

METHOD OF STANDARDIZATION OF TERMINAL AND NETWORK PRODUCTS IN MULTIMODAL TRANSPORTATION

V.A. GLINSKIY *, E.N. ZAITSEV, O.V. BELYI, V.P. MASLAKOV AND YU.I. PALAGIN

St. Petersburg State University of Civil Aviation, 196210, St. Petersburg, Pilotovstr, 38, Russia

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ABSTRACT

The article introduces the concept, development problems and options to improve the efficiency of international multimodal transportation (MMT). The main characteristics, functions, as well as organizational and logic structure of MMT are shown. We consider the basic stages of the formation of the terminal network, and the concept of shipping and forwarding activities. The principles and standards of documentation procedures in accordance with the basic rules are considered. The paper describes the terminal and network principle of cargo movement and its main characteristics, as well as the effectiveness of this principle. The comparative analysis of the ways of MMT implementation was conducted. The main advantages of these ways, as well as the advisability of separate ones, were shown. The principles of the classification of terminal and network products of the forwarder, as the main link in the organization of the system, were formulated. We have proposed some innovative modes of delivery allowing to increase the efficiency of the system and to ensure its reliability.

INTRODUCTION

Multimodal transport is the system of organizational provisions and legal groundwork for international transportation performed with at least two different means of transport (Multimodal Transportation, 2017; Smurov, *et al.*, 2016). Such cargo movement on traffic arteries is impossible without the standardized conditions for carriages which form the ingredient of transportation system. Considering that a forwarder plays a key role in the interaction of all participants of trade and transportation activities, this paper is focused on the ingredient of transportation system of the forwarder.

The basis for the transportation process is a sales contract, transport basic conditions of which are listed in the INCOTERMS classifier. The transport proforma presented as model contracts should be developed by the ICC and FIATA (Jones, 2008). Using a standard proforma of documents makes

them easier to fill, which allows to improve the control of cargo flows movement, to simplify customs formalities, documentation procedures and mutual settlements, to reduce commodity stocks and warehouse requirements.

METHODS

The concept of shipping and forwarding activities (SFA) is based on the need for a universal classification of transport products of forwarders to improve the reliability of transactions, to simplify documentation procedures, and as a result, to receive funds by documentary letter of credit (Fig. 1) (Intermodal/Multimodal Freight Transportation; Multimodal and Intermodal Freight Transportation, 2017; Multimodal and Intermodal Transportation, 2017; Gubenko, and Ksenofontova, 2015; Multimodal Services That Optimize Air, Sea, Land, and Rail Transportation, End-To-End, 2017).

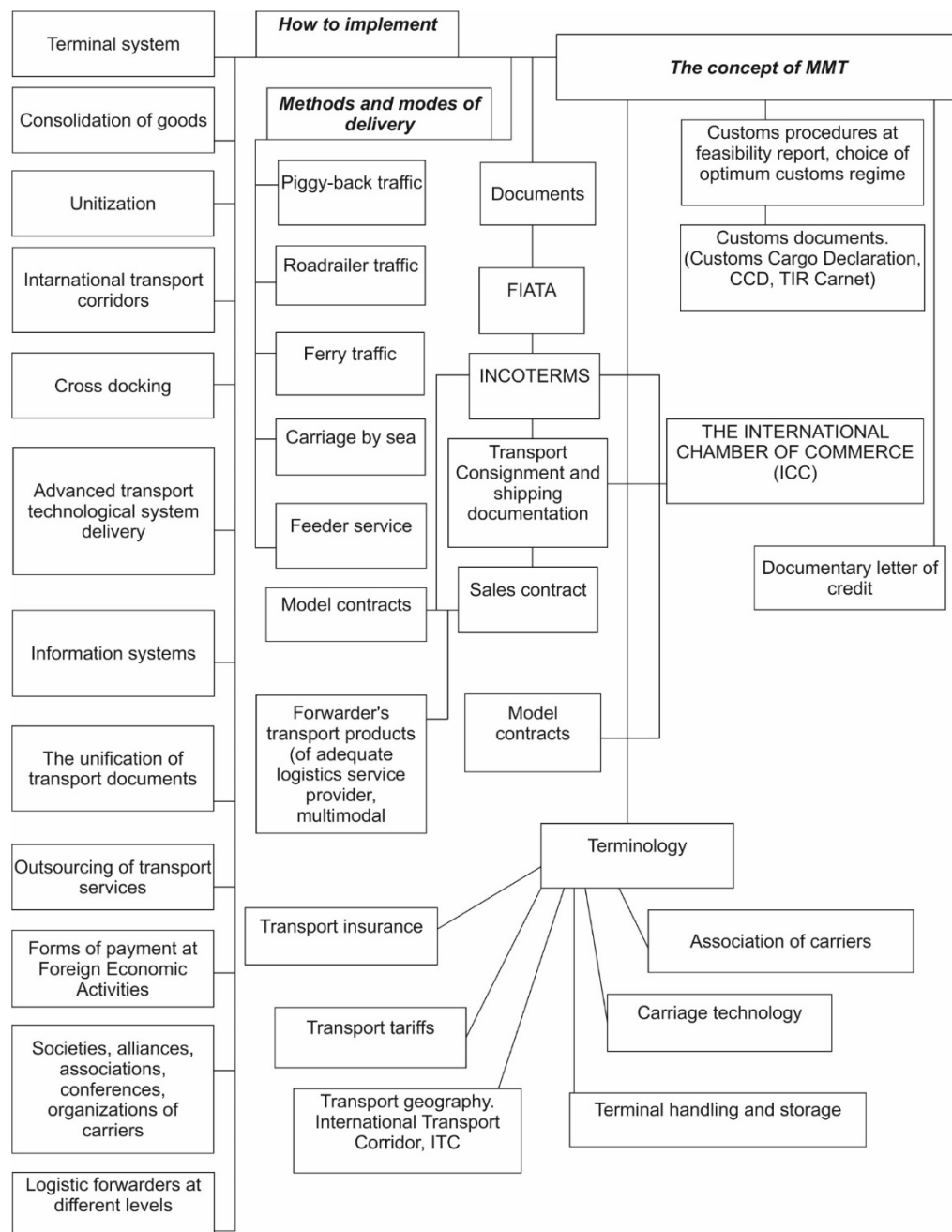


Fig. 1 Concept elements of SFA.

To improve SFA efficiency in this part, it is necessary to introduce an e-document management, and to implement the automated processing of commercial documents. This will significantly reduce the time of confirming paperwork at dispatching points, customs, and facilitate the interaction between the transportation system participants.

DISCUSSION

Through the analysis of international multimodal transport technology (MMT) we determine the services for clients, the most convenient route, and calculate the through rate. The use of international

transport corridors and discount schedule, the coordination of modes of transport at the hubs of interaction, the cargo consolidation for reducing logistic costs, all this allows to achieve efficiency in this part Table 1.

RESULTS

The foundations of terminal business are formulated as the first stage of the terminal network organization (AnyLogic Logistics Network Manager-Decision Support System for Network Optimization, 2017; Best Airports of, 2014): the focus on the container market, the model of hierarchically organized

Table 1. The effectiveness of international multimodal transport (MMT)

MMT ways of implementation	Advantages
Terminal system	Providing a wide range of services
	The single cargo and distribution terminal
	Reliability of delivery time
	Increasing of cargo delivery speed
	Reducing transportation costs
	System flexibility
	Decreasing in risk of cargo damage
	Rapid order processing
	Reducing stock reserves
	Improvement of quality in transport and logistics service
Consolidation of goods	Minimum financial costs for the delivery of a small consignment of goods to anywhere in the world
	Facilitation of shipping documentation execution
	Availability of necessary storage and handling conditions
	Different types of goods can be carried in one vehicle
	Cargo of different senders can be placed in one vehicle
Unitization	Delivery within the specific time frame
	It ensures the safety of goods
	Low labor costs due to the mechanization of cargo operations
	Increasing of cargo delivery speed
	Possibility of re-shipment of goods without repacking
	Simplifying of cargo record
	Wide range of the transported goods
	Reduction of costs and speeding up the rolling stock processing
International transport corridors	Reduction of warehouse facilities (containers can be used as storage; reservoirs of processing companies; the possibility of multitier stacking)
	Simplification and unification of shipping documentation and freight forwarding operations
	Rationalization of the interaction between different modes of transport in the intermodal transport chain
	Safe passage of passengers and cargo across national borders
	Providing the international through traffic
Cross docking	Unitary international standards
	Minimizing the cost of transit carriage
	Reduction of cost of warehousing services due to renunciation of the storage and repetition some of cargo operations
	Increasing of cargo delivery speed
	Lessening of the need for storage facilities, and as a consequence logistics costs saving
	Totals and performance improvement as the goods pass over the warehouse
Advanced transport technological system of delivery (Multimodal and Intermodal Transportation)	Efficient utilization of automobile vehicles
	Facilitation of documentation procedures
	Combining different modes of transport and their effective interaction
	Application of new principles of movement in order to increase the speed of goods delivery
	Increasing the intensity of cargo handling operations and reduction of material and labor costs
	The high degree of organization, mechanization and automation of technological processes
	Increasing the load capacity of vehicles
	Reduction the number of shipping documents
	Increasing the cargo safety
	Increasing the transportation capacity of transportation providers

Information systems	Quick exchange of the information flow between the parties
	Transparency of the whole process of works and services
	Provision of timely and reliable information that allows to improve a decision-making process
	Single financial service system
	Organization of the unified information data about the carriage participants, road infrastructure and services performed with the carriage
The unification of the transport documents	Improving export possibilities
	Increasing competitiveness in the choice of forwarder
	Improving the national control of the transport system and the movement of cargo flows
	Simplifying the customs formalities, the reduction of the volume of documentation
	Increasing control over the aggregate transportation charges and forwarding costs and facilitating their settlements
	Currency expenditures savings and improving the balance of payments, reduction of dependence on changes in interest rates and tariffs for cargo handling, port fees
	Simplifying the procedures for filing claims and reduction of costs associated with the claims, insurance premiums, interest payments
	Expediting of carriage and delivery of goods, provision of more reliable transactions
Logistic forwarders at different levels	Complexity of logistics services
	Focus on core competencies
	Technological flexibility
	Individual approach to each client
	The high level of reliability of supply
Outsourcing of transport services	Focus on core activities (core competencies)
	Reduction of non-core spending in many areas
	More efficient implementation of transport functions under the control of the experienced people
	Guaranteed quality and reliability of service
	Transport service management flexibility
	Focus on the development of the main type of one's activity.
	Optimization of transport costs
Forms of payment at foreign economic activities	Safety of transactions
	Mutual control of participants of the calculations and their liability for compliance with the order of payment
	The legal regulation of noncash settlements in order to ensure its consistency
Societies, alliances, associations, conferences, organizations of carriers	Protection of the interests of carriers
	Development of uniform customs and documents

transport and terminal network, approaching the market of distribution services and cargo handling, the idea of creating a network by means of the route "container trains" (Airport Passenger Terminal Planning and Design, 2010).

The main indicators, reflecting the preferences of the MMT operator for customers, include the presence of a person responsible for the cargo and its transportation for the whole route; preservation of the goods; price characteristics; the possibility of customs clearance; the possibility of issuing the document of multimodal transportation received by

domestic and foreign banks; financial transparency of the relationship with the client (CAST Terminal-Passenger Terminal Simulation, 2017).

Clients have need of terminals for optimization their logistics costs. The review of product policy of terminals is important for quality network organization, which is caused by the need for specialization in key services. The formulation of the basic products enables to plan the development of the terminal network at all stages more effectively; it allows to point some key customer groups and the potential for the development of competition.

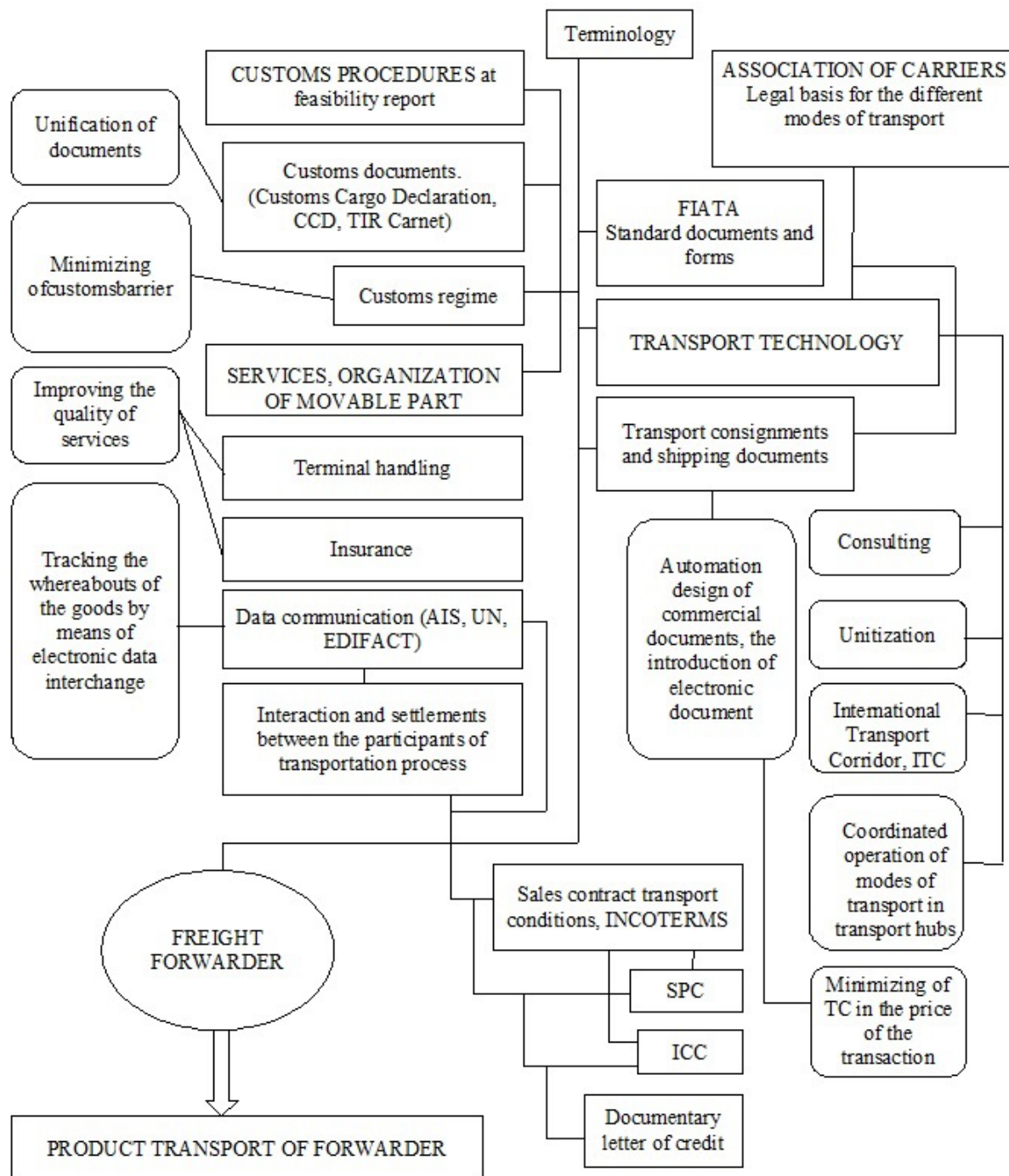


Fig. 2 Formation of SFA transport products.

The list of forwarding services in the terminal network is unusually wide (Freight Forwarding and Logistics: What the High Performers Know, 2017). The forwarder arranges the movable part of the process (including carriage monitoring); cargo operations, warehousing; interaction of modes of transports at gateways; storage, release, acceptance; execution of documents; settlements; legal support; contract work; consulting; customs clearance; selection of the optimum carriers and other participants in the

transport and terminal organization (TTO); selection of the optimal route; minimization of transportation cost in the price of the goods; calculation of the through rate; insurance, etc. Financial relations between the parties of TTO are carried out by the banking system; the information support is carried out with the help of automated information systems (Palagin, 2014; Connectivity and Growth. Directions of Travel for Airport Investments, 2014). Information technologies allow to track the whereabouts of

cargo, to carry out monetary settlements fast and convenient, to execute the necessary documents before the arrival of the goods at the place of destination (customs clearance). Thus, an MMT operator provides a complex of logistics services for a shipper, closing all the logistics flows and providing the transport product of high quality (Fig. 2).

For better understanding of stock liabilities, (Ksenofontova, 2013) the classification of warehouse services Supplementary Table 2 is proposed. The code, obligations of the parties, and the price of services and groups of warehouses are indicated for each condition that allow to carry out the necessary works (Air Traffic Control, 2015).

CONCLUSION

The article introduces the concept, development problems and options to improve the efficiency of international multi-modal transportation (MMT). MMT operator plays a big role in the international multimodal transportation concept. It organizes the end-to-end control for transportation process. The principles of increasing the efficiency of the systems, their development and implementation are given here.

First of all, we have considered the terminal and network principle of cargo movement. Also, this article formulates the principles of classification of the forwarder's terminal and network products.

REFERENCES

- Air Traffic Control. Retrieved July 1, 2015, from https://en.wikipedia.org/wiki/Air_traffic_control.
- Airport passenger terminal planning and design. Vol. 1: Guidebook," Washington, Transportation Research Board of the National Academies, 2010.
- AnyLogic Logistics Network Manager-Decision support system for network optimization. Retrieved January 6, 2017, from <http://www.anylogic.com/logistics-network-manage>.
- Best Airports of 2014. Retrieved July 1, 2015, from <http://www.sleepinginairports.net/2014/best-airports.htm>.
- CAST Terminal-Passenger Terminal Simulation. Retrieved January 6, 2017, from <http://www.airport-consultants.com/cast-simulation/cast-terminal>.
- Connectivity and Growth. Directions of travel for airport investments, 2014. Retrieved July 1, 2015, from http://www.pwc.com/en_GX/gx/capital-projects-infrastructure/publications/assets/pwc-connectivity-growth.pdf.
- Freight Forwarding and Logistics: What the High Performers Know. Retrieved January 6, 2017, from <https://www.accenture.com/us-en/insight-outlook-freight-forwarding-and-logistics-what-high-performers-know>.
- Gubenko, A.V. and Ksenofontova, T.Y. 2015. Strategy to increase the state's role in the business process management on the airport service market. *Journal of Internet Banking and Commerce*. 1 : 1-8.
- Intermodal/Multimodal Freight Transportation. Retrieved January 6, 2017, from <http://www.kkgloballlc.com/services-freight-logistics/multimodal-transportation.html>.
- Jones, P. 2008. Rukovodstvo FIATA. FIATA Legal Handbook on Forwarding, Minsk, OOO Belfarpost.
- Ksenofontova, T.Y. 2013. Enterprise competitiveness management based on innovation-intensive OIS involvement in economic turn over. *Biznes v zakone*. 2 : 227-230.
- Multimodal and intermodal freight transportation. Retrieved January 6, 2017, from <http://www.adr8.lt/en/services/freight-services/multimodal-and-intermodal-freight-transportation/>.
- Multimodal and intermodal transportation. Retrieved January 6, 2017, from <http://www.kaplan.com.tr/eng/index.php/2015-06-01-09-33-01/multimodal-and-intermodal-transport>.
- Multimodal services that optimize air, sea, land, and rail transportation, end-to-end. Retrieved January 6, 2017, from <http://www.yusen-logistics.com/en/services/transportation-services/intermodal-and-multimodal-transport/>.
- Multimodal Transportation. Retrieved January 6, 2017, from <http://www.stalogistic.com/services/multimodal/>.
- Palagin, Yu.I. 2014. Logistics-Planning and Materials Management. Decree of the Government of the Russian Federation No. 303 "on the approval of the state program of the Russian Federation "development of the aviation industry in 2013-2025", 15 April 2014. Retrieved July 1, 2015, from <http://www.garant.ru/products/ipo/prime/doc/70544068/>.
- Smurov, M.Yu., Gubenko, A.V. and Ksenofontova, T.Yu. 2016. Interrelation of the problems of the aircraft fleet development and the improvement of the air traffic control system. *Journal of Internet Banking and Commerce*. 21(4) : 1-15.