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ANALYTICAL PROBLEMATICAL PAPER

CONTAINER TRANSPORT DIRECT CALL – LOGISTIC SOLUTION TO CONTAINER TRANSPORT VIA ESTONIA

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Abstract. Container transport in the world grows up to 12 % every year. Chinese container transport contributes majority of container flows in international container transport. Many world seaports compete for Chinese container flows and make efforts to get investments and direct calls from China to their ports. Estonia has a possibility to decrease its large dependence and risks due to the transit of oil and oil products and coal with the help of container flows from China. In addition to a favorable geographical location Estonia has several other important arguments, like sufficient land in the harbours for developing a container terminal to launch extensive container transport transit from China. Port of St. Petersburg, container transport port closest to Estonia by the Baltic Sea, is overloaded. Estonia can compete for container flows directed to Moscow, Nizhniy Novgorod, Kazan and Kaluga. Construction of an international high-tech container terminal in Port of Tallinn serves as one important precondition for directing Russian transit container flows through Estonia. Such a container terminal could service also larger vessels and container flows from China. Container lines and container terminals operating as alliances are jointly able to substantially increase container flows through countries.

Keywords: container, transport, container vessel, direct call, container terminal, trend.

1. Introduction

Russian import cargo flow in containers keeps growing rapidly and analogous trends exist also for container transport of the Baltic countries. All four countries have a common characteristic – trade with China grows rapidly. In addition to rapid growth of trade also the growth of GDP in China, Estonia, Latvia and Lithuania is rapid. During the last year's the growth of Russia's GDP has remained stable, but the absolute figures of economy in the country are high.

All three Baltic countries compete for investments into regional cargo transport port in the area. Russian container ports located by the Baltic Sea compete simultaneously with Estonia, Latvia and Lithuania. Ports of St. Petersburg, Kaliningrad and Ust-Luga are the most rapidly growing ports among Russian ports. During the coming three to five years some of these ports will get a direct line from China. Next based on world best practices we analyze the preconditions a port has to meet to become a regional port with a direct call from China. We also offer a direct call from China between the Baltic Sea seaports, including Port of Tallinn. We study the advantages of direct call compared to deep sea and short sea shipping. We analyze new trends in the construction of container vessels and the way respective developments support direct call trends in different regions of the world. We also analyze arguments supporting continuing increase of the number of direct calls between ports.

2. Container transport from Chinese ports

Container transport grows rapidly in the world. This is supported by the general 4.4 % increase of world economy and the rapid increase of container transport of China as world factory. In 2007, container transport growth is expected to be 15 %. Compared to 2005, in 2006 container transport in the world grew by 12 %. Majority of world container transport comes from Chinese ports, amounting to a total of 30 %. In 2006, container transport volume of Chinese ports was almost 100 million TEU. As mostly all production is concentrated on the coast of China, majority of containers is transported to the world via ports by container vessels. In 2006, the world largest container port TOP 30 included eight ports of China. The total volume of Ports of Shanghai, Shen-

zhen, Qingdao, Ningbo, Guangzhou, Tianjin, Xiamen and Dalian comprised 74.7 million TEU and growth compared to 2005 was 21.9 % (Fig. 1). Taking the amount serviced by world largest container ports TOP 30 and the amount serviced by Chinese eight largest ports of 74.7 million TEU as a basis, the latter comprised

30.9 % of the general volume, compared to 28.2 % and 61.3 million TEU of the previous year. From the 440 million TEU volume serviced in the world 74.7 million TEU comprised 17 %. In 2006, ten Chinese largest ports serviced a total of 77.1 million TEU and the average increase per port was 23.7 %. Chinese ports rapidly develop their volumes, which in turn continues to increase advantages compared to use of mainland transport. Also, position compared to ports in other Asian countries, will improve.

Chinese ports service a total of almost 100 million TEU, which for the most part will be transported into the world by vessels. As the majority of containers are services by sea, it is important to follow the development of container vessels.

3. Container transport intermodality in Chinese ports

Due to the demand of the clients to decrease expenses on fuel and environmental pressure vessel schedules of container vessels will start to change. Also, the conception of shuttle vessels, during which container vessels call at only four ports during their loop, has already been used, for example shipping lines calling at Ports of Shanghai and Shenzhen in the Far East and Ports of Rotterdam or Hamburg in Europe. As a second example of the same trend shuttle vessels calling at Ports of Ningbo and Hong Kong and Ports of Oakland and Long Beach in Transpacific can be presented. As a third trend there are shipping lines like Wan Hai and PIL, which are not able to invest into huge container vessels and may start to service a specific sector from container transport. Namely, smaller vessels can service smaller ports in China and Europe and America. Such a trend is useful for nature and shipping lines preferring direct calls between ports to lines through hubs. The flow of containerized cargo exported from China to Russia increases over 40 % in a year and Russian retail trade increases over 50 % per year. At the same time the new container terminals of Russian ports have not been completed yet (for example Ust-Luga). Therefore Port of Tallinn has good possibilities to capture part of cargo flows between Russia and China. Above all this assumes a strategy for transportation of cargo to the port by the sea, servicing of cargo in ports and further transportation of transit cargo to Russia. Also, servicing of Russia's containers and their potential filling with cargo in Estonia. For example in 2006, only about 3 million containers were transported by railway in China in 2006, whereas only 99 498 containers were transported by railway from ports to Chinese foreign borders. The given figures comprise 3 % and 0.1 % respectively of container transport passing through Chinese ports. Hence, 97 % of container transport into and out of Chinese ports is performed by trucks. Container transport in other larger seaports is performed analogously. Table 1 provides corresponding data compared to the corresponding data of Port of Tallinn. We see that even in the largest ports largely trucks perform, well equipped with infrastructure transport of containers from the port and only under one third is performed by rail.

4. Changing of the size of container vessels

Many 2000 up to 3000 TEU container vessels have outlived their time. The speed of these container vessels is low – 19–20 knots and many of these have been built in the beginning or middle of the 1980's. In the meantime

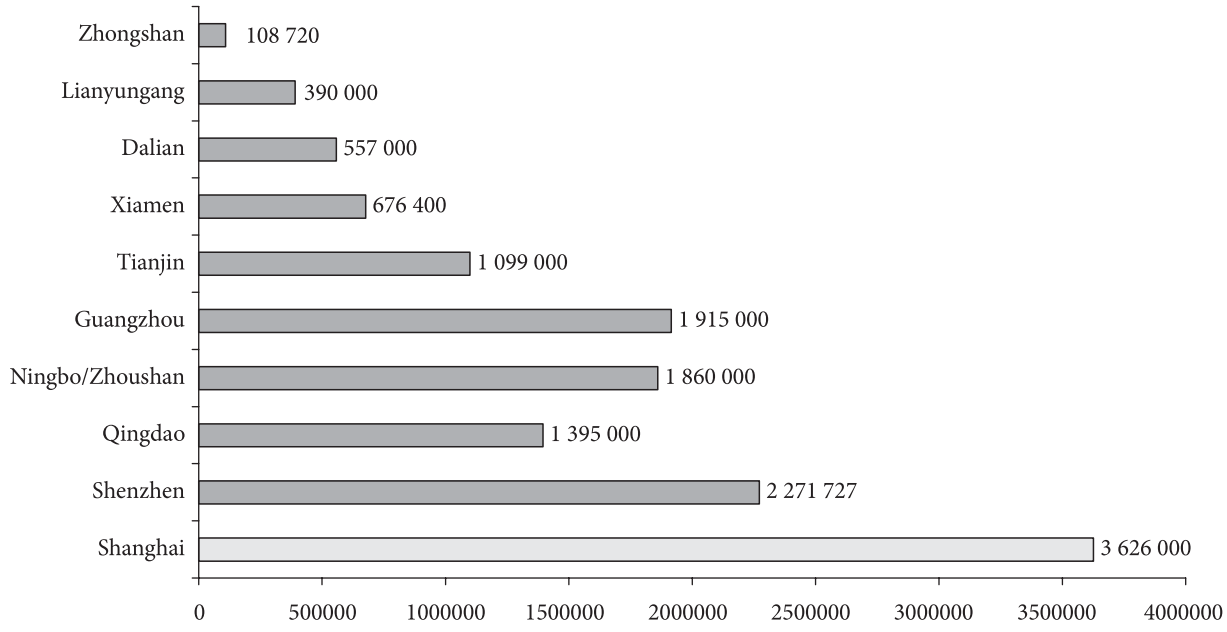

Fig. 1. Growth of Chinese ports 2006 (TEU)

Table 1. Division of container transport into port(s) according to transportation types

Port	TEU	Share of truck transport %	Share of rail transport %
Petersburg	1 449 958	95	5
Hamburg	8 862 000	67	30
Rotterdam	9 600 000	60	9,3
Los Angeles	8 469 853	72	28
Tallinn	152 399	93	7

Table 2. Forecast need for container vessels 1996–2014

To be served by a fleet of TEU	Present 2006	Plus ordered 2009	Plus extra needed 2014
1 000 to 3 000	1 745	2 161	2 400
3 000 to 5 000	627	873	1 000
5 000 plus	487	786	1 100
Mean vessel capacity	3 092	3 362	3 670

Table 3. Estimated international throughput 1996–2006 (million TEU)

Trade lane	1996	2006	Growth	% Growth
Asia-Europe/Med	8.2	27.3	19.1	232
Transpacific*	10.4	33.9	23.5	226
Transatlantic	6.6	14.6	8.0	122

the repair and reconstruction costs of such container vessels have increased considerably. Also, new technologies have been added to new container vessels, making container vessels more efficient. Presently container vessel fleet includes 359 of such vessels with the gross tonnage of 386 621 TEU, which are older than 25 years. 60 vessels of these container vessels are 29 to 30 years old comprising gross tonnage of up to 60 000 TEU. Majority of world container vessel fleet is controlled by twenty world's largest carriers. The general trend characterizes continuing growth of the market shares of large carriers. The possible slow down of ordering of new container vessels can be prevented by (balanced by) utilization of large capacity container vessels. As many 2 000 TEU to 3 000 TEU vessels become outdated due to low speed and high repair and fuel expenses, quite probably the share of such vessels in the orders of container vessels will increase in the near future. In addition to the aforementioned changing trends in transport of containers in the form of a direct call operation between the ports will influence respective developments. In Table 2 we will add a forecast for container vessel orders.

5. Direct call option

As every year world economy will increase at least by 4.4 %, based on this growth also container transport between countries will grow. China as world's factory has become the world third largest exporter after Germany and Japan and in front of the USA. As almost 30 % of world international container transport belongs to China, the fact where Chinese export is destined is important. Main directions in exporting containers by sea have included Europe and America.

Transatlantic includes data on West Asia and North America and does not include domestic and transhipment movements. The Table 3 indicates large growth, which by absolute value amounts to tens of millions of TEU. As growth has been continuous it has taken large ports to a situation, where more and more they need to be able to service container transport. Today, feeder vessels from hubs take cargo to the ports of the Baltic Sea and Russia. Large container vessels with up to 10 000 TEU transport containers take cargo for example from Asia to large hubs like Hamburg, Bremerhaven, Rotterdam or Antwerp. This service model has several weaknesses. First by such container transport has additional costs at reloading of containers from large deep sea container vessels to hubs and once again at their reloading to feeder container vessels for the continuing of the voyage to the next destination. Secondly, the transit time of containers lengthens. Thirdly, in a hub organizational work at servicing of containers is added, during which it is followed that containers are transported to right ports and they would not be lost. Fourthly, also cooperation with feeder shipping lines based on further division of container transport has to be organized in hubs. As these are not large vessels, upon need even deep sea container lines owning their own feeder lines have to cooperate with other container lines to make container flows smooth. As majority of containers transported to Russia pass through Port of St. Petersburg, in case of the possible direct line from Asia container line should pass through Pusan, Sanghai, Kaoshang, Shenzhen, Hong-Kong, Keelung and finally reach Petersburg. Assuming that cranes service container vessels with the speed of up to 20 TEU per one hour 11 to 12 container vessels have to be brought to container line. Monetary gain in case of a direct call from Asia to Petersburg is 80 Euros at unloading from a deep sea container vessel to a hub terminal and in addition to this 60 Euros at loading to a container vessel. Considering the numerical ratio of 20 feet and 40 feet containers the summed average will be by 87.5 Euros more than favorable marine transport per container. Direct call container lines would cover their initial capital investments, if the size of container vessels reached 6 000–7 000 TEU. According to different evaluations in case of transhipments in hubs container terminals service 25 to 30 % of the cost of container transport continuing its voyage by container line. Presently in our area deep sea container vessels call only at Port of Gothenburg and Port of Arhus. The direct call trend has a kind of regional specification, which has been certified upon transpacific container transport. For example, in Asia many operations have been focused on special ports and regions (clusters like North-China (Bohai Sea) and South-China (Pearl river delta). In North America – Pacific North West, Pacific South West and Mexico on the west coast of America. And ports on the east coast of America on Atlantic seaboard. Collecting of different container vessels has established a sufficient base for direct call into smaller ports in different regions, which were serviced with feeder container lines. Direct call trend is supported by construction of high technology

terminals in regional ports, which are able to service already larger vessels. In the USA such ports include Ports of Jacksonville, Mobile (Alabama), Tampa and Port of North-Carolina in Wilmington. The analogous trend in China is represented by Port of Xiamen, Port of Fuzhou and Port of Lianyungang. The fact that many such regional ports have been planned to service post-panamax type container vessels is an intriguing fact. Let us compare the possibilities of hub-and-spoke and direct call more closely and analyze costs based on the example of US east coast. The cost comparative analysis is provided in Table 4. Table 4 indicates that container vessel costs are by 37 USD smaller in case of a direct call, but this price difference is not sufficient for covering a 4 000 TEU size container vessel to replace higher transhipment costs. Still, the triumph of regional ports continues and this trend may even capture almost one half of transhipment growth. Direct call service making use of container vessels with the size of 4 000 TEU panamax assuming 70 % fulfillment and calling at five (regional) ports assumes the amount of at least 556 TEU (4 000 TEU X 0.7/5/1.67) or 335 containers (assuming that two thirds of containers are 40 feet containers) per one regional port in every direction. Already today many regional ports are able to generate such amounts and in the near future such ports will continue to be added. Based on Table 4 we add Fig. 2 indicating the hub and spoke option and direct call option on the east coast of the United States. The location of hub port in Guantanamo Bay in Cuba has been provided as an illustrative port on the map.

Looking at the possibilities of Estonia at becoming a direct call port in the area of the Baltic countries we analyze possible ports the container line would pass through. As all three Baltic countries have set an objective to become a location of an international container terminal, it is sensible to view other countries and ports the direct call container line could service. The large growth of Port of St. Petersburg of up to 40 % in a year is noteworthy. At the same time in 2009 a new container line will be added to Port of Ust-Luga and this will substantially change container flows passing through Port of St. Petersburg. In such a case majority of containers transported to Rus-

Table 4. Ship and port costs for selected service patterns

		Direct	Hub and spoke	
		Regional	Mother	Feeder
Ship size	TEU	4 000.0	8 000.0	2667.0
Ships in string		8.0	7.0	1.0
Total rotation time	Days	56.0	49.0	7.0
One-way time	Days	28.0	25.0	4.0
Daily ship cost	USD/Day-FEU	27.6	23.9	30.0
Total ship cost	USD/FEU	773.0	585.0	105.0
Total ship cost, mother&feeder	USD/FEU	773.0		690.0
Ship cost differentials	USD/FEU			83.0
Port cost	USD/FEU			120.0
Ship&port cost differentials	USD/FEU			(37.0)

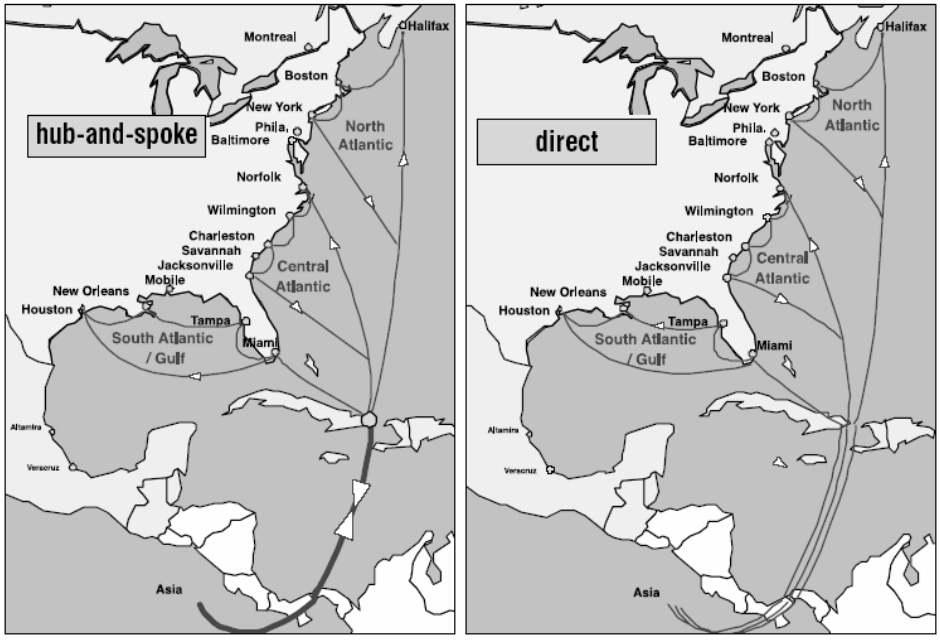

Fig. 2. Hub and spoke option, direct option on the east coast of the USA

Fig 3. String between ports in the Baltic Sea

sian hinterland are transported to other large Russian regions via Port of Ust-Luga. Hence, Port of St. Petersburg can ensure sufficient container throughput capacity in the coming ten years in the town of St. Petersburg and province of Leningrad. Due to the aforementioned based on container volumes of Ports of St. Petersburg and Ust-Luga Russia will collect a sufficient number of containers for direct call container line. The volume of the ports of the Baltic countries at least for the volumes of Port of St. Petersburg overlaps and the ports of the Baltic countries will not be able to compete with its own transport (vessel/truck and vessel/rail) with Port of St. Petersburg. The possibility of Estonia is to compete for container flows directed to Moscow, Nizhniy Novgorod, Kazan and Kaluga. Due to the aforementioned Port of Tallinn has a possibility to get partner ports Gdynia and Gdansk from Poland and Port of Kaliningrad from Russia for launching a potential direct call container line**.** Presently, Port of Gdynia accommodates two international container terminals (Hutchison and ICTC) and a 500 000 TEU throughput capacity container terminal will be opened in Gdansk in the end of 2007. Compared to the first three months of 2006, in 2007 container transport of Port of Kaliningrad has increased by 34 %. The province of Kaliningrad makes good use of the possibilities of the special economic zone created for the province by the Russian central government. The respective container line should also include Port of Arhus, which today is the largest Nordic port. Let us take the direct call operation, which makes use of container vessels of 4000 TEU panamax assuming 70 % fulfillment just like in case of the respective example in the USA. A container vessel calls at Ports of Arhus, Gdansk, Gdynia, Kaliningrad and Tallinn. Such a string analogously assumes 556 TEU (4 000 TEU X 0.7/5/1.61) or 348 containers per every port (assuming that 61 % of containers are 40 feet containers). Fig. 3 provides a possible string between Port of Arhus, Port of Gdansk, Port of Gdynia, Port of Kaliningrad and Port of Tallinn.

One supporting factor at the launching of a direct call container line also includes existence of an international high technology container terminal in the given ports. Such international container terminals may include Hutchison Port Holdings (HPH), Cosco Pacific or China Shipping. According to the words of Ken Uriu, the marketing manager of Port of Long Beach, also close contacts between seaports – sister cities – exist as forms supporting operations between the ports in the United States. Today 40 % of cargo in containers is transported from Asia to the United States into Ports of Long Beach and Los Angeles. The importance of ports is stressed by their good strategic location, infrastructure and deep-water berths. Also, the time of transit transport influences cargo flows. For example, upon transporting of containers from Hong Kong to New York via Long Beach this will be a total of 19 days. Transporting of cargo to New York via Panama Canal will take 21 days. In addition to the aforementioned 18 million people live in the state of California and as the world six the largest economy the region has high purchasing power. By 2020, container transport volume from the United States to West Coast will increase to 36.2 million containers. Ken Uriu stresses that therefore the United States needs new ports in Mexico and Canada (Port of Prince Rupert). Ken Uriu

claims that there will be enough cargo for everyone. But Port of Long Beach is the dominating port in the region. The so-called smaller ports are able to service one to two million TEU and Port of Long Beach needs such ports, as in the future Ports of Los Angeles and Long Beach will have difficulties in servicing over 35 million TEU. According to Marcel van Dick, the Marketing Manager of the port, the other hub of the United States – Port of Los Angeles has one official sister port agreement. This port is Port of Nagoya in Japan. But the rest fifteen sister ports of Port of Los Angeles are actively exchanging information with Port of Los Angeles in all port related areas. Major sister ports to Port of Los Angeles include Port of Shanghai and Port of Yantian and Port of Hong Kong in China. During the past five years Port of Los Angeles has become almost twofold. Cargo is like water flowing to where there are less restrictions, comments Marcel van Dick. Advantages of Port of Los Angeles include good infrastructure enabling restriction - free movement of cargo. Port of Los Angeles has a new large APM terminal Pier 400. Compared to 2005, in 2006 Port of Los Angeles grew by 800 000 TEU, which is half of the yearly volume of Port of Seattle or Port of Tacoma. For example, smaller ports grow by 20 % in a year with the yearly volume of 2 000 000 TEU and they cannot grow suddenly by 800 000 TEU in a year. Hence, Marcel van Dick is of the opinion that part of containers move also into smaller ports via direct call. Such ports include the already aforementioned Port of Prince Rupert in Canada. Marcel van Dick does not see a problem, as he thinks that there are enough containers for everybody. Also, Mexican ports, like Port of Punta Colonet, grow. Yet, the given port needs investments in the amount of nearly 2 billion US dollars, as today there is nothing else but a bay there. Port of Manzanillo plans to grow to two million containers within the period of 5 to 7 years. In the opinion of Mark Wheeler, the West Basin Container terminal manager of Port of Los Angeles, container vessels become bigger and bigger and also bigger container terminals will be constructed in the ports. Smaller ports on the West coast in the United States include Tacoma, Seattle, San Francisco and Oakland. The trend is that part of cargo moves into the aforementioned areas, but at the same time instead of smaller 2 000–4 000 TEU container vessels more and more 8 000–10 000 TEU container vessels call at Port of Los Angeles.

In the opinion of Philip Lucier, APL terminal manager of Port of Los Angeles, the two largest ports of the United States, Port of Los Angeles and Port of Long Beach, are able to continue growth. Hence, part of cargo may start to move to smaller ports in the near future. Such a change may occur starting from 2008 at the earliest.

6. Conclusions

During the coming ten years Chinese container transport increasing to one third of world container transport, will dominate in world container transport. To get a share of the aforementioned container transport Estonia has to actively participate in the international container transport market and find a suitable logistic solution for transporting of containers into Estonia in large quantities. Large-scale transport of transit containers from China passing through Estonia can take place by sea, using the deep sea and short sea or direct call principle. The maritime transport trend is also supported by the factual intermodal transport division between different modes of transport in Chinese ports. In 2006, only 0.1 % of all container traffic of Chinese ports was transported from Chinese coastal ports to other countries by rail. Container transport continues to grow in hubs all over the world. Regional ports with the volume of up to 2 million TEU per year are more and more able to service container flows hubs are not able to service. Direct call transport has several advantages in relation to deep sea and short sea transport. Deep sea and short sea transport is more expensive compared to direct call. Also, the time of transit transport is longer. With a transhipment in hubs container terminals earn an estimate of up to 30 % of the cost of container transport transported onward using a feeder container line. Instead of smaller up to 4 000 TEU container vessels more and more up to

10 000 TEU vessels call at world hubs. Container lines specialize just the way there is specialization between hubs and regional ports. Container lines not able to invest into large container vessels start to service a specific sector from container transport. Smaller container vessels can service smaller ports in China and Europe and America. Due to the request of the clients to decrease expenses on fuel and environmental pressure, container vessel schedules start to change. Such a trend is useful for shipping lines preferring direct calls between ports to shipping lines through hubs.

The direct call trend is supported by construction of terminals in regional ports, which already today are able to service container vessels. The three Baltic countries have a solvent population of a total of 7.6 million, which in turn gives an important input for the launching of a potential direct call shipping line in the area and partially balances transit container flows with the domestic export-import container flow. Port of Tallinn has a possibility to start to service extensive container flows to Moscow, Nizhniy Novgorod, Kazan and Kaluga. Extensive container flows to Russia serve as a prerequisite to the lunching of a direct call shipping line China – Arhus – Gdynia – Gdansk – Kaliningrad – Tallinn.