designated parking lot closest to the place of delivery. These areas have strict quarantine and social distance rules; Drivers can neither communicate with other people nor leave the area. Outsiders cannot enter the area.

Drivers should be aware that the following situations are considered a violation of quarantine rules in Uzbekistan:

- deviation from the planned route;
- Not using protective suits, masks or gloves;
- Not complying with the deadlines set for repatriation;
- lack of necessary transport documents (driver's license, permits, certificates, international transport permits)

If the driver does not comply with the delivery dates established by the customs authority, written confirmation must be provided that the non-compliance with these delivery dates is due to the driver observing this temporary regulation, then no administrative proceedings will be started<sup>24</sup>.

From June 12, 2020, foreigners need an appropriate insurance policy to enter Ukraine, and for those arriving from countries with a wide spread of coronavirus infection, they need to be observed during the quarantine period, crossing the state border by foreigners and stateless persons (except for foreigners, stateless persons permanently residing in Ukraine, and persons recognized as refugees or persons who need additional protection) is prohibited without an insurance policy (certificate, certificate) costs associated with treatment with COVID-19, observation.

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<sup>24</sup> Ibid.

Citizens of states with a wide distribution of COVID-19 who have not been on the territory of these states for the past 14 days, employees of diplomatic missions and consular agencies of foreign states, missions of official international missions, organizations accredited in Ukraine, and their families are not subject to discussion, drivers and crew members of freight vehicles, crew members of air and sea, river vessels, members of train and locomotive crews. States with a wide spread of COVID-19 are states in which the number of active cases of COVID-19 is more than 40 people per 100 thousand people<sup>25</sup>.

### III. Impact of the COVID-19 pandemic on international road transport

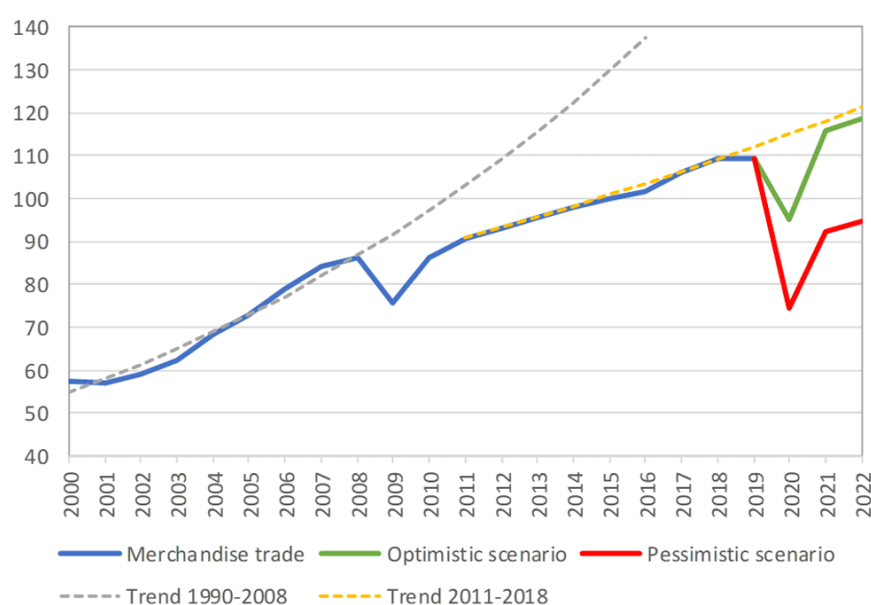
Covid-19 has spread rapidly around the world to become a global health crisis. Severe restrictions have been put in place to contain the virus and avoid the collapse of health care systems in many countries. One result of the efforts to contain the pandemic has been a dramatic reduction in transport activity.

The "Big Picture" of COVID-19 impact on world economy in mid-June 2020 and recent predictions on world economy in 2020 offer varying scenarios of the pandemic's impact on economic activities and growth:

- IMF: World GDP in 2020: - 3 %;
- Advanced economies: - 6.1 %;
- Emerging and developing economies: -1.0 %;
- The WTO: World trade could fall by as much as a third;
- UNCTAD: foreign direct investment (FDI) flows down by 30-40%;
- The World Bank: cross-border remittances to fall by 20%.

World trade is expected to fall by between 13% and 32% in 2020 as the COVID 19 pandemic disrupts normal economic activity and life around the world. The wide range of possibilities for the predicted decline is explained by the unprecedented nature of this health crisis and the uncertainty around its precise economic impact. But WTO economists believe the decline will likely exceed the trade slump brought on by the global financial crisis of 2008-2009.

**Figure 1: World merchandise trade volume, 2000 – 2022**



Source: WTO Secretariat

<sup>25</sup> Ibid.

In the field of international road freight transport, contractions of international trade would entail:

- reduced demand for road transport services and, as a result, traffic volumes;
- reduced demand for new vehicles for international road transport and, as a result, the volume of production and sales of these vehicles;
- increase in the number of dismissed personnel from the transport sector;
- increased cost of road transport services due to the numerous costs associated with unpredictably changing opportunities and conditions for international transport in different regions and countries along the route;
- reduced investment attractiveness of the international road transport industry.

Currently, significant pressure continues on logistics facilities, from transportation to warehousing. As companies from different industries will seek to increase their activities, the most likely bottleneck will be the logistics capacity, which will remain at a high level during this time.

#### A. Impacts of the pandemic on supply chain and freight logistic

Logistics service provision has been surprisingly resilient during the crisis, offering almost uninterrupted critical supplies (pharmaceuticals, food) in most countries. The capacity remained available to meet the rapidly diminished demand and most problems have been caused by the decisions on lockdowns and closure of borders, complicating documentary processes esp. with paper-based procedures and hindering or banning crew changes (especially in shipping). After a sudden and global fall in activity, and despite several hardships, the logistics sector is bouncing back spectacularly.

**Table 1: . Summary of COVID-19 generic impact by freight transport sub-sectors**

Transport sub-sector	Service	Mobility	Financial cost	Freight demand forwarding
Road freight	Domestic	Negative	to Negative	Negative to mixed
	International	Mixed		
Rail freight	Domestic	Negative to neutral or positive		Very negative
	International			
Air freight	Belly cargo	Mainly negative; also neutral to positive routes		Positive
	Cargo only			
Maritime freight	Shortsea liner	(Very) Negative		Negative to Mixed
	Deepsea liner			

Source: Adopted from Dr. Lauri Ojala, "The Fall and Rise of Freight Transport during the Coronavirus Pandemic", 23 June 2020. Note: impact on rail and road freight is adjusted for Asia and the Pacific, based on the secretariat's estimations.

Global trade volumes, as indicated by container trade volumes, declined by 8.6% in February 2020 compared to the same month of 2019. The decline in container trade was particularly marked in the Far East. In Europe, North America and Oceania it is also significant, while it is not yet noticeable in other emerging economies (Latin America, Sub-Saharan Africa and the Indian Subcontinent and the Middle East). The table below lists the changes in January and February 2020 for different world regions.

**Table 2: Changes in container trade volume by world region<sup>26</sup>.**

	Change Jan 2019 to Jan 2020 (%)	Change Feb 2019 to Feb 2020 (%)
Far East	0.0	-17.5
Europe	0.7	- 4.0
North America	- 0.3	- 7.0

<sup>26</sup> ITF COVID-19 Transport Brief (29.04.2020) : Global Container Shipping and the Coronavirus Crisis ( [www.itf--oecd.org](http://www.itf--oecd.org) )

Australasia and Oceania	- 6.5	- 2.8
Indian Subcontinent and M. East	3.7	6.1
South and Central America	2.4	2.8
Sub-Saharan Africa	5.4	7.4

Source: International Transport Forum, 2020.

The current mobility and activity restrictions around the world are likely to result in a strong reduction of global freight transport volumes in 2020 of more than one third. Overall, freight transport, measured in tonne-kilometres, is projected to be 36% below the level foreseen without Covid-19 for this year. Non-urban freight activity, i.e. national and international goods transport outside of cities, could be 37% lower overall, compared with the estimate for global 2020 freight volumes without Covid-19.<sup>27</sup> Regional differences are significant. A reduction of more than half is projected for ASEAN countries, Russian Federation/Central Asia and India. For China, the impact is just above a quarter less freight. Europe and the Americas are in the middle of the range with reductions of around 40%; only the Andean countries are projected to be hit harder, with a 50% fall in non-urban freight activity.<sup>28</sup>

Freight transport within cities may suffer significantly less than national and international freight transport. Updated forecasts show that urban freight activity is 8% below the estimate, which has not yet reflected any impact of Covid-19. One of the reasons for this is the growth of online shopping during the imposed restrictions on mobility, which leads to an increase in the supply of purchases in e-Commerce. This phenomenon is associated with an increase in the number of vehicles delivering goods within cities, despite a significant overall drop in traffic volumes.<sup>29</sup>

The estimated impact depends on the duration of activity and mobility restrictions, as well as on the composition of freight transport in each country. Regions with a large presence of livestock, mining, and energy-related mining and processing may see a greater reduction in freight volumes, followed by markets with intensive production. The 2020 values for trade activity and geographical composition used in the simulation are estimates and depend, in particular, on the projected population and economic activity.

If the pandemic situation persists for a long time, there will be a long-term need to maintain social distancing measures, and there will be significant changes in demand and productivity in the manufacturing and transport sectors. In this scenario, an increase in the number of bankruptcies of transport companies for international road freight transport, as well as many suppliers and manufacturers, is likely.

In the most likely scenario, the pandemic peaks in different regions will vary in time and scale, with repeated outbreaks. This suggests that the effects of the pandemic on the economy will continue in the second half of 2020 and most likely even into 2021. In addition to affecting demand, this also means that suppliers will be able to work for a certain allowed period of time, and then suspend activity in the next period. Because of the variability and unpredictability of these periods, companies should be able to make better use of resources by moving capacity allocation from severely affected regions to minimally affected ones.

In both the best-case and most likely scenarios, the pace of recovery in road transport volumes in the international segment will depend on the extent to which transport and logistics companies realize the potential of digital technologies and communications adapted to the new challenges of the consequences of the COVID-19 pandemic. At the same time, especially before the advent of effective pharmaceutical products and treatment technologies, preventive measures to protect personnel from infection with the COVID-19 virus will remain relevant.

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

## B. Impact on costs and delays in cross-border freight transport

In most countries, due to COVID-19 and the introduced quarantine measures, the activities of international road transport were impacted. Checkpoints at some border crossings were completely closed or their number is sharply reduced, and a limit is imposed on the number of cars allowed per day. Border closures often occurred unexpectedly for carriers, forcing them upon arrival at a closed checkpoint to find out and agree on a new route to existing border checkpoints and increase the travel distance and delivery time. Additional runs also occurred when the driver needed to be returned to issue additional documents, certificates, and in some cases, visas. Some drivers did not go to work for fear of getting infected, others continued to work, but were forced to spend time on additional documents or certificates confirming the absence of the virus.

The remaining checkpoints were experiencing excessive workload, significantly exceeding their design capacity. They lacked the capacity to service the sharply increased flow of vehicles. Additional procedures related to the implementation of measures to counter the spread of the COVID-19 pandemic resulted in an increase in the length of time required to inspect each driver, cargo, vehicle and paperwork. As a result, long queues and forced downtime of vehicles formed. Forced communication between drivers, personnel and with each other created additional potential risks for the spread of infection.

Inspection of documents and measurement of the temperature of drivers is carried out at the border, control posts at the entrances to the territory of warehouses, as well as at many other checkpoints, also increase the duration of vehicle downtime.

The resulting organizational difficulties in organizing international road transport have led to a significant increase in costs for carriers, associated with new business continuity processes due to COVID-19 (table 3).

**Table 3**

Additional costs incurred by the road operators due to COVID-19	
Labour costs	Recruitment and hiring of additional drivers to replace those sick or in quarantine
Health check requirements	Arrangement and payment for additional health tests of drivers and preparation of accompanying documents.
Idle time	<ul style="list-style-type: none"><li>• additional downtime, including at paid parking;</li><li>• unpaid vehicle mileage due to forced change of the route; termination of the started transportation and empty runs due to the impossibility of reloading;</li><li>• payments to drivers for the actual increase of working hours on the route and living expenses, including during the period of forced quarantine;</li></ul>
Insurance	Complying with more stringent insurance requirements
Operational costs	<ul style="list-style-type: none"><li>• Hygiene products for drivers,</li><li>• means and procedures for sanitizing vehicles and transported goods.</li></ul>
Business losses	<ul style="list-style-type: none"><li>• Losses from disruption of the transport schedule or the transport itself</li><li>• Penalties from the side of cargo owners.</li></ul>

Source: ESCAP, 2020.

## IV. New developments in cross border freight in Asia-Pacific

### A. Reallocation of freight volumes from road transport to other modes of transport

The spread of the coronavirus has dealt a severe blow to global logistics and supply chain security for raw materials and finished products. The crisis caused an imbalance in freight traffic associated with changes in demand, production suspension and imposed restrictions. Because of this factor, national governments and

international organizations must give the highest priority to maintaining the continuity and strength of supply chains.

In the context of the epidemic, rail transport has gained a prominence. Due to the high volatility of rates for air and sea transport, volumes are redistributed towards land transport, especially on the Asia-Europe routes. Although the borders are open to international freight shipments, strict checks, quarantines, driver changes and other measures are slowing down the speed of road transport. This opens up new perspectives for rail transport. The cancellation of passenger trains made it possible to free up the timetable for running additional freight trains. Railroad transport operators did not respond to changes in demand by increasing rates but in several cases offered special favorable conditions to new or existing shipments.

It was by trains that a significant part of China's anti-epidemic and medical cargo was transported. Railway teams from many Chinese provinces worked around the clock and helped factories, construction and trading companies get back to work on time. In February, Guangzhou re-established rail links with Russian Federation. In May 2020, there is a high demand for rail transportation from Asia.

According to the estimates of JSC Russian Railways (Russian Railways), the transportation of loaded containers on the China-Europe-China route in March increased by 33.4%, to 28.5 thousand TEU. But due to the complication of the situation in Europe, there have been reduced shipments of both cargoes to the East and empty containers. In March 2020, the dispatch of empty containers on the China-Europe-China route, mainly from Europe, decreased by almost 70%, to 1,000 TEU. Since April 1, the Russian railway monopoly has given large discounts on the return of empty containers through Kazakhstan to China - up to 40%. But market participants noted that the discount in the total cost of transportation, despite the high share rate, has an insignificant weight.

The Russian railway company managed to maintain positive dynamics in terms of container traffic in the first quarter of 2020. According to preliminary results, the total traffic volume of UTLC ERA for the quarter amounted to more than 75 thousand TEU, which is 20% more than in 2019.

In early April, Russian Railways announced an increase in container traffic in January-March 2020 by 13.1% (up to 1.3 million TEU) compared to the same period last year. At the same time, the number of loaded containers in all types of traffic increased by 12.5%, to 858.5 thousand TEU.

China National Railway Group, in turn, also reported on the success in the transportation process. In the first quarter of this year, according to the company, the number of container trains on the China-Europe route and



**Figure 2:** Containers on the railroad.

the amount of cargo shipped grew by 15% (up to 1941 trains) and 18% (up to 174,000 TEU), respectively, on an annualized basis. At the same time, due to quarantine measures, problems arose with the loading of Chinese containers in Europe.

The driver of rail container traffic growth was the need to supply of medicines and other medical products. A report from the China National Railway Group indicates that since March 21, when the first such "anti-coronavirus" trains went to Italy, Germany, Spain, Czech Republic, Poland, Hungary, the Netherlands, almost 500 tons of medical supplies

have been delivered to EU countries.



Another important incentive for China-Europe rail transit remains container subsidies by the Chinese provinces. And although, in accordance with the previously announced intentions, it is planned to gradually reduce this state support, starting in 2020, the Chinese authorities have not cut state support so far.

After the pandemic, the freight logistics world will not be the same and most scenarios hold an important promise for rail transport. Rail companies that follow trends and quickly adapt to changing circumstances will be able to manage the situation, create demanded services and strengthen their position in business. In the context of the emergence of the global economy from the "pandemic peak", it is the collaboration and initiative of logistics companies that can become one of the most important and effective drivers of further development and growth.

## B. Operational improvements to minimize the losses of the road transport industry

The economic environment for international trade and transport services is changing rapidly, including as a result of the impact of the COVID-19 pandemic.

The urgency of achieving maximum efficiency in the management of logistics supply chains has become more acute, not at the expense of the number of resources involved, but by adapting the organization of the transportation process and implementing innovative technologies to reduce operational costs.

One of these technologies is the use of an electronic control system, which is used to plan, manage and execute the order throughout the entire delivery process, thanks to the information that precedes, accompanies and completes the delivery process. For example, at present, when organizing multimodal transport, it is enough to send the necessary documents, including in digital format, to the customs post one day before the cargo departure to get the appropriate approval. As a result of the preliminary check, the cargo will cross the border without loss of time at customs control related to paperwork and waiting in the queue, as it will arrive at the post exactly at the appointed time interval.

Another strategy designed to reduce time and financial costs is the technology for optimizing loading and unloading operations. Currently, various advanced developments in this area are being actively implemented, such as warehouse management information technologies. Systems within this technology record all names and positions stored in the warehouse, take into account the term and conditions of cargo storage, independently distribute the received products to the most suitable place for storage. The program also generates a list of goods that should be shipped from the warehouse, indicating the time of operation and the place of storage of products, which allows you to bring the vehicle to the most convenient place of loading.

More and more attention is now being paid to the quality and safety of transport. Cargo, in accordance with the main principle of logistics: "the desired product of the required quality and quantity at the specified time, in the right place and at the optimal cost" must be delivered exactly in the form and configuration in which it was sent. The human factor is very significant.

As an example, it can be considered road transport: only drivers who have a certain category that allows driving trucks, sufficient driving experience, and a medical work permit of this type are allowed to work. However, despite these rather strict requirements, various technical devices have been widely used in recent years to improve the level of safety, helping to control the process of driving and driving a vehicle.

For example, special devices are installed in trucks that monitor drivers' compliance with work and rest modes, speed limits, the driver's physical condition, the specified route and traffic schedule. At the same time, you can read the driver's pulse and, if it slows down (which indicates that the driver is overtired and may lead to sleep at the wheel), the device immediately gives a loud signal. Such safety devices not only ensure the safety of transportation, but also protect the life and health of the driver.

### C. Accelerated digitalization of road transport business processes

In the context of the knowledge economy, digitalization<sup>30</sup> processes are recognized as one of the most significant manifestations of innovative and scientific and technical development. At the same time, there are no unambiguous estimates of how large-scale economic transformations will be due to digitalization, how and when they will manifest themselves.

The transport sector was one of the first to experience the introduction of digital technologies: the objective need to automate management and improve the reliability of the transport system prompted transport companies to computerize management processes before others, and then digitalize the entire sphere. At the same time, while optimization and digitalization of business processes, including in the field of international road transport, has been discussed for a long time, but only few companies dared to make real and fundamental changes in the approach.

During the COVID-19 pandemic, many companies decided to transfer all work to "new rails", prompting the real IT revolution in logistics and creating a high demand for highly automated logistics chain. Cargo owners need a full range of services with access from their mobile device. The client needs the ability to order transportation on a digitalized logistics platform by clicking on a button in a mobile application. Transferring employees to remote work also requires optimization and automation of all business processes in a logistics and transport company.

A distinctive feature of digitalization in the transport sector is that it occurs unevenly in each of its directions. The following table identifies the most popular ways to use digital technologies for transport needs.

**Table 4**

Areas of application of digital technologies in the transport sector	
The direction of the impact	Example of using the technology
Electronic document circulation	Introduction of e-tickets, remote registration of travel documents, creation of "virtual offices", customer service without personal contact.
Remote communications	Use of digital communication technologies for live remote communication.
Making payments	Mobile payment, unified travel documents, and the use of mobile apps to get transport services.
Cloud technologies	Data processing at a new level: <ul style="list-style-type: none"><li>• collection and analysis of data on traffic flows and cargo;</li><li>• use of "bigdata" technologies.</li></ul>
Integrated transport management systems	Reorganization of transport management systems, their automation, involvement of the client and Supervisory authorities in the process of cargo management and control.
Intelligent transport system	Automation and robotization of traffic flow and cargo control, forecasting of the transport situation, support for autopilot systems.
Platforms for providing logistics services	Creating digital platforms focused on providing logistics services, including booking time and range of services, identifying and coordinating optimal routes and schedules, etc.

Source: ESCAP secretariat, 2020.

The push for digitalization in transport can come from technologies that have been successfully tested in other areas, like "big data", but it can also be internal to the transport industry, like the development of intelligent

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<sup>30</sup> As the concept of digitalization is very broad, this report looks at digitalization in the transport sector, as a large – scale penetration of digital technologies, both at the managerial level and at the operational level.

transport systems (ITS). In this case, it implies a change in the technical and economic foundations of transport services.

At the moment, there are several ongoing directions of the process of digitalization of the transport sector.

First is digitalization of transport infrastructure and logistics chains (including warehouses and service centers. This means that each stage in the logistics chain, as well as the vehicle, must be involved in the digital sphere, that is, have a personal identification on the Internet, as well as be controlled by software. This allows managing the entire transport flow in real time, reducing costs, and making the transport operations more predictable. An example of this is the provision of chips to all sea containers, tracking the movement of each container, and in the future, each cargo compartment of vehicles.

Second is the robotization of production processes in the transport sector. It is already taking place at a very rapid pace. However, the most labor – intensive components-warehouse management (especially packing and packing of cargo), vehicle maintenance still require extensive involvement of manual labor. In the transport sector, robotization involves the introduction of autonomous vehicles, as well as the automation of production itself and the use of equipment that works without human intervention. It should be noted that autonomous systems have long been used at service stations (both road transport and rail). In the future, the accumulated experience will allow to apply the practice of using such technologies to all components of the transport sector.

Robotization in transport has its own specifics, different from other areas of economic activity. For example, robotics is often seen as the production and use of certain physical machines that can mimic any human actions. However, autonomous transport systems cover a much larger range of areas and can be considered as the production and use of self-controlled adaptive intelligent systems that can perform their production functions regardless of the degree of human intervention.

Third is large-scale automation of management processes, which has been going on for a long time. In fact, the transport sector was one of the first in which management processes began to be automated. The speed of modern transport flows is such that a person in principle will not be able to make competent, thoughtful decisions without the risk of a critical error.

This covers digital information platforms which integrate all participants in the value chain, as well as communication channels, distribution routes, and a community of potential customers. Logistics sector uses specialized local digital platforms for planning the transportation process, as well as organizing cooperation between different types of transport and logistics centers. For example, digital platforms help coordinate cargo handling in warehouses and establish communication with the end user. With the help of platforms, the end user can directly establish contact with the supplier, and the platform will provide them with all the necessary tools for managing the movement of goods. In other words, this type of digital platform can integrate all logistics and other processes into a single system, connect consumers and manufacturers, and take over the management of all additional functions.

**Table 5**

Examples of digitalization in the transport sector

Example of the technology	Technology features
SARTRE	A program for creating passenger vehicles with a single remote control that are safe for pedestrians and the environment.
Open Shuttle	Interactive picking of the goods using the automated trucks.
Pack by light	Use of special light indicators to facilitate the operation of robotic vehicles.
Put by Beamer	Warehouse technology for receiving and distributing cargo in automatic mode.
Automated port complexes	Use of automated storage systems in seaports, primarily in container terminals.

Source: ESCAP secretariat, 2020.

Final area is the use of artificial intelligence (AI) technology that is becoming a general-purpose technology (GPT) for transport. In addition, the consumers themselves are becoming more and more "armed" with a variety of technologies, primarily thanks to the use of smartphone. The presence of a mobile device for accessing the Internet and the mass distribution of such devices allows for a new interaction between the entire transport sector and users. The emergence of such a service as UBER, and the subsequent term "uberization" radically changed the fundamental principles of providing services in the transport sector.

The advantages of digitalization in transport are clearly recognized, as they help improve the efficiency of the transport sector by reducing fuel costs, increasing road capacity, reducing the number and scale of transport accidents and the proportion of cargo damaged during transportation. They also reduce labor costs for drivers and many employees, reduce vehicle downtime and eliminate the so-called "human factor", i.e. the risk of human error.

At the same time, the use of automated transport systems is still a controversial issue associated with new threats and risks, including social impacts due to consequence on labour market; insurance and liability issues and risks of software failure and loss of control of the vehicle. The process of digitalization can also make the market challenging for many of its participants, as it can lead to the emergence of a market model that is commonly called "winner takes all". In other words, integration in each market segment reaches the point where there is a single, very large monopoly. With the emergence of such a monopolist, all other participants become very dependent on the market leader. This can be seen in the e-commerce market. Similar processes can be observed in the transport sector: logistics companies are increasingly dependent on the e-commerce sector (Internet exchanges, online stores).

In conclusion, digitalization is the dominant process in the transport sector among all manifestations of scientific and technological progress. In addition, the process of digitalization itself is much faster than previous technological revolutions. however, the end result of these transformations is difficult to predict which entails the need for adequate monitoring and impact assessment mechanisms.

## Textbox 2 : Experience with digitalization and smart transport solutions in Latin America and the Caribbean

### Smart transport solutions in Latin America and the Caribbean

In Latin America and the Caribbean, there are several *smart transport or intelligent transport systems (ITS)* applications currently in place, mainly in ports (linked with operation planning and management, security and optimization) and along the highways (electronic tolls and several applications related with traceability of cargo). The following table shows lists most used technologies in the region.

Need	Medium	Objective	Its technology
freight traceability / security	Freight	Security	Electronic seals, tampering
		Freight quality	Temperature, humidity, vibration sensors
		Dangerous freight	Electronic Identification Fleet management systems
	Transport mode	Mechanical condition monitoring	Sensors: fuel level, tyre status, speed, mechanical alerts.
	Infrastructure	Monitoring traffic conditions	Traffic management systems
		Weather conditions	Weather stations monitoring rain, fog, precipitation, atmospheric pressure, etc.
	Driver	Identification	Automated identification systems
		Route conditions	Traveller information systems
		Driving times	Fleet management systems
	Equipment (cranes, trailers, other)	Depending on type of freight	Automated identification systems
Need	Medium	Objective	Its technology
Infrastructure efficiency	Tolls	Free-flow	Electronic payment
		Non-stop	Non-stop weighing
		Port terminal access	Automated identification systems
	Border crossings, customs procedures	Shorter stops	Automated identification systems
		Less paperwork	One-stop counter
			Electronic bill of lading
	Terminal logistics management	Efficient use of space and resources	Terminal operating systems
			Automated identification systems
		Reduced operating costs	Automated machine guidance
	Inspection	Selective	Automated identification systems
		Freight verification	Image processing systems
	Planning	Reliable information	Fleet management systems
	Operations	Real-time information	Terminal
			Electronic data transmission
			Port community systems
	Trade	Electronic	Electronic data transmission Port community systems

Source: Intelligent transport systems in Latin American seaport logistics, ECLAC, 2012.

### Best practices from Latin America: Free flow, RFID and the interoperability with other logistics actors

In the year 2005, the government of Chile began the concession of 155 Km of urban highways in the capital city. The normative defined that the companies had to implement a free flow system for the charging of toll with a unique sensor (RFID dispositive) for all the highways, with an integrated registration of users linked with vehicle number plate number of the vehicle. At that moment, this was the first implementation of these kind of technology in Latin America and one of the first experiences in the world in implementing the interoperability among the different actors and technological providers. Fifteen years later, the technology has been able to maintain the quality of operation despite the growing in vehicle fleet rate as well as the incorporation of new actors like tunnels operators, airport access toll and parking building that are using the same RFID dispositive.

The RFID technology is also used in several Argentinean ports, to manage the truck shifts and allow the access to the ports. In Colombia, several land transport associations are using this technology to identify freight and passenger vehicles to monitor key route locations, such as tolls, checkpoints, border crossings, duty-free zones, ports, increasing the logistics traceability and security. In the following months, also Guatemala will require the use of RFID tag in each truck to collect information about cross-border time, enhancing the security and trade facilitation in the Northern Triangle of Central America.

**Textbox 2 : Experience with digitalization and smart transport solutions in Latin America and the Caribbean (continued)**

**Lessons learned**

Latin America has invested in technologies, however most of its implementation has been using closed architectures (associated with a single provider) and not assuring their interoperability with other technology suppliers. This is particularly important, as in a near future it will be necessary to include new open-source systems or disruptive technologies over open-source platforms. There is also a concern that some tracking (real-time location) and traceability (flow memory) implementation are not designed to function throughout the whole logistics chain, reducing the potential of these technologies to improve fleet management and interoperate with other services and devices such the Internet of things. Moreover, what is currently observed is a lack of use of international standards, their partial use or, even, the production of a mix of international standards.

Thus, support is needed to help countries keep track of new developments and threats and assist them in the design of mitigation plans to avoid the degradation/denegation of digital services by technical, connectivity or cybersecurity reasons. At regional level, fostering the regional cooperation over a common technological architecture could reduce the cost of implementation, gaining scale, specialization and agglomeration economical economies. Also, it could provide technical guidance for the implementation of harmonized public-private solutions. These elements could open towards regional smart freight corridors where the ITS's interconnectivity could be enhanced with other emerging technologies that have a disruptive potential in logistics, like the Artificial Intelligence, blockchain, the Internet of Things or the prompt arrives of automates trucks and other innovations, which will allow the processing of big data for improving the logistics decision making process and the implementation of evidence-based policies.

To take advantage of these innovations and the data generated, it is crucial the development of a technological architecture that promotes the interoperability through specifications based in international norms and UN standards for both equipment and systems to ensure compatibility, interoperability and consistency with national or international regulations, in order to ensure the exchange of information, lower development costs and less uncertainty about technological change. The priority to open source solutions over proprietary versions (those associated with a single technological provider could also reduce implementation costs and reduce the technological obsolesce. The essential architecture should be part of a political effort to move the facilitation towards a new level, where the goods flow smoothly and seamlessly over the continent without physical and technological local, national and regional borders.

Finally, investment in technology must be embedded in concrete and coordinated action by government, industry and transport service users under a public-private model that encourage utmost cooperation for suitable investments in management systems and transport. The technology alone will not resolve such problems as the lack of communication or real commitment by all parties and could even aggravate some conflicts if lack of trust among participants is not resolved early in the process and not concrete outputs are not achieved in the midterm. In these intersectoral dialogue and regional coordination processes, the help and guidance of ECLAC as others United Nations Regional commissions could bring instruments and methodologies to achieve long-term vision and make tangible the political will required to solve the traditional transport and border-crossing problems and advance towards a logistics operation in a wider regional market.

Source: Economic Commission for Latin America and the Caribbean, 2020.



## PART 2 – Supporting seamless and smart connectivity along the Asian Highway Network during and after the pandemic

As detailed in Part I, the COVID-19 pandemic, in many ways, has underscored the need for further facilitation and digitalization of road transport services along the Asian Highway Network. At the same, it has provided a wealth of innovative measures and renewed attention to the existing standards and solutions in road transport facilitation and digitalization efforts.

One area for further action is harmonizing safety and health requirements applicable to international road transport, using the best practices available at national or regional level. The second area is promoting the use of new technologies and digitalization to further the risks and costs of international road transport in the times of the pandemic but also during normal transport operations.

This part of the report elaborates on these two areas, based on existing technical knowledge and practical information available.

### I. Seamless connectivity: Transport facilitation measures to minimize the impact of COVID-19 on the international road transport

As described previously, to minimize the threat of the spread of the virus COVID-19 among the personnel involved in the organization of international road transport, countries have adopted measures and recommendations.

They include, for example:

- daily examination of drivers and staff with conducting thermometry before the beginning of the shift and record the results of the inspection in an electronic database. The suspension from being in the workforce of persons with high body temperature and (or) with signs of an infectious disease;
- implementation of thermometry drivers in the international road checkpoints when crossing the state borders, as well as the Parking of vehicles or freight terminals, but not less than once a day;
- survey of drivers and staff about their health and the health of the persons residing together with him as well as possible contact with sick individuals or individuals returning from another state or region (interview, questionnaire, etc.);
- carrying out explanatory work among drivers and staff about the necessity of observance of measures of personal hygiene (constant washing of hands with liquid soap treatment hands skin antiseptics, the use of personal protective equipment;
- use of personal protective equipment in the form of disposable masks and gloves after thermometry;
- regular treatment of hands skin antiseptics or disinfectant wipes;
- the frequency shift masks in case of contact drivers and staff should be every 2-3 hours, gloves – at least once per shift, or with their pollution, damage;
- driver briefing:
  - about the symptoms and signs of infection with the COVID-19 virus and the necessary actions for suspected illness (high fever, respiratory failure, decreased sense of smell, etc.);
  - on the rules of conduct and compliance with security measures in places of communication with other drivers, as well as personnel providing services during transportation;
- driver support:
  - information:
    - on compliance with the route, traffic regime and stops on the territory of states;

- about places along the route for an emergency stop of vehicles upon detection of signs of a disease;
- about actions and contacts for calling for medical assistance;
- an insurance policy that guarantees the payment of medical services for the period of possible treatment in the territory of a foreign country;
- personal protective equipment and hygiene, as well as disinfection of the workplace, in an amount that covers the needs during the trip, but not less than one week.
- registration in a single database of the results of tests for the presence of the COVID-19 virus.

Currently, these measures and recommendations are supplemented by countries on their own initiative and have not been reflected in international agreements and are also not harmonized for mandatory implementation by all participants of international road transport.

#### A. Harmonization of new requirements at regional level: Example of the EAEU recommendations.

Despite the fact that the governments of many countries develop sanitary and epidemiological national rules, the maximum effect for international road transport can be achieved only as a result of joint and coordinated activities along the route.

These activities should be carried out taking into account the internationally accepted recommendations for application on the agreed routes of international road transport.

An example is the recommendations adopted by the EAEU member States. These recommendations determine the procedure for organizing the work of the objects of the "green corridors of international transport routes" (points of stops for motor vehicles for refueling, maintenance, rest and meals for drivers) at the customs border of the Eurasian Economic Union and the customs territory of the Eurasian Economic Union in order to carry out organizational, preventive and disinfection measures and prevention of the spread of coronavirus infection COVID-19.

It is recommended that the facilities provide services only to drivers and (or) persons accompanying cargo transported by road vehicles of international transportation (hereinafter referred to as persons accompanying the cargo) in order to exclude their contacts with the population.

Measures to prevent the spread of COVID-19 infection at the facility are aimed at:

- preventing the introduction of COVID-19 infection into the facility;
- preventing the spread of COVID-19 infection among facility workers;
- implementation of other organizational measures to prevent the spread of COVID-19 infection at the facility;
- ensuring self-protection of drivers and (or) persons accompanying the cargo from COVID-19 infection.

#### 1. Preventing COVID-19 infection from entering the transport facilities

In order to prevent the introduction of COVID-19 infection into the facility, EAEU recommends to<sup>31</sup>:

- organize an "entrance filter" for drivers and (or) persons accompanying the cargo, with non-contact thermometry and mandatory isolation of persons with high body temperature and (or) signs of a respiratory infection (fever, cough, runny nose) in a specially designated room before arrival medical workers. If there is no possibility of allocating a separate room for such persons, the driver and (or)

<sup>31</sup> Recommendation Of the Board of the Eurasian economic Board dated July 07, 2020 <http://eec.eaeunion.org/ru/covid-19/Documents/%D0%A0%D0%B5%D0%BA%D0%BE%D0%BC%D0%B5%D0%BD%D0%B4%D0%B0%D1%86%D0%B8%D1%8F%20%D0%9A%D0%BE%D0%BB%D0%BB%D0%B5%D0%B3%D0%B8%D0%B8%20%D0%95%D0%AD%D0%9A%20%D0%BE%D1%82%207%20%D0%B8%D1%8E%D0%BB%D1%8F%202020%20%E2%84%96%2011.pdf>

the person accompanying the cargo must self-isolate in the passenger compartment (cabin) of the vehicle;

- arrange at the entrance to the facility a place for treating hands with skin antiseptics (including using the installed dispensers) or disinfecting wipes;
- ensure the minimization of contacts of the arrived driver and (or) persons accompanying the cargo with the employees of the facility;
- provide information to drivers and (or) persons accompanying the cargo:
  - the need to immediately report deteriorating health and the appearance of signs of a respiratory infection (fever, cough, runny nose);
  - on the compulsory fulfillment of the requirements for self-isolation (living in an isolated room, which makes it possible to exclude contacts with other persons);
  - on compliance with individual and public prevention measures;
- provide for a cashless payment system at petrol stations;
- provide for drivers and (or) persons accompanying the cargo, a separate bathroom (in compliance with the enhanced disinfection regime), a room for eating, a shower, a rest room;
- when organizing meals for drivers and (or) persons accompanying the cargo:
  - provide for the most rational methods of service (various types of self-service, service through vending machines, service behind the counter with the ability to choose dishes from the display counter);
  - exclude from the assortment dishes that have not undergone heat treatment;
  - ensure that people are in the room for eating in a minimum amount, observing the principle of social distance (at least 1.5 meters)
  - use disposable tableware. Collect used disposable tableware in disposable tightly closed plastic bags, disinfect them at the end of the working day and dispose of in a specially designated place;
- identify employees who will contact drivers arriving at the facility and (or) persons accompanying the cargo. Such workers need to ensure that contact with other employees of the facility is minimized who do not come into contact with the arriving drivers and (or) persons accompanying the cargo.

If the driver and (or) the person accompanying the cargo is found to have an increased body temperature and (or) signs of a respiratory infection (fever, cough, runny nose), it is recommended:

- report this information to the authorized body of the relevant EAEU member state in the field of sanitary and epidemiological welfare of the population;
- send the motor vehicle, on which the driver and (or) the person accompanying the cargo arrived, to the sanitary parking lot for sanitization using disinfectants in accordance with the procedure established in the EAEU member state;
- disinfect the parking and stay areas of the vehicle, on which the driver and (or) the person accompanying the cargo arrived.

After leaving the facility, the driver and (or) the person accompanying the cargo with an elevated body temperature and (or) signs of a respiratory infection (fever, cough, runny nose), the premises where they were located should be cleaned using viricidal disinfectants.

## **2. Preventing the spread of COVID-19 infection among facilities workers**

In order to prevent the spread of COVID-19 infection among the workers of the facilities, EAEU recommends to<sup>32</sup>:

- organize a daily “input filter” with non-contact thermometry and mandatory isolation of persons with high body temperature and / or signs of a respiratory infection (fever, cough, runny nose);

<sup>32</sup> Recommendation Of the Board of the Eurasian economic Board dated July 07, 2020 <http://eec.eaeunion.org/ru/covid-19/Documents/%D0%A0%D0%B5%D0%BA%D0%BE%D0%BC%D0%B5%D0%BD%D0%B4%D0%B0%D1%86%D0%B8%D1%8F%20%D0%9A%D0%BE%D0%BB%D0%B5%D0%B3%D0%B8%D0%B8%20%D0%95%D0%AD%D0%9A%20%D0%BE%D1%82%207%20%D0%B8%D1%8E%D0%BB%D1%8F%202020%20%E2%84%96%2011.pdf>

- organize at the entrance to the facility a place for treating hands with a skin antiseptic (including using the installed dispensers) or disinfecting wipes;
- for regular hand hygiene, install in common areas (eating rooms, lounges, toilets) washbasins for washing hands with soap (including those equipped with wall-mounted dispensers), dispensers for treating hands with skin antiseptic, paper towel holders and waste containers with foot pedal to open the lid;
- provide workers with personal respiratory protection equipment (disposable masks (based on the duration of the work shift, taking into account the need to change masks at least once every 3 hours), respirators), gloves, detergents, disinfectant wipes, skin antiseptics for treating hands and other disinfectants means. Workers in contact with drivers arriving at the facility and (or) persons accompanying the cargo should be additionally provided with disposable anti-epidemic suits (gowns, aprons) and eye protection (for example, face shields or goggles). Reuse of disposable masks, gloves, anti-epidemic suits (gowns, aprons) and eye protection, as well as the use of wet (wet) masks is not allowed;
- ensure the presence of employees in the office and production premises of the facility in the minimum number necessary for the normal functioning of the facility, in compliance with the principle of social distance (at least 1.5 meters), as well as restrict the access of persons not associated with the facility's activities, with the exception of persons performing work related to production processes (repair and maintenance of technological equipment);
- restrict the movement of employees during lunch breaks and during rest breaks (going outside the territory of the facility, moving to other areas, to premises not related to the performance of direct official duties);
- organize centralized meals for employees and visit the canteen at a strictly defined time according to the approved schedule;
- prohibit eating at workplaces in the absence of a canteen. In this case, allocate a special room or part of a room for eating a meal with an equipped sink for washing hands and a dispenser for treating hands with a skin antiseptic;
- to ensure that employees are in the canteen or a room for eating in a minimum quantity, observing the principle of social distance (at least 1.5 meters);
- carry out daily (every shift) wet cleaning of office premises and public places using viricidal disinfectants with treatment every 2-4 hours of all contact surfaces: door handles, switches, handrails, handrails, table surfaces, chair backs, office equipment;
- use recirculating bactericidal air irradiators indoors;
- ventilate the premises every 2 hours;
- arrange during the working day to examine employees for signs of a respiratory infection (fever, cough, runny nose) with thermometry (in the absence of medical personnel at the facility, organize a survey of employees to identify signs of a respiratory infection (fever, cough, runny nose) with conducting thermometry, having previously determined the person responsible for conducting such a survey);

If individuals with an elevated body temperature and (or) signs of a respiratory infection (fever, cough, runny nose) are identified, ensure their isolation in a specially designated room until the arrival of medical workers.

When organizing the work of canteens for employees of the facility, EAEU recommends to carry out the following preventive and disinfection measures to prevent the spread of COVID-19 infection:

- observe personal hygiene measures, do not allow personnel with signs of a respiratory infection (fever, cough, runny nose) to work;
- use disinfectants registered in the manner prescribed by acts included in the law of the Eurasian Economic Union, and permitted for use in catering organizations, in the instructions for the use of which the modes of disinfection of objects for viral infections are indicated;

- carry out preventive disinfection on a systematic basis: observe personal hygiene measures (use masks to protect the respiratory system, regularly wash hands with soap and water (for at least 40 seconds) or treat them with a skin antiseptic), disinfect the dining room (ventilate and disinfect the air, carry out wet cleaning of the premises using disinfectants) and disinfection of kitchen utensils;
- at the end of the work shift (or at least once every 6 hours) ventilate the dining room and carry out wet cleaning with disinfecting wipes (or solutions of disinfectants) of door handles, handrails, table surfaces, chair backs (armrests of chairs), sinks for washing hands at the entrance to the dining room, self-service windows;
- comply with the requirements for the exposure time and concentration of the working solution of the disinfectant provided by the instructions for its use. If necessary, after treatment, rinse the surface to be disinfected with water and dry it with paper towels;
- carry out cleaning and disinfection of bathrooms in the manner prescribed by the authorized body;
- use disposable tableware when organizing meals. Collect used disposable tableware in disposable tightly closed plastic bags, disinfect them at the end of the working day and dispose of in a specially designated place;
- use for disinfection agents from various chemical groups: chlorine-active (sodium salt of dichloroisocyanuric acid - with an active chlorine concentration in the working solution of at least 0.06 percent, chlorines B - with an active chlorine concentration in the working solution of at least 3 percent), oxygen-active (peroxide hydrogen - with an active oxygen concentration of at least 3 percent), cationic surfactants - quaternary ammonium compounds (with an active ingredient concentration in a working solution of at least 0.5 percent), tertiary amines (with an active ingredient concentration in a working solution of at least 0.05 percent), polymer derivatives of guanidine (with an active substance concentration in the working solution of at least 0.2 percent), alcohols (as skin antiseptics and disinfectants for treating small surfaces: isopropyl alcohol at a concentration of 60-80 percent by weight ). The content of active ingredients is indicated in the instructions for use of disinfectants;
- store disinfectants in the manufacturer's packaging, tightly closed in a designated ear, cool and dark place. Precautions for disinfection and first aid in case of accidental poisoning are set out in the instructions for use of the disinfectant;
- in case of receiving information on the detection of patients with COVID-19 infection based on the results of testing, carry out the final disinfection of the premises by a specialized organization in the absence of people. Use for processing disinfectants based on chloroactive and oxygen-active compounds. All surfaces, equipment and inventory of production and office premises, dining rooms, and bathrooms are subject to disinfection. Apply the method of irrigation when treating surfaces. Treat the air in the absence of people using disinfectants in the form of an aerosol.

If it is not possible to fully comply with these Recommendations in terms of catering at the facility, takeout service should be provided.

### **3. Other organizational measures to prevent the spread of COVID-19 at the facility**

In order to prevent the spread of COVID-19 coronavirus infection at the facility, EAEU recommends <sup>33</sup>:

- informing employees about the need to observe preventive measures and personal hygiene rules: regularly washing their hands with soap (for at least 40 seconds) or treating them with a skin antiseptic throughout the working day after each visit to the toilet, before each meal;
- not involving in the current activities persons from risk groups, which include persons over 65 years of age, as well as persons with chronic diseases (in accordance with the list of chronic diseases

<sup>33</sup> Recommendation Of the Board of the Eurasian economic Board dated July 07, 2020 <http://eec.eaeunion.org/ru/covid-19/Documents/%D0%A0%D0%B5%D0%BA%D0%BE%D0%BC%D0%B5%D0%BD%D0%B4%D0%B0%D1%86%D0%B8%D1%8F%20%D0%9A%D0%BE%D0%BB%D0%BB%D0%B5%D0%B3%D0%B8%D0%B8%20%D0%95%D0%AD%D0%9A%20%D0%BE%D1%82%20%D0%B8%D1%8E%D0%BB%D1%8F%202020%20%E2%84%96%2011.pdf>

determined by the authorized bodies), reduced immunity, pregnant women, with the establishment of a regime for these persons self-isolation during a period of increasing persistence of a high incidence of COVID-19 infection.

If any person who has been in contact with an infected COVID-19 infection detects signs of a respiratory infection, it is recommended to classify this case as suspicious and conduct appropriate testing with the involvement of health professionals from the EAEU member State.

When a new probable or confirmed case of COVID-19 infection is identified, the circle of persons who have been in contact with the sick person or a person suspected of being infected with COVID-19 infection should be identified and monitored with the involvement of health professionals from the EAEU member State.

It is recommended to observe the following precautions:

- wash hands regularly with soap (for at least 40 seconds) and dry with disposable towels. You can also use (if available) a skin antiseptic (with an alcohol content of at least 60 percent) to treat your hands;
- observe social distancing (at least 1.5 meters);
- when coughing and sneezing, cover your mouth and nose with a disposable tissue, which you then immediately dispose of in a waste container with a lid;
- avoid touching the eyes, nose and mouth.

When using medical masks, it is recommended to observe the following rules for their proper use and disposal:

- carefully put on the mask so that it covers the mouth and nose and fits as tightly as possible to the face;
- do not touch the mask with your hands during use;
- to remove the mask, do not touch the mask from the outside, remove the mask by the elastic bands (ties);
- after removing the mask or if you accidentally touch it, treat your hands with a skin antiseptic (if any) or wash your hands with soap and water (for at least 40 seconds);
- if the mask is wet or wet, replace it with a new one;
- do not reuse disposable masks;
- after use, dispose of the disposable mask in a specially designated place.

When using personal protective equipment, in order to minimize the risk of contamination, it is recommended to observe the following rules:

- take off gloves and dispose of them as waste in the manner prescribed by the authorized body;
- wash your hands with soap (for at least 40 seconds) or treat them with a skin antiseptic;
- take off a disposable anti-epidemic suit (gown, apron), rolling it upside down, and place it in a waste container in accordance with the procedure established by the authorized body;
- remove safety glasses (face shield) by pulling only on the headband or side ties and dispose of them as waste in accordance with the procedure established by the authorized body;
- wash your hands with soap (for at least 40 seconds) and treat them with a skin antiseptic.

#### **4. Ensuring self-protection of drivers and (or) persons accompanying the cargo**

In order to ensure the self-protection of drivers and (or) persons accompanying the cargo from COVID-19 infection, EAEU recommends to<sup>34</sup>:

<sup>34</sup> Recommendation Of the Board of the Eurasian economic Board dated July 07, 2020 <http://eec.eaeunion.org/ru/covid-19/Documents/%D0%A0%D0%B5%D0%BA%D0%BE%D0%BC%D0%B5%D0%BD%D0%B4%D0%B0%D1%86%D0%B8%D1%8F%20%D0%9A%D0%BE%D0%BB%D0%BB%D0%B5%D0%B3%D0%B8%D0%B8%20%D0%95%D0%AD%D0%9A%20%D0%BE%D1%82%207%20%D0%B8%D1%8E%D0%BB%D1%8F%202020%20%E2%84%96%2011.pdf>



- conduct theoretical and practical training (instructing) drivers and (or) persons accompanying the cargo, safe methods and techniques of disinfection of interiors (cabins) of vehicles, as well as the rules of personal hygiene before going on a flight and along the route;
- for drivers and (or) persons accompanying the cargo, independently conduct thermometry along the route (a thermometer must be present in a vehicle).

The driver and (or) person accompanying the cargo is advised to observe the following rules:

- constantly use respiratory protection (masks, respirators) and safety glasses (face shield), especially when interacting with people;
- avoid crowded places (more than 2 people);
- take food ordered to take away, exclude eating in public and roadside cafes;
- ensure the availability of available disinfectants (skin antiseptics, disinfectant wipes) in the vehicle;
- regularly treat the hands of the controls of a motor vehicle (steering wheel, gear lever, parking brake, door openers, window lifter keys and climate control systems, screens of multimedia systems) with disinfectants or use medical gloves (with their change at least once every 4-6 hours);
- regularly ventilate the interior (cabin) of a motor vehicle, avoiding air stagnation;
- use special devices and devices for disinfection of the passenger compartment (cabin) of a motor vehicle (quartz lamps powered by the on-board network, air purifiers, disinfectants, spraying a formaldehyde solution with antimicrobial action).

## B. Improving operational procedures for international road transport

Organization of barrier-free transportation, reducing the impact of constraining factors in the development of international road transport and building effective mechanisms to combat the consequences of COVID-19, including, require changes aimed at improving organizational procedures for the implementation of international road transport.

These activities do not explicitly require the introduction of new technologies, but they ensure the improvement of the system of organizing the international transportation process and create the basis for the subsequent application of digital management and control tools. These include:

- harmonization of the requirements of national legislation on the implementation of international road transport, including requirements for rolling stock and road infrastructure;
- promoting the accession of the Asian Highway Network member states to key international conventions and agreements in the field of international road transport.

### **1. Harmonization of requirements of national legislation on international road transport, including requirements for vehicles and road infrastructure**

As explained in Part I, currently, the legislation of the Asian Highway Network member States has certain differences in national legislation regarding the regulation of road transport, including in terms of requirements for rolling stock and road infrastructure.

In particular, in terms of the requirements for rolling stock, there are differences in the permissible maximum vehicle size. The main considerations in traditional freight transport policies continue to revolve around the traditional and axle loads, in the maximum overall dimensions of vehicles (in length, width and height), the minimum turning radius, as well as in the environmental standards of transport. The legislation of a number of states allows, on special conditions and with a special permission of state regulatory authorities, exceeding the specified parameters when transporting certain categories of goods on public roads (for example, project cargo).

As a result, vehicles eligible for legal operation in one country do not meet the legal requirements in another country on a number of parameters. It becomes impossible to carry out international road transport on these vehicles in the traffic between these countries, or it requires reloading of cargo or changing the rolling stock.

Similar differences in national legislation are observed in terms of requirements for road infrastructure, including the values of the permissible maximum vehicle weight and axle load, as well as the overall dimensions of transport infrastructure facilities and the allowable weight loads on the road. In addition, in a number of countries, temporary or seasonal restrictions may be introduced, changing these parameters downward.

To ensure barrier-free road transport, it is necessary to continue harmonizing the requirements of national legislation on these issues, including the harmonization of requirements for rolling stock and road infrastructure.

## **2. Promoting the implementation of key international agreements in the field of international road transport**

The organization of international road transport, in addition to the national legal framework, is also regulated by international agreements and conventions that determine the procedure for carrying out international transport, requirements for the preparation of accompanying documentation for the transported cargo (goods), requirements for vehicles, their crews and conditions of transportation. Among international agreements and conventions in the field of international road transport, the most important are:

- the European Agreement concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR), concluded at Geneva on 1 July 1970;
- Convention on the Contract for the International Carriage of Goods by Road (CMR), concluded in Geneva on May 19, 1956;
- Customs Convention on the International Carriage of Goods under the Cover of TIR Carnets (Geneva, 1975);
- Customs Convention on the ATA Carnet for the Temporary Importation of Goods (Brussels, 1961);
- Container Transport Convention (Geneva, 1972);
- International Convention on the Harmonization of Frontier Controls of Goods (Geneva, 1982);
- International Convention on Mutual Administrative Assistance in the Prevention, Investigation and Suppression of Customs Offenses (Nairobi, 1977);
- International Convention on the Harmonized Commodity Description and Coding System (Brussels, 1983);
- Convention on Temporary Import (Istanbul, 1990) and others.

The comparative analysis showed that not all Asian Highway Network member States are parties to international conventions and agreements in the field of international road transport. This circumstance should be taken into account when planning international traffic on the Asian Highway Network, including new routes.

As a general recommendation, the Asian Highway Network member States should be encouraged to join key international conventions and agreements in the field of international road transport, which will ensure equal regulation in this area.

## **II. Smart Connectivity: use of new technologies and smart road transport solutions**

The COVID-2019 pandemic will remain in world history as a phenomenon that has temporarily paralyzed economic activity around the world. Nonetheless, its consequences create new opportunities for managing

system calls and effectively modernizing the organization of cargo transportation in international traffic, giving digital technologies, services and services a paramount role.

The first half of the year radically changed the decades-old consumption model: billions of people around the world use digital services and services every day using devices connected to the Internet to cope with the challenges of everyday life and get the opportunity to continue working as remotely as possible.

The restriction regime resulted in the transition to remote work of organizations in many sectors of the economy, the load on the infrastructure of communication networks and data centers increased significantly, the demand for specialized software (platforms for digital services, video conferencing, virtual "desktops", cloud resources) increased. In the face of limitations, the benefits were gained to companies that timely implemented deep automation and digitalization of activities and supply chains.

World experience shows that countries that made "early" investments in information infrastructure, introduced ICT in everyday life and launched the digital transformation of the national economy in advance, were better prepared for the challenges and gained a competitive advantage in the post-crisis period.

Today, the introduction of digital technologies and services in the field of international transport is a necessary condition for sustainable transport support for the needs of foreign trade relations of states. The development and scaling of the information infrastructure, together with the provision of industry services and services based on it, will allow to solve the strategic problem of digital transformation of the organization of cargo transportation in international trade.

The following paragraphs will present several technologic solutions of direct relevance to containing the spread of COVID-19, including:

- A. Medical monitoring of drivers 'condition and data exchange for sanitary controls
- B. Satellite monitoring systems for traffic progress and route compliance
- C. "Electronic queue" system at international checkpoints and accelerated lanes for trucks
- D. Preliminary electronic declarations for control and supervisory authorities
- E. WEB and mobile applications to monitor the operational situation on the route
- F. Electronic document management and exchange of legally significant data
- G. Improving information support for route planning and monitoring
- H. Remote system for online access and authorization for specialized freight operations
- I. Automated and online monitoring of weight and other truck parameters
- J. Online system for exchanging and issuing permits for international transport
- K. "Green corridor" system
- L. Electronic navigation seals and smart containers
- M. Smart tachographs
- N. Information systems for intermodal interaction and transport nodes
- O. Use of unmanned technologies (including caravan transport)
- P. Step-by-step formation of an ecosystem of digital corridors

#### **A. Medical monitoring of drivers 'condition and data exchange for sanitary controls**

Pre-trip and post-trip medical examinations of drivers are aimed at ensuring the health status of the crews of vehicles, their compliance with professional and medical requirements for admission to driving vehicles, as well as at identifying and preventing the spread of diseases transmitted from person to person.

In connection with the situation caused by the COVID-19 pandemic, pre-trip and post-trip medical examinations are of particular importance for the provision of anti-epidemiological and sanitary measures.

As a rule, in the framework of pre-trip and post-trip medical examinations, in accordance with the regulated procedures (protocols for conducting medical examinations), the following checks are carried out:

- body temperature;

- blood pressure;
- concentrations of alcohol in exhaled air;
- the general psychological state of a person, including that caused by fatigue, depression, stress, unacceptable exposure to drugs, drugs, etc.

In some cases, including periodically, sampling can be used for laboratory tests, analyses and studies.

Medical examinations are carried out by medical professionals, usually in person, in the presence of drivers. Such examinations take a considerable amount of time, including waiting for drivers in line for a medical examination, which only increases the risks of infection of personnel.

The main reasons affecting the effectiveness of medical examinations of drivers with existing methods:

- the opportunity for negative manifestations of the human factor associated with paperwork without actually performing the inspection procedure, falsification of inspection results, etc.;
- the duration of the inspection procedure reduces the overall efficiency of the useful use of labor resources;
- high unit cost of the service for geographically distant facilities with low bandwidth requirements due to the lack and low load of medical personnel located in the location or the need to move it over significant distances;
- complexity for monitoring the reliability of the inspections.

Due to the shortcomings of the existing technologies for conducting a medical examination and recording results, traffic accidents and other incidents occur, resulting in loss of life and financial loss.

The use of telemedicine technology can significantly change the practice of pre-trip and post-trip medical examinations. For these purposes, specialized software and hardware systems have recently been developed that provide comprehensive medical monitoring of a person's condition without involving medical personnel and automatically register correct results in databases.

**Figure 3: Application of telemedicine equipment**



The implementation of telemedicine technologies for medical examinations is carried out using a specialized hardware-software complex that provides:

- the possibility of online medical pre-trip and post-trip examinations;
- the provision of services for medical pre-trip and post-trip examinations in a large territorial space when creating a network of specialized software and hardware systems;
- recognition of the legal significance of the fact of a medical examination and its results;

- efficiency of transferring data on the results of medical examinations to transport companies and state regulatory bodies;
- keeping a history and providing interested parties with retrospective information and reports regarding the level of health of registered service participants for analysis and development of necessary measures.

Examples of successful implementation of telemedicine technologies for pre-trip and post-trip medical examinations of drivers are:

- "Telemedic" service from "One Telemedic" company, Russian Federation (<https://telemedic.one/>);
- Service "MedPoint24" from the company "Artius", Russian Federation (<https://medpoint24.ru/#about>)

The introduction of telemedicine technologies to conduct pre-trip and post-trip medical examinations yields the following effects:

- monitoring the status and creation of conditions for increase of level of health of the personnel in the transport sector;
- reduction of the probability of occurrence of emergency situations caused by a sudden deterioration in health the health of drivers, including in connection with the spread of infectious diseases;
- reduction in treatment time pre-trip and post-trip medical examinations;
- the possibility of obtaining services of a medical examination in remote areas at a reasonable cost;
- increase accessibility and transparency of services of medical examination and verified the presence of all participants in the mechanism of confirmation of medical examination and its results;
- more time efficient use of staff without the need of a General increase in working time.

An essential task for the introduction of telemedicine technologies for conducting pre-trip and post-trip medical examinations is to amend national legislation regarding the legalization of these technologies, as well as recognition of the fact that a medical examination and its results are legally significant. Harmonization of telemedicine technologies is necessary to ensure international mutual recognition of such data when organizing road transport in international traffic.

## B. Satellite monitoring systems for traffic progress and route compliance

Satellite technologies offer both navigation and monitoring services. The use of satellite monitoring system of international road transport is an effective measure to ensure traceability of freight (trace&tracing), as well as the basis for the subsequent introduction of organizational principles for the creation of "green corridors" in international road transport.

Areas of application equipment with the use of satellite monitoring technologies are:

- monitoring and management of road freight transport;
- the management of municipal transport (passenger transport, transport, housing and communal services, transport, delivery of food and industrial goods for the population, fire service, ambulance);
- security status monitoring of transported goods;
- to ensure the safety of road users;
- management of technological transport in the construction and repair of roads;
- monitoring, identification, and management of transport on career and terminal traffic;
- automatic detection of road accidents and more.

Satellite navigation technology has taken a strong place in the set of digital tools used by commercial companies to monitor the implementation of transportation, including:

- location and condition of the vehicle;
- compliance with the prescribed transportation route;



- control of the parameters of the cargo compartments (including temperature parameters) and access to it;
- control of the parameters of work and rest regimes of drivers.

Satellite navigation technologies are actively developed and used for dispatching fleets of vehicles. The structure of the vehicle monitoring and control system using satellite monitoring technologies is presented in the following figure.

**Figure 4: Structure of the monitoring and control system for vehicles using GNSS technologies.**



Through the use of satellite monitoring systems, participants in international road transport receive the following effects:

- reduction in the cost of transport and forwarding companies for transportation;
- speeding up the transportation process and reducing unproductive downtime;
- reduction in the number of vehicles to carry out the necessary volume of traffic;
- improving transportation safety, reducing risks and related financial and insurance costs.

At the moment, the introduction of satellite monitoring systems for road transport is also actively discussed at the international level, including in the framework of interaction between state regulatory bodies with the active participation of business structures.

The use of satellite monitoring for government bodies has the following effects:

- ensuring compliance with current legislation in the transportation process;
- creation of equal competitive conditions for bona fide transportation participants;
- reduction of government spending on the provision of control and supervision activities in the field of international road transport services;
- increasing the attractiveness of international transport corridors and increasing traffic volumes on them;
- increase in tax revenues to budgets of various levels, which is also connected with the growth of economic activity and the development of transportation along international transport corridors.

The requirement for the mandatory use of navigation equipment of GLONASS (Russian Federation) and BeiDou \ BDS (China) systems is included in the Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on international automobile traffic (signed on June 08, 2018). According to available information, the practical implementation of these requirements was to take place before June 1, 2020, but due to the situation caused by the COVID-19 pandemic, the deadlines were postponed until July 01, 2021.



The implementation of the Russian-Chinese project to create a system of navigation and information support for cross-border transportation based on the GLONASS and BeiDou navigation systems provides the necessary conditions for a comprehensive increase in the efficiency of international road transport between the Russian Federation and China, the development of international transport corridors. According to experts, the introduction of satellite monitoring technologies for international road transport between the Russian Federation and China will allow, on the basis of the monitoring information received, the implementation of the “green corridor” principle, which provides for non-stop movement of vehicles subject to the prescribed transportation conditions.

As part of the Russian-Chinese project to create a system of navigation and information support for cross-border transportation based on the GLONASS and BeiDou navigation systems, it is planned to implement information services in the interests of state bodies and commercial structures, including:

- Information services in the interests of state bodies:
  - monitoring the movement of foreign vehicles across the state (trace and tracing);
  - monitoring compliance by participants of carriage with the prescribed conditions and the use of permits for international carriage in accordance with the Agreement on International Road Transport;
  - monitoring compliance with traffic rules and the requirements of transport legislation.
- Information services for commercial entities:
  - information support for the planning of the transportation process, taking into account all the requirements on the route of transportation;
  - monitoring the movement, location, condition and parameters of vehicles and cargo compartments (trace and tracing);
  - prompt receipt of information and response to emergency situations during transportation, including interaction with state regulatory authorities of the Russian Federation and China (hot line).

The parties are discussing plans to expand the project, including with respect to all road transit from China through the Russian Federation, including along the routes of the China - Mongolia - Russian Federation and the China - Kazakhstan - Russian Federation. These transportation routes and the use of navigation and communication equipment based on GLONASS and BeiDou navigation systems were previously tested during test transportation China-Mongolia-Russian Federation in 2016 (<https://rosavtotransport.ru/ru/press/2016-cmr/>) and China-Russian Federation in 2018 (<https://rosavtotransport.ru/ru/press/2018-acr/>).

A similar project is planned for implementation in the European Union. The European Satellite Navigation Agency (GSA) and the European Commission are planning to launch the Galileo Green Lane project, which aims to simplify goods and transport flows, including transit traffic across the EU. A key feature of the project is the use of Galileo technology for the European navigation system for monitoring traffic routes and reducing transportation time.

The app will have two interfaces. The first is for border control authorities and provides a real-time visualisation of the overall border situation between a country and its neighbours. In turn, border officials can contribute information to the system by regularly feeding updates into the app on the traffic flow and waiting times at their borders. At the same time, the app will provide Member States with a website, generating reports automatically to demonstrate compliance to the EU on the Green Lanes implementation.

The app is already in its final development stage and the GSA has started to reach out to EU Member States that wish to pilot the app and work together to define case scenarios and fine-tune the technical solution. Talks are currently underway with border authorities in France, Romania, Hungary, Italy and the Czech Republic.

### C. "Electronic queue" system at international checkpoints and accelerated lanes for trucks

International checkpoints are a kind of “bottleneck” on international transport corridors. Delays in the transportation process occur with the length of compliance with the necessary procedures for inspecting drivers, vehicles, transported goods and the preparation of relevant documentation. The queues arising from this due to insufficient throughput of the automobile checkpoint are an additional constraining factor. The situation may deteriorate further due to:

- peak seasonal shipments of products;
- on the eve of holidays or upcoming vacations;
- natural disasters such as heavy rains, landslides, snowdrifts and the associated blocking of part of the roads, causing temporary redirection of traffic flows;
- the introduction of quarantine and restrictive measures introduced by states to counter the proliferation of COVID-19 and others.

To minimize the effects of these phenomena and overcome their consequences, it is recommended that digital and organizational tools for forecasting and queuing at international checkpoints be used, including:

- implementation of the electronic queue management service;
- Introduction of specialized accelerated lanes for trucks (Expedited lanes for trucks).

The implementation of these recommendations should be coupled with the creation of equipped parking lots for vehicles and living conditions for drivers.

Also the implementation of the electronic queue management service will allow transport and forwarding companies engaged in transportation, remotely and in real time:

- plan the time and schedule of passing international automobile checkpoints depending on the route and schedule of the vehicle;
- choose and plan the time of arrival at the checkpoint at the border, depending on its workload and operational situation;
- reserve the time for passing the checkpoint (electronic queue);
- receive operational information about changes in the current situation at a border checkpoint, including SMS and other informing drivers about changes with the transport situation;
- use publications in a special portal and mobile application of current operational data on the load of the checkpoint;
- receive informational support regarding the passage of the checkpoint, including information on the schedule of its work, requirements for the necessary documents and their execution, etc.

**Figure 5: Type of information display "electronic queue".**



The results of the implementation of the service "electronic queue" include:

- increase in throughput of border crossing points;
- reducing unproductive downtime of motor transport;
- reduction of damage to goods transported;
- reduce the risk of disrupting the schedule of delivery of cargoes;
- reduced contact of the drivers and personnel items.

Target effects of the implementation service are:

- avoidance of peak loads exceeding the throughput capacity of border crossing points;
- ensuring smooth operation and uniform load points;
- improving the overall throughput of the checkpoint on the border;
- increasing the attractiveness of the international transport corridors, transparency, predictability of their operation.

Examples of successful implementation of the "electronic queue" service are:

- NEURONIQ traffic management system from future TECHNOLOGIES, Russian Federation<sup>35</sup>;
- Service of electronic queue from the company GoSwift, Finland<sup>36</sup>;
- Service "Electronic queue of drivers" from SOLVO, Russian Federation<sup>37</sup>;
- Service for booking a place in the queue at the border, provided by RUE "Beltamozhservice", Republic of Belarus<sup>38</sup>.

Creating fast-track lanes for commercial vehicles (expedited lanes for trucks) ensures the separation of traffic flows, the allocation to organized lanes and site inspections for international road freight transport.

This ensures the execution of specialized procedures for the verification of documents, inspection and, if necessary, inspection for each category of vehicle and cargo types.

The figure below presents the approximate scheme of the organization of traffic lanes for commercial vehicles (expedited lanes for trucks) at an international road checkpoint on the border of States:

**Figure 6: Dedicated lane for commercial vehicles (expedited lanes for trucks)**



<sup>35</sup> <http://neuroniq.ru/resheniya-dlya-logisticheskikh-tsentrov/>

<sup>36</sup> <https://www.evpa.fi/yphis/index.action>

<sup>37</sup> <https://www.solvo.ru/products/solvo-tos/>

<sup>38</sup> <https://belarusborder.by/>

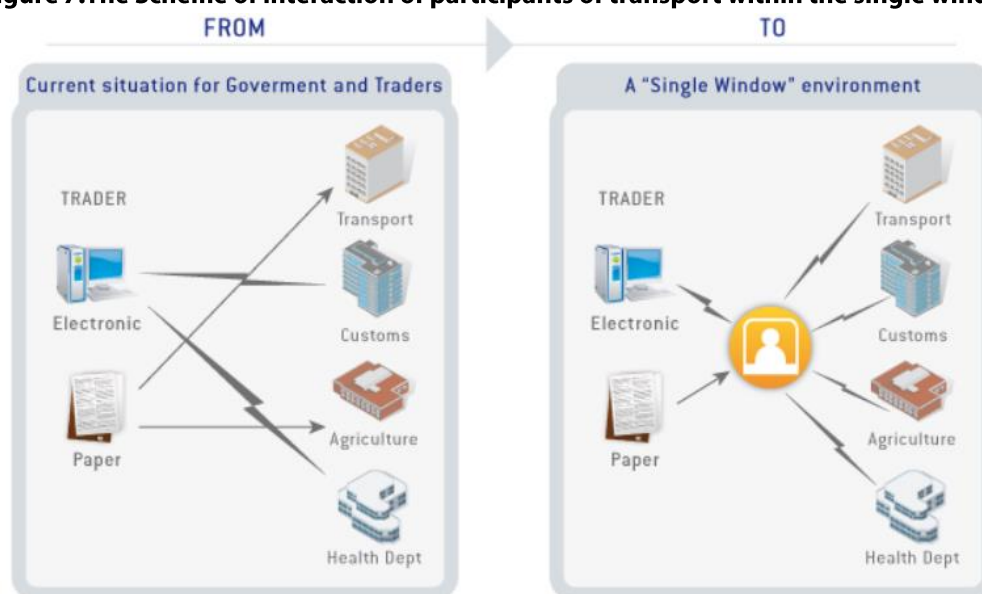
#### D. Preliminary electronic declarations for control and supervisory authorities

The purpose of remote submission of preliminary information in electronic digital form enforcement authorities and preliminary Declaration in the course of foreign economic activities is to minimise physical contact of the driver and other participants with representatives of state regulatory authorities, and a decrease in the number of provided documents on paper and other media.

The implementation for providing the information, Supervisory authorities and Declaration be undertaken in the framework using the mechanism of "single window" (single window). The concept is recognised and promoted by several world organisations that are concerned with trade facilitation. Amongst these are the United Nations Economic Commission for Europe (UNECE) and its Centre for Trade Facilitation and Electronic Business (UN/CEFACT), World Customs Organisation (WCO), the United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific (UNNExT), SITPRO Limited of the United Kingdom and the Association of Southeast Asian Nations (ASEAN).

The Single Window (SW) is defined as a facility which allows parties involved in trade and transport to lodge standardised information and documents with a single entry point to fulfill all import, export and transit-related regulatory requirements (cf. UNECE recommendation 33<sup>39</sup>). If information is electronic, then individual data elements should be submitted only once<sup>40</sup>.

**Figure 7: The Scheme of interaction of participants of transport within the single window**



The information supplied through the use of the single window mechanism in the framework of preliminary informing regulatory authorities and Declaration in electronic form should be used in relation to:

- customs authorities – in respect of information about the goods, planned to moving through customs border of the state, risk assessment and making preliminary decisions about the choice of objects of customs control and measures providing carrying out of customs control before arrival of the goods into the customs territory of the state;

<sup>39</sup> [http://www.unece.org/fileadmin/DAM/cefact/recommendations/rec33/rec33\\_trd352e.pdf](http://www.unece.org/fileadmin/DAM/cefact/recommendations/rec33/rec33_trd352e.pdf)

<sup>40</sup> [https://ec.europa.eu/taxation\\_customs/general-information-customs/electronic-customs/eu-single-window-environment-for-customs\\_en](https://ec.europa.eu/taxation_customs/general-information-customs/electronic-customs/eu-single-window-environment-for-customs_en)

- border authorities – in part information, vehicle crew and passengers for risk assessment and making preliminary decisions about necessary bases, including visas and the absence of violations, their admission to the territory of the state;
- sanitary, phytosanitary and other state bodies in the sphere of health protection in respect of information concerning the state of health of the vehicle crew and passengers, the availability of sanitary and phytosanitary certificates of the transported products;
- transport and road inspections in respect of information about the vehicle and its technical condition, ensuring of compliance dimensions, weight and environmental parameters.

The information in the format of the data in electronic form to designated offices should be provided regarding the following categories of data:

- motor vehicles;
- crews of vehicles;
- cargo compartments of vehicles and transported goods;
- prescribed conditions for the implementation of international transport and properly executed supporting documents.

Target effects of the implementation of single window mechanism and digital service electronic pre-informing of regulatory and Supervisory agencies and of the Declaration is:

- reducing the number of manually entered information and data entry errors;
- avoidance of duplication of information and filling out various forms for different regulatory and Supervisory bodies, containing similar information;
- acceleration of the procedures of customs clearance of goods transported across the customs border;
- acceleration of procedures of registration documents for crossing the state border by vehicles, drivers and passengers;
- transparency of customs procedures and procedures carried out by other regulatory bodies;
- reduction of risks related to the implementation of international road transport and foreign trade operations.

Examples of successful and effective implementation of services for providing preliminary information in electronic digital form to control and Supervisory authorities and preliminary Declaration in the course of foreign economic activity are:

- Singapore's TradeNet and TradeXchange systems<sup>41</sup>;
- China's LOGINK<sup>42</sup>;
- Portbase system of the port of Rotterdam, Netherlands<sup>43</sup>;
- DAKOSY (Data Communication System) of the port of Hamburg, Germany<sup>44</sup>.

## E. WEB and mobile applications to monitor the operational situation on the route

Modern development of digital technology radically changes the key business processes of the organization of transportation of goods by road in international traffic in the planning, implementation and control of transport. Interaction with clients and contractors during the transportation process is transferred to the online format, which eliminates physical contact between people and minimizes telephone communication.

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<sup>41</sup> <https://www.tradenet.gov.sg/tradenet/index.html>

<sup>42</sup> <http://www.logink.cn/>

<sup>43</sup> <https://www.portbase.com/en/>

<sup>44</sup> <https://www.dakosy.de/en/>

Digital transformation of business processes in the trucking industry delivers greater transparency of information to achieve an overall positive result, mutual trust and economic win for the participants of the traffic.

A key component in demand traffic information is information about the operational situation on the route.

Emergent traffic jams, changes in schemes and routes, the introduction of temporary restrictions on travel, repairs, and also situations associated with natural disasters, the spread of the pandemic, are factors that negatively affect the planning and operational management of transportation.

In this regard, one of the most effective tools of ITS providing increase of efficiency of transportation process, and forming a common open information space is the creation of a public and free WEB and mobile applications to inform participants of international road transport on the operational situation on the route.

Such services, depending on the adopted national practices can be established, at the initiative of the state and at the expense of budget financing, and at the initiative of the business community in commercial projects as part public part. In addition, it is possible to use the mechanism of public-private partnership to create, organize, operate, and also updating of such data services.

A key element of the services of informing of participants of international road transport is the provision of cartographic information for planning and control in international road transportation. The service implementation will allow the participants of road transportation on international transport corridors remotely in an online format to obtain official, reliable and quickly adjustable the information necessary for the organization and management of the transportation process.

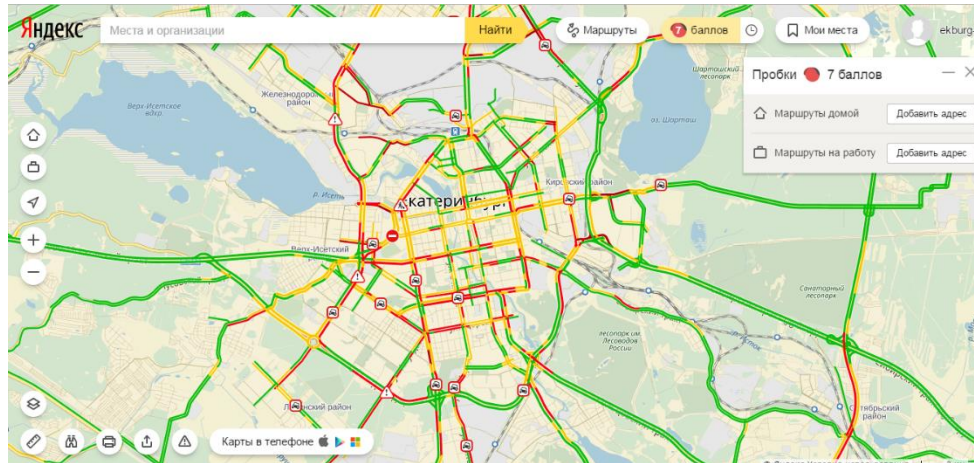
Recommended composition data of the map information should include the following information:

- the network of public roads, are part of international transport corridors, including graphs of roads, the current restrictions;
- introduced and planned changes in traffic patterns due to maintenance or other works, events, etc.;
- current workload of sections of the road network, presence of road accidents, the probability of formation of traffic jams, etc.;
- temporary restrictions for movement of certain categories of vehicles;
- permissible weight and axle load for road transportation route;
- restrictions on shipping certain kinds of goods, including hazardous, taking into account the hazard class of the transported cargo;
- restrictions on the dimensional parameters;
- the network location of the objects of transport and road infrastructure, including contacts, mode of operation and the current situation on the object, and so on.

Providing information to participants of traffic is possible through a WEB service and publish data on the special information portal, and through mobile applications.



**Figure 8: Sample implementation WEB portal with live information on traffic situation.**



Based on the information described above may develop a variety of ITS services and the integration of current information about the traffic situation and infrastructure in a variety of external services and application software products, both public and corporate.

Integrated development services can be conducted in the following areas:

- publishing through a special WEB-portal and mobile applications official, reliable and quickly adjustable cartographic information on roads and infrastructure, including an emergency on the transportation route;
- implementation of basic features, road navigation, including planning an optimal route given the current traffic situation;
- providing tools of use of cartographic information for its integration into software products third-party developers, including official and commercial services;
- assist drivers in emergency situations related to accidents, diseases etc. during transport (call center).

The implementation of such services is a challenging and complex task. Examples of successful implementation of services for providing information to transport participants via a WEB service and publishing data are:

- Yandex Services. Maps and Yandex.Transport from the company Yandex, Russian Federation<sup>45</sup>;
- Google Maps service<sup>46</sup>;
- Baidu search engine<sup>47</sup>.

## **F. Electronic document management and exchange of legally significant data**

One of the most effective and efficient measures to minimize physical contact staff, including drivers of vehicles, personnel, staff of state regulatory bodies, during transport to prevent the spread of infectious diseases is to maximize the transfer of trade, transport, permits and other documents in digital format, the maximum rejection of paper copies.

The development of the situation with transportation during an outbreak COVID-19 in the beginning of 2020 showed that the most popular methods of transport and directions of traffic flows are those where the power of the previously introduced digital technology to ensure maximum transfer of registration and exchange of documentation during transport in digital form.

So, according to the information portal ChinaLogist.ru "set a new record of container transport by rail between China and Europe, in April in the Eurasian corridor passed 46% more [goods] than in April 2019".

<sup>45</sup> <https://yandex.ru/maps> and <https://yandex-transport-online.ru/>

<sup>46</sup> <https://www.google.ru/maps>

<sup>47</sup> <http://www.baidu.com/>

Similar data is provided by Kazakhstan's national railway operator JSC "NC "Kazakhstan Temir Zholy" (KTZ), marking "a significant increase in container traffic, which is associated with the transit – an increase of 28%".

This increase was due to partial redistribution of container transport on the Eurasian space marine transport, requiring more physical interaction of personnel during port operations, rail transport, providing maximum digitalization of the documentation.

According to experts, it is primarily due to the introduction of the Railways of electronic data interchange on the planned schedules and the goods transported, including digitization of procedures of registration of customs declarations and the electronic system of preliminary informing of customs authorities.

Organization of international road transport associated with the design and validation of a significant number of documents. The composition of documents required in international road transport, the requirements for their design and content data are regulated by national legislation and bilateral and multilateral agreements and international conventions. Requirements to documents, their forms and composition data are not always harmonised and are the cause of the interruption of traffic and the imposition of penalties.

There are 4 key categories of such documents:

- documents for vehicles, including:
  - passport of the vehicle;
  - a certificate of registration of a motor vehicle;
  - state registration plates of the motor vehicle and trailer and others.
- documents of crews of vehicles and passengers, including:
  - international passport;
  - visa entitling to enter the territory of a neighboring state and the right to exercise professional activities;
  - medical records and certificates and other documents.
- documents on the goods transported, including:
  - international waybill CMR;
  - state the customs Declaration for the goods transported;
  - sanitary, phytosanitary and other certificates and other documents.
- the documents that define the prescribed conditions for the transport including:
  - permission for commercial entry into the territory of a foreign state and execution of international transportation of cargo;
  - resolution and confirmed the route for the transportation of certain categories of goods (hazardous, heavy or bulky) and other documents.

According to experts, the total weight of the transported documents in the course of each flight in international road transport, can reach up to 3 kg, which collectively gives you how million tons of documents annually transported over the network Asian Highway Network.

In addition, the essential point of the above categories, and document types is the repetition and duplication of similar data contained in different documents. Rules of filling of documents are forced to make the same information, often in different formats in different documents, along with unproductive loss of time and financial costs of processing, inevitably leads to numerous errors in completion. It is also the breeding ground of malfeasance, the growth of corruption component of the trucking business and negatively affects its economic efficiency and the overall image of the trucking industry.

**Figure 9: The different forms of applicable documents for the goods carried.**



Translation of documents in electronic form and organization of electronic documents to speed up procedures of paperwork, and minimizing contact of people (paperless logistics for preventing virus spread and improving efficiency) requires a gradual implementation in the field:

- impart legal significance of the data in electronic documents;
- remote preparation and coordination of the composition of the accompanying transport documents and the data contained therein in electronic form;
- organization of electronic exchange of legally significant and unadjusted data comprising documents;
- replacement of electronic document and members of their staff legally relevant data the information contained in traditional paper documents, including the subsequent gradual rejection of traditional "paper" documents and technology.

Implementation of electronic document management requires making the necessary and significant changes in national legislation and in bilateral and multilateral agreements and international conventions. This process can take considerable time and go iteratively. In the course of this work may become a historical atavism and forever in the past certain types of widely used at the present time, the traditional "paper" documents, as they contained data will be self-sufficient and does not require additional processing in a separate document.

Introduction of electronic document circulation require creation of the digital environment, including mechanisms for validation of electronic data. The physical implementation of such a digital environment trust can be accomplished in various ways, including the use of BlockChain technologies, or use of the service trusted third party (TTP), or other way.

BlockChain technology is based on the use of constructed according to certain rules is a continuous sequential chain of blocks (linked list) that contains information, including legally relevant data about the organization and processes for international freight.

Service trusted third party (TTP) is designed for inter-state exchange of electronic documents and automation of processes related to the confirmation of authenticity of electronic digital signature, the identity and integrity of an electronic document and, as a consequence, the recognition of its validity and reliability, data protection and security of archival storage of electronic documents.

As a recommended document on which there is most progress in terms of digitalization, it should be noted:

- e-CMR digital format the international bill of lading

- electronic customs Declaration, and in particular, digital package electronic data, used by the customs administrations of several countries in the procedure of preliminary customs declaring and informing;
- e-the permission to perform international road transport of goods;
- electronic passport of the vehicle, implemented in the Russian Federation and other documents.

The decision on the priorities documents for digitization should be adopted at the national level and harmonized at the international level taking into account feasibility and existing developments and market demand.

### G. Improving information support for route planning and monitoring

The efficiency of a transport company depends largely on the stage of planning and preparing transportation. The particular challenge of planning the organization of automobile transportations in the international message. Road transport and forwarding company needs to solve a complex problem that is associated with the following factors:

- the optimal choice is allowed in the itinerary and schedule subject to contractual obligations and possible limitations of the current transport situation;
- planning work schedule of drivers (of crews of vehicles) subject to compliance with work and rest, the presence and location of objects of transport and road infrastructure for safe Parking and rest of drivers;
- compliance with all transport, customs and other types of national and international legislation, international conventions on the organization of road transport, including in terms of transportation of certain categories of goods, such as bulky, heavy, hazardous, humanitarian, etc.

The implementation of optimal planning and flexible situational control transport reduces the risks of violation of requirements of normative legal acts in the implementation of the transportation process, increases the quality and safety of transportation, and the predictability of result and customer satisfaction.

In turn, error at the planning stage, can lead to fatal consequences, significant fines and financial losses for transport companies and customers.

For the carriage of certain categories of goods, e.g., large-sized, heavy and dangerous under the current legal regulation requires prior approval of routes and schedules transportation with state authorities (traffic police and transport Inspectorate), as well as register and obtain special permits to carry such traffic on the agreed parameters.

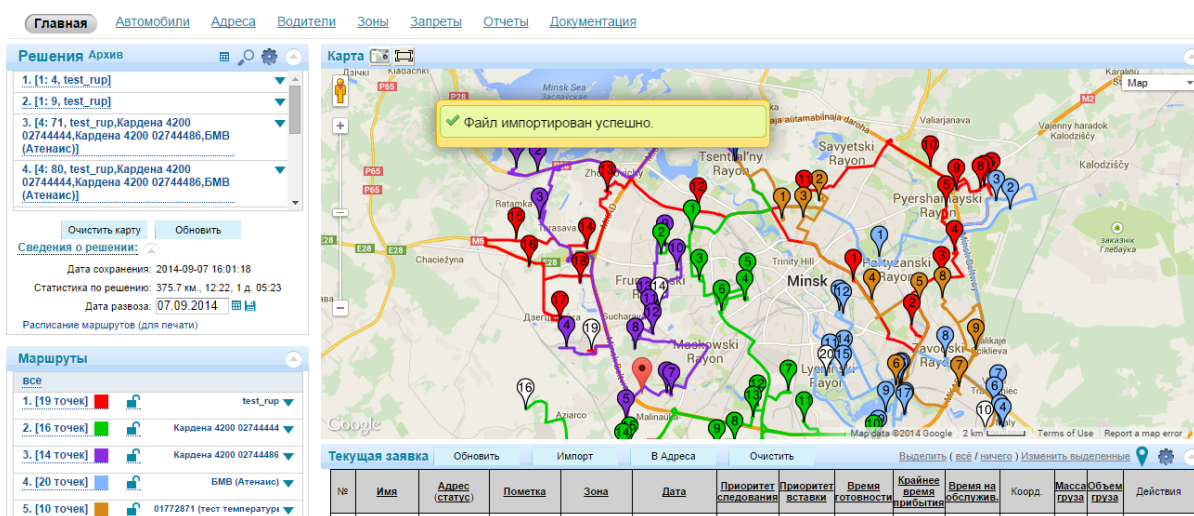
During the process of transportation requires pre-operational changes, as previously planned transportation routes and schedule, and the implementation of flexible Supervisory control and coordination of transport processes. This in turn may require making significant changes to previously established and agreed plans, partial or complete changes, and prompt delivery of amended plans to drivers via electronic mail, or information in a special software that is installed on smartphones, tablets drivers or on-Board computers of cars.

The solution of multicriteria tasks of planning and management for a large fleet of cars in modern conditions is impossible without use of special information the software that implements digital technology for planning, coordination, and operational management.

To develop an optimal route of transportation, including a fleet of vehicles that serve multiple geographically remote from each other customer requires the use of special optimization techniques, including mathematical graph theory, and Queuing theory.



**Figure 10: Example of an interface for route scheduling in urban transport**



When planning transportations using special software as well as WEB and mobile applications for participants of international road transport, the data mapping information should include the following information:

- the network of public roads, are part of international transport corridors, including graphs of roads, the current restrictions;
- introduced and planned changes in traffic patterns due to maintenance or other works, events, etc.;
- current workload of sections of the road network, presence of road accidents, the probability of formation of traffic jams, etc.;
- temporary restrictions for movement of certain categories of vehicles;
- permissible weight and axle load for road transportation route;
- restrictions on shipping certain kinds of goods, including hazardous, taking into account the hazard class of the transported cargo;
- restrictions on the dimensional parameters;
- the network location of the objects of transport and road infrastructure, including contacts, mode of operation and the current situation on the object, etc.

With particular importance is the integration of special software with the systems of the state oversight agencies for approval, if necessary, electronically routes and schedules transportation of certain categories of goods as well as processing in electronic form of special permits to transport such cargo. Will require the implementation of appropriate modifications and adaptation of the systems of public authorities and organisation of information integration.

Of special note is the complex task of planning for the international carriage passing through the territory of several States. In this case, in addition to the above-described data for planning is required when planning transportation to acknowledge the existence and validity of several categories of documents, including:

- documents for vehicles, including the validity of the certificates of technical inspection, certificates of confirmation of the ecological class and the other;
- documents of the driver, including the availability and required terms of validity, medical certificates, insurance policies, etc.
- the documents on the cargo, including the availability and required terms of action sanitary and phytosanitary certificates for goods and other;
- documents defining the conditions of carriage, including the existence and required duration of permits for international road transport, transport certain types of cargo, including oversized, heavy and dangerous goods, and more.

Ensuring the effectiveness of information support services for transport participants to raise the quality of route planning and transportation schedules is determined by the ability to flexibly change previously developed plans and schedules the transportation and bring them to drivers (crews of vehicles) via e-mail, or information in a special software that is installed on smartphones, tablets drivers or on-Board computers of cars.

In this regard, it is desirable that this service has been comprehensively implemented in conjunction with the service WEB and mobile applications to inform participants of international road transport about the operational situation on the route.

Examples of the most successful implementations of the route planning service are:

- Yandex Service.Routing from the company Yandex, Russian Federation<sup>48</sup>;
- The route planning system of the company Maxoptra, Russian Federation<sup>49</sup>;
- Verizon Connect Route Planning Software<sup>50</sup>;
- Samsara Route Planning Software<sup>51</sup>;
- Teletrac Navman Route Planning Software<sup>52</sup>;
- Silent Passenger Route Planning Software<sup>53</sup>;
- US Fleet Tracking Route Planning Software<sup>54</sup>;
- WorkWave Route Planning Software<sup>55</sup>;
- ProTransport Route Planning Software<sup>56</sup>;
- KeepTruckin Route Planning Software<sup>57</sup>;
- Fleetio Route Planning Software<sup>58</sup>;
- Omnitrac Route Planning Software<sup>59</sup>.

#### H. Remote system for online access and authorization for specialized freight operations

As noted in the previous section, the effectiveness of digital services is significantly increased when their complex use. This is true for the remote system for online access and authorization, including for the transportation of large, heavy and dangerous goods, which should be part of a holistic ecosystem platform solutions to government and business to ensure the planning, management and control of the transportation process.

The application of the service to ensure the remote system for online access and authorization, including for the transportation of large, heavy and dangerous goods acquires special importance in the framework of combating the spread of infectious diseases by ensuring minimization of physical contact staff the regulatory bodies with representatives of transport and forwarding companies and cargo owners. This is achieved by translating all business processes into a digital format, including the introduction of documentary permits for transportation in electronic form.

Transportations of oversized, heavy and dangerous goods on the territory of the state, including in the international message are regulated by norms of national and international legislation, including the European agreement concerning the international carriage of dangerous goods by road (ADR). Coordination of routes, schedules transportation, and permits for the transportation of these categories of cargoes is carried

<sup>48</sup> <https://yandex.ru/routing>

<sup>49</sup> <https://maxoptra.ru/postroyeniye-marshruta>

<sup>50</sup> <https://www.verizonconnect.com/v/fleet/gpsfleet/here-and-ready/>

<sup>51</sup> <https://www.samsarastatus.com/>

<sup>52</sup> <https://www.teletracnavman.com>

<sup>53</sup> <https://www.silentpassenger.com/>

<sup>54</sup> <https://www.usfleettracking.com/>

<sup>55</sup> <https://www.workwave.com/route-manager/>

<sup>56</sup> <https://www.pro-transport.com/>

<sup>57</sup> <https://keeptruckin.com/>

<sup>58</sup> <https://www.fleetio.com/>

<sup>59</sup> <https://www.omnitrac.com/products/route-optimization>



out by state authorities. During transport held control compliance with legislative requirements, including in terms of compliance with the weight and dimensions of, as well as routes and conditions of carriage.

In the framework of the service must be carried out in digital format online the following functions:

- the submission of applications for admission and permits, including the transportation of oversized, heavy and dangerous freights;
- planning and coordination of the transportation route on public roads, including members of the international transport corridors, subject to dimensional and weight limitations and restrictions in relation to engineering structures, roadside objects, such as social, including kindergartens, schools, medical and others;
- planning and coordination of the schedule of transportation, taking into account observance of requirements on hours of work, modes of work and rest of drivers;
- obtaining of permit and the permit is in digital format, including for shipping oversized, heavy and dangerous freights;
- receive recommendations for securing cargo;
- obtaining information about requirements to:
  - acquisition of vehicles additional equipment;
  - applying special markings and decals on the vehicle and the cargo;
- information sharing with state regulatory authorities legally significant data in electronic form on issued permits, routes, and schedules of transportation, including oversized, heavy and dangerous cargoes;
- information sharing with state regulatory bodies legally significant data in electronic form on the results of inspections in the course of transportation, including oversized, heavy and dangerous cargoes.

The implementation of this functionality may require making necessary changes to the regulatory framework, including in terms of legal consolidation of the legitimacy of electronic formats, permits the carriage of certain categories of goods.

The operation of services should be matched to the possible implementation of online monitoring for compliance with the conditions of use of permits issued for the carriage of goods prescribed routes and schedules transportation, as well as the results of the weight and dimensional control.

This is a complex task that should be ensured by the application of the set of technical controls including:

- systems of photo and video fixation on the roads;
- systems of transport telematics and satellite monitoring of movement of vehicles;
- systems of weight and dimensional control and others.

Information on the results of the monitoring of compliance with conditions and routes of transportation, weight and size parameters on the violations identified needs in an electronic format be provided via secure communication channels Supervisory authorities of the States along the route of the vehicle. In addition, it is also necessary to inform the transport company about the facts of the revealed violations.

## I. Automated and online monitoring of weight and other truck parameters

A significant place among detected violations during road transport having significant negative financial implications and critical from the point of view of transportation safety, is a violation of established by legislation requirements of the allowable dimensions, total vehicle mass and axle loads.

Regulation of the allowed range of parameters is carried out at the level of national legislation of States should be harmonized within international agreements. As mentioned above, parameters on allowed dimensions, the total permissible mass of the vehicle and axial loads significantly depend on the adopted in each state standards and technical regulations in this sphere, as well as the category the current condition of area roads,

including members of the international transport corridors. In the States, can be imposed temporary additional restrictions on the permissible total weight of the vehicle and the permissible axle load.

Failure to comply with prescribed restrictions will result in dire consequences, including damage to roads and road engineering structures and other infrastructure. No coincidence that the penalties for such violations identified in many States of the Asian Highway Network reaches its maximum among other violations.

For control of weight and dimensional parameters of vehicles regulatory and Supervisory authorities use various methods and technologies, using special technical means. Usually, these control procedures involve the interruption of the carriage and the direction of the cars on a special platform for measurements. In the process of testing and registration in a manual mode of test results, and in the case of violation of payment of penalties, is undesirable contact of the inspector and the driver, increasing the risk of spreading the virus COVID-19.

Such a practice in the fight against infectious diseases needs substantial adjustments aimed at minimizing or excluding physical contact from the inspector and the driver during the inspection. New methods and technologies are required for monitoring compliance with weight and size restrictions in remote and automated mode, which allow automatically informing state control and Supervisory authorities and transport companies about the facts and results of detected violations in online mode

In addition, close communication from the inspector and the driver during the validation process, given the large amounts of fines for violations is a significant risk for corruption conspiracy. In order to avoid the negative effects of the human factor and contacts required the introduction of new methods and technologies for remote monitoring, recording results and penalties.

The solution of such tasks is the use of system of automatic control of weight and dimensional parameters in the online mode without any interruption of transportation and disruption to the timetable. Control system based on the integrated use of multiple types of equipment, including:

- measuring weight using load cells embedded in the roadway;
- systems of photo and video, providing recognition of state license plates, as well as their identification by categories and types, number of axles, etc.;
- opto-electronic sensors for measuring of dimensions of vehicles;
- information display variable information that informs the driver in case of violations;
- telecommunication modules forming protocols in case of violations and interacting with information systems of state control and Supervisory bodies and transport operators.

The use of this complex equipment requires stopping the vehicle and can carry out measurements directly in the stream during normal speed of traffic.

**Figure 11: . Example of a modern station of weight and dimensional control and its equipment.**



In world practice, the implementation of weight and dimensional control systems is usually carried out on conditions of state-private partnership. In this case, the investor carries out designing and construction of the facility, the commissioning and subsequent transfer to the property of the state. The investor receives the right to operate the facility in exchange for any portion of the fines for the violations, either a fixed payment of current operating costs and the payment of the sum of the investment costs in advance agreed in the contract period. Since this option is attractive for investors and is most prevalent in the world.

It should be emphasized that the use of remote automatic control of dimensions and weights of vehicles must be integrated. Locations and placement of equipment on the network of public roads shall be in accordance with approved government plans. Spontaneous or ill-conceived placement of stations for weight and dimensional control in practice leads to a significant change in traffic flow, resulting in the redistribution of traffic flows in the uncontrolled and secondary roads, including those not intended for the passage of heavy vehicles of international carriers. As a consequence, an unacceptable load on secondary roads increases significantly, and resulting in accelerated destruction.

Important in this regard is the inclusion of measures to equip the network of public roads with systems of weight and dimensional control in the national development plan as ITS most important strategic planning document and development of the transport system.

Examples of implementing an automatic control system for weight and size parameters are:

- Weight and dimensional control systems for transport and cargo of VanJee Technology Co., Ltd., China<sup>60</sup>;
- Automatic weight and size control system of TENSOR company, Russian Federation<sup>61</sup>;
- Dynamic weighing systems from TENSO, Czech Republic<sup>62</sup>.

## **J. Online system for exchanging and issuing permits for international transport**

As detailed in Part I, the international automobile transportations are carried out on the basis of appropriate bilateral or multilateral intergovernmental agreements, regulating the number and conditions of such transportation. Such agreements shall, as between individual States and regional economic associations (unions) States. The key principles of the agreements is reciprocity, providing transportation on a parity basis.

<sup>60</sup> <http://www.vanjee.net/>

<sup>61</sup> <http://tenzor-rostov.ru/avtgk-avtomaticheskij-vesogabaritnyj-kontrol>

<sup>62</sup> <https://www.tenzovahy.cz/en>

Takes into account numerous factors. One of the main factors is the existence of market demand for the carriage of goods in export, import and transit directions. As well as the availability of private transport available volumes of cargo, both in quantitative and qualitative terms. The vehicle should meet the agreement requirements for admission and transportation of goods in international traffic, as well as the specifics of the transported cargo and of the conditions of carriage.

Each Contracting party aims to ensure the maximum load of its own vehicle fleets, to create competitive advantages for national carriers. Preparation, conclusion and subsequent ratification of agreements can take several years of negotiations and consultations, coupled with mutual compromises.

One of the important aspects of the intergovernmental agreements is spelled out in them the mechanism of coordination of international traffic carried by each party for a certain period, usually one year. And how the exchange of permits for international road transport, the type and format.

In world practice there are several types of permits for international road transport, including:

- a single solution for the implementation of a single trip within a specified period of time:
  - bilateral (two-sided) - in the direction between the two States participating in the agreement;
  - transit - for transit;
  - to/from third countries for the carriage of goods to/from States not party to the bilateral agreement to the territory of States parties to the bilateral agreement;
  - cabotage for carriage of goods by the carrier between points in the territory of a foreign state;
- multiple bilateral transit permit unlimited travel within a specified period of time;
- multiple multilateral permit unlimited travel within a specified period of time, including transit in the territory of the States parties to such agreement;

In some cases the permit for international automobile transportation may specify special conditions of use, for example, the transportation route, the list of automobile checkpoints for crossing the state borders, etc.

At the same time between a number of countries according to the mutual agreements on international road transport shipments could occur on a permit-basis. For example, the permit-based international road transportation is carried out between the Russian Federation and Iran. As the route of these transportations passes through transit via Azerbaijan, the Russian and Iranian carriers need to obtain from Azerbaijan transit permits.

Procedures for the approval number and the exchange of permits for international road transport become the object of intense foreign economic debate. In some cases, the deficit of the allocation of permits between the national carriers appear to corrupt the facts, including the creation of artificial deficiency for the formation of the gray market resale of permits and forged permits or violation of the rules of their use.

Permits for international transport are a form printed on a paper form, which has a certain degree of protection against forgery.

**Figure 12: Formats of forms of permits for international road transport.**

In the process of implementation of the international freight transport company and the driver is filling the fields of the authorization form, making appropriate marks on the fact of transportation and the crossing of the state borders, as well as the level of state control and Supervisory bodies.

Procedure verification by staff of the regulatory bodies of the presence of the carrier permits associated with the need for close physical contact of the personnel of the transport company, the driver inspectors of regulatory authorities, which is highly undesirable in countering COVID-19.

Technology of registration, issuance and use of permits on paper rule out the possibility for regulatory authorities to implement the remotely operational control over the proper use of permissions in automatic mode.

An effective measure for overcoming these factors is the introduction of a system of registration, exchange, issuance and use of permits for international transport in digital form, online. This should be carried out:

- conduct synchronized national or single international database of issued permits for international road transport, taking into account the parameters (type of transportation, rolling stock requirements prescribed route, etc.);
- translation of procedures for allocating and issuing permits to national carriers in online format, with the conduct of a Personal account user permissions a dedicated WEB application and mobile application for transport companies;
- application of digital control methods of use of issued permits for international road transport, including technologies of satellite navigation.

The use of satellite navigation technologies radically change models and methods of interaction during the transportation process, including the activities of state regulatory authorities on the implementation of Supervisory activities.

In particular, the use of satellite navigation technologies, including equipment motor vehicles navigational and communication equipment under the harmonized technical requirements, organization of information exchange between States on the parameters (routes, speeds, data produced stops, and more) in the process of international transportation allows to exercise operational control, including:

- check facts and points of entry and exit of the carrier on the territory of the state;
- monitoring the number and types of carried out transportations in the framework of multiple permits;



- the compliance by the carrier with the prescribed transportation route, weight and size and other restrictions;
- compliance by drivers modes of work and rest;
- automatic detection of violations of rules of transportation, including illegal business activities on the adjacent territory (cabotage) and others;
- the observance of traffic rules and more.

On the basis of satellite navigation state regulatory authorities have the opportunity to automatically carry out control over the quantity and compliance with the rules of use permission.

In turn, digital technology minimizes physical contact between drivers and inspectors of the state regulatory bodies, ensures the implementation of measures to combat infectious diseases. In addition, these technologies contribute to reduction of corruption risks in the process of preparation and transportation.

#### K. "Green corridor" system

Comprehensive implementation of the above proposed activities on the application of digital models and methods of management and control over the transportation process will allow to create conditions for the implementation of the system of "green corridors" that provide non-stop travel when the prescribed requirements for transportation.

The essence of this system is the following:

- creation of favorable conditions during transport for the law-abiding carriers, which implies the maximum possible exception of the interruption of transportation for inspections, inspections of vehicles and cargo, inspections of documents drivers and other actions by state regulatory authorities related to the Supervisory activities;
- application of technical remote monitoring, online monitoring of the transportation process with the aim of identifying violations of the prescribed conditions of transport, including adherence to prescribed routes, Parking areas, implementation of illegal business activities in the adjacent territory, including illegal cabotage and other irregularities;
- maintaining a constantly updated and actualized on the basis of objective technical control data base legal users of the transportation process, including road transport and forwarding companies, owners and operators of roadside service and others. In the framework generated by the database based on the tools of online monitoring the participants of the transportation process should be assigned and promptly adjusted the ratings to reflect the degree of compliance and the risk of disorders in relation to each participant of the transport.
- online data monitoring and current ranking member of the transportation can be used by customs and other government regulatory agencies to adjust risk in the current systems of risk control on the basis of which decisions on carrying out of additional inspection and other control activities in relation to the specific carrier and the parties of cargo.

The introduction of a system of "green corridors" provides a comprehensive and coherent application of modern digital management tools on a voluntary basis, as alternative methods of ensuring control of the transportation process. A list of such tools can include:

- systems of satellite navigation and monitoring of vehicles;
- navigation of electronic seals for monitoring access to cargo compartments of vehicles;
- digital format of commodity-transport documents and technology data communications during transport;
- digital format permits to carry out international road transport;
- digital format permits the transport of heavy, oversized and dangerous goods and agreed electronically routes;



- tools prior notification and Declaration of information on the goods transported, the vehicles and the crews of vehicles and others.

The introduction of a "green corridor" provides for the automatic application of measures in case of detection of violations by unscrupulous participants, including forced stop vehicles for checks and inspections and evacuation to the penalty Parking.

In case of identification of violations or with high risk of violations establishes additional control measures, such as the application of technical means:

- installation of navigation electronic seal for locking and sealing devices of the cargo compartments of vehicles;
- apply a locking operation of the vehicle engine devices in case of revealing negative results of remote medical examination, and others.

The system of "green corridors" should be built in close interaction between all state controlling bodies to involve information sharing and organizational coordination among them. The achieved result will not be complete if will be maintained the interagency disunity, including the complexity and fragmentation of information exchange between state agencies.

A key role in the formation of a system of "green corridors" in international motor transportations is given to customs services, and transport inspection, conducting customs transport monitoring during transport.

To form a complete system of "green corridors" in the framework of international transport corridors required the organization of international cooperation, including information exchange between the state regulatory authorities of the States through which pass the international transport corridors. This interaction can take the form of a separate intergovernmental agreements, international conventions or in the form of annexes to already existing documents.

As an example, a pilot project of creating an international system of "green corridors" through the use of digital technologies can lead to pilot the Galileo project, Green Lane , implemented a number of EU countries on the basis of the technologies European satellite navigation system Galileo. This project is implemented in order to ensure smooth transportation of essential goods through the internal land borders of the EU. As expected, its implementation will reduce the waiting time at border crossings and create conditions to build a seamless road transportation system within the framework of the European Union.

#### L. Electronic navigation seals and smart containers

The development of navigation technologies, the emergence of numerous services based on using data of satellite navigation opens up new areas of their application in international road transport. One of the most popular areas is to ensure the traceability of the transport of transported goods, including control of access to cargo compartments of vehicles. Technical means of ensuring access control in the cargo compartments of the transport means is mounted on a locking and sealing device of a cargo compartment of a special device – electronic air seal

The modern development of navigation technology and microelectronics technology allows mass-produce relatively inexpensive devices that are being mounted on the cargo compartments of vehicles can transmit navigation data on the route travelled, as well as to inform about the facts of opening the cargo bays, while maintaining its efficiency for several months without requiring special maintenance. Such electronic navigational seals ensure the traceability of the routes of transportation, to inform the cargo owners, transport companies and state regulatory authorities on the progress of the transportation process, as well as the facts of the autopsy cargo compartments, including illegal and / or unauthorized.

According to its legal status of this equipment does not replace regulated by the customs legislation of the customs seals applied as means of customs control of cargo compartments. As a rule, the customs authorities of the States the fact of providing the prescribed conditions of transportation in terms of compliance with the

customs procedure of customs transit is the availability and integrity (sincerity) customs seal applied by a customs body.



**Figure 13: Electronic navigation seals.**

In this regard, an important legal aspect that requires harmonization at the international level is the legal status applied to navigation of the seal. A reasonable recommendation is to consolidate in international practice and national customs legislation status of electronic navigational fillings as a technical means of ensuring customs control.

This equipment in compliance with the national legislation of a number of countries should be certified as a measuring tool. This may require type approval of measuring instruments, and testing and control of measurement accuracy (calibration) of commercially available and in-service equipment.

Examples of successfully operated electronic navigation seals and systems using them are the developments of companies:

- BigLock system of JSC "engineering industrial concern "STRAZH", Russian Federation<sup>63</sup>;
- Product tracking system from the center for digital platform development, Russian Federation<sup>64</sup>;
- Cargo tracking, control and management solutions from Starcom Systems, Israel<sup>65</sup>;
- The products of the company Shenzhen Joye Technology Co., Ltd, PRC<sup>66</sup>.

Derived from electronic navigational fillings telematics data should be processed in the customs authorities of the risk management systems. Thus in the absence of the revealed violations in transportation based on electronic navigation seals (deviations from the prescribed route, unauthorized stops in the wrong places, opening of the cargo compartment and access and other) risk management system should take into account these data, minimizing the extent of the estimated risk. Thus should be reducing the number of stops and checks reliable carriers.

It is important to note that the use of electronic navigational seals should be carried out on a voluntary basis, as an alternative security instrument covering customs and other risks associated with international transportation. This equipment and technology and digital technologies should not be imposed, it should not become a burden to bona fide carriers.

<sup>63</sup> <https://biglock.info/>

<sup>64</sup> <https://crp.ru/>

<sup>65</sup> <https://www.starcomsystems.com/tetis/>

<sup>66</sup> <http://www.jointcontrols.com/productCenter-257.html>

Practical implementation of the measures for use of electronic navigational fillings may include:

- ensuring the legal significance of the data from the applicable electronic navigation seals, and other equipment installed in the cargo compartments of vehicles (as a technical means for customs control), including due to their certification as a means of measurement;
- use data obtained in the risk management system (RMS) of customs bodies in determining the degree of risk and to improve the effectiveness of remotely performing control and Supervisory activities;
- development of alternative mechanisms for risk-covering in international transport along with shipping insurance, Deposit, institution of a customs carrier, the mechanism of the TIR Carnet and other existing mechanisms.

Technology development electronic navigational seals promotes the use of the so-called "smart containers". In one case integrated locking and sealing devices with integrated satellite navigation and telematics, the impact sensors and rollover, and insulated containers – thermal sensors. This equipment allows comprehensive monitoring of the cargo condition, to ensure full traceability of all parameters of the cargo during transportation.

The greatest effect of the use of "smart containers" is provided when using platform solutions to control the transport. An example of such platform solution is the platform of the block-chain TradeLens implemented by the shipping company Maersk and IBM Corporation.

The importance of applying these technologies and "smart containers" and blockchain technologies relevant in the context of the pandemic COVID-19. The organization of staged application of these technologies accelerates the transportation process, increase security of supply chains, as well as the maximum exception document in paper format, reducing human intervention in the delivery process and the risk of infection and spread of COVID-19.

#### M. Smart tachographs.

In international practice, the activities of crews of vehicles of categories M2, M3, N2 and N3, including carrying out international transport recorded a special technical control device – tachograph.

The most important document of the world level, the regulatory regimes of work and rest of drivers is the European agreement concerning the work of crews of vehicles engaged in international road transport from 01 July 1970 (Geneva, the AETR Agreement). The AETR agreement defines the specific norms of work and rest of drivers regulations control of vehicles, as well as the conditions of application and requirements for equipment intended for mounting on road vehicles in order to evidence or register the automatic or semi-automatic mode data on the movement of vehicles or certain work periods of their drivers in international transport.

**Figure 14: . Examples of tachographs from different manufacturers.**



In some States the technical requirements for tachographs are governed by national regulations, including approved by the ministries of transport technical requirements. In particular, in the Russian Federation such

requirements approved by the special order of the Ministry of transport introducing "the Requirements to tachographs installed in the vehicle."

The data of tachograph control used by the traffic police and / or transport inspectorates of States to control the parameters of transport, including time and schedule drivers the speed limit. Typically, checking readings on tachograph inspector interrupts the carriage, stopping a vehicle for carrying out information retrieval from the tachograph using a special card of the inspector or printing on paper.

In addition to flight delays and nonproductive downtime of the vehicle, a verification procedure to obtain data from the tachograph are held in close contact inspector with the drivers and increase the risk of spread of infectious diseases.

In this regard, of particular importance is the use of remote online monitoring and receiving tachograph information through technology, telematics, and without interrupting the transportation process, as well as physical contact of people. Transfer of data from the tachograph while the online format is transferred automatically to the state Supervisory authorities for further analysis and necessary action.

It should be noted that on the basis of the EU Regulation dated 15 June 2016 (EU 2016/799) introduced the requirement for mandatory installation of smart tachographs in new vehicles registered on the territory of the member States of the EU, starting from June 15, 2019. All other previously released and working in the EU space vehicles of certain categories must be fitted with a smart tachograph within 5 years (until mid-2024).

In binding to the installation in the EU smart tachograph is a collection of all information about time, speed and route of vehicle movement, status and functioning of its components and assemblies, axial loads, temperature, etc., Also contains full detailed information on modes of work and rest hours of crews of vehicle, duration of stay in foreign territory. Thus, implemented throughout the EU smart tachograph becomes one (and only regulated) by the technical means of control (a kind of telematic equipment) to equip commercial vehicles of certain categories.

The use of smart tachograph provides the opportunity to coordinate with informational and control systems and data transmission of transmitting data online, for example:

- the driver and his personal map;
- about the vehicle and its condition;
- about the modes of work and rest of the driver;
- the coordinates of the vehicle during the transportation process in real time;
- on derived from associated with the tachograph sensors of various onboard vehicle systems, including sensors axial loads and to control unauthorized access to the cargo hold, compliance with the temperature regimes, etc.

Examples of successful developments and applications of tachographs are:

- VDO (Continental) tachographs of FDO-METTEM LLC, Russian Federation<sup>67</sup>;
- Tachographs BAR Tahoe RUS group of companies "SHTRIKH-M", Russian Federation<sup>68</sup>;
- Tachographs DRIVE company "ATOL Drive", Russian Federation<sup>69</sup>;
- Incotex tachographs, Incotex TC LLC, Russian Federation (mercury trademark)<sup>70</sup>;
- Stoneridge Electronics, United Kingdom (Scotland)<sup>71</sup>;
- ECON AG, Austria<sup>72</sup>;

<sup>67</sup> <https://vdomettem.ru/products/9/>

<sup>68</sup> <https://www.auto.shtrih-m.ru/produktyi-i-uslugi/taxografyi/obshhaya-informacziya.html>

<sup>69</sup> <https://atoldrive.ru/produkty/>

<sup>70</sup> <https://www.incotextaho.ru/catalogue>

<sup>71</sup> <https://www.stoneridgeelectronics.com/products/se5000-exakt-duo-digital-tachograph>

<sup>72</sup> [https://www.efkon.com/databases/internet/\\_public/content30.nsf/web30?Openagent&id=EN-EFKON.COM\\_VTS.html&men1=3&sid=300](https://www.efkon.com/databases/internet/_public/content30.nsf/web30?Openagent&id=EN-EFKON.COM_VTS.html&men1=3&sid=300)



- ACTIA, France<sup>73</sup>.

An important aspect of the use of tachographs in international road transport is the accession of States to existing global agreements in this field. In particular, people's Republic of China has not acceded to the AETR Agreement, in this regard, the recognition data of tachograph equipment Chinese carriers causes significant legal issues in other States. In this regard, relevant is the problem of harmonization the harmonization and regulation of the use of technical means to ensure control of modes of work and rest of drivers in international transport, including additional conditions or within time of legal structures.

## N. Information systems for intermodal interaction and transport nodes

Transport nodes such as dry ports, freight yards, industrial plants, distribution centers and seaports are essential elements of international transport corridors.

They allow consolidation or the breaking up of consignments, pre-processing of cargo, and sometimes the organization of production from the incoming raw materials and components. Hubs bring together numerous feeders and the feed lines are starting and end points of trunk routes.

An important task of transport nodes is the organization and carrying out procedures related to the provision of foreign economic activities, including border, customs, sanitary and phytosanitary procedures, technical control of vehicles, control immigration and more.

In addition, they perform the change the mode transport, including transshipment of cargo from one mode of transport to another. The most important role is played by road transport, which ensures delivery of goods to the "first" and "last" mile transportation hub and transport hub to end consumers, and also participates in the main transit between transport nodes.

Thus, in the transport node is the active interaction between all modes of transport and participants in the transport process. This interaction involves formation of foci, a significant increase in the risks of infectious diseases and the spread of viruses on a global scale.

Measures the use of advanced technologies of ITS and digitalization of business processes in road transport, priority should be directed to automation and remote interaction of all participants in transport hubs, including personnel transport and forwarding companies, cargo owners, state regulatory authorities. In this regard, systematization and popularization of best practices on introduction of information system of interaction of participants of transportation process in transport hubs, including interaction with other transport modes.

In world practice the most experience of the digitalization of business processes in transport hubs has been accumulated in seaports. The digitalization of business processes in seaports, as a rule, is carried out in two directions:

- automation of interaction of participants of transportation for operational purposes of the current driving situation, the coordination of transport and commodity flows in transport area;
- automation of interaction between the participants of transportation and state regulatory bodies for the purposes of information exchange of information about transported goods and cargo, including in the framework of customs and other procedures.

In the field of international transport, the introduction of a single window, already referred to above, is important in improving state control procedures at checkpoints in order to avoid delays and cargo movements, unproductive vehicle downtime, and minimize the duration of physical contact between drivers and staff.

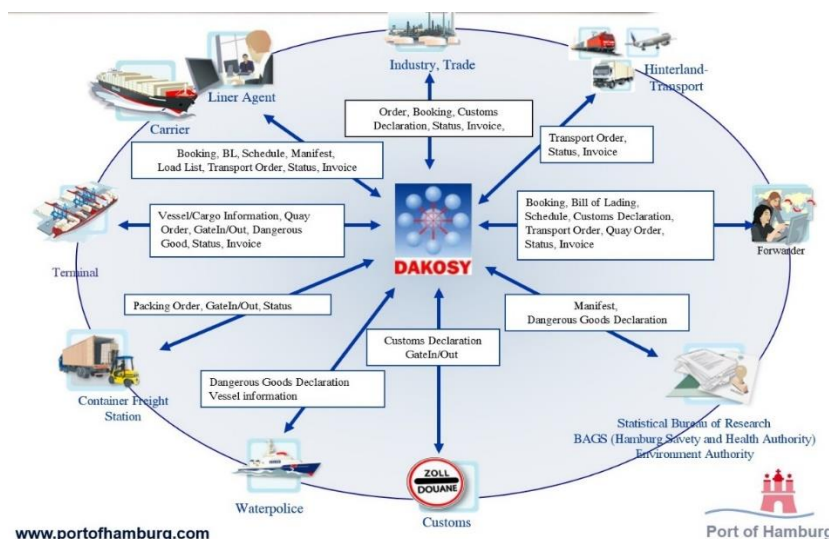
Global examples of successful implementation of the mechanism of "single window" projects are:

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<sup>73</sup> <https://tachograph.actia.com/en/>

- System port information interaction "Portbase" in the ports of Rotterdam and Amsterdam (Netherlands);
- System of DAKOSY (Data Communication System) of port of Hamburg (Germany);
- the TradeNet System of Singapore;
- System support system (Nippon Automated Cargo and port Consolidated System) and integrated system "Crew Landing Permit Support System", FAINS (Food Automated Import notification and inspection Network System), ANIPAS (Animal quarantine Inspection Procedure Automated System) and others (Japan).

**Figure 15: . Communication in the port of Hamburg on the basis of DAKOSY single window.**



An overview of the best global practices for implementing the single window mechanism is also provided in the document «Single Window for Trade Facilitation: Regional Best Practices and Future Development», prepared by Economic and Social Commission for Asia and the Pacific (ESCAP)<sup>74</sup>.

In addition to the organization of interaction of state control bodies in part of the exchange of information about transported goods and cargo automation system transport hubs also solve the problem of coordination of participants to ensure maximum vehicle performance, prevent saturation and conflict situations, ensuring the smooth processing of cargoes and transportations.

Composition of functions includes:

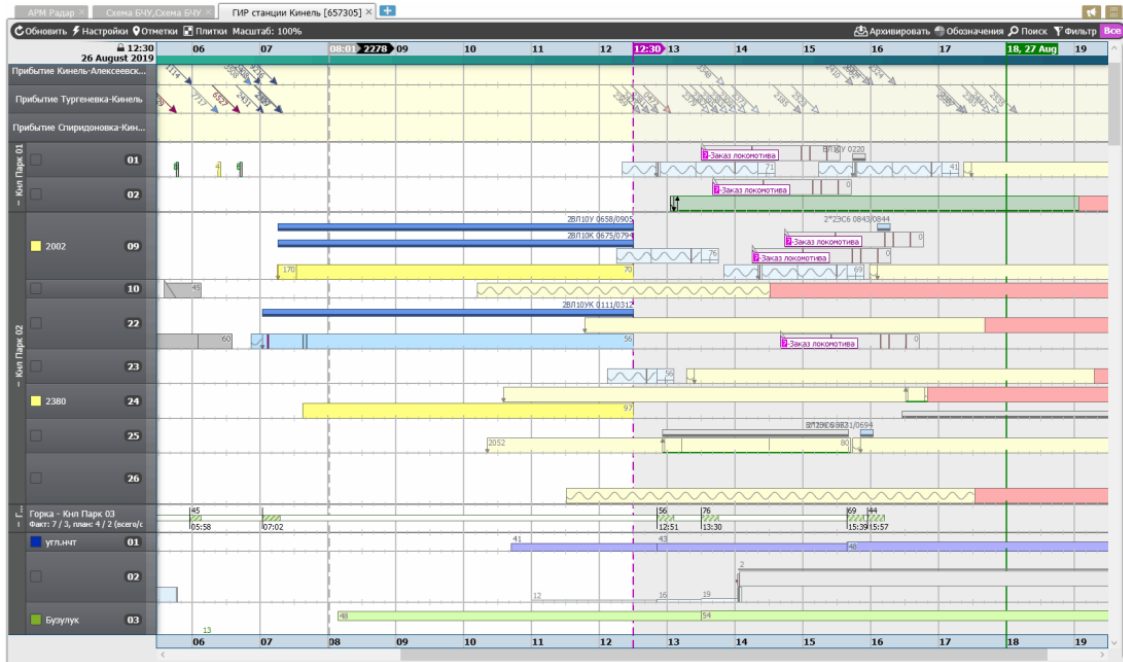
- planning of the transport operation in the transport node on long-term (year or more), medium-term (over months) and the current operational period (less than 3 days);
- coordination of traffic flows in the area's transport hub, the precedence constraints of the entry and exit of vehicles in a transport unit;
- movement control inside the transport unit;
- management of warehousing, monitoring the use of cargo platforms;
- coordination between different transport modes (e.g. between rail and road transport) and other operations.

Information and coordination the participants of the transportation node serves as a "contact graph" movement, showing the state of approach of vehicles, duration of operations, cargo processing, availability of cargo platforms and a forecast of the situation in the transport node.

<sup>74</sup> [https://www.unescap.org/sites/default/files/Regional%20Best%20Practices%20of%20Single%20Windows\\_updated](https://www.unescap.org/sites/default/files/Regional%20Best%20Practices%20of%20Single%20Windows_updated)



**Figure 16: . Sample contact schedule in a transport hub.**



Implementation of these information technologies of interaction between different types of transport and automation of transport nodes is currently actively developing in water (sea and less river transport), as well as railway transport.

In view of the need to create conditions to minimize the risks of spreading infectious diseases, including avoiding queues and downtime at border crossings, checkpoints and transport hubs, this experience needs to be studied and adapted for further implementation in international road transport.

## O. Use of highly and fully automated freight vehicles

The use of highly automated or unmanned vehicles can be a fundamental step towards minimizing interaction between the personnel during the transportation process and, consequently, prevent the spread of infectious diseases.

SAE International, previously known as the Society of Automotive Engineers, defines the following levels of automation unmanned vehicles:

- 0-level: unmanned systems no, but it might work notification system - alarm displays, sounds, etc.
- 1st level: the vehicle is controlled by the driver, but can run some automated systems: cruise control, automatic Parking and warning system exit lanes.
- 2nd level: most of the way to go in autopilot mode, but the driver needs to take over in cases where the system cannot cope on their own – for example, in a dramatic rebuild in case of unexpected interference from another vehicle. The autopilot controls the steering, the vehicle speed, and braking, but can be turned on or off at will of the driver.
- 3rd level: the car can move with almost no control of the driver, especially on roads with "predictable" traffic (e.g. highway, freeway). But the driver must be ready at any moment to take over the controls, as some non-standard situations, the vehicle can respond to the situation on the road not quite right and it can lead to accidents.
- 4th tier: same as 3rd level, but the attention of the pilot is no longer required. Level 4 is almost completely Autonomous machine.

- 5th level: from the passenger car does not require anything except start the autopilot and determine the destination. Unmanned vehicle independently reach the designated destination, unless prohibited by law.

**Figure 17: Unmanned trucks.**



Development of standards for unmanned vehicles is currently being implemented in many countries. This theme is not only a complex engineering task in which it is required to address the challenges of providing Autonomous movement, including in difficult weather conditions, information exchange with the transport infrastructure, road signs, variable information, as well as other cars. No less important remain the legal and ethical aspects of responsibility in case of committing a traffic accident, moral and ethical acceptable consequence of the actions of the driver and others.

In the development of highly automated and unmanned transport systems are the most critical tasks of ensuring information and cyber security. Should be possible to reliably eliminate the risks of unauthorized access and interception control an unmanned vehicle.

Depending on the user scenario, there are several options for the use of unmanned vehicles. It seems the most futuristic fully Autonomous driving of an unmanned truck, carried out on public roads.

Unresolved legal aspects and the requirement of enhancing the security of the force to consider as a more acceptable option, the movement of unmanned vehicles on a dedicated and physically isolated strip intended for movement only of unmanned vehicles.

The most developed at present is a variant of the convoy movement of trucks is a highly automated convoy (platooning). In this case, the head car is an experienced driver, and following vehicles are moving in the automatic mode of the column using wireless technology information interaction.

To select a specific application and highly automated unmanned transport for the real road freight transport is required for international studies on the application of drone technologies (including caravan transport), as well as organization of pilot zones.

One of the key issues for consideration in such studies is the organization of international cooperation, exchange of information with customs, border and other state control authorities to ensure smooth and non-stop traffic. It is obvious that these goals will require substantial changes in the national customs legislation and international conventions and agreements in the field of customs and other types of state control and regulation.



**Figure 18: Caravan of highly automated trucks.**

## P. Step-by-step formation of an ecosystem of digital corridors

Digital transformation of the transport sector the characteristic feature of which is a significant change in traditional business processes and transition from paper document management to electronic data interchange, is a steady global trend.

As a rule, the goals of the digitalization of business processes in the areas of transport and logistics are:

- enhance transparency and controllability (stability) of the transportation process;
- acceleration of transport process, introduction of new services and technologies transportation and handling;
- a reduction in the cost of transport and logistics services;
- save money and resources by optimizing the (modified) business processes and transition from paper document circulation to electronic data interchange;
- elimination of the negative manifestations of the human factor in the design and processing of documents;
- improving efficiency of control and supervision on transport by reducing the administrative burden;
- optimization of functioning of the used state information systems.

The achievement of these goals is possible through applying a fundamentally new approach to organization business processes in the field of transport and logistics is not based on the principles of competition, and the formation of stable self-sustaining business ecosystem participants.

The term business ecosystem was first in General practice was introduced in 1993 by James Moore (Moore, James F.) in a magazine article "Predators and prey: a new ecology of competition" (eng. Predators and Prey: A New Ecology of Competition) in the popular science journal Harvard Business Review. Then this concept was developed by the author in the book "the Death of Competition" (eng. The Death of Competition)<sup>75</sup>.

In these works, a business ecosystem is defined as an economic community, which consists of a set of interconnected organizations and individuals. In this economic community produces goods and services valuable to the consumer, which are also part of the ecosystem.

Thus, the transformation of economic relations based on the principles of hard competition and the transition to mutual mutually beneficial coexistence and mutual development. The basis of this transformation is application of digital models and management methods, digital tools that blur the boundaries between States, businesses and individuals, making the maximum available goods and services in the minimum, depending on the geographical location and boundaries.

Special impetus to the development of the term "business ecosystem" gave accelerated formation of digital services, including e-Commerce. A significant impetus for their development was the consequences for the Chinese economy, associated with the epidemic of atypical pneumonia (SARS) in 2003, when introduced into Chinese cities quarantine dramatically increased the demand for online purchasing of goods and their delivery.

The global economic situation, the pandemic of a new type of coronavirus COVID-19, was a significant driver and catalyst for fostering ecosystems in the field of transport and logistics. The formation of regional or global ecosystems in the field of transport and logistics requires a concerted counteraction by government and business, including changes to the legislative framework and creation of the application service solutions.

So, examples of business ecosystems can serve to create Port Community Systems in ports such as Rotterdam, Hamburg, Singapore and other ports. Within the formation of these ecosystems through the application of digital technology is the creation of a unified information environment of interaction of business and state regulatory authorities. As a result of the digitization of business processes minimizes the time to carry out routine operations, provides growth of efficiency of functioning of transport hubs and eliminated (or minimized) physical contact between staff.

An example of formation of a regional ecosystem of transport and logistics is a system of managing the logistics of NEAL-NET<sup>76</sup>. Platform NEAL-NET is a transnational, non-commercial mechanism for logistics interaction and data exchange within the framework of international transport corridors, jointly implemented by China, Japan and South Korea.

Another example of the project to create an ecosystem in the field of transport and logistics notes the formation of the ecosystem of digital transport corridors of the EAEU. Work on the formation of the ecosystem of digital transport corridors is conducted on the basis of the Order of the Eurasian intergovernmental Council, which determined the objectives and plan its creation.

Key technological principles applied in the formation of the ecosystem of digital transport corridors of the Eurasian Economic Union are:

- transition from exchange of documents, including in electronic form, to the exchange of legally significant data about the progress of the transportation process and the interaction of its participants;
- maximum automatic re-use of existing and previously entered the relevant information for elimination of duplicated information;

<sup>75</sup> Moore, James F. The Death of Competition: Leadership & Strategy in the Age of Business Ecosystems (англ.). — New York: HarperBusiness, 1996. — ISBN 0-88730-850-3.

<sup>76</sup> <http://english.nealnet.org/>

- information integration with state, public and corporate information systems to improve their quality and effectiveness;
- information integration with related functional information systems, including digital trading platforms and hubs.

Implementation of the project is to create an ecosystem of digital transport corridors in EAEU should create the necessary conditions to reduce the adverse effects COVID-19 at the transportation and logistics industry, accelerate the transportation process and increase its efficiency.

The formation of ecosystems in the field of transport and logistics, digitalization of the international transport corridors is a complex process that requires organizational changes, changes in the regulatory framework and its harmonization, design and implementation of digital platforms. Using the accumulated global positive experience in this area is the key to the success of these projects.



## CONCLUSIONS: Seamless and Smart Connectivity along The Asian Highway Network in the Times of Covid-19

The COVID-19 Pandemic has exposed, once again, important shortages in the functioning of international road transport sector and, notably: diverging technical requirements for fleet and transport operators, on one hand, and reliance on physical checks and manual procedures, on the other. Already a source of important logistics costs overrun and growing economic externalities, these deficiencies adversely impacted the performance of freight operations by road during the pandemic, exposing yet another cost to the economy and society, at large.

Accordingly, the Pandemic propelled the challenges of operational connectivity and digitalization along the Asian Highway Network to the forefront of public policies as a key component of pandemic response and sustainable recovery strategies.

At the same time, both policy and technical solutions for seamless and smart connectivity along the Asian Highway Network already exist and many have been implemented by other regions or sub-sets of Asia-Pacific countries.

Countries' practices and strategies prior and, especially, during the COVID-19 pandemic provided a wealth of good practices and lessons learned, which can further support the momentum for a tangible progress in achieving seamless and smart connectivity along the Network. A wide range of proven solutions can make road transport less reliant on physical contacts (contactless solutions) and less exposed to interruptions and costs of documentary and other checks (seamless).

Some of these solutions draw on technical progress in other areas (telemedicine), while others represent an internal change in the transport processes and organizations (intelligent transport systems), but still require buy in and participation of other sectors and a wide range of governmental actors. This makes awareness raising and capacity building activities a key factor for supporting ongoing and potential reforms for smart and seamless connectivity along the Asian Highways.

This technical note offers initial considerations and practical information to support seamless and smart connectivity along the Asian Highway Network in the times of Covid-19 and will be accompanied with further technical notes and reports, as well as dedicated capacity building activities, organized under the framework of the UNDA project on "Transport and trade connectivity in the age of pandemics: Contactless, seamless and collaborative UN solutions". The results of this work will also be brought to the attention of the intergovernmental Working Group on the Asian Highway to be convened in 2021.



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- "Yandex Services.Maps" and "Yandex.Transport" from the company "Yandex", Russian Federation (<https://yandex.ru/maps> and <https://yandex-transport-online.ru/>);
- "Google Maps service" (<https://www.google.ru/maps>);
- "Baidu search engine" (<http://www.baidu.com/>);
- "Yandex Service.Routing" from the company "Yandex", Russian Federation (<https://yandex.ru/routing>);
- "The route planning system" of the company "Maxoptra", Russian Federation (<https://maxoptra.ru/postroyeniye-marshruta>);
- "Verizon Connect Route Planning Software" (<https://www.verizonconnect.com/v/fleet/gpsfleet/here-and-ready/>);

- "Samsara Route Planning Software" (<https://www.samsarastatus.com/>);
- "Teletrac Navman Route Planning Software" (<https://www.teletracnavman.com/>);
- "Silent Passenger Route Planning Software" (<https://www.silentpassenger.com/>);
- "US Fleet Tracking Route Planning Software" (<https://www.usfleettracking.com/>);
- "WorkWave Route Planning Software" (<https://www.workwave.com/route-manager/>);
- "ProTransport Route Planning Software" (<https://www.pro-transport.com/>);
- "KeepTruckin Route Planning Software" (<https://keeptruckin.com/>);
- "Fleetio Route Planning Software" (<https://www.fleetio.com/>);
- "OmniTracs Route Planning Software" (<https://www.omnitracs.com/products/route-optimization/>);
- "Weight and dimensional control systems for transport and cargo" of "VanJee Technology Co., Ltd.", China (<http://www.vanjee.net/>);
- "Automatic weight and size control system" of "TENSOR" company, Russian Federation (<http://tenzor-rostov.ru/avgk-avtomaticheskij-vesogabaritnyj-kontrol/>);
- "Dynamic weighing systems" from "TENSO", Czech Republic (<https://www.tenzovahy.cz/en/>);
- "BigLock system" of JSC "engineering industrial concern "STRAZH", Russian Federation (<https://biglock.info/>);
- "Product tracking system" from "The center for digital platform development", Russian Federation (<https://crcp.ru/>);
- "Cargo tracking, control and management solutions" from "Starcom Systems", Israel (<https://www.starcomsystems.com/tetis/>);
- "VDO (Continental) tachographs" of "FDO-METTEM LLC", Russian Federation (<https://vdomettem.ru/products/9/>);
- "Tachographs BAR Tahoe RUS group" of companies "SHTRIKH-M", Russian Federation (<https://www.auto.shtrih-m.ru/produkty-i-uslugi/taxografyi/obshhaya-informacziya.html>);
- "Tachographs DRIVE" company "ATOL Drive", Russian Federation (<https://atoldrive.ru/produkty/>);
- "Incotex tachographs", "Incotex TC LLC", Russian Federation (mercury trademark) (<https://www.incotextaho.ru/catalogue>);
- "Stoneridge Electronics", United Kingdom (Scotland) (<https://www.stoneridgeelectronics.com/products/se5000-exakt-duo-digital-tachograph>);
- "ECON AG", Austria ([https://www.efkon.com/databases/internet/\\_public/content30.nsf/web30?Openagent&id=EN-EFKON.COM\\_VTS.html&men1=3&sid=300](https://www.efkon.com/databases/internet/_public/content30.nsf/web30?Openagent&id=EN-EFKON.COM_VTS.html&men1=3&sid=300));
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