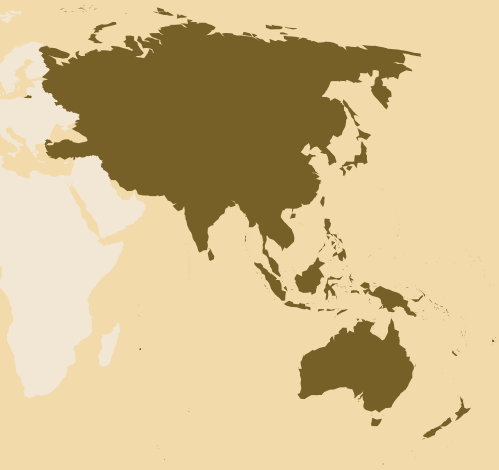
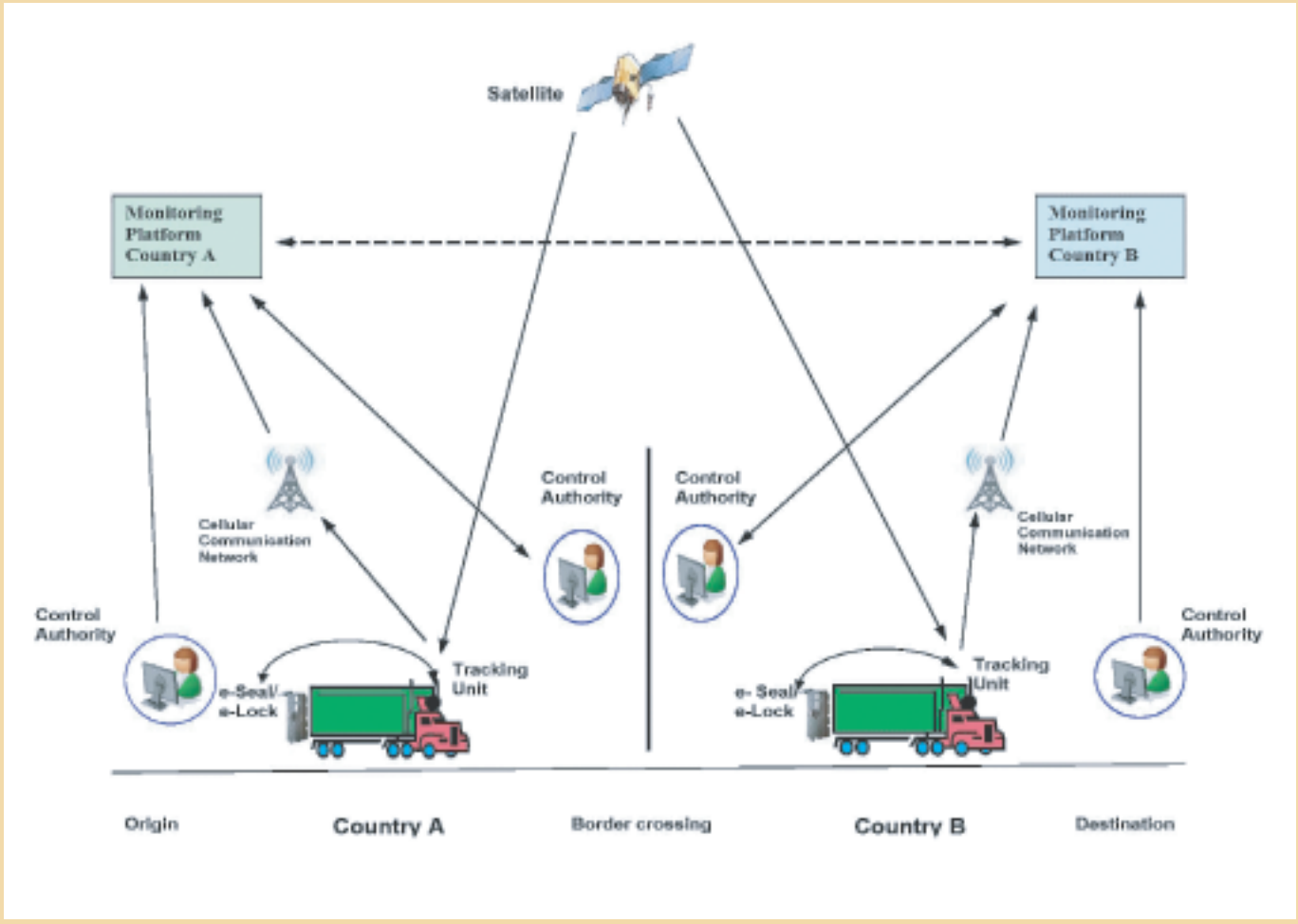


SECURE CROSS BORDER TRANSPORT MODEL



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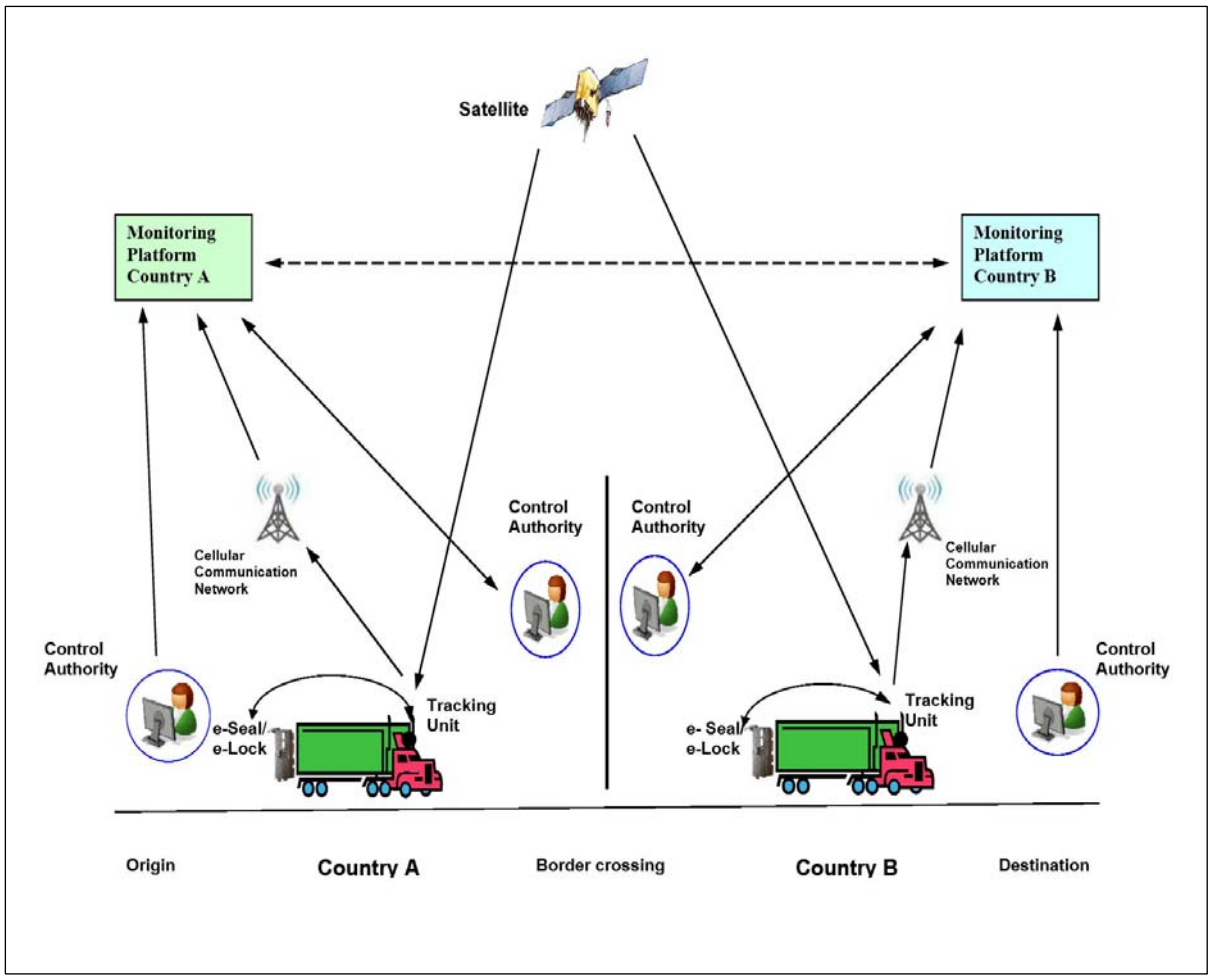
SECURE CROSS BORDER TRANSPORT MODEL



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CONTENTS

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I. BACKGROUND

The rise in intra-regional trade has led to increased demand for international road transport in the region. International road transport, however, faces numerous non-physical barriers that impede the smooth and efficient movement of goods, people and vehicles. Major barriers are the lack of opening of domestic routes for international transport and restrictions on foreign vehicles and goods in transit due to concerns about security, safety, smuggling, trafficking and loss of revenues from diversion of goods in transit to local markets. Such barriers cause high costs and excessive delays in international road transport.

Developments in information and communication technologies (ICT), satellite positioning systems (SPSs), cellular communication systems (CCS), radio frequency identification (RFID) technology, geographical information systems (GIS) and advances in web based software with visual graphics and other user friendly features, offer a tremendous potential to deal with major challenges in cross-border transport. Combined use of these technologies can secure and track vehicles and goods in real time, thereby allowing control authorities to take timely action.

Many countries in the region are using either part or all of these technologies to address various aspects of transport. For example, China and Viet Nam have made installation of an SPS device compulsory for vehicles transporting dangerous goods and passengers. Electronic seals (e-Seal) are being used extensively to secure and track the movement of containers in China, the Republic of Korea and Thailand. The Customs authorities in Shenzhen, China, Hong Kong, China and Thailand are using tracking systems based on these technologies to facilitate the movement of bonded goods between the Customs zones and for transport of containers from inland places to border crossings.

In view of the above, the purpose of the Secure Cross-Border Transport Model (hereinafter referred to as ‘the model’) is to provide a tool for developing a secure, smooth and efficient system for cross-border movement of goods and vehicles. The system may help alleviate the concerns of the control authorities and allow them to provide a more facilitated environment for cross-border transport.

The model combines the experience from the existing use of the new technologies for domestic transport and logistics with the needs of cross-border transport. It attempts to standardize main features of key devices and inter-action of the devices as well as ways for an electronic tracking system for vehicles and goods in cross-border and transit transport to work. The model can be used as a conceptual design for development of a system. Through this, the model will promote wider applications of the electronic tracking system in cross-border and transit transport, and thus support the further development of such transport operations in the region.

The model is being developed under an inter-Divisional project of ESCAP entitled "Deepening Asian Connectivity-Capacity building for trade and transport facilitation through information and communication technology (ICT) development" which was jointly implemented by Trade and Investment Division, Transport Division, and ICT and Disaster Reduction Division, ESCAP. The model is also a part of the initiatives under the Regional Strategic Framework for the Facilitation of International Road Transport (RSF) that was adopted by the Ministerial Conference on Transport held in Bangkok in March 2012.

The model will be updated periodically based on the improvements in the technologies used for the application of the model and/or any other related technological innovation that facilitates cross-border movement of goods and people, while meeting the requirements of the control authorities.

II. REVIEW OF THE EXISTING SYSTEMS FOR SECURE MOVEMENTS OF GOODS AND VEHICLES

A. Secure Free Zone Project in Thailand

In 2006, TIFFA[1] EDI Services Co., Ltd., a value added network provider, partnered with a team of Singapore-based engineers (currently with Ascent Solutions) to launch a Secure Free Zone project. The project was supported the Royal Thai Customs, and sponsored by the Western Digital (Thailand) Co., Ltd., (WD).

The purpose of the project was to facilitate movement of Customs bonded goods among the free trade zones located around Bangkok. WD worked with the Royal Thai Customs and TIFFA EDI Services Co., Ltd. to design and deploy the electronic cargo tracking system. The project has been implemented in phases. Phase 1 of the project provided electronic cargo tracking and surveillance between the free trade zones, namely Nava Nakorn Industrial Estate, Hi-Tech Industrial Estate and Bang Pa-in Industrial Estate. Phase 2 linked the Suvarnabhumi International Airport with Hi-Tech Industrial Estate. Phase 3 will track cross-border movement of goods between Malaysia and Thailand.

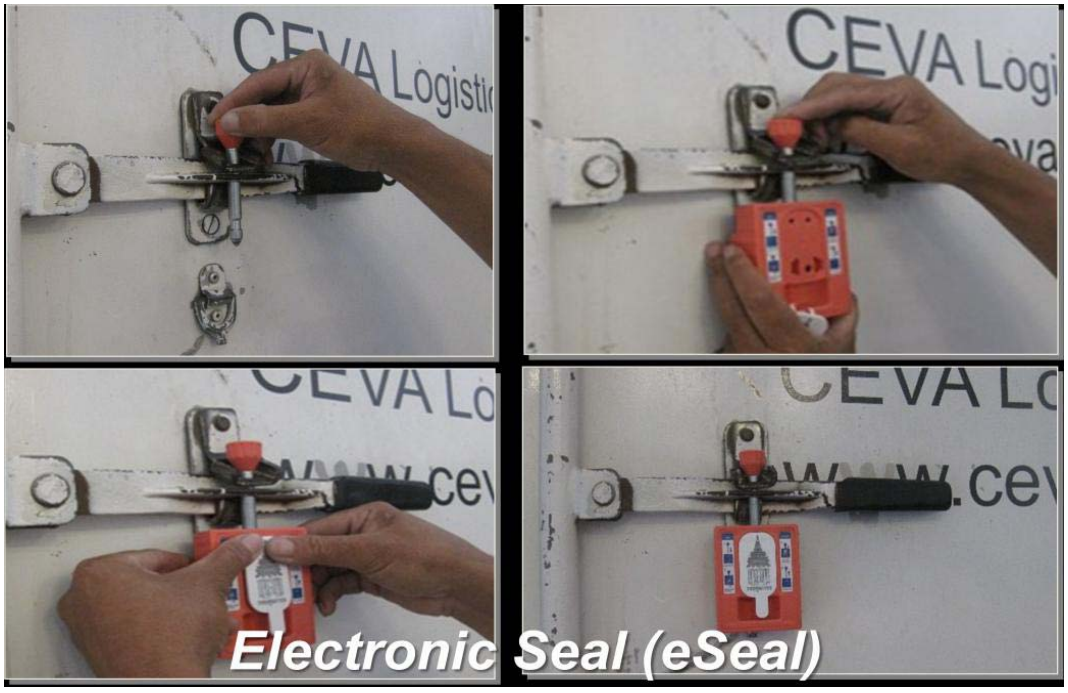
The surveillance of the transport process begins with the WD warehouse staff keying in the details of the consignment, such as the shipment order number, transport information, routing data, e-Seal number and other pertinent logistics information into the web application platform[2] which is accessible for Customs. A message is then displayed on the application software to indicate departure of vehicle in next 15 minutes to allow Customs to consider the need for inspection before departure.

Simultaneously the WD worker(s) load goods to the truck, and an authorized manager validates the contents, closes the door of load compartment and affixes an e-Seal to the door, as shown in Figure 1. When the truck departs the warehouse and crosses the RFID reader, a

[1] Thai International Freight Forwarders Association.
[2] A web based platform that hosts a WD's paperless system software to track vehicles online based on the signals received from the RFID readers.

signal is transmitted to the web application platform to record the departure. The RFID readers located at the warehouse and the exit of the free trade zone are shown in Figure 2. The information is transmitted to the web application platform through Internet and is matched with the information stored in the system. The trip details appear on the web application platform for online tracking, see Figure 3.

Figure 1. Affixing e-Seal

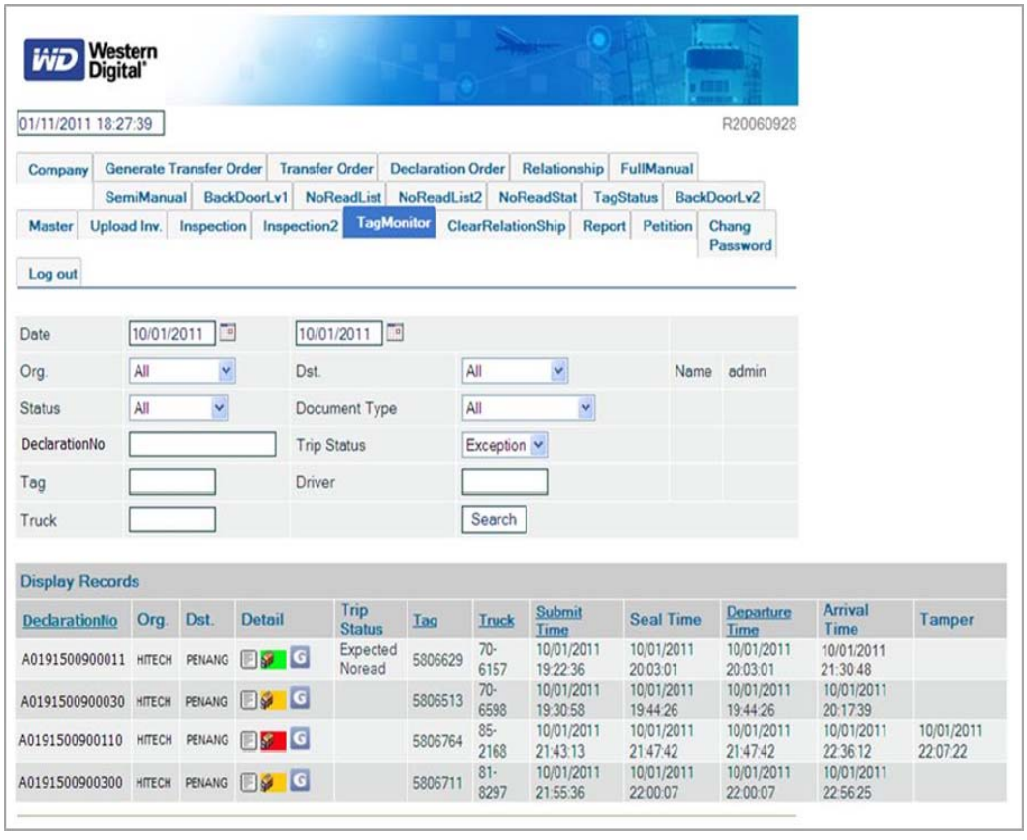


The e-Seal provides continuous monitoring of its status on the way of transport. If a tamper happens, the e-Seal records the time of tamper. When the vehicle passes through the RFID reader, the tamper alert will be picked up and broadcasted to the web application platform**.**

When the truck arrives at its destination, Customs may retrieve the shipment record from the platform. The security status of the shipment and detailed routing information are available to the Customs authorities for scrutiny**.** The Customs officers can see a red alert code on the system (Figure 3) if there is a tamper alert, while they will see an amber alert if the truck arrives later than scheduled, but with e-Seal still intact. The amber alert signifies that the truck might have made an unscheduled stop. In such cases, Customs authorities need to inspect the truck. Otherwise, Customs authorities may clear the shipment.

Figure 2. RFID readers in the free trade zone

Figure 3. Screen shot of web application platform



A memorandum of understanding (MOU) was signed between the Royal Thai Customs and WD stipulating the terms and conditions for the implementation of the project. WD was not required to pay any guarantee for movement of goods among the free trade zones. CCTV[3] was also installed at designated points to enhance monitoring of vehicles in the system.

In August 2009, WD and the Royal Thai Customs initiated Phase 2 of the project - by extending Phase 1 to the Suvarnabhumi International Airport. In July 2011, WD and the Royal Thai Customs initiated Phase 3 - by extending Phase 1 and Phase 2 processes from Thailand to Malaysia.

Since November 2006 to date, WD has accounted for a quarter of a million shipments tracked with the system. According to WD, the system has reduced one half of the number of steps its personnel must take to move shipments through two Customs checkpoints. The company has cut labor costs by 45 per cent. Also, accuracy of its shipment records has improved, from 70 per cent to nearly 100 per cent.

B. Trans-Customs Express Clearance Project in Shenzhen, China

Shenzhen Customs deals annually with 20 million TEUs[4] of containers at seaports and clears approximately 40,000 vehicles every day at land ports. This large volume of traffic created the need for the simplification of Customs clearances and adoption of new and existing technologies for clearances and inspections.

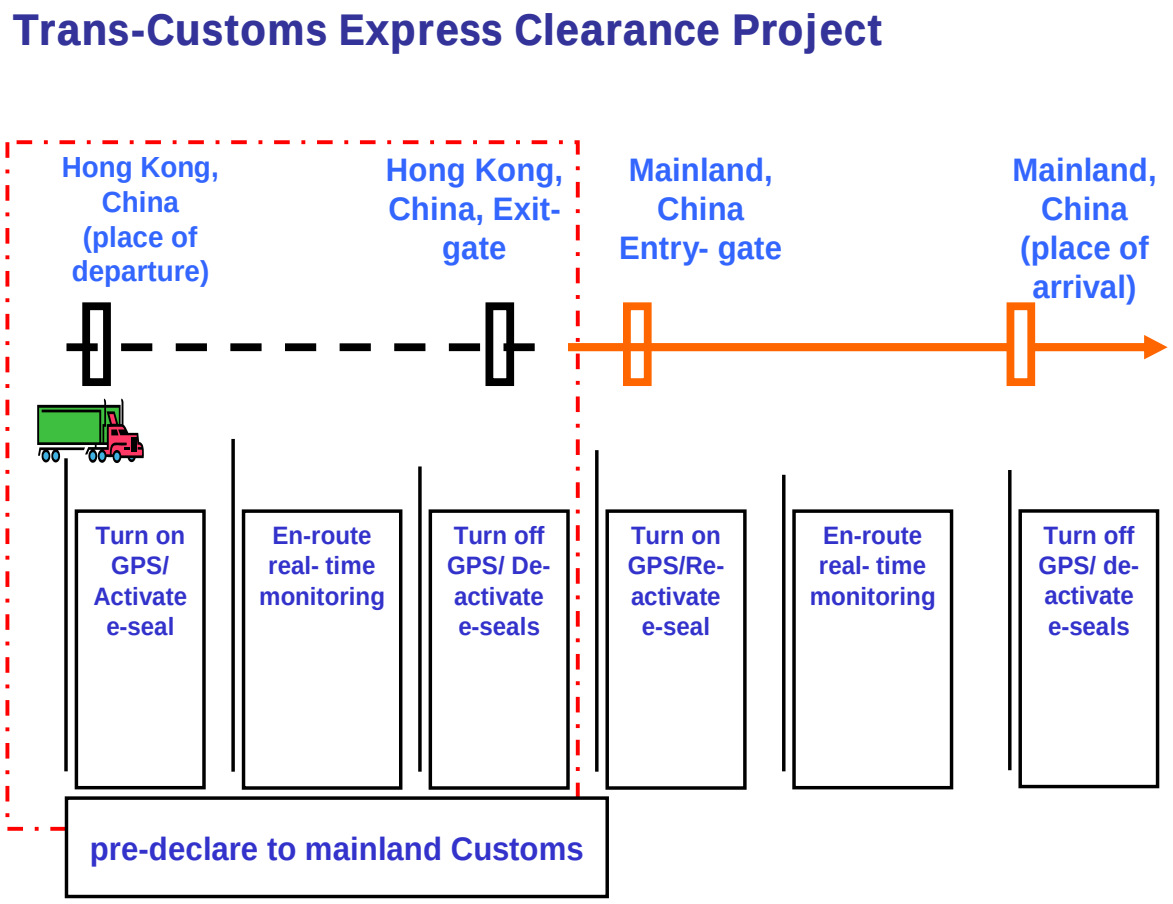
The Trans-Customs Express Clearance Project was introduced in 2007. The objective of the project was to expedite the clearances of vehicles at the land ports and at the same time ensure secured control of goods and vehicles in transit. The original design of the system under the project is shown in Figure 4.

In the design, the vehicle is locked with an e-Seal after it is loaded. When the vehicle departs from its origin, the e-Seal is activated and the GPS[5] device is turned on. During the transport process, the movement of the vehicle can be tracked with the GPS device. Once it reaches the

[3] Closed-circuit television.
[4] Twenty foot equivalent units.
[5] Global positioning system.

control area at a land port, the e-Seal is deactivated and the GPS device is turned off to mark the end of the monitoring.

Figure 4. Original design of trans-Customs express clearance system



When the vehicle passes the checkpoint to enter Hong Kong, China, the e-Seal and the GPS device can be re-activated and the movement of the vehicle can be tracked by the Customs of Hong Kong, China. After entering the control area at the destination, the vehicle can be inspected and cleared efficiently if there is no irregularity found during the journey.

Currently two separate systems are used by the Customs authorities of mainland China and Hong Kong, China, respectively. The deactivation and reactivation of electronic seal and turn on and off of the GPS device have not been launched due to institutional barriers.

In the part of mainland China, it was reported that 3,300 vehicle trips used the system in April 2011. Fast lanes for the users of the system have been opened at the checkpoints. The

transport operators that use the system are required to register with the Customs based on the specified criteria. The vehicles or containers used for this system need to meet the specifications set by Customs and be certified by Customs. As reported by the officials from the Shenzhen Customs, the system together with advance submission of documents reduces overall clearance time from 2-3 hours to 1 hour. At the checkpoint, the system takes a few minutes to clear a vehicle.

On the side of Hong Kong, China, the system was launched in 2010 and named as the Inter-Modal Transshipment Facilitation Scheme (ITFS)[6] for the use at airports and seaports for onward transport by road up to land ports. The cargo is inspected only once either at the airport or at the land ports. The users have to register with the Customs and use accredited e-Seal and GPS equipment on the vehicles that are also registered in the Road Cargo System.

C. Electronic Transit Monitoring and Facilitation System in Jordan[7]

More than one million of transit trucks cross Jordan's territory annually. In the past, Customs escort and high bank guarantees were required for such transport. Sometimes repeated physical inspections of vehicles and goods were undertaken. Due to increase in traffic and slow manual clearances, there were long delays for vehicles in transit and congestion at Customs houses. Moreover, the methods used still could not prevent planned smuggling operations.

To address those challenges, Jordan's Customs in 2008 implemented an electronic tracking system using new technologies to monitor vehicles and goods in transit. The main objective of the system is to monitor the transit traffic through the territory of Jordan to ensure integrity and security of consignments while facilitating transit traffic.

The system uses the following tools and technologies:

[6] Based on the website of Hong Kong Custom and Excise, <D:\Facilitation 09\New Interdivisional\Corridor\Secure BC Model\HK-CHN\HK\Road Cargo System - Intermodal Transhipment Facilitation Scheme.mht >, accessed 30 March 2012.

[7] Based on (i) Alfitiani A.A, Jordan's electronic transit monitoring and facilitation system, Vol.4 No.2, World Custom Journal, < http://worldcustomsjournal.org/media/wcj/-2010/2/Alfitiani.pdf>, accessed on 30 January 2012; (ii) Alfitiani A. A., Electronic Transit Tracking and Facilitation System, WCO Technology Innovation Forum, Kuala lumpur, 5-9 March 2012, <http://www.wcoomd.org/files/2.%20Event%20files/PDFs/Technology%20Forum/2012/Session1/Jordan%20customs.pdf>, accessed on 30 March 2012.

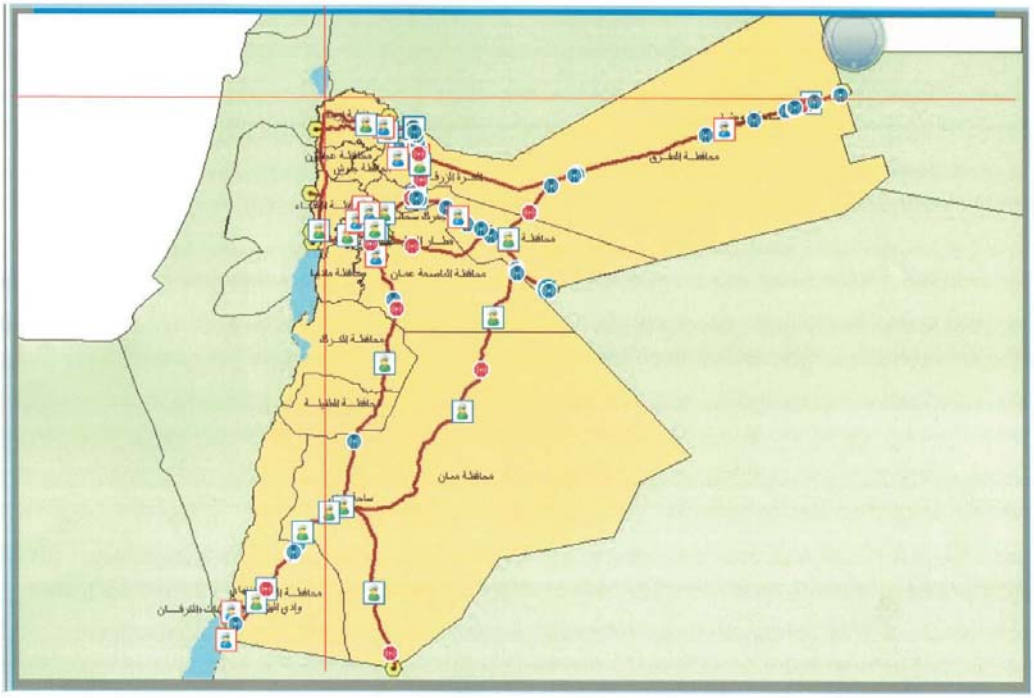
- GPS to locate the position of trucks;
- GSM[8]/GPRS[9] to send information regarding position of trucks and status of e-Seal to the control room;
- e-Seal to secure the container or load compartment of vehicle;
- Tracking unit for communicating with e-Seal and to send information regarding location and status of e-Seal to central server in the control room;
- Digital maps to provide graphical interface for Customs to follow truck movement on the screen;
- PDA[10] to initiate and terminate transit trip electronically; and
- Computer system and software for data processing, tracking information and storing information.

After a vehicle completes the Customs transit formalities including furnishing Customs guarantee in accordance with Jordan's national legislation, the vehicle is moved to the electronic tracking yard where the tracking units and e-Seal are configured and installed on the vehicle. The process of installation is completed in roughly two minutes. The vehicle is assigned to a transit route that it will follow, and an icon for the vehicle appears on the main monitoring screen in the central control room (Figure 5).

During the transit, if there is any diversion from the pre-specified route, tampering of e-Seal, or separation of prime mover and trailer, a signal from the tracking unit through the GPRS system is sent to the central server and an alarm sounds in the central control room (Figure 6). The nearest patrol car is asked to move to the vehicle to investigate the reason for violation and report to the central control room.

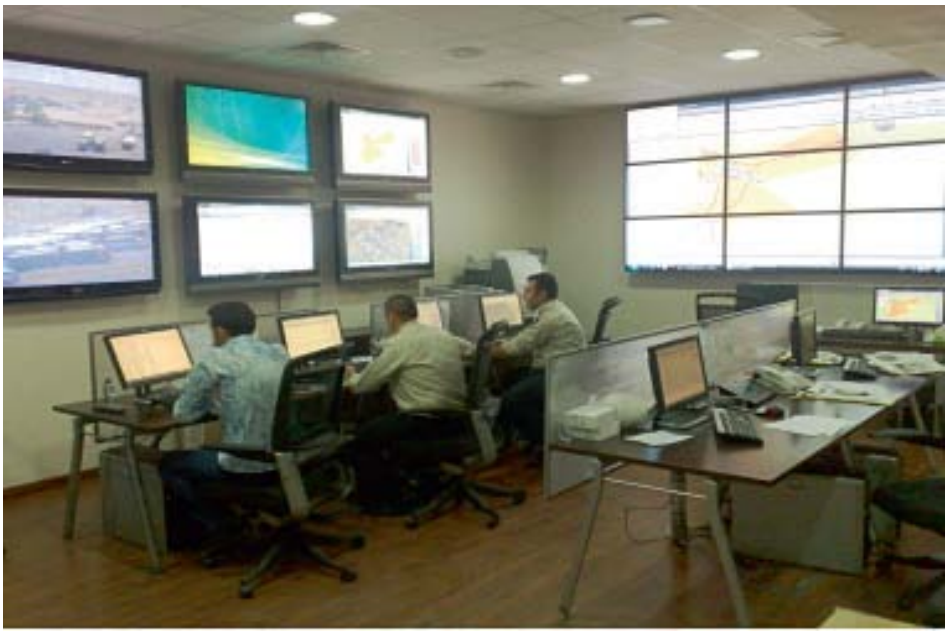
[8] Global system for mobile communications.
[9] General packet radio service.
[10] Personal digital assistant.

Figure 5. Online monitoring of vehicles in Jordan



On reaching the destination, a trip report is generated by the system in the central control room. The report is analyzed by the Customs officers to find out whether there was any violation. If there is no violation, the transit is terminated and the e-Seal and tracking unit are taken off. In the case of violations, the matter is investigated and appropriate action is taken.

Figure 6. Central control room



The use of the tracking system is optional for transport operators. To cover the operational costs, Jordan Customs charges a service fee of USD 30 per trip to the carriers for using the system.

In 2011, a total of 244,946 vehicle trips used the system. Some of the benefits from using the system were reported as follows:

- No need for Customs escort except for bulk and high duty goods;
- Reduced smuggling in transit process;
- Reduced waiting time for vehicles in Customs yards from an average eight hours to few minutes;
- Elimination of traffic congestion at the Customs yards;
- Reduction in the transit time by 60 per cent;
- Reduced physical inspections of goods at places of entry and exit; and
- Reduced cost of transport due to quick release of vehicles and guarantees.

D. Electronic Cargo Tracking System in Kenya

Kenya provides transit through its territory for many landlocked countries in Africa. The Kenya Revenue Authority (KRA) traditionally used escorts and checkpoints along the transit routes to prevent the diversion of vehicles in transit from their designated routes and sales of the transit goods to local markets. These measures resulted in considerable demand for control officers, and high costs and delays in transit. As an example, transit to Uganda from the port of Kenya or Tanzania could take up to 45 days.

In 2010, the KRA decided to adopt an electronic cargo tracking system to deal with these challenges. It will use the GPS/GPRS, e-Seal and web application software to track the vehicles in transit. The use of the system will be mandatory. The users can access the fast lanes at checkpoints.

In addition to transit, the system may also be used for monitoring movements among free trade zones and between import/export places and free zones. It may also be extended to

tracking the movements of hazardous, environmentally sensitive or high-value goods, and also ensuring security and integrity of transport processes.

III. TECHNICAL FEATURES AND FUNCTIONING OF THE MODEL

The Secure Cross-Border Transport Model described in this publication provides a conceptual framework for the application of the electronic tracking system in cross-border and transit transport. Through this system, control authorities and all parties within the logistics chain can monitor movements of vehicles and goods continuously during the transport process, from origin to destination.

The following section discusses the technical features of key components of the model and their interaction, through which vehicles and goods are secured, tracked and controlled.

A. Technical Features of Key Components

1. Tracking unit

The tracking unit contains a SPS module, a CCS module and a radio frequency (RF) module. The SPS module receives the satellite signal and records the location of the vehicle at regular intervals. The RF module receives radio signal from the e-Seal(s) affixed to the load compartment(s) of a vehicle or container(s) to indicate its status.

The CCS module on the tracking unit uses CCS network to send the information about the location of the vehicle and status of seal periodically to the monitoring platform. It has the flexibility to support more than one cellular communication network.

The tracking unit is placed in the prime mover or truck and configured with the e-Seal(s) installed on the load compartment(s) of a vehicle or container(s). It sends an alert in case there is a separation of the trailer or container(s) from the prime mover or truck.

The tracking unit can be configured with more than one e-Seal at a time. This can be done in case the prime-mover has more than one container with an e-Seal attached to it or a vehicle has more than one load compartment.

2. e-Seal

An e-Seal contains a normal bolt or cable to lock the door of the load compartment of a vehicle or container and a mechatronic component to record its status. When tampered, it will record the time of the tamper and broadcast it to the tracking unit via RFID signal. The e-Seal is configured to the tracking unit and works as a part of the system. The e-Seal can be repeatedly used during its life span.

The use of e-Seal is recommended for this model, particularly in the case of containers or a trailer that is detachable from prime-mover and is circulated among operators. The tracking unit in the prime-mover will send an alert in an event of separation of a container or trailer.

3. e-Lock

An e-Lock integrated with SPS and CCS can also be used for the vehicle with a fixed load compartment or container. In such cases, an e-Lock functions as the tracking unit and e-Seal.

The e-Seal/e-Lock can be combined with sensors that measure temperature, light, humidity and shock to remotely monitor environmental conditions within the container. For example, the shippers of electronics, foods or pharmaceutical goods might be interested in monitoring the temperature and humidity variances in transit. This real time information can be used by the consigner with the help of the logistics provider to minimize spoilage by taking appropriate action. The sensors for light and shock may also help monitor the status of the load compartment and container during the transport process. In addition, the e-Seal/e-Lock can have additional feature to store information regarding the contents of the container or the load compartment.

4. Monitoring Platform

The monitoring platform is used by the control authorities to visually track movements of vehicles and goods. Ideally the platform can be accessed both by the headquarters and site stations of the control authorities.

The monitoring platform is supported by a central server and the application software located in the central control room as the heart of the tracking system. The real time information from the tracking hardware, various on-site Customs locations and Customs central database is

received, processed and integrated here. The central server records the tracking data into GIS and uses the application software to display the information on the digital map on the screen. The movement of vehicles and their status are displayed real time on the digital map that allows control authorities in the control room or any other person with personal computer and with proper authorization to access the system and communicate with each other for taking appropriate action for any violations being noticed.

The application software, depending upon the detailed design of the system may have modules to handle various applications as indicated below:

a. Security module: to handle user authorization and access rights.
b. Data entry module: to capture and verify all relevant and necessary transport and cargo information (bill of lading, Customs declaration, invoice etc.). This module must be designed in such a way that supports different combination of transport and cargo, such as one vehicle with multiple containers and multiple shipments.
c. Import data module: to assist user to import data from existing legacy system efficiently and accurately. This module will alleviate manual data input of transport and Customs information.
d. Association module: to assign and associate an e-Seal/e-Lock to transport and cargo information created from data entry and import data modules.
e. Tracking module: overall visibility of vehicle and goods is displayed indicating security status of the e-Seal/e-Lock, vehicle/goods locations, departure/arrival date and time with further details of transport and cargo information if inquiry.
f. Exception handling module: to handle unexpected activities that may occur while the tracked vehicle and goods are in transit, such as road accident. This module is customized specifically as per the commercial arrangement or government regulations. An important part of this module is provision for authorized opening of the e-Seal(s)/e-Lock(s) during the transit as per the procedure specified by control authorities.
g. Reporting module: to handle information management in various degrees, i.e. analysis reports and graphs.

Using the GIS system, geo-route can be set on any road where the authorities allow the vehicle to travel during the trip. Further, for events of concern to the control authorities that may happen during the trip, such as diversion from the assigned route, tamper of e-Seal/e-

Lock, unauthorized separation of container from vehicle or any other pre-defined violations, the authorities can be alerted immediately. The following colour scheme is suggested: green for normal status, flashing red for tamper/separation alert, flashing yellow for late arrival and unscheduled stop alert and flashing orange for route deviation. The colour scheme can be combined with the status of vehicles and displayed on a digital map.

5. Mobile Device

A mobile device is used by the control officer on-site to initiate and discharge the trip at the origin, border crossing or destination respectively. These sites may be border crossings, inland container depots (ICDs) or any other Customs control area from where the goods are cleared under the Customs supervision. The mobile device is connected to the central server through the site wireless network. It allows easy entry for an authorized person to enter main elements required to start the trip, i.e., the Customs declaration, e-Seal and tracking unit details.

B. Functioning of the Model

1. Tracking throughout Entire Trip – Option 1

The tracking process for cross- border transport under Option 1 is seamless tracking between two countries and is depicted in Figure 7. The tracking process is explained in the following steps.

(a) At the origin in Country A

The shipment information is either manually entered or imported from a existing software into the Customs database. The information includes cargo description, quantity and financial value of the goods, invoice number and Customs declaration number and the transport information, such as vehicle registration number, driver identity, container number and other relevant details. The location information is marked on the digital map as a geo-route using GIS and application software along which the trip will be tracked. An e-Seal number(s) is/are associated with the shipment.

Once physical cargo handling (stuffing) is completed, at the factory, border or any other site where cargo is being stuffed, the control officer places the tracking unit on the vehicle and the e-Seal on the door of load compartment or container. Using a mobile device, pre-specified information (Customs declaration, e-Seal/e-Lock number and tracking unit number) is sent to the central server by the control officer. In the central server, these details are matched with the information regarding the consignment already in the Customs database and the trip details appear on the monitoring screen along with the submission time.

(b) During the trip in Country A

When the vehicle travels inside the geo-route of Country A, it is now electronically locked, secured and the trip can be tracked. The device(s) on the vehicle will transmit key information such as their number, status and location coordinates to the central server. The control authorities of Country A can now see the movement of the vehicle on the monitoring screen. In order to maintain data integrity of the trip, no information entered into the system is allowed to be modified in any way. During the trip, if the e-Seal(s) is tampered, in any way, by cutting or opening without authorization, the time/date of such an event including the e-Seal status will be immediately transmitted to the central server. The control authorities in the central control room are immediately alerted and can take appropriate action.

Otherwise, the device(s) on the vehicle will periodically transmit their status through configuration setup known as “Heart Beat” to the central server at specific interval (for example, every 15 minutes). Four types of events can happen during the trip and will be indicated by specific colours on the monitoring screen:

a. Normal event (Green) – the arrival date/time falls within the travel time limit preset prior to the trip; no deviation from the designated route; no separation of container or trailer from the vehicle; and no tampering of the e-Seal/e-Lock.
b. Exceptional events:
    i. Security Alert (Flashing red) - There is a breach of security in the e-Seal/e-Lock or separation of container or trailer from the vehicle during transit. An email notification and an alarm in the control room immediately alerts the designated officer(s) and a pre-specified handling procedure will be followed.

ii. Route Alert (Flashing orange) – a vehicle deviates from the geo-route. The system will alert the designated officer(s) by email and an alarm and a pre-specified handling procedure will be followed.

iii. Late event (Flashing yellow) – the arrival date/time falls outside the travel time limit preset prior to the trip. The system will alert the designated officer(s) by an email and alarm for taking appropriate action.

(c) At the border crossing

When the vehicle arrives at the exit of the border crossing of Country A, the control officer(s) at the border crossing may check the trip report of the vehicle generated by the system and the conditions e-Seal(s). If the load compartment of the vehicle or container and the e-Seal is in good condition, the vehicle is cleared and the control officer(s), using the mobile device, records the exit of the vehicle in the system.

It is recommended that the two countries have an identical central server and application software, and in addition have an arrangement for sharing of the cargo information. In addition, the use of the same e-Seal and tracking unit is also suggested. This will obviate the need for keying duplicated information into the system.

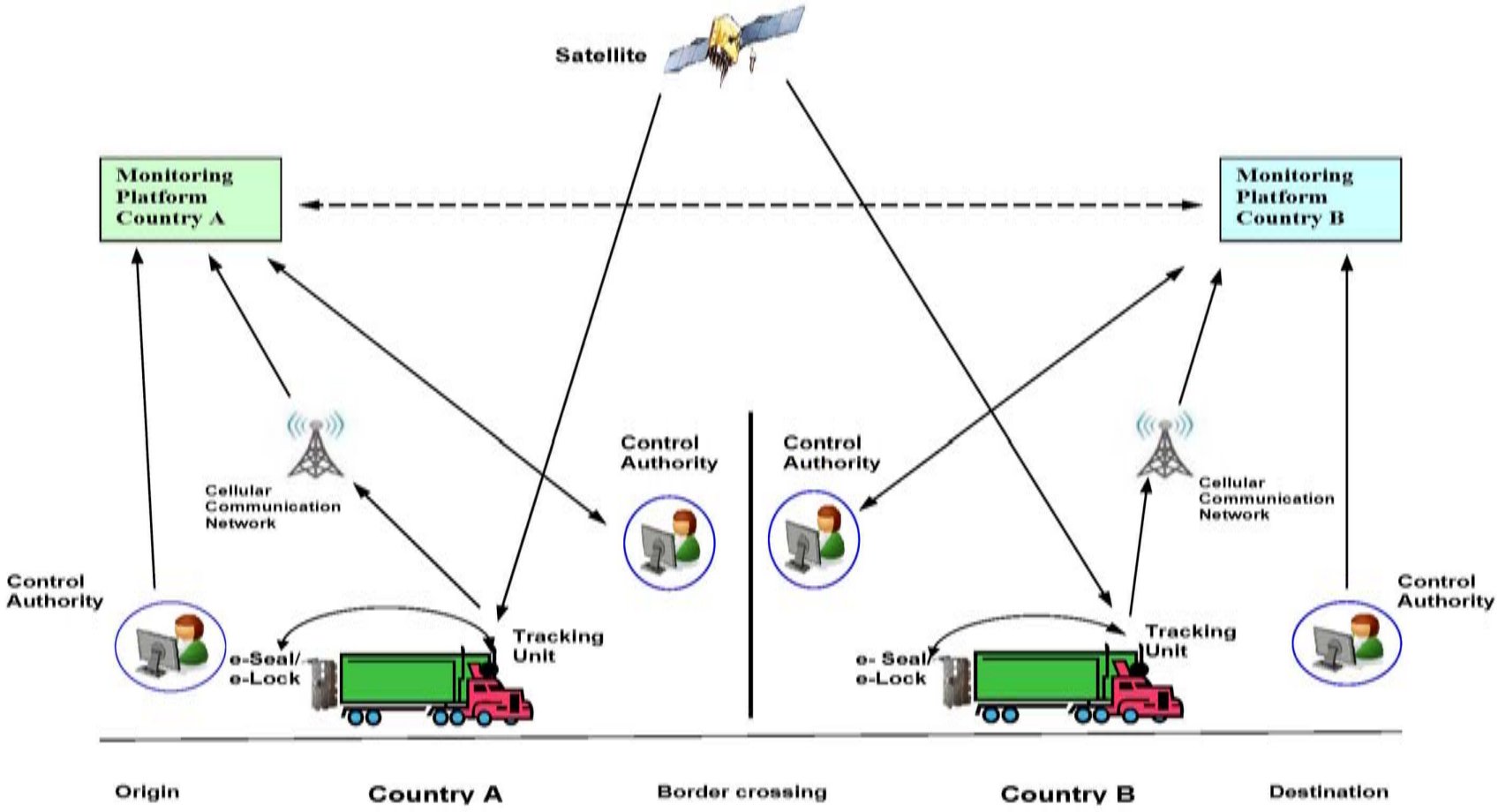
Once the border crossing formalities are complete on the side of Country A and the vehicle enters Country B, the control officer(s) on the side of Country B may simply check the trip report of the vehicle with the system, the e-Seal(s), tracking unit, and load compartment or container, in addition to advance information received about the consignment through the system. If everything is normal, the vehicle is cleared and the control officer(s) of the Country B, using the mobile device, sends the information to the central server in Country B to record the entry in the system. The vehicle and goods are further monitored until the destination.

(d) At the destination in Country B

When the vehicle arrives at the destination, the device(s) on the vehicle transmit their details to the central server in Country B. In the control room of Country B, a trip report is generated by the system and the control officer(s) can verify it. They may also check the e-Seal(s),

tracking unit and external condition of the load compartment or container, and if no violations are noticed, using the mobile device, the control officer will terminate the trip, disarm the e-Seal and tracking unit, and signal the normal completion.

Figure 7. Entire trip tracking



2. Tacking Country by Country - Option 2

In Option 2 of the model as shown in Figure 8, the tracking of the vehicle is done independently in each country. The principle of tracking is the same as in Option 1. The difference between the two options is that under Option 2, the trip is tracked independently by the control authorities of Country A form origin to border crossing in Country A, and by the control authorities of Country B from border crossing to destination in Country B.

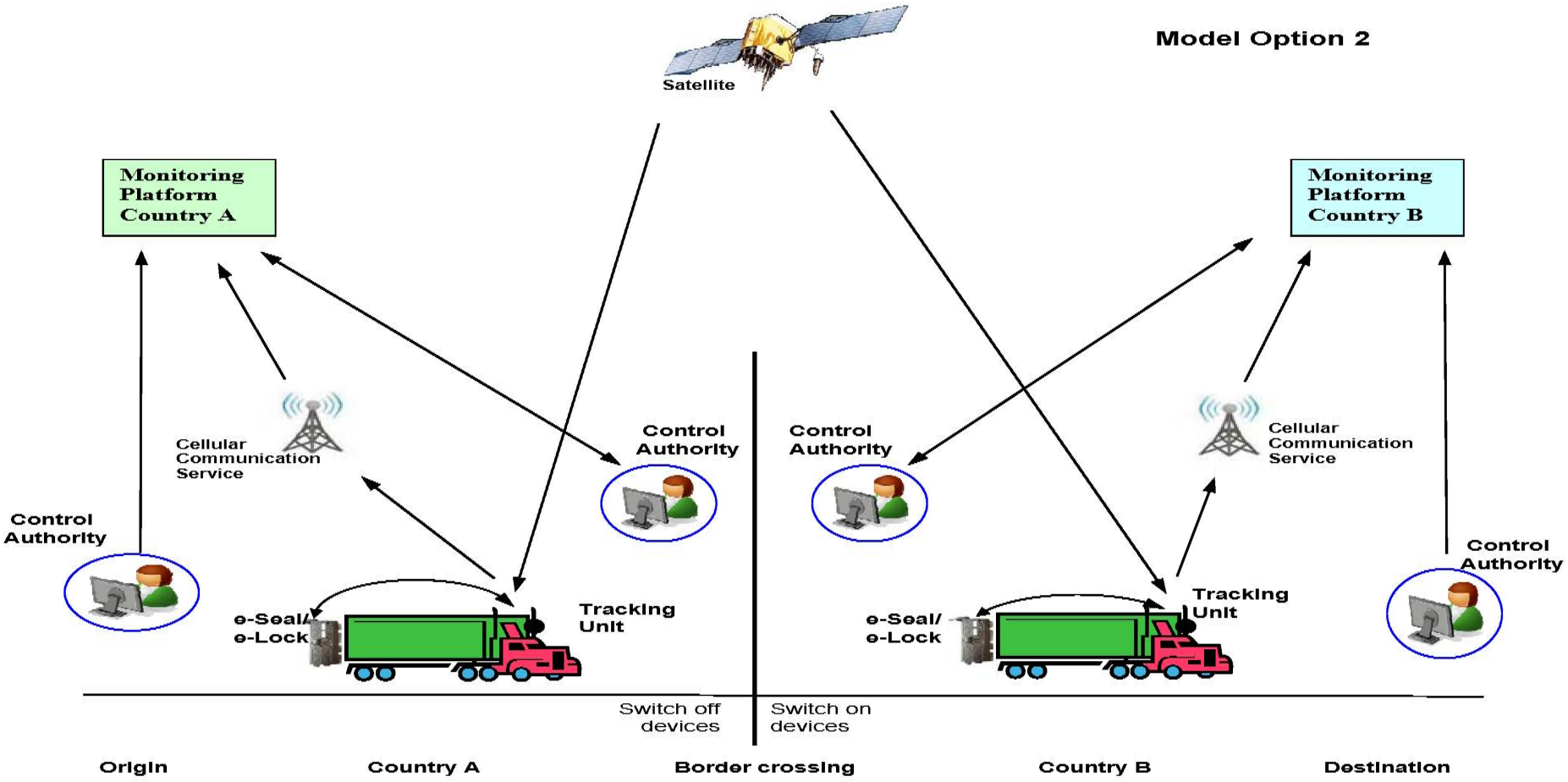
Having started the journey from origin in Country A and following steps (a) and (b) as in Option 1, the tracking in the case of Option 2 contains additional steps as described below:

- When the vehicle arrives at the border crossing of Country A, the device(s) on the vehicle will transmit their details to the central server in Country A. The control officer(s) can verify the final trip report generated by the system. If no violations are found in the trip report, the control officer(s) may check the e-Seal(s), tracking unit and external of the load compartment or container. If everything is normal, then using the mobile device, the control officer of Country A shall terminate the trip in the system, and disarm the e-Seal and tracking unit to mark the end of the trip.

When the vehicle crosses the border and enters Country B, the control authorities in Country B may re-activate the devices to restart the tracking exercise for the segment in the territory of Country B.

The use of the same devices and compatible application software is strongly recommended in this case.

Figure 8. Country by country tracking



IV. INSTITUTIONAL ARRANGEMENTS FOR APPLICATIONS OF THE MODEL

A basic assumption underlying the application of the model is that vehicles and goods are permitted to cross border(s) between countries. If vehicles are not permitted to cross border(s), this model can be used for monitoring of goods in container(s) or trailer(s) in combination with the UNESCAP Efficient Cross-Border Transport Model[11].

A. National Arrangements

In principle, it is suggested that a system developed based on the model may be used by transport operators on a voluntary basis. As the benefits from the system become apparent, more and more carriers will use the system as observed in the case of Jordan discussed earlier in Chapter II. The authorities may, however, provide incentives for the use of the system, such as fast track clearance at border crossings and exemption from physical inspections if no irregularity is found during the transport process.

It is recommended that the control authorities, such as Customs authorities, issue executive instructions backed by an appropriate legislation that provides for the registration of the users, for example, carriers and logistics service providers. The control authorities may set various conditions for registration and prescribe detailed procedures to be followed for using the system. The instructions may specify the category of goods for which the system will be applicable, or it may also provide a list of goods prohibited to use the system. The control authorities may consider prescribing additional measures for exceptional cases, such as high value of goods or dangerous goods. Annex A provides example information that may be sought by the control authorities for the purpose of registration.

In the countries where Customs Codes require guarantee for such transit operations without payment of duties and taxes, the guarantee may be specified as part of registration process. The requirements for registration and guarantee may be considered together with the Customs

[11] UNESCAP Efficient Cross-Border Transport Model provides an option for efficient trans-loading operation at border crossing in the case of difficulties for vehicles to cross border.

measures on authorized economic operators (AEOs). AEOs may be encouraged to use the system without extra guarantee.

A simple application of the model is to submit the documents associated with the transport manually. However, to take full advantage of the application of the model, a system developed based on this model should be linked with electronic Customs system or national Single Window system. Through this, monitoring of movements of goods and vehicles can be integrated into the clearances and control systems of Customs and other authorities, and duplicated submission and clearance of the documents can be avoided. Nevertheless, data transfer and processing should be encrypted to ensure security of the system.

In any case, advance submission of documents is recommended to make the system operate efficiently. With advance submission of documents, the control authorities can pre-assess the risk levels and decide their control measures before arrival of the vehicles and goods at the border crossing(s).

At most border crossings there are long waiting times as the control authorities physically inspect goods and vehicles. To reduce delays at the border crossing, the tracking system developed with the model should be integrated with risk management tools. The application software can have an additional module for this purpose. The pre-defined risk parameters in the system will flag the consignments and vehicles carrying them that need to be physically examined at the border crossings.

The physical inspection may be conducted at the border crossing only when there is substantive evidence or intelligence that creates a reasonable doubt about the declaration made, or any other fraud is suspected, or any irregularity occurred in transit process. In normal course the inspection of goods and vehicles may be undertaken at origin and destination. The system can also be used together with new inspection technologies. It is suggested to use non-intrusive inspection for the users of the system as much as possible in the transport process, including at border crossings.

The technical parameters of e-Seal/e-Lock device, tracking unit, vehicles and containers, and their periodic inspections by the authorities may also be provided in the instructions. In

addition, when scrutinizing the registration process, the control authorities may select those transporters and their drivers without offense records to access the system.

B. Inter-Country Arrangements

Ideally the model is applied for monitoring of entire cross-border or transit transport processes from origin to destination (Option 1). This option requires close cooperation between the control authorities of the countries. It is recommended that countries enter into bilateral agreements or memorandum of understanding (MOU) to provide a legal framework for the application of the model. The legal instrument may elaborate, among others, on following issues:

- Electronic exchange of cargo and transport information;
- Use of similar or compatible application software;
- Use of jointly accredited devices, such as e-Seal/e-Lock and tracking unit;
- Mutual recognition of registration or guarantee and sharing of registration information (alternatively, registration or guarantee through local agent);
- Mutually agreed requirements for temporary admission of vehicles;
- Mutual recognition of inspection results if joint inspections are not possible;
- Mutual recognition of the accredited vehicles and containers; and
- Mutual assistance in the case of exceptional events.

If the countries have concerns regarding the use of Option 1 due to institutional reasons or lack of adequate cooperation, they may use Option 2. Option 2 can work with minimum cooperation between the control authorities of the adjacent countries. As explained above, under this option, the tracking is done independently within the jurisdiction of each country and therefore this system obviates the need for inter-country guarantee. Moreover, control authorities may feel more comfortable with the fact that the vehicle being tracked is registered with them and, therefore, in the case of violations, the carrier can be identified and applicable duties and taxes collected.

However, the downside of Option 2 is that it may cause delays at border crossings. The entire trip details including the consignment information, the transport details and the e-Seal/e-Lock

number have to be resubmitted in the system to start tracking again. Moreover, in the case of transit, this system may pose challenges for reconciliation of transit declarations due to change in e-Seal/e-Lock numbers and associated information at the border crossings.

The documents required for clearances of goods and vehicles may be submitted separately to the control authorities in different countries. Harmonization and standardization of documents and simplification of clearance procedures will add value to the system. However, they are not a pre-condition for the application of the model.

V. APPLICATIONS OF THE MODEL

The model is intended to provide a tool for control authorities to monitor movements of vehicles and goods for safety, security and management of cross-border transport. It also provides an option for road transporters to safely, efficiently and smoothly carry goods from origin to destination across border(s). It can also track the goods from one location to another for the secure commercial purposes and provide necessary assistance for drivers and vehicles during transport processes. The use of the model would increase the visibility of the shipment and thereby help plan supply chain effectively.

The model provides the essential concept for the integrated use of SPS, CCS, e-Seal, e-Lock, and ICT to track vehicles and goods in the transport process. It provide general guidance for the consideration and development of an electronic tracking system with new and existing technologies, including devices to be installed, functioning and interaction of the devices and institutional arrangements at national level and between countries.

For the application of this model to a particular transport route or corridor, it is suggested that the authorities involved prepare a detailed technical design and the institutional arrangements required among the countries involved. The technical design may provide specifications of e-Seal/e-Lock and tracking unit, choices of the particular SPS and CCS to be used, requirements and specifications of hardware and software needed for tracking vehicles and links to electronic Customs or national Single Window system, facilities in the control room, alert plan and details of exceptional cases. The institutional arrangements may include registration system, guarantee (although it is discouraged with the application of the model), accreditation of devices and vehicles/containers, new work flow for the control authority, risk management plan, amendments to legislation if necessary, plan to deal with irregularities, emergency plan, and inter-country agreement or MOU.

Although the model is developed for cross-border transport, it can also be used by the control authorities for other purposes, such as monitoring of transit vehicles and goods by the control authority in the transit country. The application of the model by the control authorities can also track the transport of bonded goods between Customs control zones, such as:

- Free trade zones;

- Export oriented units;
- Manufacturing under bond;
- ICDs or dry ports; and
- Port to ICD or dry port.

The model can also be used for tracking containers in maritime transport and railway transport as well as inter-modal transport.

It is desirable that the system developed with the model be used together with a video surveillance system and vehicle/container scanner.

VI. POTENTIAL BENEFITS AND COSTS

The model offers tremendous potential to overcome many of the non-physical barriers impeding international road transport in the region. It may increase confidence of the control authorities on normal operations of foreign vehicles, improve safety and security in transport processes, reduce the need for guarantee on temporary importation of vehicle/container and transit, and reduce the time and costs for clearance and inspection at border crossings.

The benefits from particular applications may vary from case to case. In general, the application of the model may significantly contribute to:

For transport operators:

- Increase in safety and security en route;
- Reduction in transport time;
- Reduction in transport cost;
- Increased predictability about the location of the consignments; and
- Increased efficiency of fleet management.

For control authorities:

- Increase in safety and security control;
- Reduced violations during the trip, such as smuggling incidents;
- More visibility of movements of vehicles and goods;
- Reduction in workload;
- Reduction in the need for escort; and
- Less congestion at origin, border crossing and destination.

The application of the model has a tremendous potential to enhance the security of the transport process against robbery, drug trafficking, and smuggling, and will benefit both the control authorities and transport operators. The latter two issues are of increasing concern to the control authorities. Real time information on the status of vehicles and their integrity can help authorities take timely action and pre-empt such activities. This is amply demonstrated in the case study of Jordan discussed in Chapter II. Moreover, the fact that the trip is being monitored by the control authorities has a psychological impact on drivers and therefore may

reduce the potential for collusion of drivers with people with nefarious designs to commit various crimes.

In addition, application of the electronic tracking system will enhance the road safety. The real-time information about the status of the vehicle implies that in an event of an accident, the control authorities will know immediately and therefore take action to arrange timely emergency care to the victims. It will also ensure safety during transportation of dangerous goods. In addition, safer routes can be pre-selected for transport and deviation from the routes can be found and corrected timely.

For traders and transport operators, this model can provide increased visibility of supply chain and increase predictability of consignments, which is particularly important for transport operators to manage their fleet and plan transport operations.

Another major advantage of using this model is the reduction in transport time. This happens due to automation, simplified procedures and consequent reduction in the delays at borders. The fact was borne out in the case of Jordan where the use of electronic tracking system led to reduction in transit time by more than 60 per cent. The reduction in transit time has a spill over effect and brings other benefits as well. One obvious result is reduction of emissions of vehicles and air pollution.

Due to reduction in transport time, the application of the model can reduce the transport cost as well. The requirement to furnish bond/bank guarantee has a cost associated with it. It has been found that on transport corridors in Africa, the comprehensive guarantee can cost as much as 0.25 to 0.50 per cent[12] of the value of goods for each country crossed. The cost of financial guarantee like bank guarantee depends on the duration between its initiation and discharge. The inefficient information exchange among the authorities on violation and termination of transit leads to delays in the discharge of guarantees and therefore higher cost for the importers/exporters. This model can allow the waiving guarantee requirement for carriers who meet the required conditions.

[12] The World Bank, Connecting Landlocked Developing Countries to Markets- *Trade Corridors in the 21st Century* (Washington D.C 2011), p.80.

One of the main features of this model is its flexibility with regard to guarantee system. A successful transit regime needs efficient sharing of information and a guarantee system to meet the requirements of the Customs authorities. With real-time monitoring by the control authorities, such guarantee may be exempted for the users. If inter-country guarantee cannot be exempted, under Option 2 of the model, the tracking process and the control over the goods and vehicles remain within the respective jurisdictions of Customs authorities, and separated guarantees can be arranged.

In many cases, transport operators have to pay for escort and physical inspection at border crossings. With the application of the model, such measures will be removed except when irregularities are found during the journey.

The use of electronic visibility and security systems as provided in this model allows carrier/shipper and control authority to know at all times where the goods and vehicles are, and they will be immediately alerted if an intrusion event occurs. Therefore, the users of such system are usually considered for fast track clearances as observed in the case of Shenzhen, China.

The wide availability of these technologies coupled with relatively low costs associated with their application makes it possible to apply the model easily in different countries. For the users, the only cost incurred may be a nominal charge for using system each time. In the case of Jordan, users are charged US$30 each time to cover the operational cost.

The major costs involved for control authorities will be for setting up the system, including the costs of hardware and software, and the costs of devices. The costs can be recovered from the savings from other costs with the existing practices, such as escort, more inspection checkpoints and more labour etc.. The cost can also be recovered by levying a nominal fee for one time use. In addition, increased trade with more efficient procedures will generate more benefits for countries.

Annex

A. Basic Registration Information

1. Information of applicant
    i. Name
    ii. ID Card No. (expiry date)
    iii. Passport No. (expiry date)
    iv. Name of Company
    v. Business registration No.
    vi. Address
    vii. Telephone/mobile No.
    viii. Fax No.
    ix. Email address
2. Information of vehicle(s)
    i. Vehicle registration number
    ii. Name and address of registered owner (contact information if different with applicant)
    iii. SPS model (if it is fixed) and supplier
3. Information of driver(s)
    i. Name
    ii. Identity card number (expiry date)
    iii. Passport number. (expiry date)
    iv. Driving license number
    v. Address
    vi. Telephone/mobile number
    vii. Email address
4. Information regarding e-seal/e-lock (if it is fixed)
    i. Seal model and number
    ii. Name of supplier
5. Financial information
6. Previous offence cases with details
7. Other relevant information