

Research Group for  
Biological Arms Control



# **A Global Trade Monitoring Regime for Bioweapons Related Items**

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## **Abstract**

On the quest for tools to strengthen the BWC, the harnessing of global trade data for a comprehensive export and import monitoring regime for bioweapons (BW) related dual-use items should be considered. By using existing trade classification systems and data that is already generated in most countries through existing export/import regulations, trade with sensitive items can be registered. Biotechnological capabilities and conspicuous aggregations of transfers that might not be compatible with a legitimate use - even if each single transfer appears to be not of concern - may be detected by a thorough analysis of the data. Such a trade monitoring regime can detect indicators of possible non-compliance and serve as an efficient deterrent.

Trade monitoring schemes are already in place in different areas where international organisations monitor the transborder trafficking of specified goods such as certain chemicals or endangered species.

Some of these systems use the so called Harmonized System (HS). The HS is an international nomenclature for the classification of globally traded items maintained by the World Customs Organization (WCO). Already today most countries collect data on identifiable ex- and imported items, their volume and value and transmit these data to a centralised database using the HS. Due to its all-embracing and multilateral character the HS seems also most practicable for the purposes of BW-related trade monitoring.<sup>1</sup>

## **UNSCOM/UNMOVIC as an example for a successful trade monitoring system**

History provides an example for the discovery of a BW program by monitoring of trade data. The UNSCOM inspectors developed – besides the on-site verification system – a trade monitoring mechanism for biological, chemical and nuclear dual-use items crossing the Iraqi border.<sup>2</sup> The system gathered trade data and showed that Iraq had imported vast amounts of microbiological growth media in the late 1980s, but could not account for several tons of it. In July 1995, the Iraqi government - confronted with the data - acknowledged its former large-scale production of BW agents after having denied it for years.

The experiences showed that a well balanced items list is an indispensable precondition for a successful trade monitoring. If it is designed too broadly valuable information might get lost in the background noise. In a refined version of its items list UNMOVIC - that had replaced UNSCOM by that time - deleted for example chlorine from the chemical part of the items list.<sup>3</sup> Chlorine is a substance with a high potential of misuse, but the enormous quantity that is needed for civil purposes, such as the purification of drinking water, hides possible imports for illicit purposes. With a too narrow list, on the other hand, important data might not be discovered. The biological part of the refined UNMOVIC list contains approx. 100 items that could be candidates for a global trade monitoring system.

The UNSCOM/UNMOVIC example can be considered as a ‘proof of principle’ for the usefulness of an analysis of trade data for the uncovering of weapons programmes and provides an elaborated items list. But a trade monitoring system for a single country under a sanctions regime is clearly different from the here proposed global trade monitoring regime. Pre-conditions that have to be met for a global regime are availability of trade data, data submission in a consistent and comparable form, and the exact representation of the concerned goods within the system. These requirements might be fulfilled by an already existing classification system for traded goods, the Harmonized System.

## **A common language: The Harmonized System**

Over 98 % of the merchandise in international trade today is covered by the Harmonized System (HS) that was designed and is maintained by the World Customs Organization (WCO) as “the language of international trade”.<sup>4</sup>

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<sup>1</sup> This is an updated version of the article that was distributed in November. With the suggestions from the World Customs Organization the article now refers to the changes in the Harmonized System that will come into force by 1 January 2007. For an earlier and more detailed version of this paper see also Jeremias, G. and van Aken, J., ‘Harnessing Global Trade Data for Biological Arms Control’, in *The Non Proliferation Review*, Summer 2006, Volume 13.

<sup>2</sup> The IAEA was responsible for the analysis of the data concerning the nuclear field.

<sup>3</sup> UNMOVIC document S/2001/560, 1 June 2001.

<sup>4</sup> <<http://www.wcoomd.org/ie/en/AboutUs/HS.pdf>>, all URL quotes in this text were last checked 6 October 2006.

The HS has a hierarchic structure classifying all traded items by a 6-digit code. 21 sections give a broad overview and are divided into 96 chapters containing 1,121 headings (HS 2007 edition). The numbers of the chapter (01-96) and those of the heading compile a four digit code. In some cases these four digits do sufficiently encode a group of commodities. Often, the code is completed by two additional digits (subheadings) encoding further divisions. In the HS 2007 edition, for example, the code 85 is for the chapter covering ‘electrical machinery and parts thereof (...)’, within this chapter the code 8528 is for ‘monitors and projectors (...) and reception apparatus for television (...)’, and the code 8528.72 is the subheading for ‘color television sets’.

The primary function of the HS is to serve as base for customs tariffs and for the collection of international trade statistics, but from the start of the system in 1988 it was explicitly developed as a multipurpose tool and it has been used for other objectives. A number of international organizations whose mandates include the tracking of certain substances have chosen the HS as basis for their monitoring systems. The UNEP Ozone Secretariat uses the HS for monitoring the trade of ozone depleting substances (ODS), the INCB for narcotics and psychotropic substances, CITES for endangered species and the OPCW for chemicals scheduled under the CWC. The example of ODS monitoring is described in more detail below.

The HS however is not capable to deal with such specific monitoring requests from the outset. Though in the HS every tradable item is allocated a 6-digit code, by far not every code identifies a single item as the colour TV set. Most 6-digit codes identify a large group of items, and it is often the case that only few of the goods grouped under one code fall under the monitoring criteria of a particular agreement. For the monitoring of trade of particular goods, the nomenclature has to be adapted to the concrete needs, sharpening the focus to identify the concerned products individually. The adaptation of the HS can be initiated by any international organisation or contracting party to the Harmonized System Convention. This includes the majority of the states and the European Union (Commission).

### **The example of the international trade monitoring for Ozone Depleting Substances**

In the 1980s halogenated hydrocarbons used as cooling mediums and propellants were identified as depleting the ozone layer. Hence in 1987 the Montreal Protocol on Substances that Deplete the Ozone Layer was adopted and defined specific commitments.<sup>5</sup> To limit the consumption of Ozone Depleting Substances (ODS) to a calculated level, parties agreed to control the international trade of nearly 100 chemicals and products containing those substances (e.g. refrigerators). At present, 189 nations are parties to the Montreal Protocol.<sup>6</sup>

On the basis of the Protocol two separate mandatory mechanisms to control and monitor the transfer of ODS are in force today. One is a licensing system for imports, exports and transits<sup>7</sup>, the other one is a mandatory reporting requirement for the trade in ODS.<sup>8</sup> The objective of this monitoring mechanism is to enable the State Parties to assess the compliance with their obligations to phase out ODS.

The Secretariat that implements the 1987 Montreal Protocol (UNEP Ozone Secretariat) quickly decided to use customs codes for the trade surveillance, but also realized that the existing HS codes did not identify the concerned substances specifically enough to be able to find clear evidence of non-compliance on the basis of this data. Consequently, WCO Member States requested the HS Sub-Committee for a revision of some subheadings and codes in the nomenclature to henceforth display the relevant substances more accurately.<sup>9</sup>

In collaboration with UNEP, the WCO recommended relevant subheadings and HS codes to all Member States. UNEP requested adaptations of the nomenclature on three separate occasions between the early 1990s and 2004. Each revision took about 2-3 years to group the concerned substances and to complete

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<sup>5</sup> Entered into force on 1 January 1989.

<sup>6</sup> Not all of the parties have ratified the additional adoptions and amendments that are today annexed to the treaty <<http://www.iisd.ca/vol19/enb1942e.html>>.

<sup>7</sup> Adopted (along with the ban on trade with non-Parties) by the Ninth Meeting of the Parties as part of the 1997 Montreal Amendment to the Montreal Protocol (Article 4B).

<sup>8</sup> Article 7 of the original protocol adopted in 1987.

<sup>9</sup> One example for an adaptation is the change of HS subheading 2903.40 in the HS 1992 edition (halogenated derivatives of acyclic hydrocarbons containing 2 or more different halogens) into eight new other subheadings, 2903.41-49, most of which listing one or few specific compounds, to accommodate the needs of the Montreal Protocol.

the introduction of new subheadings. However, considering the urgent need to monitor the international trade in ODS, the WCO adopted Recommendations requesting its Member administrations to insert national subdivisions in their statistical nomenclatures until the HS Nomenclature was amended. The current version of the changed codes was adopted during the last regular review of the HS for implementation on 1 January 2007 by all current (November 2006) 126 HS Contracting Parties. Such reviews are conducted every five years and the next review is foreseen for implementation in 2012.

Until today, the system has not been formally evaluated. However, according to the Ozone Secretariat, anecdotal evidence suggests that the system has contributed towards achievement of the overarching goal of facilitating the phase out and elimination of ODS production and consumption.

The Ozone Secretariat, the Protocol's Implementation Committee, and the annual Meeting of the Parties have roles in assessing the collected data. The data included in the reports are publicly available, and there are NGOs that use this data.

From the states' perspective, the notification system for ODS is, very much like the UNSCOM/UNMOVIC system and other trade monitoring approaches, an active system that relies on the submission of annual reports by each Party to the organization using official data reporting forms on ODS trade, production, destruction and use. A passive system in contrast would be based upon analyzing data that is available without specific reporting requirements.

#### **Clarification of codes for BW related items**

To implement a biological trade monitoring regime using the UNMOVIC items list as a basis, one or more Contracting Parties to the HS Convention would have to suggest separate identification of the relevant items in the HS. The existing trade monitoring systems try to identify chemical substances through the HS classification. Due to the great number of often very similar chemicals, their identification is rather problematic.<sup>10</sup>

The challenges in defining items that are related to a possible BW programme are indeed others than for a trade survey for chemicals. A BW related monitoring regime would not focus on substances but on equipment that can be much easier described and identified. In the case of ODS or chemicals scheduled under the CWC, even trading with these substances is restricted under the respective treaties and may constitute non-compliance, while in the biological area trade is assumed to be legal until an unpeaceful use is proven.

The two goals of the trade monitoring for biological items – indicating national capabilities as well as possible non-compliance – need a coverage of equipment related to the production and processing of pathogens (e.g. fermenters, aerosol generating equipment, critical laboratory equipment) as well as materials related to biotechnological processes (e.g. bacterial growth media). Considering the indistinct representation of biological dual-use items in the HS, a trade monitoring for BW related items could, as mentioned above, use the refined UNMOVIC items list for defining the scope of the system. An agreed list of monitored items must include distinct definitions for those items that are specifically designed to handle dangerous pathogens or that are particularly designed for biological production processes.

Most items that are specifically designed to produce and process pathogens on large scales are rather unique and have nothing in common with the low tech-picture that is often provided when considering the BW threat. While for example spray dryers are used in many different applications, they are normally not capable of drying pathogens without fatal contamination of the environment and workers. Iraq was unable to procure a fully contained (aseptic) spray dryer that is specially designed to handle pathogens.<sup>11</sup> Some items on a monitoring list will, however, be rather generic but significant in combination with other items.

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<sup>10</sup> While identification seems to be clear enough for the ODS monitoring, the OPCW also achieved some adjustments of the HS, but the monitoring for scheduled chemicals itself still relies on a specific nomenclature for chemicals (CAS-numbers).

<sup>11</sup> UNMOVIC, 'Twenty-second Quarterly Report', United Nations document S/2005/545, 30 August 2005, paragraphs 9 and 41 of the Appendix.

### **Adjusting the framework**

The Harmonized System's trade monitoring capabilities can be achieved in two different ways: Firstly by the creation of subheadings in the HS Nomenclature, and secondly by the adoption of Recommendations.

The creation of new subheadings requires a legal amendment of the HS Nomenclature in connection with a review. While the review is an on-going process, the agreed amendments are only implemented approximately every 5 years. The next set of amendments (adopted by the WCO Council in June 2004) will enter into force on 1 January 2007. Work on the next review has already commenced and must be finalized by the HS Committee in March 2009 for implementation in January 2012. The creation of subheadings for specific products has the advantage that Contracting Parties to the HS Convention have an obligation of implementing and applying these subheadings in their national Customs tariffs and Statistical Nomenclatures.<sup>12</sup>

Considering both the relatively long timeframe necessary for the implementation of new headings or subheadings and the urgency required in some cases to insert these changes, the HS Committee can make use of the instrument of Recommendations. These Recommendations request WCO Member Administrations and HS Contracting Parties to insert subdivisions, beyond the 6-digit HS level, in their statistical nomenclatures for the products in question. The applications of the Recommendations are indeed not compulsory for countries. This implies that statistical figures will be available only from the countries that have accepted and implemented such Recommendations. However, Recommendations have the advantage that they can be implemented within a shorter timeframe than HS Nomenclature changes.

It must be emphasised, that it is the HS Contracting Parties that finally decide whether or not a request for new subdivisions can be accommodated or whether a Recommendation would be appropriate, but to achieve a system that is also by geographical means comprehensive, a decision on new subheadings would be desirable for a BW related trade monitoring.

### **Implementation of a biological monitoring regime**

Export authorities continuously submit national trade information by direction (imports, exports, re-exports), volume and value to central databases using the HS. The Eurostat Database as well as the Commodity Trade Statistics Database of the UN Statistics Division are publicly searchable.<sup>13</sup> Commercial market counsellors and industry use the databases already today to analyse market segments.

The existing monitoring systems whose implementing organisations use the HS, all rely on the reception of harmonised trade notifications by the member states. Their mandates do not allow the verification of the given information by using the online databases and limit them to the evaluation of the declared data.

A future biological trade monitoring regime could work completely different to the existing systems. Lacking a limiting mandate, an implementing institution would not be dependent on the active participation of states by submitting notifications to that institution. In contrast, it could be a passive system that relies on the scanning of online available data that was also submitted by states, but as part of regular, not security related submission of trade data for statistical purposes. A monitoring system with the ability to visualize international flows of relevant items could autonomously point out suspicious concentrations of transfers into a country that on their own might never cause suspicion.

An open question is what institution should be responsible for the evaluation of the trade data, draw conclusions, and initiate a follow-up process in case of dubious data?

### **Data analysis**

In fact, downloading data from the internet is not a monitoring system. To assemble a picture from the raw information, elaborated computer software has to be developed that can deal with the enormous amount of data that will emerge (approx. 100 types of items traded by about 190 states in two directions

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<sup>12</sup> Not all WCO Member States are as well member to the HS Committee. Currently 125 States and the EU Commission are contracting parties to the Committee.

<sup>13</sup> A fee has to be paid for the use of COMTRADE, if a limited number of requested records are exceeded. The maximum rate for non-profit users is US \$ 3,750/year. This allows an unlimited number of requests; <<http://unstats.un.org/unsd/comtrade/>>.

with crosschecks, disclosed by value and volume). Information technology experts argue, however, that modern data mining programmes can easily work with such masses of data and should be able to detect patterns as peaks and mismatches of ex- and import information.

The data itself must be of high quality. Whether adequate quality can be reached by the use of the existing databases is still to be explored. Financial and administrative efforts for implementation would be minimal, if data is used that is already publicly available, once the HS codes have been changed accordingly. Since existing open source data would be evaluated, no further international agreement was needed to put the system into place.<sup>14</sup>

### **Data interpretation**

May the technical basis be the existing databases or a specialized database, and how appropriate the software for data analysis might be – data interpretation will always have to stay in the hand of human experts. In a first step mismatches of submitted data will have to be clarified. It will frequently happen that a certain trade volume is reported to have left a country to a certain destination, but the import data of the importing country show a higher or lower volume. In most cases banal reasons cause such mismatches. To name just three: the supplier and the importing company might use different HS codes for the same traded good; shipments might be reported as exported in one calendar year, but as imported only in the next; also the different use of dots and commas in writing and submitting numbers causes misinterpretation.<sup>15</sup>

Interpretation itself would begin with drawing conclusions on a country's biotechnology level by evaluating the demand for more or less elaborated technology and by analyzing changes in the type and amount of imported technology. The following step would be the search for indicators of possible non-compliance with the BWC. Experts on BW-technology have to set up a catalogue of search and interpretation criteria. Comparison of data and knowledge about the current technological level and production capacity could in the long run lead to insights into unusual import patterns, may it be the imported items themselves, or the traded volume or a combination of both. The value of indicators, such as production, processing, or delivery equipment, may vary depending on a country's indigenous capabilities and the acquisition of critical items over time. A further complicating matter is the fact that many biological dual-use items are used in a broad range of civilian activities even beyond biological research or production.

In the Iraq case unusual amounts of imported growth media led to the assumption of a clandestine BW program. It is questionable if the assessment of the trade pattern of a single item can in all cases lead to reliable results. An adjustment to the HS however would lead to the opportunity to systematically combine the data interpretation of e.g. growth media and production equipment. A correlation of peaks could then initiate a follow-up procedure.

### **Follow up**

What happens if the trade monitoring mechanism raises significant questions about one country's compliance with international arms control treaties? Obviously, trade data alone can never provide solid evidence of illicit activities. But as one objective of the mechanism is to generate indicators of non-compliance, any such system needs to be flanked by appropriate follow-up procedures.

Most appropriate would be a built-in low-threshold clarification procedure, in which each country (or, if applicable, an international technical assessment body) can request from any other country clarifications on specific transactions. This clarification process should be easy to use, purely technical in nature and without implicating accusations or suspicion. If more serious non-compliance questions arise, they could and should follow Article V or VI of the BWC and lead to a consultation process or be brought to the attention of the UN Security Council.

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<sup>14</sup> An alternative to the open access data could be to set up of a specific purpose database. Building a specialized database, which would draw on all data that is available at national authorities, might make data available in a timelier manner. Hence it could increase data quality and could provide for clarification measures, but would require financial resources for data management. But the price for a specialized database would be the need for international agreement, which could prevent implementation for a long time.

<sup>15</sup> Interviewed experts named these sources of error as the most common ones.

## Actors

This leads to the question which actors should become involved into the operation of the proposed trade monitoring. When the mechanism is based on a publicly available database, any international, national or non-governmental entity can work with the data. In fact everybody with the technical abilities to analyze the data would be able to draw conclusions from the results – in principle even without filtering out the mismatches. For a number of reasons the spectrum of players should be broadened beyond the world of states.

The most important actors for a successful trade monitoring are the supplying companies who generate the basic data. A falsification of trade data by the supplier seems to be unlikely because most sale requests would be regarded as legitimate and benign. Due to the monitoring systems capacity to record the complete trade from both the perspective of the importing and the exporting country, it would work as deterrence for those who want to misuse the transferred technology for a BW program as suspicion could be generated by mismatching import and export data that can not be clarified. Active circumvention on both the supplier and the recipient side would of course not be detectable.

If companies had access to the collected data they could use the instrument for accurate market analysis. Such an instrument gives concrete benefit to the industry. At the same time companies would show their willingness to cooperate against the misuse of their products. For these reasons it can be assumed that involving industry would increase the incentive for correct data submission.

For the evaluation, a small international technical body is desirable that could act as headquarters of the mechanism. It could provide, in addition to simple data analysis, also preliminary data interpretation, as the UNEP Ozone Secretariat does in ODS monitoring. This task could be assumed either by an international organization (the needed know-how could for example be provided by an UNMOVIC successor organization) or by an independent civil society NGO, like the International Campaign to Ban Landmines does for landmines. Both solutions have their pros and cons; both can ensure a non-discriminatory use of the information. While states are more experienced to deal with bodies like international organizations, clarifying requests from an NGO might not appear as a formal intervention. The European Union repeatedly expressed the will to support a variety of WMD non-proliferation efforts.<sup>16</sup> Actually the EU cooperates with the civil society organization BWPP, has traditionally good relations to the private commercial actors and could thus become a possible nucleus of a trade monitoring system. Eventually it is essential that the conducting institution acts more as a service provider than as an intrusive inspection unit. Transparency and confidence have to be the benchmarks of the trade monitoring.

## Outlook

Assuming that the technical challenges can and will successfully be mastered, on the political side the concept of a global trade monitoring for BW related equipment offers a number of benefits:

- As a system that does not rely on export regulations, a non-licensing monitoring regime would be more openly organised than the existing export control regimes. The Australia Group and its unilaterally imposed export restrictions are perceived by many developing countries as unfair trade barriers. The trade monitoring provides a more integrative approach.
- The fast developments in biotechnology make it more and more difficult to prevent the proliferation of all relevant technologies and know-how. Some of the recent developments in biological production technology, for example disposable fermenters, have a high relevance for BW programmes and are already traded in high numbers. This will make it soon rather easy to circumvent current export controls and acquire a significant production capability for biological agents. A passive trade monitoring system can cover a broader range of items and consequently complement traditional export controls.
- By the provision of global information on national biotechnology capabilities, the monitoring could complement active notification/declaration schemes such as the BWC Confidence Building Measures and focus cooperation activities on areas of most need.

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<sup>16</sup> For example the EU strategy against the proliferation of Weapons of Mass Destruction, December 2003 and the belonging progress reports.

- Article X of the BTWC clearly stresses “*the right to participate in the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes.*” As a non-licensing system a global trade monitoring of critical dual-use items could help to ensure the free trade of material and at the same time be a multilateral instrument to increase transparency on capabilities.
- Since the system may also be used to generate indications for non-compliance with the BWC, it would thereby act as a strong deterrent against misuse of biological dual-use items because - since the system is not actively circumvented - it would become rather difficult for any single country to acquire a significant BW capability without leaving a trace if such a system was truly global and comprehensive.

There are, of course, limits to this concept, and it might be particularly difficult to identify goods that can serve as indicators for both envisaged tasks. If a tool as the trade monitoring for BW related items should come into place, its ability will primarily be the assessment of the national levels of biotechnology capabilities. The detection of possible misuses of biotechnology will always be limited to the detection of large scale BW programs, since smaller amounts of sales in most cases will be hidden in the background noise.

Programmes in states with a high indigenous biotechnical capacity can probably not be discovered, as transborderly trade is not needed to produce and to weaponise agents.

The here proposed monitoring system for BW related items can also not become a real-time working instrument, since there is always a time gap between the shipment and the availability of the data, and it is not designed to find clear evidence on non-compliance with the BWC.

But it could supplement traditional export controls and other building blocks for the non-proliferation of BW related technology by the identification of unusual peaks in trade patterns. In contrast to current export control systems the monitoring mechanism could cover a broad range of items and be much more inclusive because it neither impedes trade nor conflicts with economic interests nor requires active notification.

The proposed trade monitoring is to be seen as a model for further discussion. The aim was to conceptualize an implementable instrument. The technical developments concerning information technology and the availability of data, makes a survey of global merchandise technology transfers possible in a way that was not thinkable in the past.