

# Appendix 13D. Sources and methods for arms transfers data

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The SIPRI Arms Transfers Project reports on international flows of conventional weapons. Since publicly available information is inadequate for the tracking of all weapons and other military equipment, SIPRI covers only what it terms *major conventional weapons*.<sup>1</sup>

Data are collected from open sources in the SIPRI arms transfers database and presented in a register that identifies the suppliers, recipients and weapon deliveries, and in tables that provide a measure of the trends in the total flow of major weapons and its geographical pattern. SIPRI has developed a unique trend-indicator value system. The figures produced by the system are not comparable to official economic statistics such as gross domestic product, public expenditure and export/import figures.

The database covers the period from 1950. Data collection and analysis are a continuous process. As new data become available the database is updated for all years included in the database.<sup>2</sup>

## I. Selection criteria and coverage

### Selection criteria

SIPRI uses the term ‘transfer’ rather than ‘trade’ since the latter is usually associated with ‘sale’. SIPRI covers not only sales of weapons, including manufacturing licences, but also other forms of weapon supply, including aid and gifts.

The weapons transferred must be destined for the armed forces, paramilitary forces or intelligence agencies of another country. Weapons supplied to or from rebel forces in an armed conflict are included as deliveries to or from the individual rebel forces, identified under separate ‘recipient’ or ‘supplier’ headings. Supplies to or from international organizations are also included and categorized in the same fashion. In cases where deliveries are identified but where it is not possible to identify either the supplier or the recipient with an acceptable degree of certainty, transfers are registered as coming from ‘unknown’ suppliers or going to ‘unknown’ recipients. Suppliers are termed ‘multiple’ only if there is a transfer agreement for weapons that are produced by two or more cooperating countries and if it is not clear which country will make the delivery.

Weapons must be transferred voluntarily by the supplier. This includes weapons delivered illegally—without proper authorization by the government of the supplier or the recipient country—but excludes captured weapons and weapons obtained from

<sup>1</sup> A complete description of the SIPRI Arms Transfers Project methodology, including a list of the sources used, is available on the SIPRI Internet site at URL <<http://www.sipri.se/projects/armstrade/atmethods.html>>.

<sup>2</sup> Thus data from several SIPRI Yearbooks or other SIPRI publications cannot be combined or compared. Readers who require time-series trend-indicator value data for periods before the years covered in this Yearbook or who require updated registers should contact SIPRI, preferably via the Internet site at URL <<http://projects.sipri.se/armstrade/atrequest.html>>.

defectors. Finally, the weapons must have a military purpose. Systems such as aircraft used mainly for other branches of government but registered with and operated by the armed forces are excluded. Weapons supplied for technical or arms procurement evaluation purposes only are not included.

### **Major conventional weapons: the coverage**

SIPRI covers only what it terms *major conventional weapons*, defined as:

1. *Aircraft*: all fixed-wing aircraft and helicopters, including unmanned reconnaissance/surveillance aircraft, with the exception of micro-light aircraft, powered and unpowered gliders and target drones.

2. *Armoured vehicles*: all vehicles with integral armour protection, including all types of tank, tank destroyer, armoured car, armoured personnel carrier, armoured support vehicle and infantry fighting vehicle.

3. *Artillery*: naval, fixed, self-propelled and towed guns, howitzers, multiple rocket launchers and mortars, with a calibre equal to or above 100 millimetres (mm).

4. *Radar systems*: all land-, aircraft- and ship-based active (radar) and passive (e.g., electro-optical) surveillance systems with a range of at least 25 kilometres (km), with the exception of navigation and weather radars, and all fire-control radars, with the exception of range-only radars. In cases where the system is fitted on a platform (vehicle, aircraft or ship), the register only notes those systems that come from a different supplier than the supplier of the platform.

5. *Missiles*: all powered, guided missiles and torpedoes with conventional warheads. Unguided rockets, guided but unpowered shells and bombs, free-fall aerial munitions, anti-submarine rockets and target drones are excluded.

6. *Ships*: all ships with a standard tonnage of 100 tonnes or more, and all ships armed with artillery of 100-mm calibre or more, torpedoes or guided missiles, with the exception of most survey ships, tugs and some transport ships.

The statistics presented refer to transfers of weapons in these six categories only. Transfers of other military equipment—such as small arms/light weapons, trucks, artillery under 100-mm calibre, ammunition, support equipment and components, as well as services or technology transfers—are not included.

## **II. The SIPRI trend indicator**

The SIPRI system for the valuation of arms transfers is designed as a *trend-measuring device*. It permits the measurement of changes in the total flow of major weapons and its geographical pattern. The trends presented in the tables of SIPRI trend-indicator values are based only on *actual deliveries* during the year/years covered in the relevant tables and figures, not on orders signed in a year.

The trend-indicator value system, in which similar weapons have similar values, reflects both the quantity and the quality of the weapons transferred. The value reflects the transfer of *military resources*.

Arms transfers can be measured with several objectives in mind. The two most common objectives are to gain knowledge about the economic factor and about the military implications of arms transfers. However, different goals require different statistical approaches.

The SIPRI values do not reflect the money value of (or payments for) weapons transferred. This is impossible for three reasons. First, in many cases no reliable data on the value of a transfer are available. Second, even if the value of a transfer is known, it is in almost every case the total value of a deal, which may include not only the weapons entered in the SIPRI database but also other items related to these weapons (e.g., spare parts, armament or ammunition) as well as support systems (e.g., specialized vehicles) and items related to the integration of the weapon in the armed forces (e.g., software changes to existing systems or training). Third, even if the value of a transfer is known, there remains the problem that important details about the financial arrangements of the transfer (e.g., credit/loan conditions and discounts) are usually not known.<sup>3</sup>

Measuring the military implications of transfers would require a concentration on the value of the weapons as a military resource. Again, this could be done from the actual money values of the weapons transferred, assuming that these values generally reflect the military capability of the weapon. However, the problems enumerated above would still apply (e.g., a very expensive weapon may be transferred as aid at a 'zero' price, and therefore not show up in financial statistics, but still be a significant transfer of military resources). The SIPRI solution is a system in which military resources are measured by including an evaluation of the technical parameters of the weapons. The tasks and performance of the weapons are evaluated and the weapons are assigned a value in an index. These values reflect the military resource value of the weapon in relation to other weapons. This can be done under the condition that a number of benchmarks or reference points are established by assigning some weapons a fixed place in the index. These are the core of the index, and all other weapons are compared to these *core weapons*.

In short, the process of calculating the SIPRI trend-indicator value for individual weapons is as follows.

For a number of weapon types (noted in the register as the 'weapon designation') it is possible to find the actual average unit acquisition price in open sources. It is assumed that such real prices roughly reflect the military resource value of a system. For example, a combat aircraft bought for \$10 million may be assumed to be a resource twice as great as one bought for \$5 million, and a submarine bought for \$100 million may be assumed to be 10 times the resource a \$10 million combat aircraft would represent. Those weapons with a real price are used as the core weapons of the valuation.

Weapons for which a price is not known are compared with core weapons. This comparison is made in the following steps.

1. The description of a weapon is compared with the description of the core weapon. In cases where no core weapon exactly matches the description of the weapon for which a price is to be found, the closest match is sought.

2. Standard characteristics of size and performance (weight, speed, range and payload) are compared with those of a core weapon of a similar description. For example, a 15 000-kg combat aircraft would be compared with a combat aircraft of similar size.

3. Other characteristics, such as the type of electronics, loading/unloading arrangements, engine, tracks or wheels, armament and materials, are compared.

4. Weapons are compared with a core weapon from the same period.

<sup>3</sup> It is possible to present a very rough idea of the economic factors from the financial statistics now available from most arms-exporting countries. However, most of these statistics lack sufficient detail.

Production under licence is included in the arms transfer statistics to reflect the average percentage of licensee-imported components embodied in the weapon (in reality this import share may fluctuate, often gradually decreasing over time). Supplies of sub-systems from other sources than the licensor registered in the database are not included (unless these sub-systems are weapons as defined by SIPRI for the database, in which case a separate record is included in the database with details for these systems).

Weapons delivered in 'second-hand' condition are given a standard value of 40 per cent of the value assigned to the new weapon; second-hand weapons that have been significantly refurbished or modified by the supplier before delivery (and have thereby become a greater military resource) are given a value of 66 per cent of the new value. In reality there may be huge differences in the military resource value of a second-hand weapon depending on its condition after use and the modifications during the years of use.

The SIPRI trend indicator does not measure military value or effectiveness. It does not take into account the conditions under which a weapon is operated (e.g., an F-16 combat aircraft operated by well-balanced, well-trained and well-integrated armed forces has a much greater military value than the same aircraft operated by a developing country; the resource is the same but the effect is very different). It also assumes that the real prices of the core weapons are genuinely real and do not include costs which, even if officially part of the programme, are actually not exclusively related to the weapon itself—for example, funds that seem to be part of a programme could actually be related to optional add-ons and armament or to the development of basic technology that will also be included (free of cost) in other programmes but have for the sake of convenience been put under one programme, and hidden government subsidies to keep industry in being by paying more than the weapon is worth.

### III. Sources

The sources for the data presented in the arms transfers register are of a wide variety—newspapers; periodicals and journals; books, monographs and annual reference works; and official national and international documents. The common criterion for all these sources is that they are open—published and available to the general public.

Such open information cannot, however, provide a comprehensive picture of world arms transfers. Published reports often provide only partial information, and substantial disagreement between them is common. Order and delivery dates and exact numbers, or even types, of weapons ordered and delivered, or the identity of suppliers or recipients, may not always be clear from the sources. The exercise of judgement and the making of estimates are therefore important elements in compiling the SIPRI arms transfers database. Estimates are kept at conservatively low levels (and may very well be underestimates).

All sources of data as well as calculations of estimates, while not published by SIPRI, are documented in the SIPRI database.