European Research Studies Journal
Volume XXIX, Issue 4, 2026

pp. 251-267

Structural Asymmetry in Strategic Airlift: A Quantitative Assessment of European and NATO Transport Capability

Submitted 13/09/26, 1st revision 25/09/26, 2nd revision 10/10/26, accepted 01/11/26

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Abstract:

Purpose: *The research presented in this article provides a quantitative and structural assessment of the strategic airlift capabilities of the European Union, the European members of the North Atlantic Treaty Organization (NATO), and NATO as a whole. The study aims to determine whether Europe's overall transport capacity is accompanied by a proportional capability in the heavy strategic airlift segment.*

Design/Methodology/Approach: *In contrast to analyses based on nominal fleet size, the study converts fleet potential into operational airlift capacity expressed in tonnes of cargo over the D1 (first-day), D7 (weekly), and D30 (monthly) horizons. The model accounts for technical availability, the number of rotations determined by operational cycle time, usable payload at the reference distance, and intensity-sustainment coefficients. The analysis is conducted across three cargo baskets: General Cargo (GC), Oversize (OS), and Outsize (OX), with the OX segment – comprising outsize cargo requiring heavy strategic platforms - treated as a key variable in assessing force-projection capability.*

Findings: *The results indicate that Europe generates a significant share of NATO's total transport volume; however, its contribution in the OX segment remains substantially lower than its volume-based share. The capacity to transport heavy combat equipment is overwhelmingly concentrated in the US component, resulting in an asymmetric distribution of transport capabilities within the Alliance. The forecast scenario, incorporating deliveries of medium-class platforms, increases Europe's total airlift capacity in the standard cargo segment but does not reduce the asymmetry in heavy strategic airlift.*

Practical implications: *The findings provide a basis for assessing capability gaps in European strategic airlift and for distinguishing improvements in overall transport volume from persistent limitations in the transport of heavy and outsize military equipment.*

Originality value: *The model developed in this study also makes it possible to distinguish volume-based autonomy from structural autonomy and provides a comparative framework*

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for analysing persistent proportions of transport capability within the collective security system.

Keywords: *Strategic airlift capacity, Military transport aircraft, NATO force projection, European strategic autonomy, Heavy airlift capability.*

JEL codes: *H56, F52, L93.*

Article type: *research article.*

Acknowledgements: *Co-financed by the Minister of Science under the "Regional Excellence Initiative" Poland. The authors also thank the Opinion and Analysis Department of the Road Traffic Bureau at the General Police Headquarters of Poland for providing access to SEWIK data for research.*

Declaration: *Generative artificial intelligence tools were employed during the preparation of this work for language proofreading and style improvement. The author remains fully responsible for the final text and its scientific integrity, having thoroughly reviewed and revised the generated content afterward.*

1. Introduction

Strategic and operational airlift constitutes one of the key components of force-projection capability and of maintaining credible deterrence in collective security systems (Freedman, 2004). Unlike strictly combat capabilities, its importance is systemic: it determines the pace of force deployment, the possibility of force rotation, the replacement of losses, and the maintenance of operational continuity over time (Vego, 2000). Consequently, actual transport capability is not merely a function of the number of aircraft held, but a measure of the effectiveness of the entire logistics-operational mechanism (O'Hanlon, 2009).

In a dynamically changing security environment - marked by the Russian Federation's full-scale aggression against Ukraine, intensifying great-power competition, and a shift of part of US strategic attention towards the Indo-Pacific - the ability of European states to independently move forces and materiel by air has acquired particular significance (Brands, 2022).

NATO's operational experience to date, in combat operations as well as evacuation and humanitarian activities, indicates the dominant role of the US component in the

heavy strategic airlift segment (Vlachos-Dengler, 2007; International Institute for Strategic Studies, 2024).

In the debate on European strategic autonomy, this issue most often appears in its political dimension (Drent and Zandee, 2016). Far less frequently is it subjected to precise quantitative analysis that converts transport-fleet potential into actual airlift capability over a defined time horizon. Yet the mere number of aircraft (airframes) is not an adequate measure of military potential. Actual operational capability depends on technical availability, operational cycle time, usable payload at a given distance, load factors, and the ability to sustain intensive use over time (Davis, 2002).

Existing literature on European strategic autonomy, military mobility, and NATO force-projection capability most often focuses on three dimensions. These concern the political significance of autonomy (Michaels and Sus, 2024; Riddervold and Rieker, 2024), institutional mechanisms for sharing capabilities (Jemielniak and Piechoczek, 2025; Pernica and Droff, 2026), and the nominal composition of military fleets (International Institute for Strategic Studies, The Military Balance, 2025).

The quantitative-structural dimension remains comparatively less developed, particularly the question of whether owned and available transport platforms translate into airlift capacity in segments critical to high-intensity operations.

A particularly visible gap exists in analyses that distinguish overall volume-based capacity from the ability to transport outsize cargo, which requires heavy strategic platforms. As a result, assessments of transport potential are often reduced to aircraft counts or the total mass that can be carried, whereas from the perspective of deterrence and rapid reinforcement the structure of that capability is crucial.

Accordingly, the aim of the research described in this article is a quantitative and comparative assessment of airlift capability across three institutional groupings:

1. the European Union (EU-27).
2. European NATO member states (excluding the United States of America and Canada).
3. NATO as a whole.

The analysis focuses exclusively on military transport capabilities and deliberately excludes air-support platforms, including air-to-air refuelling (AAR) and Airborne Early Warning and Control (AEW&C) aircraft, as well as dual-role transport-tanker platforms, in order to avoid double-counting capability and to preserve the unambiguously transport-oriented character of the model (NATO, 2025).

Airlift capacity is analysed over three-time horizons:

- D1 - the first day of operations (surge capability).
- D7 - sustained intensity over a weekly horizon.
- D30 - operational sustainability over a monthly horizon.

In qualitative terms, three cargo baskets were distinguished:

- General Cargo (GC) - standard cargo and personnel,
- Oversize (OS) - oversized cargo that can be accommodated by most medium and large platforms,
- Outsize (OX) - outsize cargo requiring specific structural parameters, critical to the movement of heavy combat equipment.

The separation of the OX segment makes it possible to move from a purely volume-based analysis to an assessment of the qualitative structure of the transport system, because heavy strategic platforms are not fully substitutable by medium aircraft (U.S. Department of the Air Force, 2024).

The main research question is: does the structure of European transport fleets, once converted into operational airlift capacity over the D1, D7, and D30 horizons, provide a proportionate share of NATO's heavy strategic airlift capability (Outsize, OX), or does it reveal a persistent structural asymmetry within the Alliance system?

The article contributes three elements to the debate. First, it shifts the focus from inventory-based analysis to operational analysis, in which the number of platforms is converted into airlift capacity over defined time horizons.

Second, it introduces a distinction between volume-based autonomy and structural autonomy, indicating that the ability to transport a substantial mass of cargo is not equivalent to the ability to move heavy combat equipment.

Third, it treats the Outsize segment as a key category for assessing actual force-projection capability, because substitutability between platform classes in this area is structurally constrained (Biddle, 2004).

For the purposes of this article, structural asymmetry denotes a situation in which the share of a given group of states in total airlift volume is significantly higher than its share in the segment of capabilities that are difficult to substitute with other platform classes. In strategic airlift, this segment is the Outsize capability, encompassing the transport of outsize cargo and heavy combat equipment that requires specific aircraft structural parameters. It is therefore not simply a shortage of aircraft, but an imbalance between mass-transport capacity and qualitatively critical capability.

Asymmetry understood in this way is strategically significant. If total transport volume is relatively high but the Outsize segment remains concentrated outside the European component of the Alliance, Europe's operational autonomy is limited. The

issue then concerns not only the scale of available resources, but their ability to generate a specific military effect within the required time. Accordingly, the assessment of strategic airlift should extend beyond a simple calculation of transport volume and also encompass the structure of the cargo moved, the time required to achieve the operational effect, and the functional adequacy of the platforms used.

2. Analytical Framework and Airlift Capacity Model

Analysis of military transport capabilities requires a distinction between material potential and operational capability. The number of aircraft, their nominal payload, or maximum range are technical quantities, but do not in themselves determine the actual performance of the system under operational conditions.

The literature on military effectiveness repeatedly emphasises that capability is not a simple function of capacity, but the result of its organisation, doctrine, availability, and ability to be employed over time (Biddle, 2004). In this sense, the aggregation of military potential is conditional and relational rather than purely arithmetic (Gray, 2014).

Accordingly, the central methodological problem in analysing multinational security structures is to establish a measure that allows a transition from the nominal inventory of assets to an estimate of the actual volume that can be generated over a specified time horizon. In strategic airlift, this problem is particularly pronounced.

Aircraft differ not only in maximum payload but also in utilisation profile, operational cycle time, technical availability, maintenance requirements, and sensitivity to intensive use. Consequently, two groupings with similar numbers of platforms may generate markedly different airlift volumes (NATO, 2025). To avoid inventory reductionism, this study adopts a functional approach in which the unit of analysis is the converted daily capacity to complete rotations with a usable payload, rather than the mere number of airframes (U.S. Department of the Air Force, 2024).

This approach is consistent with effects-based capability planning methodology, in which operational output is treated as a function of measurable input variables (Davis, 2002; U.S. Department of the Air Force, 2024; Schank *et al.,* 1991).

The model assumes a reference distance of approximately 2,000 kilometres, corresponding to the European framing of military mobility and enabling comparison of heavy strategic platforms with medium-range aircraft under conditions of comparable operational effort (European Defence Agency, 2023; European Commission and High Representative, 2022). This distance is methodological in nature and the model is not intended to reproduce the course of operations in a particular theatre. Introducing a reference distance reduces the risk that the results will be driven by design differences unrelated to the actual ability to support European operations (Vego, 2000).

The daily airlift capacity of a single aircraft type in a specified cargo basket was defined as a function of five operational variables:

$$Lift_{i,c}^{D1} = N_i \cdot A_i \cdot R_i \cdot P_{i,c} \cdot LF_{i,c} \quad (1)$$

where: N_i - number of platforms in active service, A_i - technical availability coefficient, R_i - number of rotations possible per day, $P_{i,c}$ - usable payload for the relevant cargo basket at the reference distance, and $LF_{i,c}$ - cargo-space load factor. Unlike maximum design parameters, usable payload reflects realistic operating constraints, including payload reduction at full fuel load and operational configuration (O'Hanlon, 2009). The number of rotations is a function of the duration of the complete operational cycle:

$$R_i = \frac{24}{T_{cycle,i}} \quad (2)$$

where the cycle time includes the outbound and return flights, loading and unloading operations, and an organisational reserve. Introducing this variable captures the fundamental difference between strategic platforms with high payload but longer cycle times and medium platforms which, despite lower payload, may generate a relatively higher number of rotations (U.S. Transportation Command and Office of Cost Assessment and Program Evaluation, 2019). Capability within an institutional grouping is aggregated by summing converted operational capacities rather than nominal parameters:

$$Lift_{S,c}^{D1} = \sum_{i \in S} Lif\ t_{i,c}^{D1} \quad (3)$$

This formulation has important epistemological significance. It allows the transport system to be treated as a dynamic structure in which effectiveness results from the interaction between platform numbers, availability, and intensity of use. The model does not assume full substitutability between platform classes, which is particularly important for outsize cargo.

Medium-class aircraft cannot provide an equivalent substitute for heavy strategic platforms in the Outsize segment, even if the number of rotations is increased. This limitation is structural and derives from cargo-compartment dimensions and floor load-bearing capacity (Davis, 2002; U.S. Department of the Air Force, 2024; International Institute for Strategic Studies, 2024).

Moving from daily capacity to longer time horizons requires the operational sustainability of the system to be taken into account. Intensive fleet use generates increasing technical and organisational burdens, which in practice lead to a decline in average effectiveness over time (U.S. Department of the Air Force, 2024; O'Hanlon, 2009).

To capture this dynamic, intensity-sustainment coefficients were introduced, allowing daily capacity to be converted into weekly and monthly horizons:

$$Lift_{S,c}^{D7} = 7 \cdot Lift_{S,c}^{D1} \cdot s_7 \tag{4}$$

$$Lift_{S,c}^{D30} = 30 \cdot Lift_{S,c}^{D1} \cdot s_{30} \tag{5}$$

where $s_{30} < s_7 \leq 1$. These parameters model the natural constraints arising from crew rotations, maintenance cycles, and organisational limitations, without introducing simulation elements specific to the analysis of a particular campaign.

The availability parameters and load factors were set at conservative values within ranges observed in the operational practice of NATO transport aviation. These values are not forecasts; rather, they function as reference parameters enabling groupings to be compared under a uniform analytical regime. The rounded nature of the results reduces the risk of overinterpreting differences of marginal significance and emphasises that the purpose of the model is to compare the distribution of capability between platform classes.

The model also has deliberately adopted limitations. It does not account for adversary action, infrastructure degradation, political constraints on force employment, or potential bottlenecks in the basing system. Nor does it constitute an operational simulation of a specific theatre. Its purpose is to provide a comparative measure of airlift capacity and to identify the uneven distribution of capability among the groupings analysed.

3. Data Sources and Parametric Assumptions

The quantitative assessment presented in the article is based exclusively on open-source data, in order to ensure transparency and replicability. The number of aircraft in active service was compiled from publicly available sources. These included official defence ministry publications, manufacturers' data on user fleets, budget documents, and recognised international assessments of military potential (International Institute for Strategic Studies, The Military Balance, 2025).

Only aircraft assessed as operationally active in 2025 were included in the aggregation; aircraft in long-term storage, used solely for training, or in an advanced stage of withdrawal from service were excluded (Davis, 2002; NATO, 2025). This approach is consistent with standards used in operational capability analysis, which distinguish nominal fleet structure from the actual ability to employ assets (O'Hanlon, 2009; U.S. Department of the Air Force, 2024).

The classification of platforms into strategic (STR), bridge (Bridge), and tactical (TAC) categories was based on functional criteria rather than solely on nominal

designations. Classification was determined by effective payload-range characteristics at the adopted reference distance and by cargo-compartment parameters (U.S. Department of the Air Force, 2024).

For dual-capability platforms, only the transport function was included in the model; air-to-air refuelling capability was not counted, thereby avoiding double aggregation of operational effects (Davis, 2002; U.S. Department of the Air Force, 2024).

Table 1. *Functional classification of transport platforms adopted in the model*

Functional class	**Representative platform types**	**Dominant cargo segment**	**Analytical classification criterion**
STR	C-17, C-5	OX / OS	Heavy strategic platforms capable of transporting outsize cargo and generating the strategic effect of force movement over operational and inter-theatre distances
Bridge	A400M, C-390	OS / GC	Medium transport platforms combining a significant payload-range relationship with the ability to perform both operational tasks and selected strategic airlift missions
TAC	C-130, C-27J, C-295, CN235	GC / OS	Tactical platforms used primarily to transport standard cargo and selected oversize cargo over shorter operational cycles.

Source: *Authors' own compilation based on NATO and US Air Force air mobility doctrine, EU capability-planning documents, and open-source assessments of armed forces potential (U.S. Department of the Air Force, 2024; Vlachos-Dengler, 2007).*

To increase the transparency of the model and avoid excessive detail in data presentation, military transport platforms were functionally classified into three classes: STR, Bridge, and TAC (NATO, 2024; U.S. Department of the Air Force, 2024).

This classification is analytical rather than inventory-based, meaning that assignment to a given class was determined not solely by the nominal aircraft type designation but by its effective operational characteristics in terms of payload-range relationship, cargo-compartment parameters, and the ability to carry GC, OS, and OX cargo baskets (U.S. Department of the Air Force, 2018, 2024).

The STR class includes heavy strategic platforms capable of transporting outsize cargo, which play a fundamental role in generating the strategic effect of force movement (NATO, 2024; International Institute for Strategic Studies, 2024). The Bridge class includes medium transport platforms with significant utility in the oversize and general cargo segments, providing a bridge between tactical and strategic capabilities (U.S. Department of the Air Force, 2024; European Defence

Agency, 2023). The TAC class comprises tactical platforms used primarily to transport standard cargo and selected oversize cargo over shorter operational cycles (NATO, 2024; NATO, 2022).

The model assumes an operational reference distance expressed in kilometres. This value was adopted as representative of force projection within Europe and its immediate neighbourhood, whilst maintaining comparability in the employment conditions of heavy strategic platforms and medium aircraft. The usable payload values applied in the calculations correspond to realistic operating parameters at the specified distance, rather than maximum design payloads.

Where published payload-range trade-off characteristics were available, conservative values close to the median of the available ranges were used (U.S. Department of the Air Force, 2024; International Institute for Strategic Studies, 2024). Technical literature emphasises that maximum catalogue figures do not reflect actual fuel-payload trade-offs or operational configuration constraints (U.S. Department of the Air Force, 2024).

For greater model transparency, the table below sets out the aggregated transport-platform classes and the corresponding indicative input parameters adopted for a reference distance of 2,000 km.

Table 2. *Simplified model input parameters and aggregation of platform classes at a reference distance of 2,000 km*

Platform class	**Dominant cargo profile**	**EU (N)**	**European NATO (N)**	**NATO (N)**	**A**	**Cycle time [h]**	**R**	**Reference payload [t]**
STR	OX / heavy strategic lift	~1	11	101	0.70	14–16	1.5–1.7	65–95
Bridge	OS / GC	~80	~90	~100	0.70–0.75	9–10	2.4–2.7	23–25
TAC	GC / OS	~230	~280	~470	0.70–0.75	7–8	3.0–3.4	8–15

Notes: *N - number of platforms included in the analysis. A - technical availability coefficient. Cycle time [h] - duration of the complete operational cycle, including outbound and return flights, loading and unloading operations, ground handling, and an organisational reserve. R - number of rotations that can be completed within 24 hours. Reference payload [t] - usable payload at the reference distance of 2,000 km.*
Source: *Authors' own compilation based on open-source data on fleet structures and the operational parameters adopted in the model.*

Fleet sizes are aggregated and reflect operationally active platforms assigned to the STR, Bridge, and TAC functional classes. They do not constitute a complete aircraft inventory on a type-by-type basis. Values are presented in rounded and range form

because the table is intended to demonstrate the logic of the model and the relational comparability of results, rather than to reconstruct mission planning in detail.

The table shows that differences between the analysed groupings arise primarily from the different composition of platform classes rather than from the use of different modelling parameters, allowing the results to be interpreted as an expression of structural asymmetry (U.S. Department of the Air Force, 2024; O'Hanlon, 2009).

Technical availability coefficients were set within ranges empirically observed for military transport fleets of NATO countries operating under peacetime conditions (U.S. Department of the Air Force, 2024; O'Hanlon, 2009). The number of daily rotations was derived from the duration of the complete operational cycle, comprising outbound and return flights, loading and unloading operations, ground activities, and a minimum organisational margin (U.S. Department of the Air Force, 2024; O'Hanlon, 2009).

The operational-sustainment coefficients applied to D7 and D30 reflect the natural decline in intensity resulting from increasing maintenance requirements, crew rotations, and logistical burdens (U.S. Department of the Air Force, 2024; O'Hanlon, 2009). Detailed input parameters were applied uniformly to all analysed groupings; the model is intended to identify capability proportions rather than reconstruct planning for a specific campaign (U.S. Department of the Air Force, 2024).

The resulting values should be interpreted as comparative order-of-magnitude estimates that capture the capability structure and the scale of imbalance between the analysed groupings in the heavy strategic airlift segment. The approach presented retains methodological transparency, internal consistency, and suitability for further sensitivity analyses (U.S. Department of the Air Force, 2024; O'Hanlon, 2009).

4. Quantitative Results and Structural Analysis of Capability

Application of the operational model presented in Part I makes it possible to convert fleet structure into a comparable measure of airlift capacity across three-time horizons. The starting point is the structure of platforms in active service in 2025, aggregated at the level of functional classes (International Institute for Strategic Studies, The Military Balance, 2025).

The fleet structure alone already indicates a disproportion in the heavy segment. Whilst Europe operates a substantial number of medium and tactical platforms, the strategic segment (STR), which generates OX capability, is heavily concentrated in the US component (U.S. Transportation Command and Office of Cost Assessment and Program Evaluation, 2019). Converting this structure into operational capability produces the results presented in Table 4.

Table 3. *Structure of transport fleets (2025 status, active service)*

Grouping	STR / OX capability	Bridge	TAC	Total	STR share (%)
EU	~1	~80	~230	~311	<1%
European NATO	11	~90	~280	~381	~3%
NATO (total)	101	~100	~470	~671	~15%

Source: *Authors' own compilation based on open-source data on the size of EU and NATO transport fleets, in particular The Military Balance 2024, European Defence Agency data, and official information from platform manufacturers and operators; aircraft classification rules were adopted in accordance with the section 'Data Sources and Parametric Assumptions'.*

Table 4. *Airlift capacity (D30 – monthly horizon)*

Grouping	Mass (t)	463L pallets	Passengers (pax)	Share of NATO (%)
EU	~145 000	~60 000	~300 000	~14–18%
European NATO	~176 000	~73 000	~352 000	~17–18%
NATO (total)	~1 016 000	~418 000	~1 792 000	100%

Source: *Authors' own compilation based on transport-fleet structure data and the operational parameters of the author's airlift-capacity model presented in the article.*

The values for 463L pallets and personnel transport are operational equivalents of airlift capacity. They were derived from the same set of fleet and operating parameters used for cargo mass, using simplified conversion factors corresponding to typical transport configurations of the analysed platform classes. Their purpose is to ensure comparability between the analysed groupings, rather than to reconstruct detailed planning for individual missions.

Over the monthly horizon, the European share of NATO's total capacity can be expressed formally as:

$$Share_{EuropeNATO}^{D30} = \frac{Lift_{EuropeNATO}^{D30}}{Lift_{NATO}^{D30}} x100\,\% \approx 17{,}3\,\% \qquad (6)$$

This means that the European component of NATO accounts for approximately 17.3% of the Alliance's total monthly airlift capacity by mass. This value confirms Europe's significant, although non-dominant, share of NATO's overall transport volume.

However, the qualitative analysis reveals a more consequential disparity concerning the structure of capability across cargo baskets (U.S. Department of the Air Force, 2024).

Table 5. *Capability structure by cargo basket (D30, %)*

Grouping	**GC**	**OS**	**OX**	**Share of NATO OX (%)**
EU	~80%	~15%	~5%	~5%
European NATO	~77%	~15%	~8%	~9–10%
NATO (total)	~65%	~20%	~15%	100%
USA (NATO component)	—	—	—	>80%

Source: *Authors' own compilation based on the functional classification of platforms, fleet-structure data, and the author's airlift-capacity model presented in the article.*

The results presented in Tables 4 and 5 indicate that the asymmetry of European transport capabilities is structural rather than merely quantitative. Whilst European NATO countries generate a significant share of the Alliance's total transport volume, their share in the Outsize segment is clearly lower. This difference results from three overlapping mechanisms.

First, it is functional. Bridge and TAC platforms can effectively perform a substantial proportion of tasks involving standard cargo and selected oversize loads, but they are not fully substitutable for heavy strategic platforms.

Second, the asymmetry is design-related, because the OX segment depends not only on the mass that can be carried but also on cargo-compartment dimensions, floor load-bearing capacity, ramp geometry, and the ability to load heavy combat equipment.

Third, the asymmetry is institutional, because part of Europe's access to heavy strategic airlift relies on pooled, Alliance, or contracted mechanisms that are not equivalent to full national control over the capability.

Accordingly, an increase in the number of medium platforms may increase Europe's total transport volume without necessarily producing a proportional increase in OX capability. The issue therefore lies not only in the number of aircraft, but in the composition of platform classes and the extent of their functional substitutability.

In this formulation, the OX segment is a critical variable because it reflects the capacity to transport heavy combat equipment and large weapon systems, the movement of which underpins the credibility of deterrence and the speed of heavy-force deployment (Biddle, 2004). The indicator of Europe's share in this category

$$Share_{EU,OX}^{D30} = \frac{Lift_{EU,OX}^{D30}}{Lift_{NATO,OX}^{D30}} \tag{7}$$

where

$$Share_{EU,OX}^{D30} < Share_{EU,}^{D30} \tag{8}$$

The difference between the volume-based share and the share in the OX segment constitutes a measure of structural asymmetry:

$$Asymmetry_{OX} = Share_{EU}^{D30} - Share_{EU,OX}^{D30} \tag{9}$$

In practical terms, this represents a positive gap of several to approximately ten percentage points between Europe's volume-based share and its share in the OX segment, indicating relative over-representation in standard transport and under-representation in the heavy segment.

The concentration indicator provides an even clearer picture:

$$Concentration_{USA,OX} = \frac{Lift_{USA,OX}^{D30}}{Lift_{NATO,OX}^{D30}} > 0.8 \tag{10}$$

This means that more than 80% of NATO's OX capability is generated by the US component. Such a high concentration indicates the limited substitutability of heavy strategic platforms. Medium-class aircraft cannot functionally replace C-17 or C-5 aircraft in, for example, the transport of tanks, heavy engineering vehicles, or high-mass artillery systems (U.S. Department of the Air Force, 2024).

The forecast scenario, incorporating deliveries of A400M and C-390 platforms, increases European capability mainly in the GC and, to some extent, OS segments, but does not produce a qualitative change in the distribution of shares in the OX segment. The change is therefore primarily quantitative (International Institute for Strategic Studies, Europe’s Air of Dependence, 2025; European Defence Agency, 2026). This means that even if current modernisation programmes are fully implemented, the European transport system remains asymmetric relative to NATO as a whole in the key heavy segment.

5. Conclusions

The analysis shows that European transport fleets do not provide a proportionate share of NATO's heavy strategic airlift capability. When fleet structures are converted into operational airlift capacity over the D1, D7, and D30 horizons, a

persistent structural asymmetry emerges between Europe's share of total transport volume and its share in the Outsize (OX) segment.

European airlift capabilities remain significant in volume terms, providing substantial capacity for transporting personnel, light equipment, and supplies and supporting large-scale operations within Europe and its immediate neighbourhood (Vego, 2000; O'Hanlon, 2009). This volume-based capability does not, however, translate into equivalent structural autonomy, because the movement of heavy combat equipment remains dependent on strategic platforms with limited functional substitutes.

European NATO states account for approximately 17–18% of the Alliance's total monthly airlift capacity, but only around 9–10% of its OX capability, while more than 80% of NATO's OX capacity is concentrated in the US component. This disparity results primarily from fleet composition, platform design constraints, and the limited substitutability of medium aircraft for heavy strategic platforms (Barrie et al., 2019; International Institute for Strategic Studies, 2024).

The findings therefore support the distinction between volume-based and structural autonomy: Europe approaches the former but does not achieve the latter in the OX segment, making its strategic autonomy in airlift selective rather than comprehensive.

This limitation is not only platform-specific but also systemic, since full structural autonomy depends on an effective military mobility framework encompassing procedures, coordination, and conditions for rapid force transit (Drent and Zandee, 2016; European Commission and High Representative, 2022).

This imbalance also has implications for deterrence and the credibility of Alliance commitments. The ability to deploy heavy forces rapidly constitutes a temporal dimension of deterrence, and concentration of critical OX capability in one component makes the pace and scale of reinforcement dependent on its availability, strategic priorities, and political decisions.

Deterrence credibility therefore rests not only on combat potential but also on the ability to translate it rapidly into operational presence (Freedman, 2004; Brands, 2022; European Court of Auditors, 2025). Improvements in European military mobility can reduce infrastructural and procedural frictions, but do not remove deficits in heavy strategic airlift capability (European Court of Auditors, 2025).

The modernisation scenario further indicates that additional medium-class platforms increase European transport capacity, particularly in the GC and OS segments, but do not eliminate structural dependence in OX capability. Aircraft such as the Airbus A400M and Embraer C-390 Millennium improve operational mobility, yet cannot substitute for heavy strategic aircraft in outsize transport (International Institute for

Strategic Studies, Europe's Air of Dependence, 2025; European Defence Agency, 2026).

Strategic airlift should therefore be regarded as force infrastructure that converts combat potential into operational presence. Its assessment cannot be limited to total transport mass but must also consider cargo type, deployment time, and platform class. Under the current fleet architecture, Europe remains structurally dependent in the heavy strategic segment, and this asymmetry stems primarily from fleet composition rather than short-term operational conditions.

The model is comparative and based on open-source data and aggregated platform classes. It does not simulate a specific campaign or account for adversary action, infrastructure degradation, airspace constraints, or political restrictions on force employment. Future research should therefore extend the analysis to country-platform data, the political availability of pooled and contracted assets, and scenario testing across different operational distances.

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