

# Strengthening Subregional Connectivity in East and North-East Asia through Effective Economic Corridor Management Training-Workshop Series: Workshop 2

## Lecture: Railway Transport

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# Outline

1. Emerging trends in international railway transport
2. Enhancing interoperability for facilitation of international railway transport
3. Electronic information exchange for facilitation of border crossing by rail  
*Case Study: Electronic information exchange between railways and Customs in Russian Federation and INTERTRAN Project*
4. Use of new technologies for efficient and secure border crossing by rail
5. Facilitation of Customs transit procedures for international railway transport
6. Joint border controls and streamlined border crossing  
*Case Study: Border crossing at Rezekne railway station (Latvia)*
7. Corridor management mechanism for railway transport



# 1. Emerging trends in international railway transport



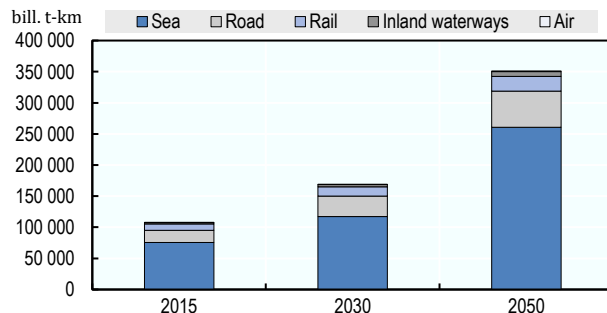
# Railways as a part of Sustainable Economy

Railways on global level:

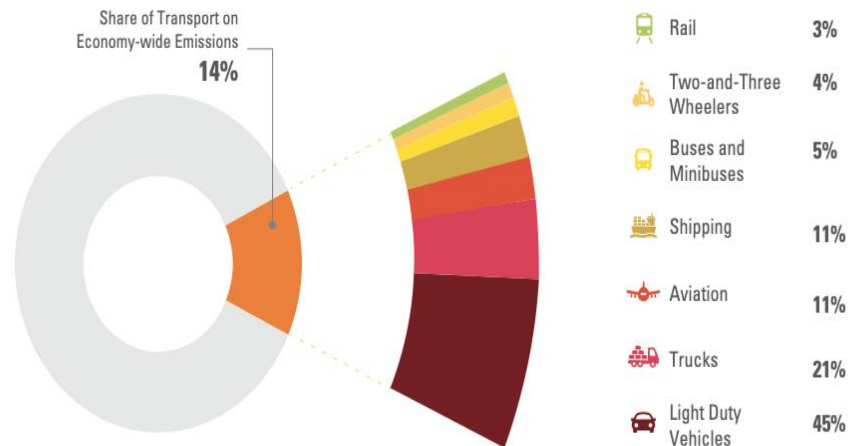
- 8% of passenger transport
- 28% of surface freight transport

**Only 3% of global transport CO2 emissions from railway**

**By 2050 global projected freight transport demand will triple**



Global freight transport demand by mode of transport  
Source: OECD, 2019, ITF Transport Outlook 2019



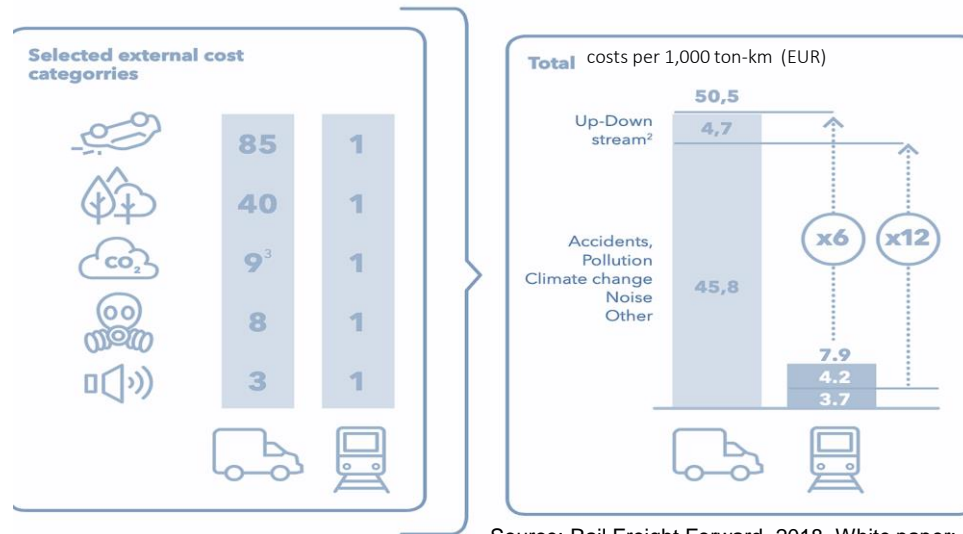
Source: SLoCaT (2018). Transport and Climate Change Global Status Report 2018.

Transit traffic in Central Asia will increase by 6% per year until 2050  
Potential for increased freight flows in Mongolia is substantial

OECD/ ITF (2019), "Enhancing Connectivity and Freight in Central Asia"

# Railways as a part of Sustainable Economy

Sustainability advantages of railway in comparison to road transport



National & International policies, strategies, initiatives

- Shift-to-rail initiatives
  - smart client-oriented solutions
- Green technologies
- Green financing

# Railways as a basis for International Connectivity

- “Hard” - physical (infrastructural) connectivity
- “Soft” - operational connectivity
  - access to railway services, interoperability, facilitation of cross-border railway operations and
  - regulatory controls of border crossing agencies (Customs, border control, sanitary and quarantine agencies)

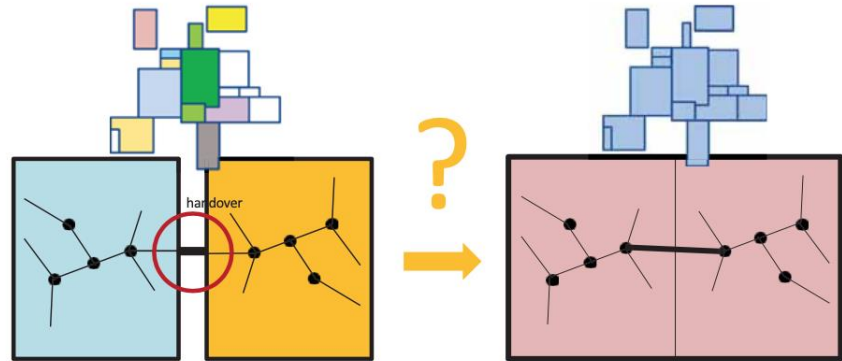


Figure Source: ERA

# Examples of instruments and initiatives that support international connectivity

**Expanding favourable environment  
for realization of coherent  
connectivity policies**

- Intergovernmental Agreement on the Trans-Asian Railway Network (2009)
- Belt and Road Initiative
- Eurasian Economic Union (EAEU) coordinated (agreed) transport policies
- Program of China-Mongolia-Russia Economic Corridor (2016)
- Bilateral railway transport / transit agreements (Mongolia – China / Mongolia – Russian Federation)
- International Convention on the Harmonization of Frontier Controls of Goods (1982) (Annex 9 on Facilitation of border crossing procedures for international rail freight)
- WCO Revised Kyoto Convention (1999)
- ...

# Railways as a part of overall logistics

- Traditional markets vs. changing markets & requirements
- Railway operational efficiency and overall supply chain view
- Addressing fragmentation of networks
- Integrated planning and investment
- Reduction of inefficiencies and reductions of costs
- Increased cooperation with stakeholders (shippers, freight forwarders and third-party logistics providers – e.g. affiliated companies / mutually arrangements)





# Reliability of railway operations

- Reliability and competitiveness of railways

Physical reliability	Non-physical reliability
<ul style="list-style-type: none"><li>■ from traditional to predictive maintenance</li><li>■ automation of mainline/shunting operations, including driving</li><li>■ use of new digital tools for data-driven operations and maintenance: sensors, e-seals, drones, etc.</li></ul>	<ul style="list-style-type: none"><li>■ calculation of ETA with improved accuracy (e.g. with use of AI);</li><li>■ e-data exchange, including pre-arrival exchange;</li><li>■ construction of trusted digital ecosystems for transportation and cargo data sharing</li></ul>

Source: UN ESCAP, 2020, Study on Smart Solutions for Railway Transport

# Resilience of Railways



Disinfection tunnels at Iranian railway border crossings Source: UIC, June 2020, MANAGEMENT OF COVID-19: RAILSilience

- Dealing with COVID-19 pandemic
  - challenges and opportunities
- Long lasting impact
  - need for higher predictability and reliability
  - less dependence on human factor
  - less physical interaction
  - harmonization of border-crossing issues
  - automation and information interchange

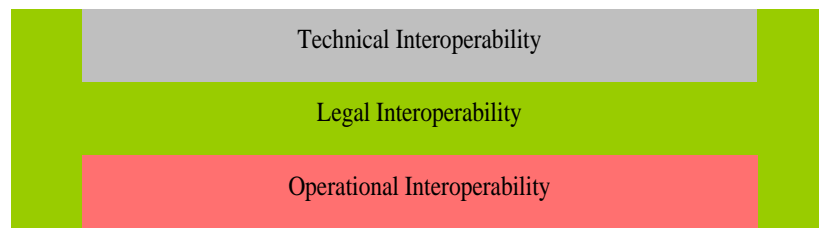
# Discussion

- What are the policies of Mongolia regarding railways as a part of sustainable economy?
- Could you briefly describe some related initiatives / projects already launched?
- What are the lessons learned from such projects ?



## 2. Enhancing interoperability for facilitation of international railway transport

- From individual national railways networks to interoperable and well-connected railway corridor
- Comprehensive approach to railways interoperability



- Focus on:
  - common parameters for interoperability
  - border crossings
  - non-physical barriers

# Technical Interoperability

- **Common technical parameters of railways infrastructure and rolling stock:** track gauge, structure and loading gauge, maximum axle load, train length, rolling stock technical specifications (vehicle authorization and safety certification), etc.
- Break of gauge 1,520 mm - 1,435 mm gauge
- Efficient of break of gauge operations
  - transshipment of containers (**preferred option**)
  - Change of bogies
  - Variable-gauge bogies (specific circumstances only)
- Efficient operational practices to address lack of interoperability based on advanced information exchange between the railways



# Key elements for increased efficiency of break of gauge operations

Sufficient rail tracks with both gauges

Sufficient capacity of facilities (side-tracks, platforms, container yards)

Available equipment (gantry cranes reach-stackers; bogie-changing stations)

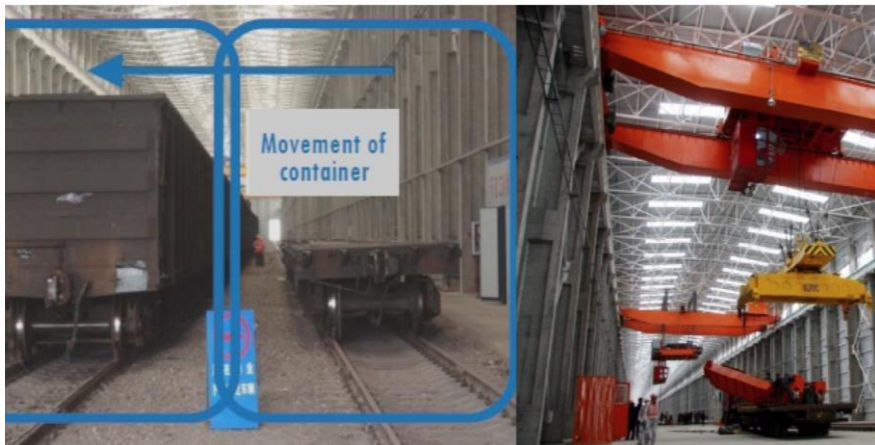
Increased automation of loading/unloading, container transfers and shunting

Efficient coordination between railways for organization and optimization of processes

Efficient coordination between railways and wagon owners, loading/unloading service providers, container yard operators

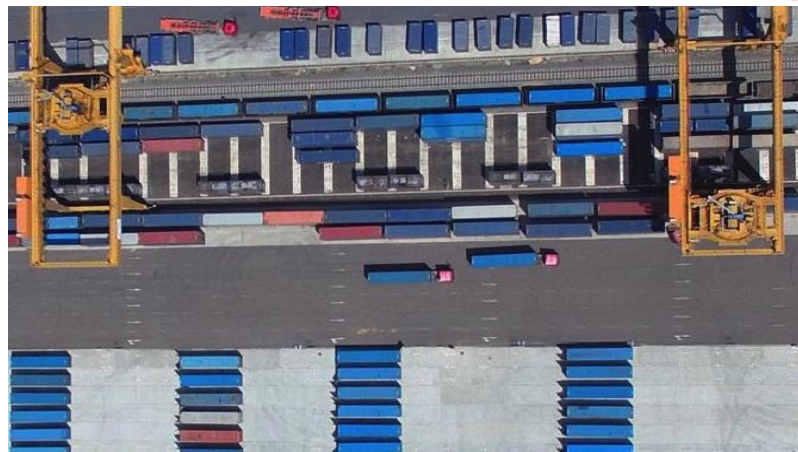
Organization break of gauge operations in parallel with other border crossing railway operations and control formalities

# Transshipment of containers



Alashankou transshipment station (China), Source: ADB

- directly and simultaneously
- through container yards
- automation of loading/unloading



Manzhouli Port (China), Source: Photo Xinhua



**Watch:** [New China TV video](#) on Alataw Pass transshipment warehouse



# Discussion

- What are the experiences of dealing with break of gauge at Erlian (CN) – Zamiin-Uud (MN) border crossing ?
- What is the status of new transshipment Zamiin-Uud Regional logistic park (benefits and remaining challenges) ?

## Development of transshipment capacities at: Zamiin-Uud Regional logistic park



Source: Ministry of Road and Transport Development of Mongolia



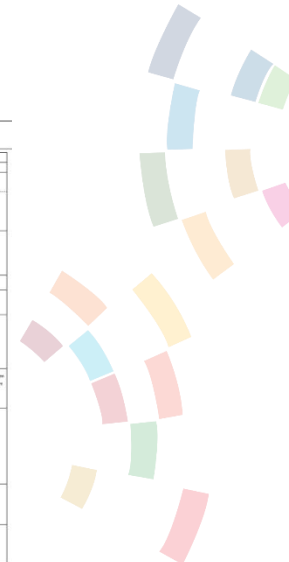
# Legal Interoperability

- Unified contractual obligations to customers from origin to destination
- OSJD Agreements e.g.:
  - on the International Railway Goods Transport (SMGS)
  - on Rules for the Use of Freight Wagons in International Traffic (PGW)
- Bilateral arrangements (based on OSJD rules)
- Harmonization of transport law in OSJD members and COTIF
- Common CIM / SMGS consignment note

# CIM/SMGS consignment note

- Implements both contracts of carriage (sum” of the CIM and SMGS consignment notes, liability conditions)
- Recognized as a Customs and bank document
- Expanding the use of CIM-SMGS
- Use of electronic CIM/SMGS
- Functional, legal and technical specifications for the electronic CIM/SMGS Consignment Note (CIT/OSJD, July 2019)
- Paperless pilots and next challenges

The image shows a detailed view of a CIM/SMGS Consignment Note form. The form is titled 'CIM/SMGS Consignment Note' and includes sections for 'Transport details', 'Cargo information', and 'Legal declarations'. It is a complex document with many small boxes and lines for data entry. The form is divided into several parts, including 'General information', 'Cargo description', 'Transport details', 'Legal declarations', and 'Signatures'. The form is filled with text and numbers, indicating it is a sample or a completed document. The form is a standard document used in international rail transport.



# Operational Interoperability

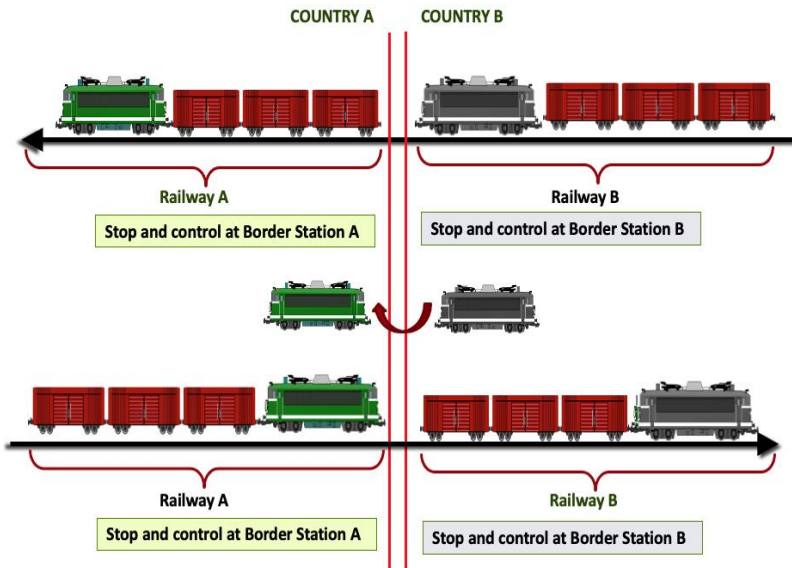
Harmonized operation practice over entire international corridor

Common operational parameters categories:

- Operational interoperability of railways (e.g. harmonized international train timetables, train composition, traffic management, handover of trains, changing of locomotive and train crew, technical inspections and maintenance of wagons..)
- Operational interoperability of other entities (Customs and OGA); (harmonized documents for Customs transit, recognition of Customs control measures...)

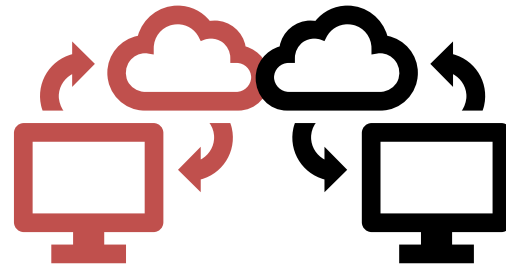


# Operational Interoperability



- Target: improvement of efficiency and competitiveness (time, service quality, tariff)
- Depends on the level of technical and legal interoperability
- Relations with customers and other stakeholders
- Complexity, priorities, and jointly agreed strategies on corridor level

### 3. Electronic information exchange for facilitation of border crossing by rail

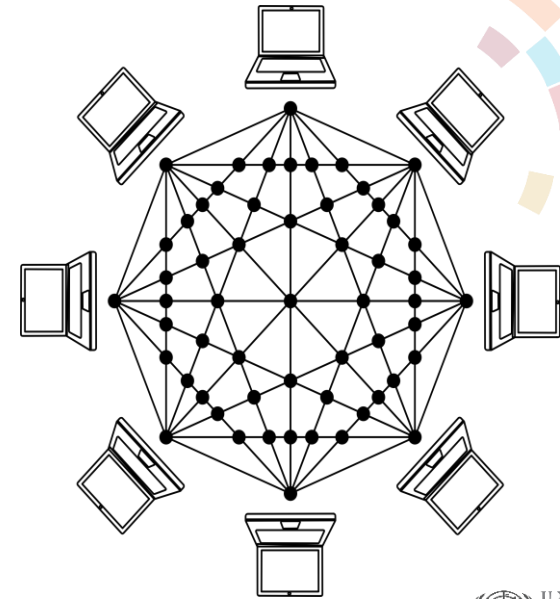


- **Between Railways**
- **Among railways and control authorities**

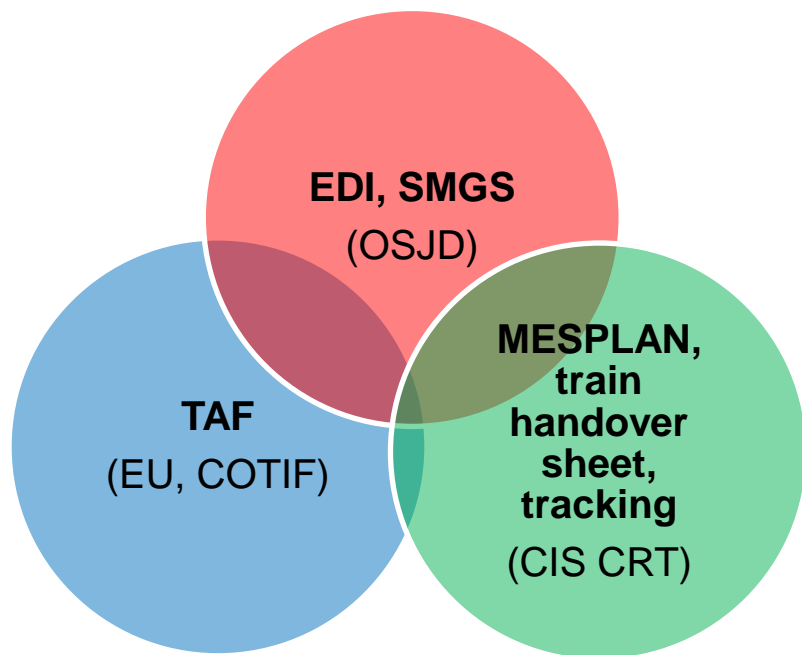


# Automated Information Systems of Railways

- Communication interface with clients, business partners and other railways undertakings
- Transport operation planning, processing of railway transport documentation, automation of traffic control, transport operations support, cross-border data exchange
- Digitalization and automation for optimization and facilitation



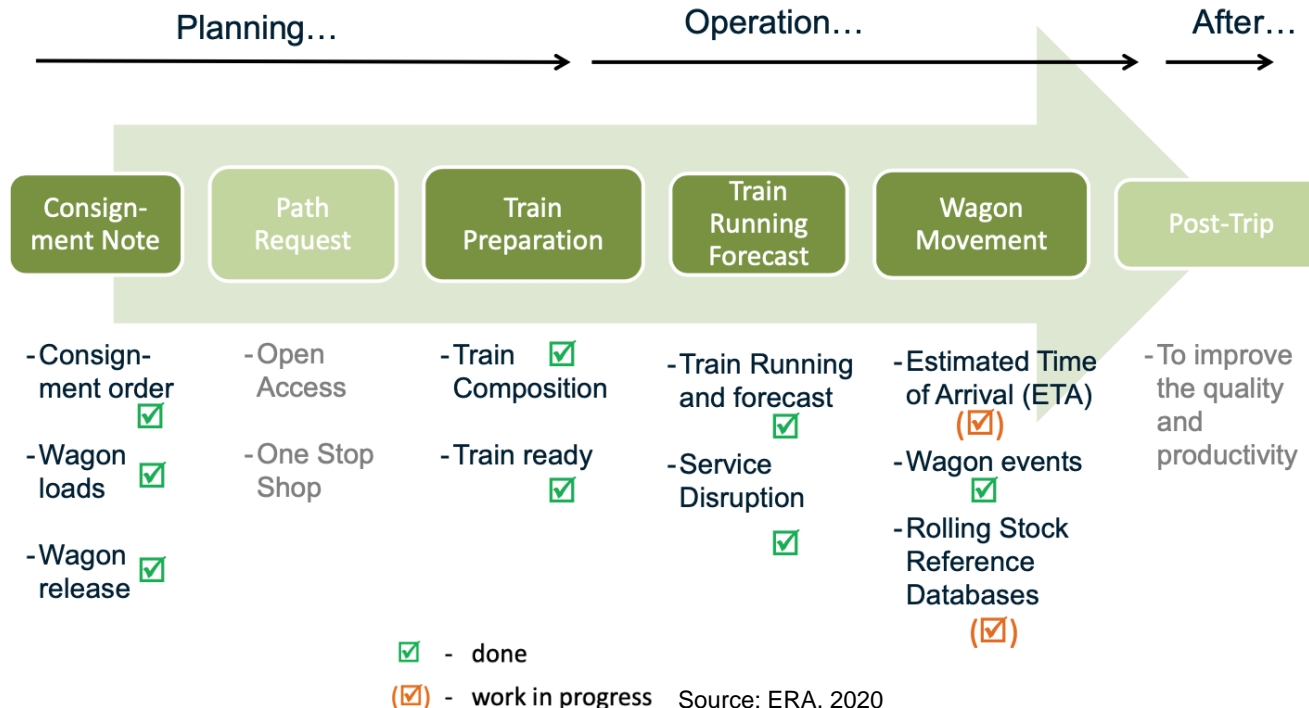
# Electronic information exchange between railways



- Independently developed systems
- Lacking interfaces
- Aimed at facilitation of international freight traffic
- Common essential exchangeable information



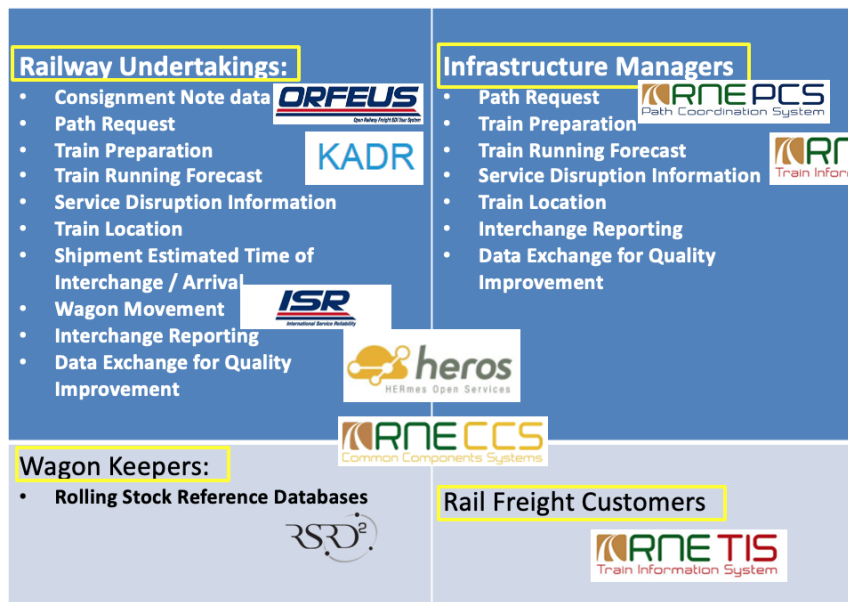
# Electronic information exchange between railways



**OSJD - ERA  
Contact Group**  
 mapping between  
 TAF TSI and  
 corresponding  
 OSJD messages



# Electronic information exchange between railways



TAF TSI Supporting IT Tools, Source: ERA, 2019

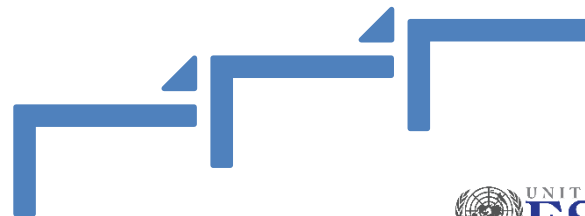
## Numerous supporting IT tools

- RailData (ORFEUS, ISR)
- Rail Net Europe (RNE) (CCS, PCS, TIS)
- HIT Rail (HEROES, Hermes)
- UIP (RSRD<sup>2</sup>)
- Infoset-21
- ...

XML and UN/EDIFACT standards

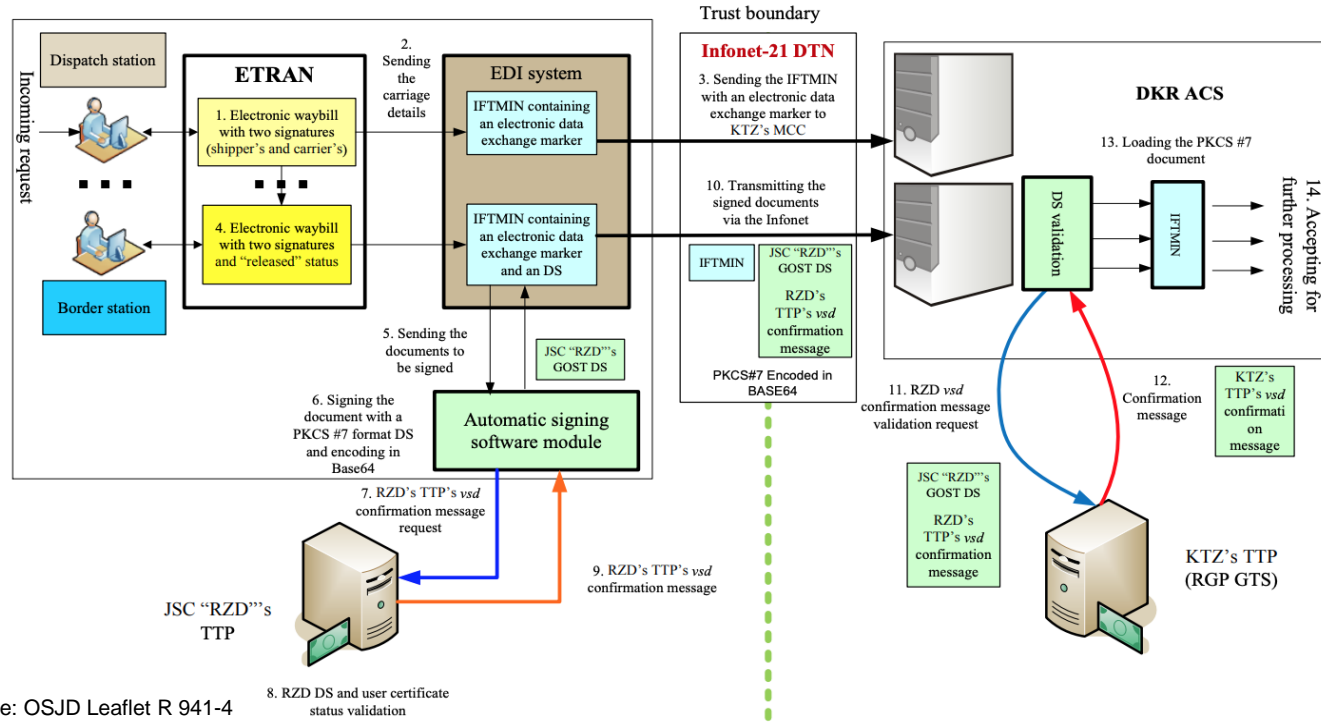
# Electronic information exchange between railways

- EDI agreement between the railways
- Establishing adequate information systems and infrastructure for electronic exchange
- Mutual recognition of the electronic signatures
- Paperless electronic document processing
  - empty wagons
  - transport of goods



# Cross-border electronic exchange between JSC RZD and AO NK KTZ

Direction: from Russia towards Kazakhstan



# Electronic information exchange among railways and control authorities

- Communication interface between IT systems of railways, Customs and other control agencies
- Support for completion of Customs and OGA formalities (border security, immigration, sanitary and phytosanitary, veterinary and food safety)
- Pre-arrival information (regarding cargo declaration and entry into Customs territory – security and safety)
- Customs transit (simplifications and railways as AEO)

# Electronic information exchange among railways and control authorities

## Challenges:

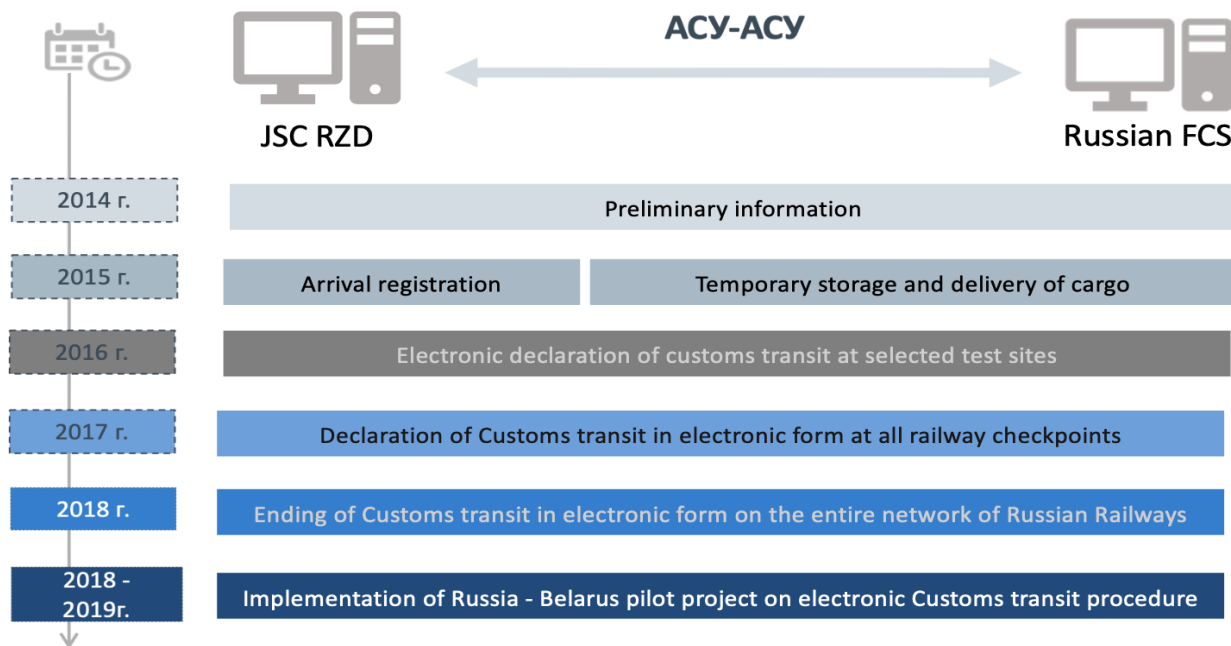
- lack of harmonized data requirements (e.g. goods classification, railways and Customs data sets, Customs requirements along the corridor)
- different level of automation and development of interfaces
- authentication and legal requirements for acceptance of paperless electronic documents
- complex, extensive requirements from multiple authorities

WCO standards and recommendations (e.g. WCO RKC, WCO SAFE Framework of Standards, WCO Data Model)



# Case Study: Electronic interaction Railways - Customs in Russian Federation

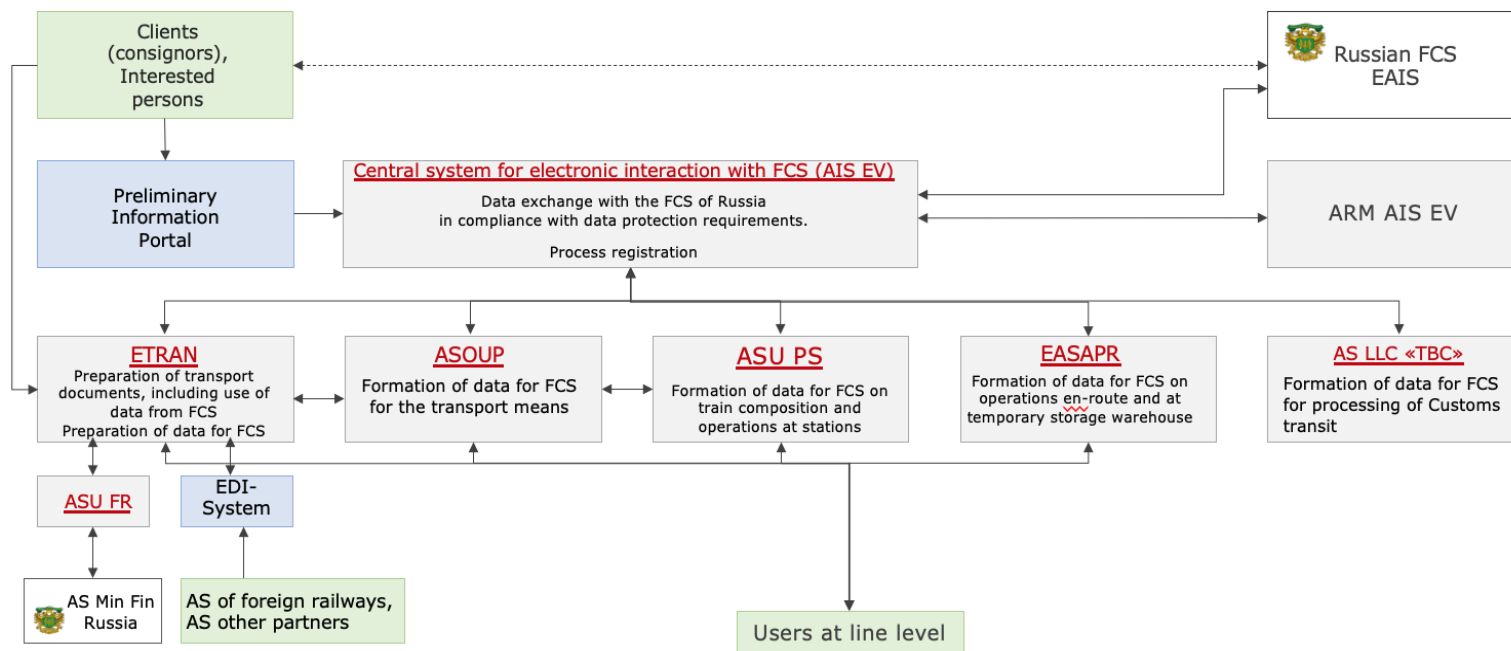
Electronic information interaction between FCS of Russia and JSC RZD



Source: RZD 2019

# Case Study: Electronic interaction Railways - Customs in Russian Federation

Information flows with electronic interaction between RZD and FCS of Russia



Source: RZD 2019

# Case Study: Project INTERTRAN

- Electronic interaction between the stockholders at ports and railway stations,
- Increased use of paperless technology (up to 30 transport document in fully electronic form, mobile workstations for paperless processing)
- Optimization of railway operations at ports / railway stations; and
- Paperless Customs transit procedures for rail (e.g. fully electronic transit declarations and electronic closing of Customs transit procedure).



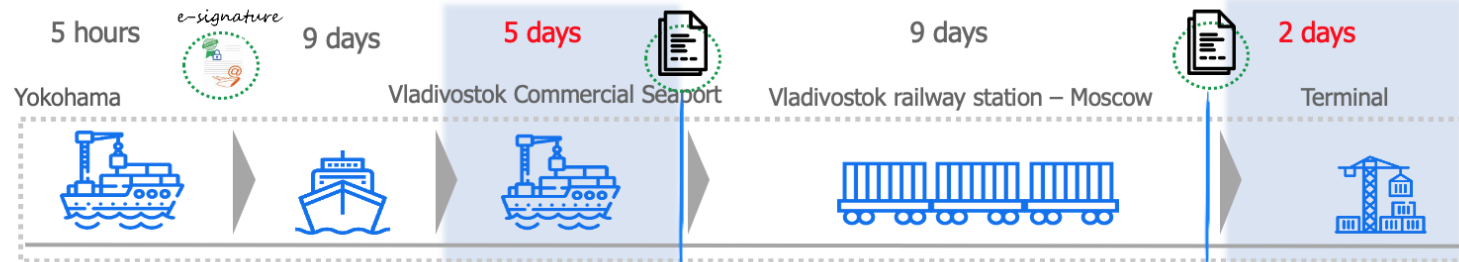
Project INTETRAN, Source: RZD



# Case Study: Project INTERTRAN

- Phase I (2018-2019) intermodal transport in import direction to Russian Federation
- Phase II (2019-2020) transit movements across Russian Federation
- Gradual expansion on piloting of routes (destination/transit stations)

## BEFORE PROJECT:



## AFTER PROJECT IMPLEMENTATION:



Project INTERTRAN, Source: RZD

# Case Study: Project INTERTRAN

**before** INTERTRAN (2017)

**after** INTERTRAN (since august 2019)

<i>Submission and approval of the application</i>	24 hours	3,7 days	1 minute	10,2 hours
<i>Preparation of the consignment note</i>	2 minutes		2 minutes	
<i>Printing and sending for authentication</i>	5 minutes		0	
<i>Authentication</i>	12 hours		10 minutes	
<i>Application for the arrival of the vessel</i>	24 hours		5 hours	
<i>Submission, release, transferring of the customs declaration to the seaport</i>	12 hours		4 hours	
<i>Declaring of the freight for the carriage</i>	1 hour		2 minutes	
<i>Transfer of the printed consignment note FF-Seaport-FF</i>	1 hour		0	
<i>Preparation of the loading plan</i>	2 hours		30 minutes	
<i>Preparation of the document for the acceptance of the empty platforms</i>	6 hours		5 minutes	
<i>Transfer of the information on the completing of freight operations</i>	10 minutes		3 minutes	
<i>Notification book on the completion of a freight operation or the transfer of wagons to the track</i>	2 hours		5 minutes	
<i>Preparation of the message for the supply or cleaning of wagons</i>	6 hours		5 minutes	
<i>Transfer of the paper consignment note to the station</i>	1 hour		0	

Project INTERTRAN, Source: RZD



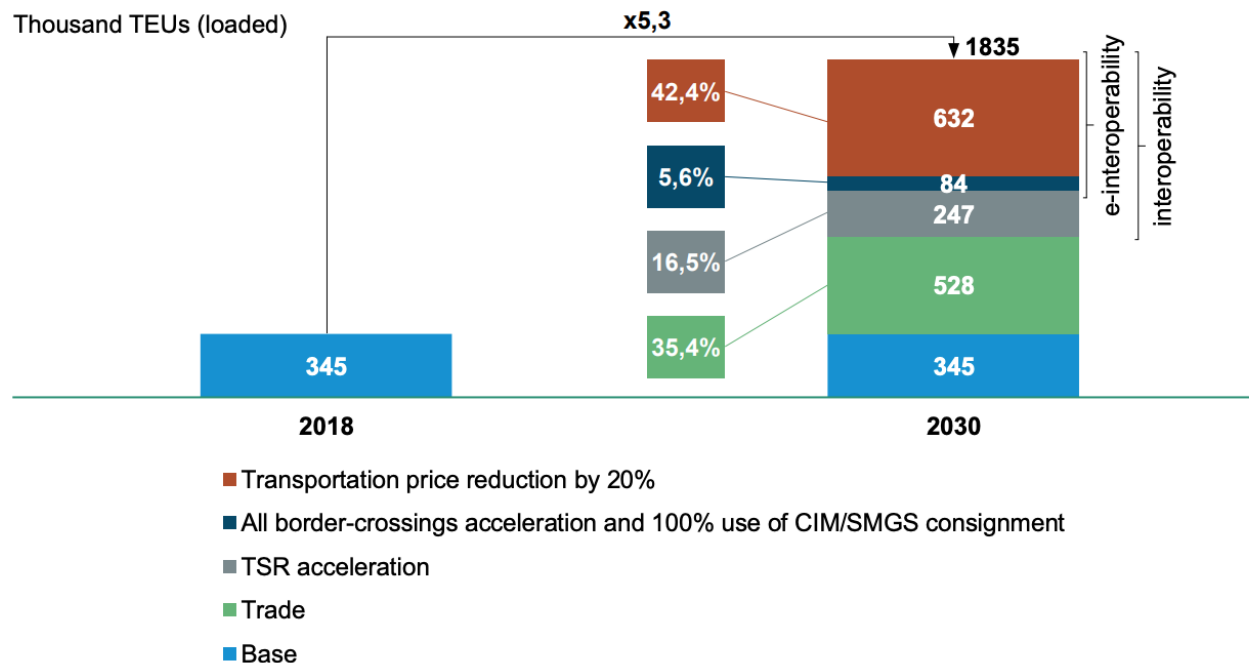
Watch PROSTO Production  
Video: INTERTRAN

# Benefits from electronic information exchange among railways and control authorities

- Improved communication / coordination
- Reduced paper-based processing, automation
- Reuse of data & reduction of multiple data entries
- Improved data accuracy and reliability
- Optimization of organization of transport operations and controls
- Improved risk management
- Simplifications for Customs procedures
- Reduced time for Customs procedures and streamlined control formalities
- Accelerated transport operations & reduced costs of transport



# Impact of E-Interoperability



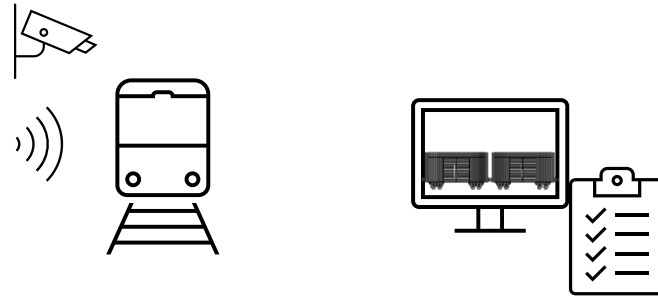
Source: UIC/IEC, 2020, Eurasian corridors: development potential.

# Discussion

- What are the experiences and status of electronic information exchange of UBTZ with Russian Railways and Chinese Railways (including use of e-signature technologies)?
- What are the experiences and status of electronic information exchange of UBTZ with Mongolian Customs?
- What are the benefits and remaining challenges of electronic information exchange between railways, and railways and Customs in your country?



## 4. New technologies for efficient and secure border crossing by rail



**Automated and non-intrusive inspections**

**Electronic tracking with e-seals**



# Automated and non-intrusive inspections

- Railway inspections and regulatory controls (e.g. Customs)
- Targeting efficiency and security aspects
- Collecting data while the train is in motion (dynamic control)
- Use of electronic systems to compare and analyse data, detect irregularities and suggest further actions (automation)
- Control of goods, transport means without physical interference (non-intrusive inspections)



# Automated and non-intrusive inspections

## Individual systems

- electronic dynamic weighing scales
- video surveillance
- scanning systems



Dynamic weight scales, Photo Source: Information Ministry of the Republic of Latvia

Positioning

Data sharing

Data usage





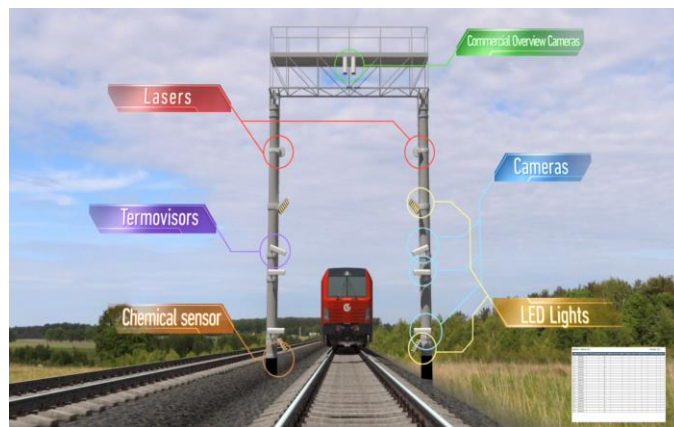
# Automated and non-intrusive inspection

Multifunctional intelligent gate systems:

- detecting, imaging and video processing
- optical character reding (OCR) (wagon/container numbers identification)
- laser scanning (oversize cargo control)
- heat, chemical sensors etc.



Watch Lithuanian  
Railways Video:  
Automated train  
inspection system



Source: Lithuanian Railways, 2015 (Kena border crossing)

# Automated and non-intrusive inspections

- X-ray and gamma-ray scanning of containers/wagons
- Radiation detectors
- Electronic and video surveillance systems (movement in controlled areas)



Stationary radiometric gates and control panel,  
Source: Information Ministry of the Republic of Latvia

Minimized interruption of  
railway freight traffic

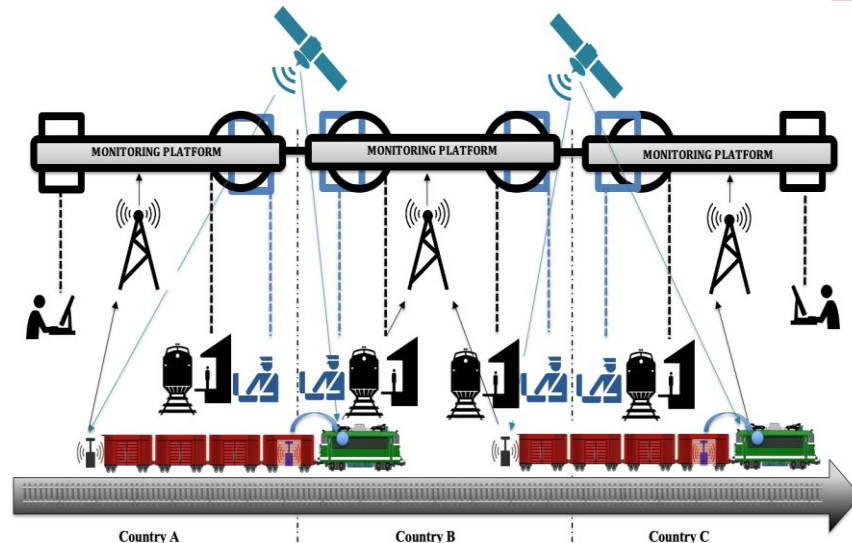
Risk management and  
increased security



Dynamic X-Ray scanner, Source: Information Ministry of the Republic of Latvia

# Electronic tracking for secure border crossing

- Integrated technologies: satellite positioning systems, cellular communication systems, RFID enabled e-seals, advanced web-based software and computer networks
- Use of e-seals:
  - mandatory/conditional/voluntary
  - single country / multi country
- E-seals characteristics:
  - mechanical/electronic security
  - active / passive
  - integrated electronic tracking or connected to additional tracking device



Adapted from ESCAP Secure Cross Border Transport Model

# Electronic Cargo Tracking System (ECTS)

## – India

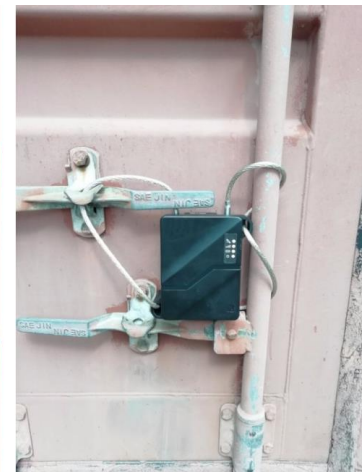
- Facilitation of traffic-in-transit of third-party imports for Nepal (by road and rail)
- MoU India/Nepal & India Customs regulation
- Registration at website of Managed Service Provider (Transecure)
- Electronic sealing and GPS tracking
- Support for electronic Customs Transit Declaration (e-CTD)
- Automatic reconciliation/discharge of transit with ECTS "trip-report"
- Reduced container turnaround time and avoided demurrage/ detention charges



Source: Transecure, 2019 Presentation on ECTS

# GLONASS Electronic navigation seals in Russian Federation

- Russian Federation regulation related to permission of transit to certain sanctioned goods (by road and rail)
- Roles of transport and Customs authorities, sealing operator and transport carriers
- Electronic sealing and GLONASS tracking
- Sealing Operator: Digital Platforms Development Center (CRCP) website operations and sealing services
- Tested within Russian Federation and joint EAEU pilot



ЦБКЕ.464425.006 navigation seal (Source: CRCP User manual)

# Benefits from electronic tracking

- Enhanced safety and security against unlawful intrusion and smuggling
- Increased confidence in properly conducted transit movements
- Increased efficiency of Customs clearance if accompanied by:
  - reduction of paper-based procedures
  - simplification of Customs formalities (e.g. waiver of guarantee, less physical inspections)
- Faster turnaround time, lower insurance costs
- Higher quality of customer services (own cargo tracking)
- Potential for expanding to electronic tracking of cargo conditions (if additional sensor technologies are employed)



# Discussion

- What are the new technologies already employed at Mongolian railway border crossings? How they contribute to increased efficiency at border crossing inspections and controls ?
- What are the possibilities for further improvement and information sharing of data collected from new technologies in Mongolia?
- What are the relevant benefits and challenges for implementation of electronic tracking in your country?





# 5. Facilitation of Customs transit for international railway transport

**Railway consignment note as  
a Customs document**

**Potential for new international  
railway Customs transit  
arrangements**





# Facilitation of Customs transit for international railway transport

## Customs transit challenges:

- Lack of harmonized Customs procedures along corridor
- Diverse advance information requirements
- Different Customs transit documents
- Requirements for re-sealing by Customs
- Burdensome/repetitive regulatory procedures (Customs and other)
- Repetitive inspections of goods, containers, rolling stock

Increased complexity, costs and delays



# Use of railway consignment note as a Customs document

- Common railway consignment note (SMGS, CIM-SMGS)
- Annex 9 on Facilitation of border crossing procedures for international rail freight of the International Convention on the Harmonization of Frontier Controls of Goods (1982)
- Reuse of already available railway data / documents as Customs transit document
- Facilitation of border crossing formalities, reduced involvement of intermediary parties
- Paper-based, dual and paper less format of railway consignment note



# Use of railway consignment note as a Customs document

- National / Customs Union Customs requirements
  - Entry/exit in/from Customs territory (e.g. pre-arrival info)
  - Customs transit procedures
- Role of the carrier (railways / representative) as declarant / principal
- Harmonization based on WCO Instruments (cargo / goods)
  - RKC (Specific Annex A and Specific Annex E Customs transit)
  - WCO SAFE FoS (e.g. recommended time limit)
  - WCO Data Model (e.g. advance cargo declaration / goods declaration datasets)

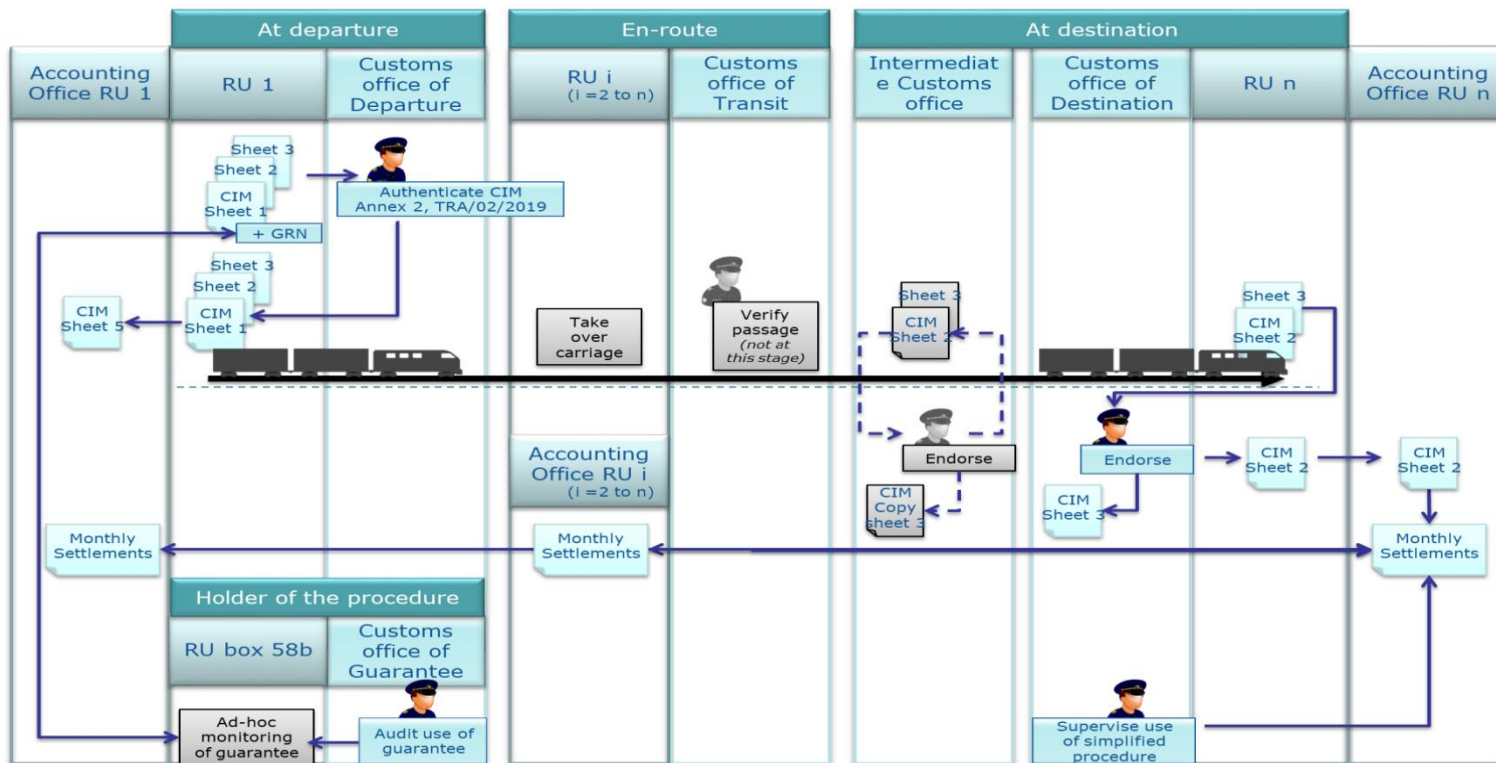


# Use of railway consignment note as a Customs document

- Customs transit declaration (rail)
  - In electronic format - from already available data elements in railway consignment note (additional data elements; supporting docs)
  - In paper-based format - equivalent of paper-based railway consignment note (no additional Customs document) (supporting docs)
- Implementation differs e.g. in EAEU, EU, other countries
- Customs transit procedure based on EU Customs regulation and Convention on a common transit procedure:
  - simplified paper-based procedure - CIM (CIM/SMGS) as Customs document
  - standard paperless procedure (NCTS) - paper CIM as transport document only
  - standard paperless procedure (NCTS) - reuse of e-CIM/e-CIM-SMGS



# Paper-based transit procedure for rail based on European Convention on a common transit

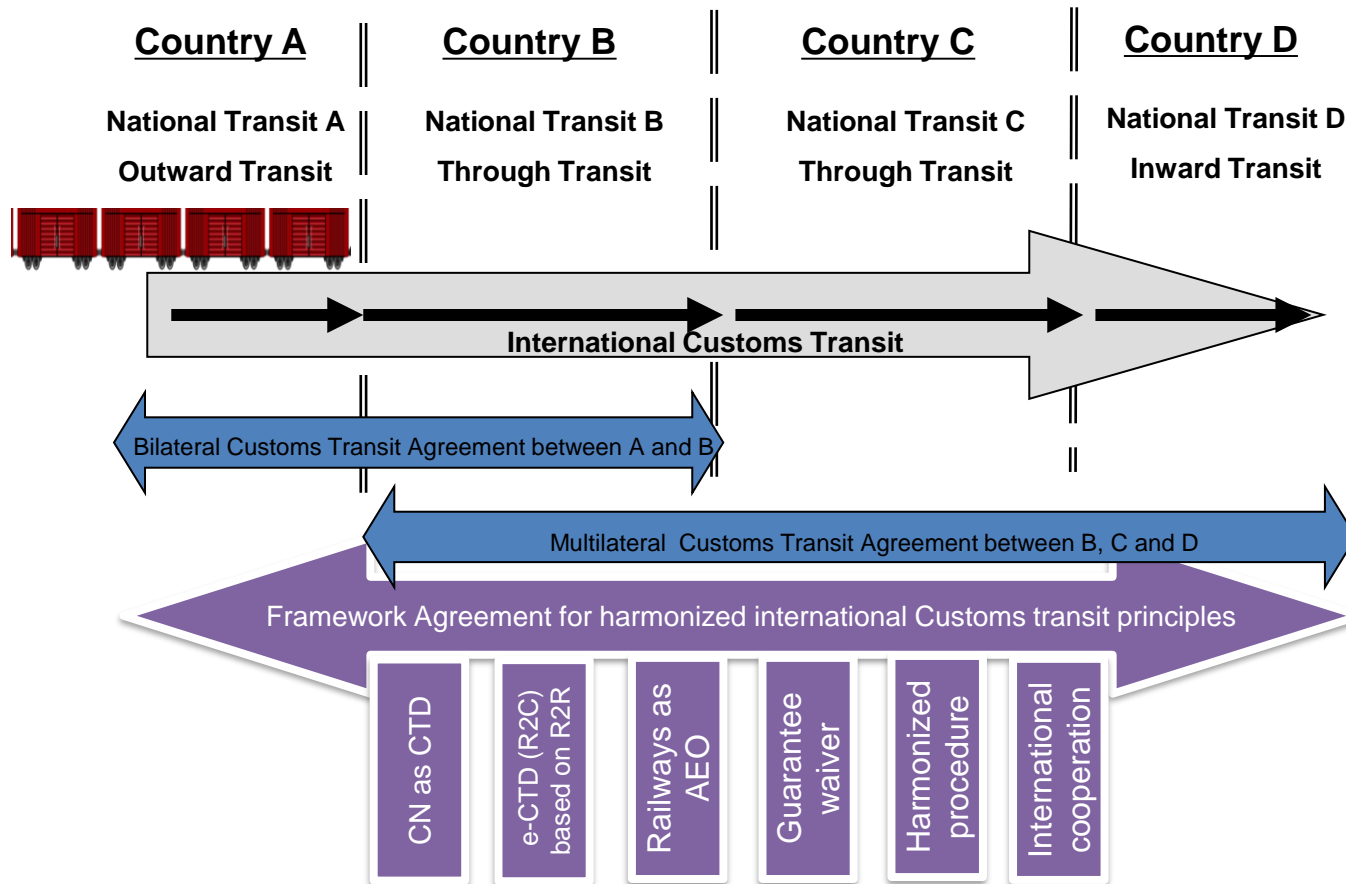


Source: European Commission, May 2019, Transit Manual Amendment

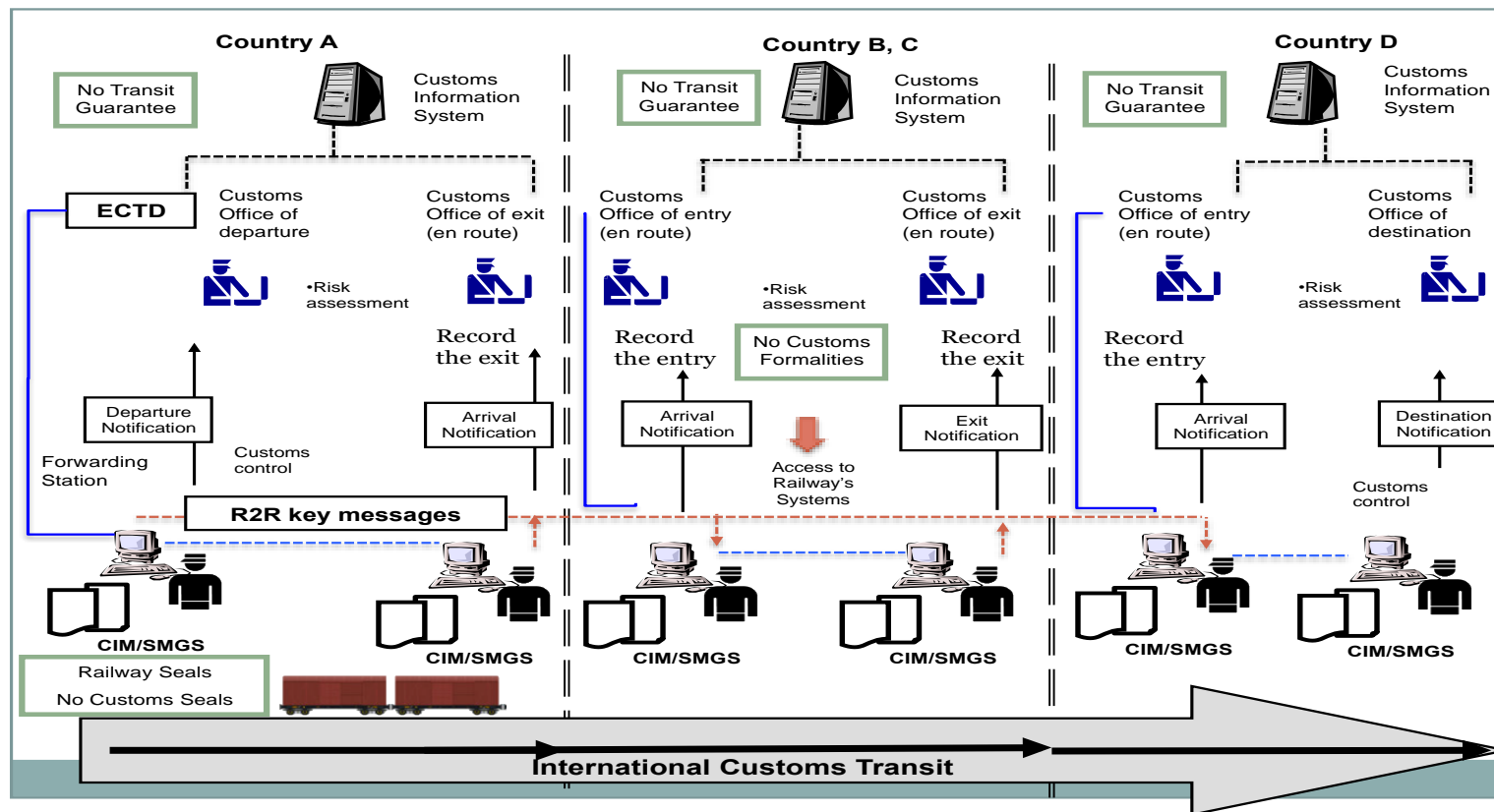
# Simplified railway Customs transit procedures in Turkey

- Entry summary declaration and arrival notification submitted electronically to the Customs authorities
- Turkish Railways as AEO for simplified Customs transit procedure (Turkish Customs legislation and Convention on Common Transit Procedure)
- Paper-based CIM consignment note as a Customs transit declaration + electronic data exchange between the Turkish railways and Customs (minimal info only: wagon number, CIM number, shipment date, Customs offices)
- Electronic signature technologies and interconnected Customs offices

# Concept on new International Railway Customs Transit



# Electronic information exchange under the concept of new International Railways Customs Transit System (distributed solution)





# Discussion

- What is the experience in using railway consignment note as Customs transit declaration in your country? Is it possible to further facilitate organization of Customs transit on national level ?
- What are your views on the suggested concept of a new International Railways Customs Transit System?



## 6. Joint border controls and streamlined border crossing

**Joint border controls within a country**

**Single window facilities for railway transport**

**Single stop inspections at joint border crossings and no-stop border crossings**



# Joint border controls and streamlined border crossing

## Border crossing challenges:

- Manual and paper-based processing
- Inefficient transport / logistics coordination
- Lengthy and uncoordinated regulatory controls

Inordinate delays and increased costs

## Smart solutions:

- Digitalization and electronic information exchange (R2R, R2C...)
- Automation of processing (loading/unloading, new tech.)
- Use of railway consignment note as a Customs document

Reorganization and streamlining

# Joint border controls within a country

- Coordination of railway inspections and regulatory controls (separately in exit and entry country country)
- Transfer of border control responsibilities (e.g. to Customs)
- Single window inspection principles (example Russian Federation – e.g. first level examination SPS documents by Customs)
- Joint border inspection teams
  - Arrival / Departure (Railways, Customs, Border Guards)
  - Clearance (Customs, OGA)

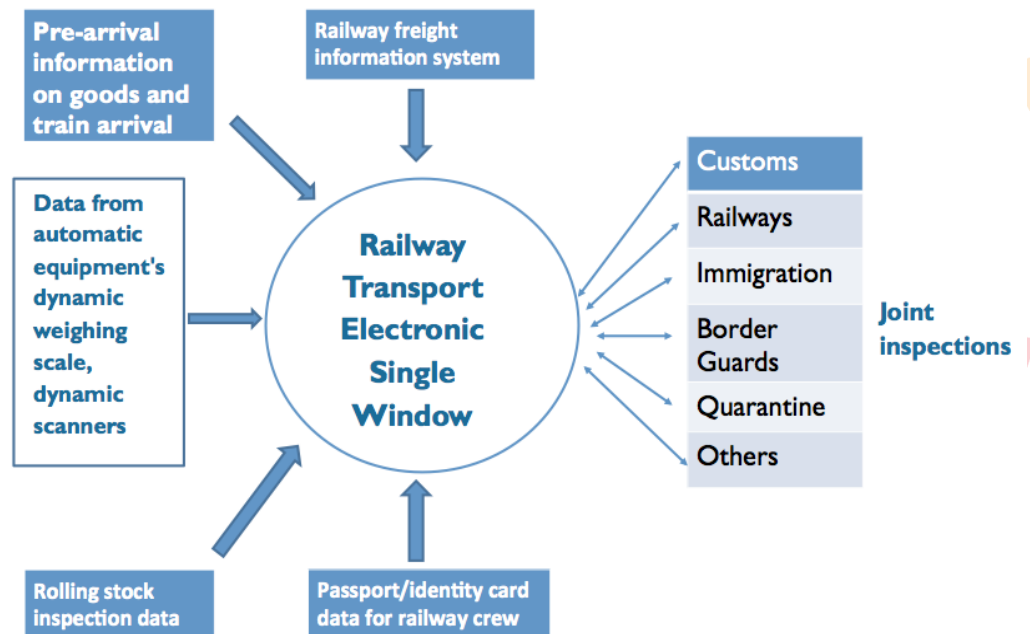
Efficient electronic  
information exchange

Common control location  
and joint use of equipment

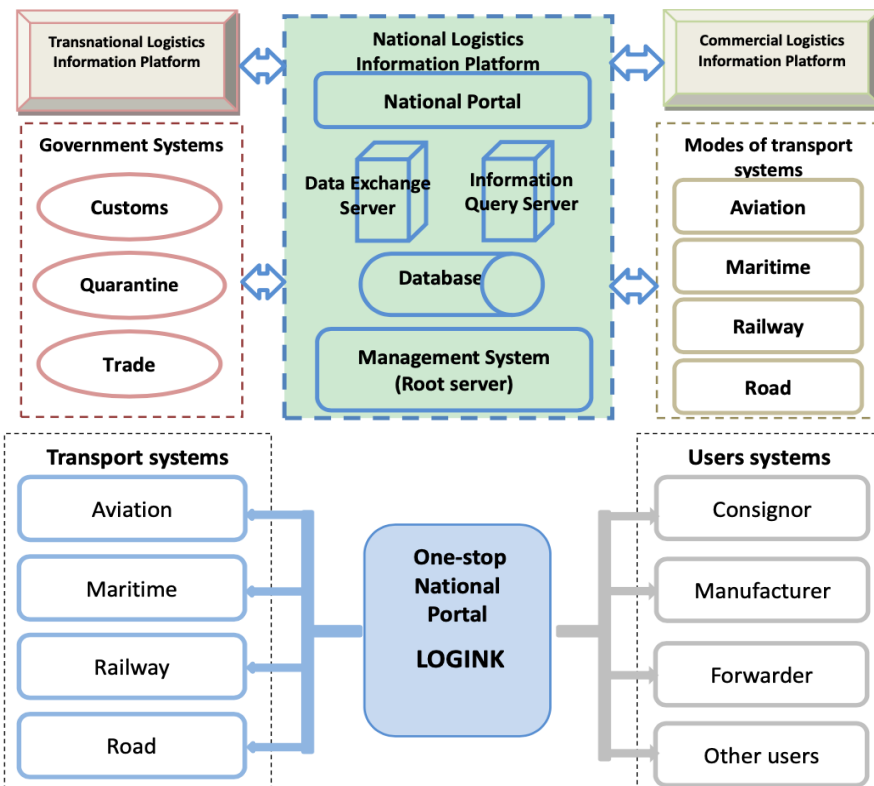


# Single window facility for railway transport

- Links multiple:
  - stakeholders (private and public)
  - sources of information
  - information systems
- No resubmission of same/similar info
- Risk management and efficiency of controls
- Regulatory SW linked/integrated with digital logistics platforms



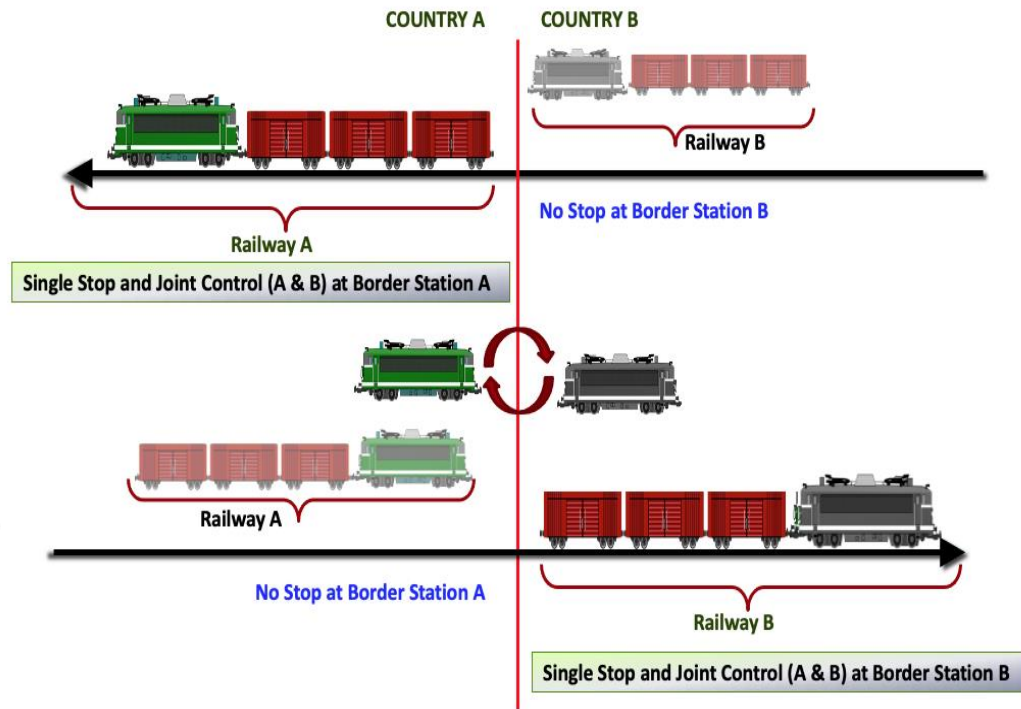
# National Transport and Logistics Public Information Platform (LOGINK) in China



- Exchange of logistics info across entire supply chain
- B2G, G2B, and B2B exchanges
- Railway info: e.g. carrier registration, e-booking, freight rates inquiry, tracking, e-waybill
- Customs clearance interface
- Cross-border connection - NEAL-NET (China, Japan, RoK)

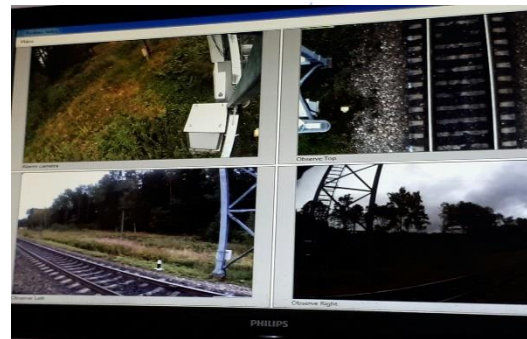
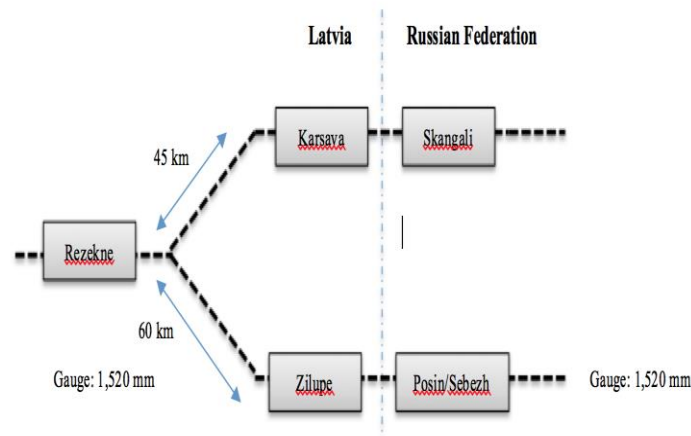
# Single stop inspections at joint border crossing

- Only one common border station (entry or exit)
- Railway interchange station and all railway processes
- Common inspection area for control procedures of both countries (e.g. Customs, OGA)
- Example: Padang Besar Malaysia (passenger trains)



# Case Study of Rezekne (Latvia) railway border crossing

- Minimal operations at border and transfer of operations/controls at next major station
- Advance information R2R, R2C
- Use of dynamic and automated control equipment (scales, X-ray, multifunctional inspection gate)
- Expeditious handover inspections
- Risk assessment, railway as AEO



Video surveillance from the Rezekne control room,  
Source: ESCAP/OSJD 2016



# Discussion

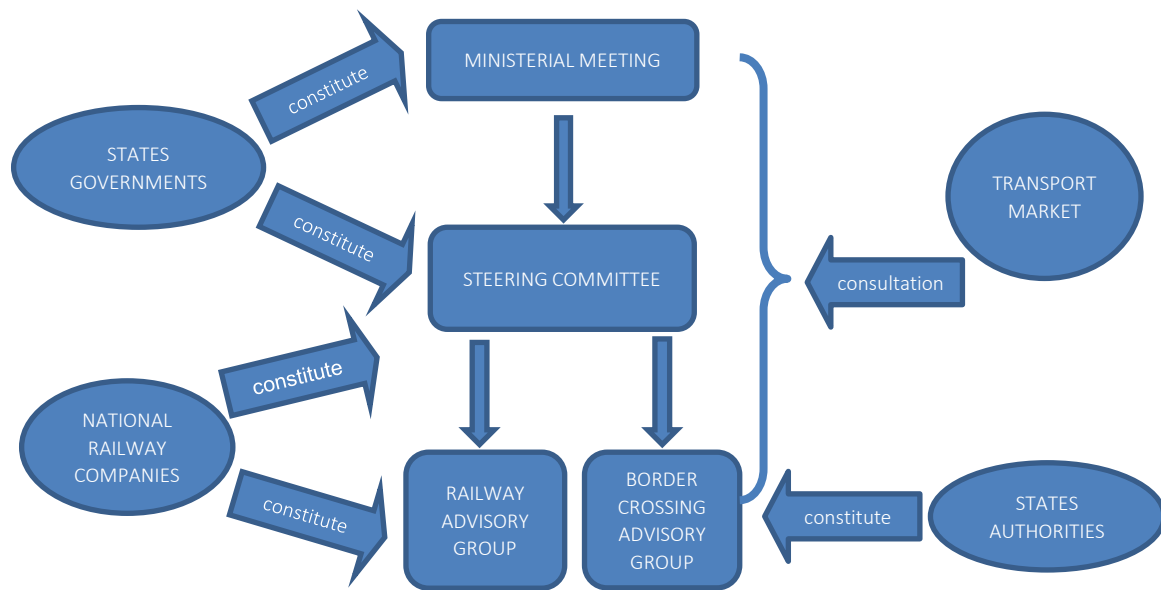
- What is the experience of railways related joint border controls, single window facilities and logistics platforms in your country ?
- What are the benefits / challenges for the railways in Mongolia to participate in such activities ?
- How can increasing use of new technologies and smart solutions support potential reorganization and streamlined movement across railway border crossings at China-Mongolia-Russian Federation Economic Corridor ?



## 7. Corridor management mechanism for railway transport

- Need for harmonized and coordinated approach (common objectives, legal / institutional framework) (single, multiple arrangements)
- Examples: European Rail Freight Corridors (RFC), New Eurasian Land Bridge Economic Corridor, Trans-Siberian route and CCTT, China-Mongolia-Russian Federation Economic Corridor, CAREC corridors, ...
- Corridor management functions: development of transport infrastructure, resolution of bottlenecks, enhancing interoperability, harmonization and facilitation of border crossing procedures, corridor performance monitoring, stakeholder coordination, capacity building

# Concept of corridor management mechanism for railway transport



More structured and permanent corridor management mechanism for regular consultation and increased operational performance

**Thank you**

