

The Missing Link: Railway Infrastructure of the Baltic States and its Defence-related Implications

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The Baltic States' railway infrastructure encompasses serious strategic vulnerabilities that may hamper NATO's military logistics in the region. The railway infrastructure of Lithuania, Latvia, and Estonia rests upon an East-West vs. North-South asymmetry with the East-West railway interconnections dominating and binding the Baltic States much tighter to Belarus and Russia than to Continental Europe. The Baltic States are still using the "wide gauge" railway tracks stemming from the Soviet times that make them directly interoperable with Belarus and Russia. Lithuania keeps using the Russian locomotive safety control and maintenance system KLUB-U and is vulnerable to the misuse of existing security gaps in this system that, in the worst case, might include remote control take-over of trains. In addition, the Kaliningrad transit through Lithuanian territory poses hybrid security risks, as recent examples show that unauthorised disembarking from transit trains in Lithuania is possible. The Baltic States and NATO should immediately address these risks for military logistics and defence planning by adjusting the infrastructural asymmetry in the Baltics to serve NATO's - not Russia's - interests. An immediate progress on the implementation of the "Rail Baltica" is crucial to install the European standard railway gauge in the Baltic States and connect them with Continental Europe. Additional investments in security equipment and enhanced presence by the Lithuanian military along the Kaliningrad transit route should be achieved to deter any possible instances of misuse of the transit scheme. These measures would have a huge impact on deterrence, forward defence planning, and its practical implementation in the region.

Forward defence planning in the Baltics

Russia's war of aggression against Ukraine has dramatically increased the urge for NATO to strengthen its deterrence and defence posture along its Eastern flank and especially in the geostrategically exposed Baltic States. Already since Russia's illegal annexation of Crimea in 2014, NATO has gradually increased its forward presence on the ground in Lithuania, Latvia, and Estonia, where multinational battlegroups are now stationed as a part of NATO's enhanced Forward Presence (eFP) framework.¹ NATO's ultimate goal is to scale up the battlegroups (around 1,700 troops) to brigade-size units (around 3,000 troops) in the near future.² In addition, in the summer of 2023, the Alliance made another important step forward by updating its military defence plans for the Baltic States. With the new plans, the concept of forward defence in the Baltics was established meaning that Lithuania, Latvia, and Estonia would be defended collectively by NATO from the onset of a military crisis.³ In light of the Baltic States' complicated accessibility by land, sea, and air because of Russian anti-access/area

¹ NATO, NATO's military presence in the east of the Alliance, https://www.nato.int/cps/en/natohq/topics_136388.htm [accessed: 29.10.2023].

² Ibid.

³ BNS, Lrt.lt, 'If Russia sets foot here, it will be pushed out' – NATO approves Baltic defence plans on eve of summit, 11.07.2023, <https://www.lrt.lt/en/news-in-english/19/2032024/if-russia-sets-foot-here-it-will-be-pushed-out-nato-approvesbaltic-defence-plans-on-eve-of-summit> [accessed: 29.10.2023].

denial (A2/AD) capabilities stationed in Kaliningrad⁴ and the absence of strategic depth for a military retreat which is pre-conditioned by their small geographical size, NATO's forward defence planning marks a qualitative upgrade in its deterrence and defence posture in the Baltic region.

Although the current "boots on the ground" posture of NATO sends a strong signal of its readiness to defend the Baltics from the onset of a military crisis, the Alliance also recognises that "credible deterrence and defence relies on adequate logistics capability."⁵ NATO's logistics in the Baltics are, however, hampered by Lithuania's, Latvia's, and Estonia's persisting complex infrastructural bounds with Russia and Belarus that are making them vulnerable to potential sabotage, political and military blackmailing, and hybrid attacks. This is particularly true for their railway infrastructure being an area in which the Baltic States are still better integrated with Russia and Belarus than with its NATO allies in Central and Western Europe. This interconnectedness poses two types of challenges: easier access for the Russian troops to the territory of the Baltic States and hampered logistics for NATO allies for transferring reinforcements and military supplies for their defence.

Drawing on lessons learned from ongoing Russia's war against Ukraine, it is crucial to assess the role of railways in the military logistics and defence planning of the Baltic States and to embed the topic of infrastructural connectedness in the Baltics in the strategic debate.

Strategic vulnerabilities of the railway infrastructure in the Baltics

The history of railway infrastructure development in the Baltics illustrates its critical importance for civil and military logistics. After the first railway lines in the Baltics have been installed back in the 19th century when the Baltic States were a part of the Russian Empire, the occupying forces of the 20th century - the USSR and Nazi Germany - changed the gauge type of railway tracks in the Baltics several times. The initial gauge of 1435 mm dating back to the 19th century was changed to the USSR standard gauge of 1520 mm in 1940, then back to 1435 mm in 1941 after the occupation by Nazi Germany, and back again to the USSR standard after the end of the Second World War.⁶ During the second Soviet occupation (1944-1990), the railway infrastructure in the Baltics was further developed as an integral part of the vast railway network of the Soviet Union. Within this network, the main railway lines in the Baltics were planned as an East-West connection between mainland Russia and the Baltic Sea harbours Klaipėda, Riga, and Tallinn.

Today this Soviet infrastructural legacy manifest itself as a source of critical vulnerabilities for the Baltic States including their dependence on Russia in several interrelated areas. First, because of the initial design of the railway network as an East-West axis, the Baltic States are to date not sufficiently connected among themselves as they lack a North-South interconnection. Options for traveling between the capital cities Vilnius, Riga, and Tallinn by

⁴ Daniel Ince, The Russian Antiaccess/Area Denial Security Issue over Kaliningrad and the Baltics, in: Wild Blue Yonder, Air University (AU), 17.06.2021, <https://www.airuniversity.af.edu/Wild-Blue-Yonder/Article-Display/Article/2659250/the-russian-antiaccessarea-denial-security-issue-over-kaliningrad-and-the-balti/> [accessed: 19.11.2023].

⁵ NATO, Vilnius Summit Communiqué, paragraph 40, https://www.nato.int/cps/en/natohq/official_texts_217320.htm [accessed: 04.11.2023]

⁶ LTG INFRA, Geležinkelių infrastruktūros istorija, <https://ltginfra.lt/apie-mus/istorija/> [accessed: 06.11.2023].

train are still limited: the first passenger interconnection between Vilnius and Riga opened in December 2023.⁷ Second, the railroads in the Baltic States are still operating using the wide “Russian type“ gauge (1520 mm) railroad tracks. This puts the Baltic States in a position of being fully interoperable with Russia and Belarus on the technical level of their railway infrastructure. On the other hand, technical interoperability with Poland and through it with Continental Europe using the 1435 mm gauge is extremely limited as railway tracks of this width end in the Lithuanian city Kaunas.⁸

The strategic costs of this infrastructural incompatibility of the railway tracks in Europe are evident in the context of Russia’s war of aggression against Ukraine. Following the blockade of Ukraine’s Black Sea ports by Russia, Ukrainian grain is now being shipped to the world market also through the Lithuanian port of Klaipėda. Because of the above-mentioned technical limitations, this is not an easy task. Before reaching the Lithuanian seaport, the Ukrainian grain transported on trains using the 1520 mm gauge is reloaded on trains with the European standard gauge (1435 mm) at the border between Poland and Ukraine and then is reloaded again on 1520 mm gauge trains at the border between Poland and Lithuania.⁹ Beyond the fact of being more expensive, inefficient, and time-consuming, this logistical incompatibility between Ukraine, Poland, and Lithuania demonstrates in practice the hurdles that NATO would face when trying to supply the Baltic States with military equipment and reinforcements in a case of military aggression.

Within this context, integration into the European railway infrastructure has been a proclaimed strategic goal of the Baltic States since the 1990s. This goal is to be achieved through the implementation of the “Rail Baltica“ project constituting a part of the EU’s North Sea-Baltic TEN-T corridor. When finished, the “Rail Baltica“ will connect the Baltic capitals Vilnius, Riga, and Tallinn among each other and - through Warsaw - also with Continental Europe using the European standard gauge of 1435 mm.¹⁰ However, real progress in implementing this project is still pending with merely the route segment between Warsaw and the Lithuanian city Kaunas operational to date. The main brakes for the implementation of the project include initial prolonged disagreements among Lithuania, Latvia, and Estonia regarding the route plan, financial constraints as the project is only partially EU-funded¹¹, and, most importantly, serious mismanagement issues in the Baltic States¹² resulting in the recent postponement of the finalisation of the project from 2026 to 2030. The Baltic States’ inability to push for a rapid

⁷ Irt.lt, „Pirmasis keleivinis traukinys iš Vilniaus į Rygą pajudės dar šių metų gruodį“, 10.11.2023, <https://www.irt.lt/naujienos/eismas/7/2121997/pirmasis-keleivinis-traukinys-is-vilniaus-i-ryga-pajudes-dar-siu-metu-gruodi> [accessed: 12.11.2023].

⁸ Lietuvos Respublikos susisiekimo ministerija, Lietuvos geležinkelių tinklas, <https://sumin.lrv.lt/lt/veiklos-sritys/gelezinkeliu-transportas-1/apie-sektoriu-2> [accessed: 31.10.2023].

⁹ European Commission, Amended proposal for a Regulation of the European Parliament and of the Council on Union guidelines for the development of the trans-European transport network, amending Regulation (EU) 2021/1153 and Regulation (EU) No 913/2010 and repealing Regulation (EU) 1315/2013, Brussels, 27.7.2022, COM(2022), 384 final, 2022/0420 (COD), p. 8.

¹⁰ Rail Baltica, Rail Baltica - Project of the Century, <https://www.railbaltica.org/about-rail-baltica/> [accessed 31.10.2023].

¹¹ Rail Baltica, Historical Facts, <https://www.railbaltica.org/about-rail-baltica/history/> [accessed: 01.11.2023].

¹² Politico, „Struggle over Rail Baltica spills into Brussels budget fray“, 20.02.2020, <https://www.politico.eu/article/struggle-over-rail-baltica-spills-into-brussels-budget-fray/> [accessed: 18.11.2023].

implementation of this strategically important project is surprising knowing their principled position toward ending dependence on Russia in other security-related areas.

Another area of critical vulnerabilities is related to railway system control, operation, and maintenance as Lithuania still uses the Russian locomotive traffic safety maintenance system KLUB-U.¹³ This issue has already been a topic of a special investigation by the Committee on National Security and Defence (CNSD) of the Lithuanian Parliament in 2017. This found out that in the time frame between 2005 and 2017, the KLUB-U system was even connected to the Russian satellite navigation system GLONASS/GPS: as an operator of the KLUB-U system, Russia was technically capable to track the movement of trains in Lithuania, collect information on their technical condition and even stop them remotely.¹⁴ Although following the recommendations of the National Cyber Security Centre, the KLUB-U system was disconnected from the GLONASS/GPS navigation system in 2017 and thus the risk of remote control take-over was minimised, the CNSD concluded that the use of the Russian locomotive control system in Lithuanian trains is per se incompatible with Lithuania's national security interests.¹⁵ Even though these conclusions were drawn in 2017, the Lithuanian Railways announced the ongoing gradual switch from KLUB-U to an alternative system - the Ukrainian locomotive traffic safety maintenance system "Impuls" only in 2023.¹⁶ This is a remarkably slow progress in light of the ongoing Russia's full-scale war in Ukraine and the repeated instances of misuse of critical infrastructure for military goals, including sabotage and military blackmailing.

The above-mentioned vulnerabilities pose considerable challenges to the defence planning of the Baltic States. One of them is easy access for the Russian military to the Baltic States in terms of the interoperability of their existing physical infrastructure. Russia's war against Ukraine has confirmed that the Russian army is a "railway army" with this status being based on its long military experience in the vast Eurasian geospatial context.¹⁷ As a result, Russia's military logistics relies heavily on rail transportation for supplies and reinforcements.¹⁸ It is being argued that Ukraine's success in preventing Russia from overtaking and utilising its rail infrastructure has been an important factor that limited Russia's advance in the crucial early stage of the war and, among others, helped prevent Kyiv's fall.¹⁹ Also, the interconnected railway infrastructure of Belarus which is currently acting as a de-facto co-aggressor in Russia's war against Ukraine was foreseen with an important role of supplying Russian forces in Ukraine

¹³ 15min.lt, BNS, „LTG išbando Ukrainos „Impuls“ lokomotyvų saugos sistemą“, 22.02.2022, https://www.15min.lt/verslas/naujiena/transportas/ltg-issbando-ukrainos-impuls-lokomotyvu-saugos-sistema-667-2012728?utm_medium=copied [accessed: 01.11.20023].

¹⁴ Lietuvos Respublikos Seimas, Nutarimas „Dėl Lietuvos Respublikos Seimo Nacionalinio saugumo ir gynybos komiteto atlikto parlamentinio tyrimo dėl asmenų, verslo subjektų ir kitų interesų grupių galimo neteisėto poveikio valstybės institucijoms priimant sprendimus ir galimos neteisėtos įtakos politiniams procesams išvados, 2018 m. birželio 5 d. Nr. XIII-1228, Vilnius, pp. 41-42.

¹⁵ Ibid, pp. 41-42.

¹⁶ 15min.lt, BNS, „LTG išbando Ukrainos „Impuls“ lokomotyvų saugos sistemą“.

¹⁷ Lukas Milevski, Russian Logistics and Forward Urban Defense in the Baltic States, in: Military Review Online Exclusive, September 2022, p. 3.

¹⁸ Maria Engqvist, A Railhead Too Far: The Strategic Role of Railroads during Russia's Invasion of Ukraine, FOI, Swedish Defence Research Agency, October 2022, p. 2.

¹⁹ Ibid, p. 3.

from the North. These plans were hampered in the first weeks of the war as the Belarusian railway infrastructure was sabotaged by Belarusian partisan groups seeking to disrupt those supply lines and thus complicate the invasion.²⁰ Given the Baltic States' infrastructural interoperability with the railway track gauge of Russia and Belarus, it is quite certain that they would try "pushing"²¹ their military supplies to the Baltics by rail.

By contrast to the Russian military forces and logistics, NATO allies would be hampered by the existing physical infrastructure in accessing the Baltics by rail for military support and reinforcements. Under current circumstances this would only be possible through reloading NATO's military freights on trains using the wide gauge either on the border between Poland and Lithuania or in the Lithuanian city of Kaunas. This would cost valuable time and increase the risk of damaging military equipment. In addition to the current infrastructural limitations, Lithuania's accessibility from Poland, which has become a crucial logistics hub for military supplies to Ukraine during the current war²², is extremely hampered as Lithuania is accessible from Poland only through the 80 km wide border region between Belarus and the Kaliningrad enclave of Russia, better known as the "Suwałki gap"²³. Furthermore, Lithuania's reliance on Russia's infrastructural maintenance and control systems creates cyber security risks for the operational security of the railways. Would Russia be able to misuse security gaps in the KLUB-U system, the safety of railway transportation, and even its ability to fulfil its initial function would be put in question. Planning NATO's military logistics by railways that, at least theoretically, could be controlled by Russia on the system level, sounds like a contradiction in itself.

Security risks emanating from the Kaliningrad transit

The route of the Kaliningrad transit from mainland Russia to its Kaliningrad enclave and vice versa goes through the Lithuanian territory and thus is carried out using its railway infrastructure. Since 2002 the Kaliningrad transit between Lithuania and Russia has been regulated at the EU level. The principle of free transit of passengers and goods by rail and road from mainland Russia to its enclave Kaliningrad was established by the Joint Statement

²⁰ Washington Post, „The Belarusian railway workers who helped thwart Russia's attack on Kyiv“, 23.04.2023, <https://www.washingtonpost.com/world/2022/04/23/ukraine-belarus-railway-saboteurs-russia/> [accessed: 02.11.2023].

²¹ The Economist, „Why logistics are too important to be left to the generals“, 03.07.2023, <https://www.economist.com/special-report/2023/07/03/why-logistics-are-too-important-to-be-left-to-the-generals> [accessed: 08.11.2023].

²² Financial Times, „Russia's war transforms sleepy Polish city into aid hub for Ukraine“, 11.04.2023, <https://www.ft.com/content/0adf3a46-0251-4877-a758-ea141d6d6467> [accessed: 02.11.2023].

²³ Leopold Scholtz, The Suwalki Gap dilemma: A strategic and operational analysis, in: Militaire Spectator 189, Nummer 11, 2020.

between the EU and Russia on the Kaliningrad transit in 2002²⁴ and anchored in Protocol No 5 of Lithuania's EU accession treaty.²⁵

In terms of legal organisation, the Kaliningrad transit functions based on special transit documents - facilitated transit document (FTD) and facilitated railway transit document (FRTD) - that are being issued by the Lithuanian authorities. Regarding the transit route by road, it is not fixed to particular roads but is limited in time (24 hours). The transit route by rail, on the other hand, is a fixed interconnection that crosses the Lithuanian territory through the 227 kilometres long railway route Kena–Vilnius–Kaunas–Kybartai.²⁶ In the meantime, the number of passengers per transit train is limited to 250 with approximately four such trains crossing the Lithuanian territory per day.²⁷ Through the implementation of the Kaliningrad transit scheme, Lithuania preserves its sovereign right to implement national regulations for border control as well as to refuse entry into its territory in special cases.

Since the start of Russia's war against Ukraine at the latest, the Kaliningrad transit, especially its railway route, has been perceived by the Lithuanian government as an immediate security risk for the country²⁸. The biggest source of concern for the authorities in Lithuania is unauthorised halts of transit trains, including disembarking while on Lithuanian territory.²⁹ In such a scenario disguised Russian military personnel on board of transit trains are being feared. To prevent such actions, the wagons of transit trains of Russian formation on the routes Kaliningrad - Moscow - Kaliningrad, Kaliningrad - St. Petersburg - Kaliningrad, Anapa - Kaliningrad - Anapa, Chelyabinsk - Kaliningrad - Chelyabinsk,³⁰ are being attached to Lithuanian locomotives (that still rely on the Russian traffic safety maintenance system KLUB-U) after entering Lithuania's territory. In addition, special surveillance equipment is being attached to transit trains and the route itself is being secured by the Logistics Unit of the

²⁴ European Council, Joint Statement of the European Union and the Russian Federation on Transit between the 24 Kaliningrad Region and the Rest of the Russian Federation, EU-Russia Summit, 11.11.2002, 13970/02 (Presse 347), https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/er/74447.pdf [accessed: 02.11.2023].

²⁵ Act concerning the conditions of accession of the Czech Republic, the Republic of Estonia, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the Republic of Slovenia and the Slovak Republic and the adjustments to the Treaties on which the European Union is founded - Protocol No 5 on the transit of persons by land between the region of Kaliningrad and other parts of the Russian Federation, Protocol No 5 on the transit of persons by land between the region of Kaliningrad and other parts of the Russian Federation, Official Journal L 236 , 23/09/2003 P. 0946 - 0946.

²⁶ Papildoma informacija apie Lietuvos nacionalinę programą VSF (Europos Komisijai pateikta 2015 m. liepos 20 d.), p. 5, https://www.cpva.lt/data/public/uploads/2018/06/speciali-tranzito-schema_20_lt.docx [accessed: 08.11.2023].

²⁷ Ibid.

²⁸ Ministry of Interior of the Republic of Lithuania, „Ministrė A. Bilotaitė: stipriname Kaliningrado tranzito saugumą“, 30.03.2022, <https://vrm.lrv.lt/lt/naujienos/ministre-a-bilotaitė-stipriname-kaliningrado-tranzito-sauguma/> [accessed: 03.11.2023].

²⁹ Ministry of Interior of the Republic of Lithuania, „Ministrė A. Bilotaitė: stipriname Kaliningrado tranzito saugumą“.

³⁰ The agreement between the Government of the Russian Federation and the Government of the Republic of Lithuania on procedure for issue of the simplified travel document on the railroad of June 20, 2003, Article 1, paragraph 4.

Lithuanian Armed Forces and the Lithuanian State Border Guard Service.³¹ Reacting to the changed geopolitical context in the region, the European Commission recently provided Lithuania with additional financing for an upgrade of security measures on the transit route³².

Despite these security measures, some serious security gaps in the transit scheme have been recently revealed: while transit trains are making a compulsory halt for technical inspection in the Lithuanian village of Kena on the border to Belarus, some passengers manage to leave transit trains, and stay in Lithuania or travel further using other transport means.³³ This security gap is mainly being misused by Russian citizens who have been recently denied access to the EU with cars registered in Russia.³⁴ In such cases the disembarking passengers traveling on transit trains to Kaliningrad are misusing the transit scheme as a “window to Europe” and thus making their current restricted travels much cheaper and less time-consuming. However, the fact that such misuse is possible indicates serious security gaps in the Kaliningrad transit scheme that could turn into potential hybrid threats for Lithuania’s security as disembarking “passengers” could end up being “green men” as seen during the occupation of Crimea in 2014. The element of a potential hybrid attack by Russia while using the Kaliningrad transit scheme increases challenges for NATO’s forward defence planning in the Baltics. Since hybrid warfare is marked by blurred lines between peace and war, accidental security incidents and well-prepared diversions, NATO allies have to stay vigilant and react swiftly to fast-changing situations in these so-called “grey zones”.

Policy recommendations

To achieve progress in reforming the Baltic States’ railway infrastructure to correspond to the standards needed for smooth NATO’s military logistics in the region, the current critical vulnerabilities in their railway infrastructure should be addressed on both - national and NATO levels. On the national level, the main brake for a comprehensive railway network reform including the implementation of the “Rail Baltica” project stems from the lack of political ambition to dismantle current inefficient and often corrupt structures managing strategic projects in the transport sectors of the Baltic States. The push for immediate progress in the implementation of this project must come from the highest political level. The Baltic States have a good track record in dismantling opaque Soviet-style management structures in their energy sectors. The same level of political ambition is now needed for their transport sectors to follow suit. The stakes are high as transport infrastructure that is reliable and interoperable with NATO allies would increase their national security significantly. NATO too should invest more in standardizing its logistical lines across the member states’ territories and demonstrate more actively its ability to transfer military equipment and personnel from one member state

³¹ Ministry of Interior of the Republic of Lithuania, „Ministrė A. Bilotaitė: stipriname Kaliningrado tranzito saugumą“.

³² Irt.lt, „Kaliningrado tranzito saugumui stiprinti EK skyrė 24 mln. eurų“, 15.06.2023, <https://www.lrt.lt/naujienos/verslas/4/2014219/kaliningrado-tranzito-saugumui-stiprinti-ek-skyre-24-mln-euru> [accessed: 20.11.2023].

³³ Irt.lt, „‘Window to Europe’: Russians use Kaliningrad transit train to enter Lithuania“, 10.10.2023, <https://www.lrt.lt/en/news-in-english/19/2095991/window-to-europe-russians-use-kaliningrad-transit-train-to-enter-lithuania> [accessed: 05.11.2023].

³⁴ Irt.lt, Lenkija įvedė draudimą įvažiuoti automobiliams su rusiškais registracijos numeriais, 17.09.2023, <https://www.lrt.lt/naujienos/pasaulyje/6/2078880/lenkija-ivede-draudima-ivaziuoti-automobiliams-su-rusiskais-registracijos-numeriais> [accessed: 08.11.2023].

to another in a short period of time. The Kaliningrad transit should also be lifted to the NATO level involving enhanced military presence on the transit route. These measures would help strengthen the deterrent potential of NATO against Russia. For now, and if the Alliance cannot assure its superiority in accessing the Baltic States with reinforcements and military supplies, Russia knows - the gates to the Baltics are open.