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SAFETY AND SECURITY OF PASSENGER TERMINAL: THE CASE STUDY OF RIGA INTERNATIONAL COACH TERMINAL

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This paper presents the Riga International Coach Terminal safety and security management system. Authors analyse European documents and tendency to ensure adequate security in the operation of Passenger Terminal and present RICT security risk-based decision-making approach. It is based on the security organization setup, which includes interfaces with internal and external bodies and strategy based on risk management, implemented through a structured security, risk management process.

These results and initiatives in Riga International Coach Terminal (RICT) are important steps to create safeguard of the "sustainability" perspective, which implementation in whole redefine the RICT reliable node of public transport.

Keywords: passenger terminal, safety, security, risk, analysis, process, management

1. Introduction

The concept of safety and security plays an important role in the European transport policy and significant aspect of the service quality provided to passengers. Peek and Van Hagen (2002) prioritized the quality factors in public transport and introduced the "pyramid of Maslow" for public transport. We suggest adding the security in the lower part, as shown in Figure 1. Quality components: safety, security, reliability and speed form the base of the pyramid, representing most important requirements set by the public transport customers. The lower part of this pyramid shows the components that must be sufficient without doubt. Passengers will be dissatisfied, if it not, and they do not travel or change their travel mode. The two upper parts (comfort and experience) show the satisfiers which are additional quality aspects.

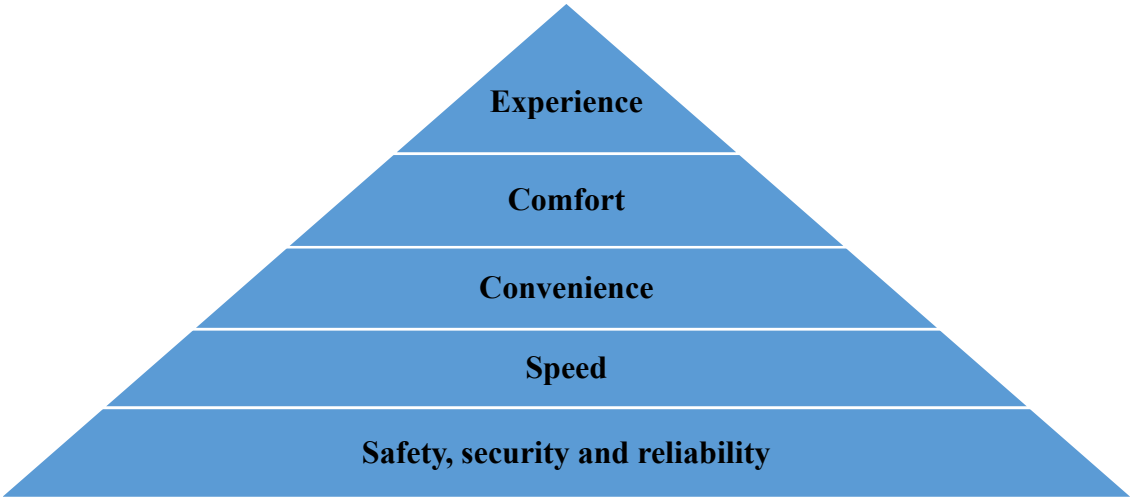

Figure 1. Maslow Pyramid of quality factors in public transport (adapted by authors from Peek and Van Hagen, 2002)

Transport safety and security are different issues, because safety is associated with risk while security is associated with uncertainty or they focus on very different types of risks. "Safety risks"

originate from unintended failures, errors or misfortunes whereas "security risks" originate from deliberate or malicious attempts to disrupt, disable or destroy (Ranger, 2010). The term "security" is the prevention of unlawful interference with passengers and transport infrastructure and must give users confidence in the use of transport, while term "safety" refers to the methods and measures to protect people from the risks directly related to and arising from transport (Safety and Security, 2014). Security – sense of personal protection experienced by customers, derived from the actual measures implemented and from the activity designed to ensure that customers are aware of those measures (European Union, 2002). Safety measures reflect the likelihood that one will be involved in an accident, but security measures- become a victim of a crime.

The analysis of security problems in transport are often based on transport safety. In OECD report (2010) Louis Ranger mentioned that transport "safety" can rely on well-established legislative frameworks, a long history of practices, sophisticated data bases, targeted education programs and long-term action plans, otherwise, the security problem is less well quantified or recognized. EU transport research needs to focus on establishing integrated security and safety systems and common requirements and standards for all transport modes in Europe (Safety and security, 2014).

For passenger terminals with the concentration of vehicles and passengers' accumulation the problem of increasing the level of safety and security becomes more significant. Passenger terminals often operate 24-hours a day and are placed where people congregate, especially during peak hours. As node of regional and international transportation networks, terminal generates a number of routes, flow throughputs and attract different activities to it surrounding area. It is expanded risk landscape terrorism, criminal activities and extreme weather.

A lot of research projects consider safety and security as a substitute for quality services assessment, in FP6 Framework Programme: COUNTERACT, and FP7: DECOTESS, SECUR-ED, SECURESTATION etc. Innovations need to focus on incorporating security features into design of infrastructure. SECUR-ED and SECURESTATION projects consider the risk main issues, assessment methodology and innovative security solutions. The SECURESTATION project is particularly focussed on station and terminal security.

Transport research and innovation should support development and deployment of technologies and solutions for better and effective use of transport networks, and safer and more secure operations through information and communication systems (EC, 2011). These solutions should be innovative, based on new technologies or renovated old ones and improved security level in any aspects. For passenger terminal it means: to improve passenger terminal resilience to terrorist attacks and safety incidents through technologies and methodologies enabling design to reduce the impact of blast, fire and dispersion of the toxic agents on passengers, staff and infrastructure (Anon, 2016). Transport infrastructure is directly affected by extreme climate events such as storm surges, floods, droughts and temperature changes due to which recognizing a need for implementing adaptation measures is important. Research on passenger security as mentioned in (Safety and Security, 2014) should lead to more effective and privacy friendly technologies (scanners, detectors of new explosives, smart chips) enabling monitoring of a large number of passengers with minimum inconvenience and intrusion. Security at land transport terminals should be at the same level as provided at the airports and maritime ports.

The research is focused on the problem of safety and security analysis in passenger terminal and presents approach to this problem for Riga International Coach Terminal (RICT). The RICT management is considering the security and safety concept trying to use risk-based decision making approach including all possible input dates for it. It is based on the security organization setup, which includes interfaces with internal and external bodies and risk based strategy, implemented through a structured security, risk management process. Yatskiv and Gromule (2016a) consider the IS which operates on in Riga International Coach Terminal (RICT) and analyse how information from these systems can enrich safety and security issues. The terminal passenger flow and traffic analysis on the basis simulation modelling, which was implemented in 2015 and gave a suitable instrument for managing an effective and efficient safety and security concepts development in terminal are presented in (Yatskiv *et al.,* 2016b).

Authors support the vision of Bus and Coach Terminal as critical infrastructure that should be in frame of resilient transport system. This concept discussed very often in different sources, and following the concept of the Global Risk Report 2013 of the World Economic Forum (WEF 2013) can be defined "a system that bounces back faster after stresses, enduring greater stresses, and being disturbed less by a given amount of stress". The term "resilience" can be characterised '5R':

- Robustness: ability to absorb disturbances
- Redundancy: excess capacity which enable a core functionality
- Resourcefulness: ability adapt to crises, respond flexibly
- Response: ability to mobilise quickly
- Recovery: ability to regain a degree of normality.

And one of the important tasks for RICT authorities on next 5 years to develop and implement a common procedure to identify all risks for critical transport infrastructure and integrate fully security aspects into their day-to-day operations.

This paper presents the RICT safety and security management system. Particular emphasis in this research is placed on the documents which determine safety and security policies and procedures at RICT, and on developed safety and security assessment and planning framework for terminal.

2. Key Policy Documents Regulating Security and Safety Concept

Key policy documents regulating security and safety concept could be categorized on European regulations, country (Latvian) regulations and Terminal regulations. Separately the EU reports, guides, best practices and others may be useful for passenger Terminal security and safety management system development.

The foundation of transport safety and security policy is set in the Treaty on the Functioning of the European Union (EU, 2010). In 2011, the Transport White Paper defined the creation of an Advisory Committee on land transport security as a priority initiative (EC, 2011) and sets out the EU transport research, innovation and deployment strategy and highlights standardisation and interoperability as keys to avoiding the technological fragmentation of the European transport market. A higher degree of convergence and enforcement of social, safety, security and environmental rules, minimum service standards and users' rights must be an integral part of this strategy, in order to avoid tensions and distortions (EC, 2011).

European Commission in 2012 gives land transport in its Working Paper on Transport Security first priority. The establishment of an Advisory Group on Land Transport Security should strengthen this aspect of transport security in the future (European Commission, 2012). The goal of this Group is to assist the Commission in developing policy on security in land transport. The freedom of access and movement of large volumes of passengers and cargoes, availability of strategic infrastructure require introduction of outstanding measures for security in land transport.

From point of view national regulations it is actual Civil Protection and Disaster Management Law, which was accepted by Latvia Republic Saeima 5 May 2016 and entered into force 1 October 2016. The aim of new law is to define subject competence in civil protection and disaster management system to insure the fullest possible protection of human, environment and property safety and security in circumstances of disaster or threat. The law defines the conception of disaster, determines the types and scales, as well as new disaster management principles and institutions responsible for disaster management.

According to Civil protection and disaster management law Section 13 (point 6), the object owner or lawful possessor shall develop, reconcile and approve the Civil defence plan in the State Fire and Rescue Service (VUGD), if the object is included in the critical infrastructure totality and there more than 100 people can be situated.

The next document which need to mentioned Directive 95/46/EC (General Data Protection Regulation) Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016. This document is important from the point of view of the protection of persons, with regard to the processing of personal data and on the free sharing such data and repealing.

3.RICT Security Assessment and Planning Framework

Security research for the transport sector should help owners and operators of passenger transport terminal to analyse and assess the risks for their particular objects.

Unfortunately, there are some difficulties in security aspects implementation in Latvia:

- no transfer of good practices and competences from other countries, because the security policy is a national prerogative;
- lack of operative implementation standards: procedures and technologies;

- many actors involve in security management;
- security approach usual based on unimodal approach etc.

RICT management board formulated the security concept and try to use security risk-based decision making approach including all possible input dates (from IS and other sources) for it (Yatskiv and Gromule, 2016). RICT management board considers the terminal risk management as a multi-step process, which aims to reduce or compensate for the object upon the occurrence of adverse events. The Safety and Security Management System includes:

a) procedures and methods for Terminal security design,
b) processes for security assessing, planning, implementation
c) Terminal security operation activities.

The security and safety assessment and planning framework for RICT is shown in Figure 2. The RICT activities in the frame of these stages are included in boxes of the outer loop.

One of the important parts on first step is to understand the threats. Taking into account the set of possible involved stakeholders and activities the following groups of threats for RICT ware identified:

1) Physical and large-scale attacks:
   - Terrorism
   - Vandalism and/or civil disorder
   - Theft of data and/or infrastructures

2) Environmental and nature attacks:
   - Natural disasters
   - Environmental disasters

Typical threats include: earthquakes, floods, wildfires, pollution, dust and corrosion.

3) Technical risks:
   - building technical structure
   - communication and technical resources
   - transport infrastructure
   - interruption/disruption of electrical supply

4) IT risks: not functioning and/or insufficient functioning of any IT infrastructure assets. Common threats generally referred to as cyber-attacks.

A security risk management approach, based on categorisation of the risk level following a risk assessment, selection of risk mitigation safeguards based on cost-benefit considerations, operational and technical feasibility, and accepted risk management strategies are planned to implement in whole.

As shown on Fig.2 implementation of RICT Safety and Security system is complex process with many stages and activities. Of course, the process of implementation requires resources and couldn't implement in the one moment, that's why some steps are already implemented, some – in process of development and some – in process of near future.

The collection of data for risk assessment is one of the key stages for risk management process. One of the spotlight tasks for nearest future to develop the module that should to enhance the information from all Information systems by utilising different analytical capabilities and tools that provide the ability to detect trends, patterns, and emerging threats on basis on link analysis among data elements. It'll include analytic tools for advanced search capabilities into existing data bases sources, and generated queries to other sources: state and commercial data aggregators, to allow analysts to search several databases simultaneously.

The example of applying simulation modelling as an analytical mean for decision support at the stage of reconstruction of passenger terminal is presented in (Yatskiv *et al.,* 2016a). Consideration of the current and projected passenger counts, current and planned layouts for identifying where the offered design for station reconstruction allowed safe aggress in capacity. The next step – to use this model for online simulation of pedestrian flow in terminal and it gives the possibility to improve the aspects of safety and short-term planning in the phase of organizing and operating terminal. For instance (see Fig. 3), the data from *People flow counting system* can be used as input for *Bus and coach flow model* and in case of high density on platform the decision about moving bus arrival/departure platform will be changed or even provided changes in timetable in order to avoid not safety conditions on terminal.

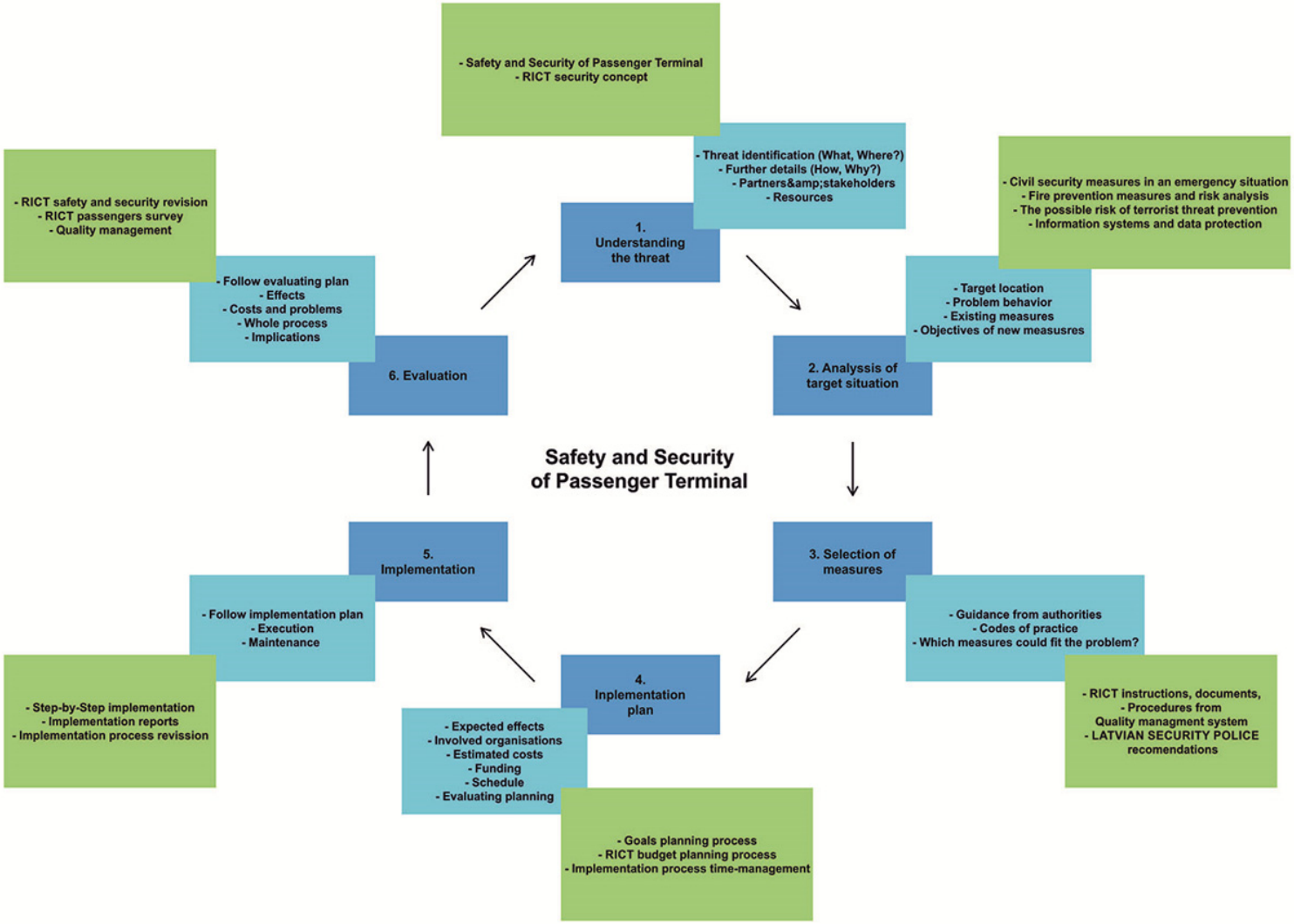

Figure 2. Security and safety assessment and planning framework

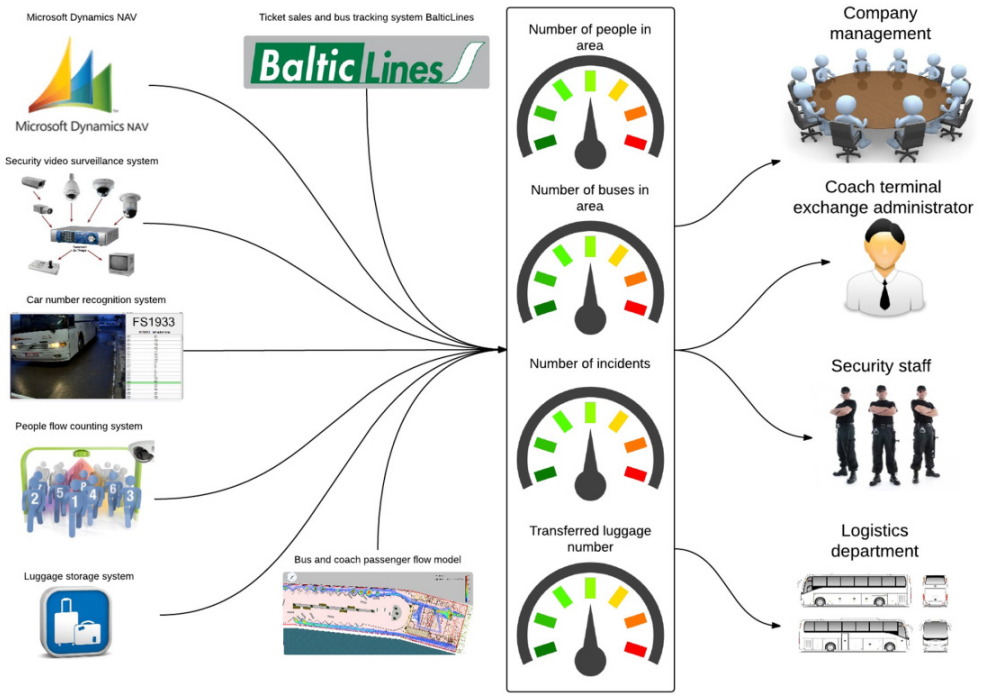

Figure 3. Collection the data for the risk assessment

As noted previously, this process requires that each department in Terminal has safety and security instruction, detailed procedures and guidelines, as well as the Terminal has a written guidance. Of course, a lot of documents in the RICT Quality Management System (QMS) consist of description of risk-management processes. In Table 1 the parts of RICT safety and security system are presented and highlight the quantities of RICT QMS developing for safety and security issues. Nowadays, RICT operates according to new Quality Standard (ISO 9001:2015) in servicing and provision of the passenger traffic by bus and coach, where highlight risk management process.

Table 1. RICT safety and security system components

N	System components	Safety	Security	RICT Quality management system (QMS)
I	Maintenance of public order in coach terminal territory	X	X	4 documents
II	Assistance to carriers and passengers	X		2 documents
III	Civil security measures in an emergency situation		X	
IV	Fire prevention measures and risk analysis	X	X	1 document
V	The possible risk of terrorist threat prevention		X	2 documents
VI	Information systems and data protection	X	X	3 processes
VII	Vehicle traffic management and record keeping	X	X	2 documents
VIII	Pedestrian (visitors) flow in terminal research and analysis	X	X	
IX	Cooperation with national and local safety authorities	X		2 documents
X	Building technical structure safety monitoring	X		
XI	Protection measures of Coach terminal employees	X	X	

4. Conclusion

Authors analyse documents and tendency to ensure adequate level of safety and security in the operation of Passenger Terminal and present RICT safety and security management system.

These results and initiatives in RICT are important steps to create safeguard of the "sustainability" perspective, which implementation in whole redefine the RICT reliable node of public transport.

What are the next steps in this process?

- European security approach, which includes the methodologies and tools, more practicable solutions in form of handbooks and manuals is needed.
- Development and implementation procedure to identify the risks in concrete terminal, development of risk maps and then analyse which of them are critical and not only for terminal but also for the transport network in whole.
- Integration and fusion data from different sources and systems: cameras, sensors, fire detectors, transactional, information systems and social media.
- To build up technical, organizational and operational mechanisms for real-time monitoring and emergence management.

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