



**GINA**  
Military

# Methodological Notes

Jesse Kommandeur, Rens van Dam & Emma Bokel  
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**Authors:** Jesse Kommandeur, Rens van Dam & Emma Bokel

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HCSS  
Lange Voorhout 1  
2514 EA The Hague

Follow us on social media:  
[@hcssnl](#)

The Hague Centre for Strategic Studies  
Email: [info@hcss.nl](mailto:info@hcss.nl)  
Website: [www.hcss.nl](http://www.hcss.nl)

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# Key takeaways

The Geopolitical Interactive Network Analysis (GINA) Military initiative developed by the Hague Centre for Strategic Studies (HCSS) showcases a methodological approach to understanding global military dynamics. This framework transcends traditional analysis by the analysis of **event-based military conflict** and **trade-based military cooperation** data. Our approach allows for a multi-layered understanding of military power dynamics on a dyadic level, which is crucial for interpreting complex geopolitical landscapes.

GINA Military utilizes the Uppsala Conflict Data Program (UCDP) to enhance its analysis of military **conflict dynamics**. While acknowledging the challenges posed by the availability and reliability of sources in remote and volatile regions, GINA Military leverages this data to offer descriptives of interstate and intrastate conflicts. This includes details about the number of deaths and military events, which help to identify both intrastate and **global conflict patterns** and trends.

The Stockholm International Peace Research Institute's (SIPRI) Arms Transfers Database within the GINA Military framework provides essential data on **international military arms transfers**, captured through the Trend Indicator Value (TIV). This metric, while not reflecting the financial value of transfers, offers a consistent measure of the volume of military capabilities transferred internationally. By documenting **both imports and exports of military goods**, GINA Military not only reflects on the global military capacity but also on the shifts in international trade flows.

# 1. Introduction

In an ever-evolving global landscape, the Hague Centre for Strategic Studies (HCSS) remains at the forefront of pioneering research into the intricacies of global, monadic, dyadic, and network relations within the geopolitical domain. Our Geopolitical Interactive Network Analysis (GINA) initiative aims to transcend the limitations of traditional, material-based analyses, shedding light on the nuanced tapestry of relational power dynamics that define our world.

This codebook serves as a cornerstone of our analytical framework, providing a categorisation of various data series. By examining the intertwined layers of conflict and arms trade variables derived from UCDP and SIPRI data, we strive to construct both a comprehensive and quantitative overview of index and score variables. The methodological notes encapsulates our innovative approach to measurement, advocating for a methodology that reflects the geodynamics of international relations. By integrating considerations such as proxy actors, statistical rigour, and standardisation, we enhance the precision and depth of our analysis<sup>1</sup>.

**GINA Military** is the third instalment of our series of interactive network analysis tools, which also includes GINA Information (scheduled for September 2024) and GINA Diplomatic and Economic which were launched respectively in June and July 2024.

In the following sections, the reader will find a detailed description of our data series, variables, and estimation methodologies for GINA Military. Our measurements are structured into three distinct levels to enhance the precision and traceability of our analysis:

1. **Index Level:** Focus on the aggregation and normalisation of scores, facilitating comparative analysis across various datasets and temporal frames. This provides a standardised framework for interpreting raw scores within broader patterns and trends.
2. **Score Level:** Involves quantitative evaluations derived directly from our data, representing specific measurements or calculated values essential for constructing indices.
3. **Data Level:** Handles both textual and numerical information, collected from diverse sources that are mentioned in following sections.

This foundational work lays the groundwork for our open-source suite of tools, each designed to bring a deeper understanding of their respective domains through network analysis techniques.

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<sup>1</sup> This is the first version (Version 1.0) of GINA Military, and it is currently in its beta phase. Therefore, proxy actors, statistical rigour, and standardisation have not been fully integrated into the analysis yet.

## 2. Conflict Variables

A few observations must be made regarding the Uppsala Conflict Data Program (UCDP) data. Firstly, the accuracy of UCDP data heavily relies on the availability and reliability of source information. Given that conflict zones are often remote and information-scarce environments, some incidents of violence might not be reported or documented accurately. Secondly, the interpretation of what constitutes a "conflict" can vary, potentially leading to inconsistencies in how different events are categorized and recorded. This can affect comparative analyses across regions or time periods. Additionally, the UCDP data is not updated in real-time, which means recent developments or escalations in conflicts might not be immediately reflected in the dataset.

### 2.1. Interstate Conflict Events

**Category:** Conflict

**Type:** Numeric

**Unit:** Score

**Source:** [UCDP](#)

**Description:** The interstate conflict events offer descriptive information on the location, actors, and intensity of interstate conflicts, providing insights into global conflict patterns and trends between recognised states.<sup>2</sup> For each interstate conflict interactions, we measure both the number of deaths and events.

$$\text{Global interstate conflict interactions} = \sum_{i=1}^n \text{Conflict}_i$$

- n: Number of states that have an conflict flow > 0.
- $\text{Conflict}_i$ : total conflict flow for a given country.

### 2.2. Intrastate Conflict Events

**Category:** Conflict

**Type:** Numeric

**Unit:** Score

**Source:** [UCDP](#)

**Description:** The Intrastate conflict events offer information on the location, actors, and intensity of Intrastate conflicts, providing insights into local conflict patterns and trends between non-state actors that have been part of a violence related conflict. For each intrastate conflict interaction, we measure both the number of deaths and events.

$$\text{Global intrastate conflict interactions} = \sum_{i=1}^n \text{conflict interactions}_i$$

- n: Number of non-state actors that have conflict interaction > 0.
- $\text{Conflict flow}_i$ : total conflict interaction for a given country.

<sup>2</sup> HCSS used the ECDP definition of a state. A state is an internationally recognised sovereign government controlling a specified territory or an internationally non-recognised government controlling a specific territory which is not disputed by an internationally recognised sovereign government, which previously controlled the same territory. *Uppsala Conflict Data Program 2024*.

## 2.3. Armed Conflict Event

**Category:** Conflict

**Type:** Numeric

**Unit:** Data

**Source:** UCDP

**Description:** The UCDP defines an armed conflict as a contested incompatibility that concerns government and/or territory over which the use of armed force between the military forces of two parties, of which at least one is the government of a state, has resulted in at least 25 battle-related deaths each year.

*Conflict ( $A_i, A_j, T, D$ )*

- **Actor i:** Identifying the country/countries in a conflict of side A in a conflict. Always the government side in civil wars, named the primary party in the table.
- **Actor j:** Identifying the name and/or country/countries of side B in a conflict. In a civil conflict, this includes military opposition organisations, named secondary actor in the table.
- **Territory:** The territory over which the conflict is fought, provided that the incompatibility is territorial.
- **Battle related Deaths:** We used the UCDP best estimate of battle related deaths (section 2.4).

## 2.4. Battle Related Deaths

**Category:** Conflict

**Type:** Numeric

**Unit:** Data

**Source:** UCDP

**Description:** According to the UDCP, battle-related deaths<sup>3</sup> encompass fatalities directly linked to combat, including those from conventional battlefield engagements, guerrilla tactics like hit-and-run attacks or ambushes, and various bombardments targeting military installations, cities, and villages. While urban warfare – including bombings, explosions, and assassinations – differs from traditional battlefield scenarios, it is similarly categorised as battle-related.

*Deaths( $D_{best}, D_{low}, D_{high}$ )*

- **Deaths Best:** UCDP Best estimate of battle-related deaths in fighting between the parties, this is the data that is used for the visualisations.
- **Deaths Low:** UCDP Low estimate of battle-related deaths in fighting between the parties.
- **Deaths High:** UCDP High estimate of battle-related deaths in fighting between the parties.

<sup>3</sup> Battle-related deaths, which concern direct deaths, are not the same as war-related deaths, which includes both direct as well as indirect deaths due to disease and starvation, criminality, or attacks deliberately directed against civilians only (one-sided violence). *Uppsala Conflict Data Program 2024*.

# 3. Cooperation Variables

The Stockholm International Peace Research Institute (SIPRI) provides several important datasets related to arms, conflict, and disarmament. One of their widely recognised contributions is the SIPRI Arms Transfers Database, which includes information on international transfers of major conventional weapons. One of the key metrics used in the SIPRI Arms Transfers Database is the "Trend Indicator Value" (TIV)<sup>4</sup>. The TIV is intended to provide a consistent measure of the volume of international transfers of major weapons. However, there are a few limitations to this metric that should be noted.

First off, TIVs do not represent the financial value of arms transfers but are calculated based on the production costs of weapons in the transferring country, adjusted for the volume of military capability. This means they cannot be directly compared with financial data or used for economic analysis. Additionally, the TIV may not accurately reflect the strategic or military significance of the transferred weapons, as older models of equipment might have lower TIVs despite potential effectiveness. The methodology behind TIV calculations involves subjective decisions, particularly in how different types of weapons are weighted, which can lead to inconsistencies in how transfers are valued between different countries or equipment types.

## 3.1. Global Military Imports

**Category:** Cooperation

**Type:** Numeric

**Unit:** Score

**Source:** SIPRI

**Description:** Global Military Imports captures the total TIV value of goods imported by all countries worldwide. This metric aggregates the imports across nations to reflect global consumption trends and international demand for military goods. Analysing global imports is essential for understanding worldwide economic health, trade dynamics, and shifts in market demands.

$$\text{Global military import flow} = \sum_{i=1}^n \text{Military Import flow}_i$$

- $n$ : Number of countries that have a military import flow  $> 0$ .
- $\text{Import flow}_i$ : total military import flow volume in TIV USD for a given country.

## 3.2. Global Military Exports

**Category:** Cooperation

**Type:** Numeric

**Unit:** Score

**Source:** SIPRI

**Description:** Global Military Exports measures the total TIV value of goods exported by all countries globally. This figure represents the cumulative military exports from nations around the world, offering insight into the global military capacity and international trade flows. Global exports are crucial for

<sup>4</sup> The TIV is based on known unit production costs of core weapons and reflects the transfer of military resources, not financial value. If production costs are unknown, weapons are compared to core weapons based on size, performance, electronics, and other features. A used weapon is valued at 40% of a new one, or 66% if significantly refurbished or modified before delivery. *The Stockholm International Peace Research Institute 2024*.



examining the economic output, trade balances, and competitive strengths of countries on a worldwide scale.

$$\text{Global military export flow} = \sum_{i=1}^n \text{Military Export flow}_i$$

- n: Number of countries that have a military export flow > 0.
- $\text{Export flow}_i$ : total export flow volume in USD for a given country.

### 3.3. Military Import

**Category:** Trade

**Type:** Numeric

**Unit:** Score

**Source:** SIPRI

**Description:** Military Import measures the TIV of goods received by a country from foreign partners. It includes all commodities brought into the country for consumption, production, or further processing. Tracking imports is crucial for understanding a country's military consumption patterns and dependency on foreign weaponry.

$$\text{Military Import flow}(I, XE, V, Q, W_{des}, W_{det})$$

- Importer: The domestic country receiving the military goods.
- Exporter: The foreign country or region from which the military goods or services are sourced.
- Volume: The total TIV value of the imports, quantified in USD.
- Quantity: the total number of items requested in the deal.
- Weapon designation: the specific name or designation of the weapon system involved.
- Weapon details: a brief description of the weapon system.

### 3.4. Military Export

**Category:** Trade

**Type:** Numeric

**Unit:** Score

**Source:** SIPRI

**Description:** Military Export quantifies the TIV of goods a country sends to foreign markets. This encompasses all products provided to international buyers, reflecting the country's military production capacity and integration into their global military markets. Detailed data on exports includes product categories, destination countries, and value over time.

$$\text{Military Import flow}(I, E, V, Q, W_{des}, W_{det})$$

- Importer: The domestic country receiving the military goods.
- Exporter: The foreign country or region from which the military goods or services are sourced.
- Volume: The total TIV value of the imports, quantified in USD.
- Quantity: the total number of items requested in the deal.
- Weapon designation: the specific name or designation of the weapon system involved.
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