Defining high risk

Gustavo L. Bottan of Passport Systems looks at the application of risk management to cargo inspection

Gustavo L. Bottan is the Vice President Business Development, Passport Systems Inc.
The opinions expressed in this article are solely the author's and do not represent those of Passport Systems Inc. or any of its clients.

Contact:
Tel: +1 978 263 9900 x2210
Fax: +1 978 263 9971
Email: Bottan@passportsystems.com
Web: www.passportsystems.com

The use of risk management techniques is the most accepted approach by governments and law enforcement agencies for container inspection. In the US, **Customs and Border Protection** (**CBP**) uses its *Automated Targeting System* (*ATS*), which is described as 'an enforcement tool that uses sophisticated automated techniques and algorithms to perform risk-based analysis of anomalies and strategic intelligence to indicate which shipments are high risk and require additional scrutiny and mandatory security inspections'. Additionally, CBP officers at ports of entry use 'their local knowledge and judgement to select unusual or irregular shipments for inspection'.

Establishing which containers would require a physical inspection is the domain of government and law enforcement agencies. In the US, the *SAFE Port Act of 2006* established the requirement for importers to transmit information to CBP 24 hours before containers are loaded on a vessel destined to the US. The *Importer Security Filing* (*ISF*), more commonly known as the '10+2', requires the submission of 10 data elements by the importer as well as 2 more from the carrier. The ISF filings are submitted electronically through the *Automated Broker Interface* (*ABI*) or the *Automated Manifest System* (*AMS*).

The data required from the importer includes: the manufacturer or supplier's name and address, the buyer or owner's name and address, the ship-to name and address, the container stuffing location, the consolidator name and address, the importer of record number/foreign trade zone applicant ID number, the consignee's number(s), country of origin, and commodity *Harmonised Tariff Schedule* number. The two data items required from the carrier are: the vessel stow plan and the container status messages.

Although the algorithms used by each law enforcement agency are not public for obvious reasons, they make use of input like that of the '10+2' as well as intelligence and other temporal or location specific information. The containers considered to be 'high risk' will be separated for a physical inspection. During these inspections, the Customs officer has the flexibility to inspect more or less of the cargo (e.g. opening the container for a general visual inspection, selecting cargo for closer inspection, the unloading of all cargo, or the waiving of the inspection altogether). Most practitioners, however, generally rely on the same physical procedures for all containers selected for inspection (e.g. using x-ray scanning, canine teams, etc.).

'There are many aspects involved in making a risk management approach a good one. The information and data used must be valid, the algorithms must be robust, the procedures have to be consistent and the people involved must be properly trained and alert'

If different risks were instead dealt with by using different inspection techniques or procedures altogether, the result could be improved security and higher cargo inspection throughputs. In this respect, in earlier articles I described various approaches to cargo inspection and in the last one published in this magazine, two distinct ways to inspect containers: (1) for export, before embarkation and (2) for import, after debarkation (see *Cargo Security International*, December/January, page 39). In these inspection approaches, the

risk focus for export containers was based on 'national security' detection of nuclear materials or nuclear weapons, while for imported containers, the inspection or risk focus was primarily one of law enforcement – tariffs and contraband. This is in contrast to the assumption that all cargo container inspections need to be the same.

In this article, I will focus on the definition of risk as one of the most important aspects determining the efficacy of a risk management system. In a follow-up article (to be published in the April/May issue of *Cargo Security International*), I will look at the technologies that can potentially provide automatic physical measurements of risk ratings to complement the data normally used in the ATS.

Risk management systems

There are many aspects involved in making a risk management approach a good one. The information and data used must be valid, the algorithms used to process and assess the risk must be robust, the procedures used to deal with risk have to be consistent and the people involved in executing such risk management approach must be properly trained and alert. Yet, perhaps no aspect is as important as that of properly defining risk.

Defining what is risky, and to what degree, is a subjective matter. For example, purchasing flood insurance for a home built in a non-flooding location is perhaps something few people would do, as one would assess the risk to be low, despite the consequences being high – the possible destruction of the home. In another example, I once heard an elderly person say they did not require regular medical check-ups as they've never been sick; while statistics point to good probabilities of upcoming illness with potentially catastrophic consequences.

Although subjective interpretation of risk is what guides our thinking and responses, can the use of metrics help to quantify the chances of an event occurrence and its consequences, to help in our decision making?

When considering how effective a risk management system is, we can clearly state that its effectiveness would

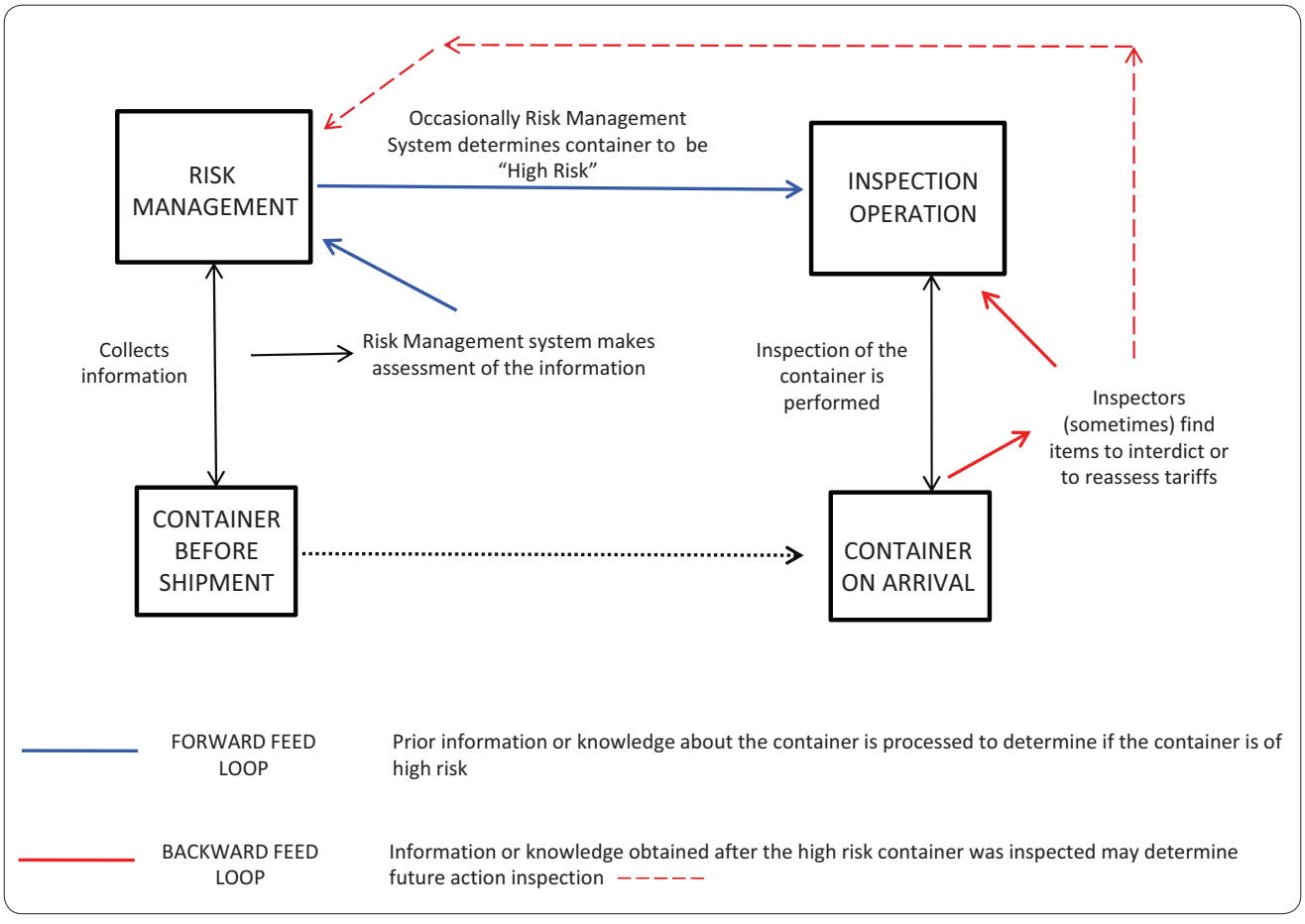

Figure 1: Feed control loops in cargo container inspection.

'We all understand that it is impossible to inspect a container with currently deployed technologies fast enough to allow for 100% cargo container inspections. But would it be possible to achieve some meaningful reading of the contents, without disrupting commerce, such that new data can be obtained to support the targeting algorithms?'

be at its maximum if:

- all containers deemed to be high risk contained items which should either be interdicted or have tariffs be reassessed on them, and
- all containers deemed to be low risk contained no items that should be interdicted or have tariffs reassessed.

It is logical to assume this is not the case with any system. The question is, how effective is the risk management system and how can one adjust it to maximise its effectiveness at all times?

One way to do this is by improving how risk is assessed, and this is precisely what the **Department of Homeland Security Inspector General's Office** (**DHS IG**) and CBP have agreed on – as reflected in the IG report of January 2010: 'During our review, CBP began the process of improving rule process procedures to improve the controls over the targeting rules and testing processes.' Improvements to the cargo targeting and examination include: processes for changing or deleting targeting rules through better definition terms ('the process can be improved by providing more specific definitions for its risk categories'), documentation of rule changes and the testing and evaluation of rule changes ('using actual data to determine how well the new rules are working').

To understand what the above means, I refer to Figure 1, which depicts the cargo container inspection in relation to the risk management system. They are linked by two major 'control' loops (information and data).

One is a forward control loop, which is what I would refer to as the risk management system or targeting system (the forward control loop in blue in Figure 1). The other is a backward control loop (in red in Figure 1). The '10+2' information is an example of the forward control loop as it determines which containers ('high risk') should be separated for inspection. The backward control loop is information resulting from the inspection process itself i.e. improperly declared cargo, contraband and other interdicted cargo is acquired evidence to be used to provide the inspector officers with better knowledge for dealing with a future container inspection. This information can also be used to validate and update the targeting system.

Both loops have shortcomings. The forward loop cannot be determined to be effective until after the inspection is made, and the backward loop is not effective as only high risk containers receive some verification of their contents (i.e. the low risk containers may contain threats, contraband or tariff avoiding materials, and there is no way to know).

Automating risk targeting

Most advances in automating a cargo container targeting operation have revolved around the collection of cargo container and supply chain data. One can expect continuous improvements in this area. However, the accuracy of the data used remains a potential shortcoming. Therefore, it would be valuable if a cargo manifest could be verified before transportation. The higher the data quality input to the targeting algorithms, the better risk assessment and targeting for inspection later on in the supply chain.

In this respect, we all understand that it is impossible to inspect a container with currently deployed technologies fast enough to allow for 100% cargo container inspections. But would it be possible to achieve some meaningful reading of the contents, without disrupting commerce, such that new data can be obtained to support the targeting algorithms?

There are examples where 100% of containers can undergo a physical verification, albeit for a specific risk: the use of radiation portal monitors (RPMs) can determine if a container has unshielded radioactive material or not. This is routinely done and it does not cause paralysis or undue delays in the flow of commerce. The 'catch' obviously is that this is indeed a partial verification of risks. Passive radiation detectors do not detect shielded radioactive or nuclear material, nor can they determine if there are explosives, contraband, weapons, drugs or undeclared goods.

Even more, they may alarm on perfectly legitimate cargo like bananas or tiles which emit 'benign' radioactivity, which now requires the resolution of such alerts through a thorough secondary physical inspection (improvements in detection and discrimination continue to be made).

The point above, however, is that there could be ways to physically and automatically examine and rate all containers for a specific risk or various risks. This would have the advantage of perhaps better addressing the highest consequence threats first and improving the accuracy of the risk management approach for most other risks.

For argument sake, let's list some of the risks that could stem from cargo in containers and place them in order of consequence. From the start, one can realise that the list and ranking, among other things, would be case specific to the mode of transportation (e.g. explosives would be at the top of the list for cargo transported by an air carrier while it may not be the same for cargo transported by ship or train). Examples of threats would include: fully armed nuclear weapons, nuclear material for the assembly of a nuclear bomb, radioactive or nuclear material and explosives (dirty bombs), chemicals or toxins capable of exploding, biological threats, and so forth.

'Most of the difficulties associated with performing a physical inspection are related to the disruption of the cargo flow'

Physical measurements of risk

Most of the difficulties associated with performing a physical inspection are related to the disruption of the cargo flow, the costs of delays, the lack of space to perform the inspection at a port, the disruption, complications and costs associated with having to modify port operations to accommodate inspections, and the cost of operating and maintaining inspection equipment.

In the US, the **Transportation Security Administration** (**TSA**) anticipated this problem for air cargo.

The TSA inspects passenger checked and carry-on luggage at the airport using equipment it has purchased and operated – but it requires air cargo shippers and consolidators to perform such function outside of the airport facilities. In this way, the cargo is supposed to be packed

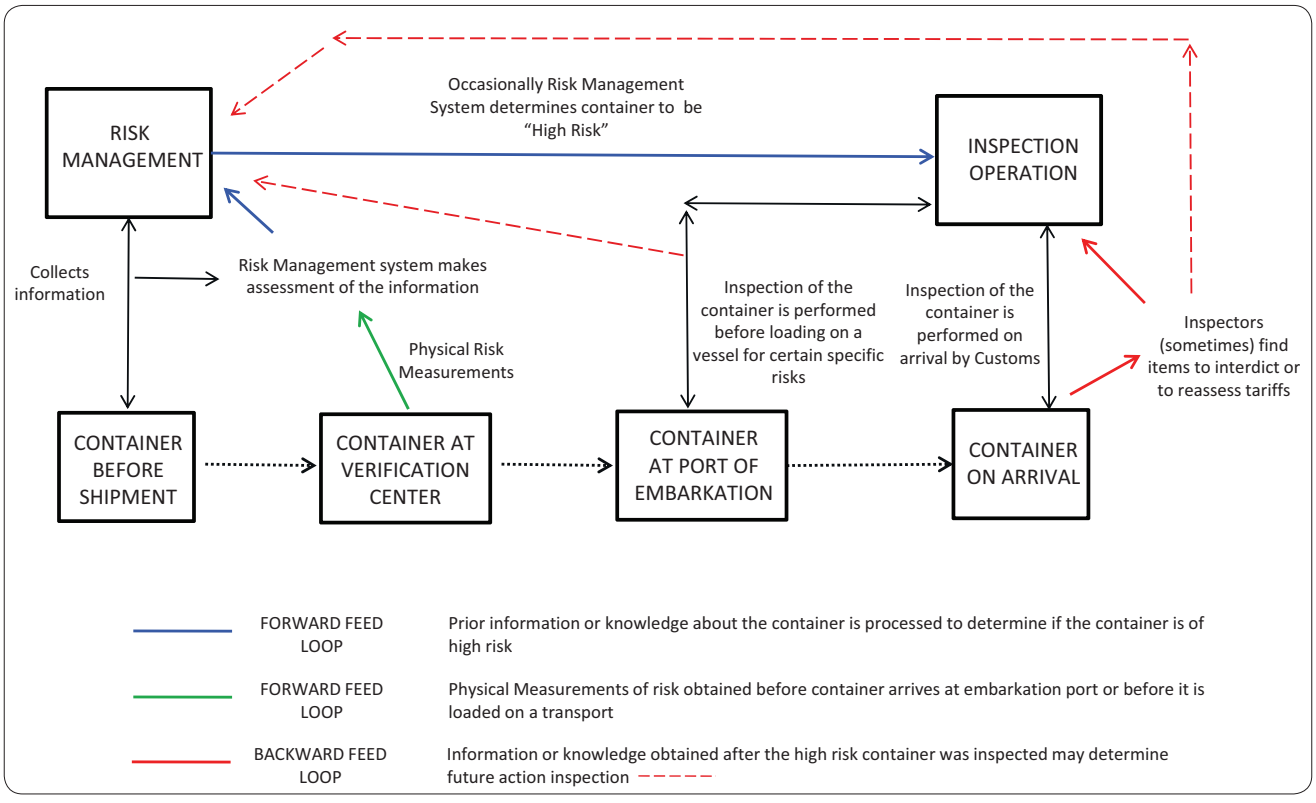

Figure 2: Physical measurements of risk added as forward control loop (green arrow) to support the risk management system.

under controlled supervision, with approved methods and secured during transport to the airport, thus reducing the need for inspections at the airport.

Regarding the question posed earlier in this article, is there a way to automatically and non-intrusively obtain information from every container that could rank the different risks a container's cargo could pose (besides that from the declared manifest and '10+2')? The answer is yes.

Physical verification of all cargo containers could be done via automatic and risk specific measurements (note this is not a container inspection comparable to Customs' normal practice on container arrivals) by private contractors outside the port facilities and the containers could then be secured on their way to a port. This would resolve the problems of space and process flow changes at a port and the costs could be offset via fees charged by container and even subsidised by governments in compensation for the added information that can be used by the risk targeting system (see Figure 2).

The goal is to make the targeting system more efficient, i.e. achieving the highest probabilities that high risk containers carry materials requiring interdiction or tariff reassessment, and that low risk containers do not carry such materials.

To achieve these measurements in an efficient way, new technologies and procedures must be used.

Figure 3 shows a schematic of an inspection station where containers would enter and specific technologies used to measure the risk of cargo on a number of dimensions.

The importance of automation and immediate actionable data cannot be stressed enough, as it is not just a matter of collecting information for future use. For example, if the 'fissionable material ranking' is determined to be high, that container should be separated and further inspected before it is loaded on a vessel, while other risk rankings may be high but could be handled by conventional inspections by Customs on arrival to the country of destination.

Physical verification of cargo is a powerful tool which is within reach of newly developed technologies and would have a significant impact in improving security before shipment as well as increasing the success of interdicting contraband and assessing proper importation fees on arrival.

'Physical verification of cargo is a powerful tool which is within reach of newly developed technologies and would have a significant impact in improving security before shipment as well as increasing the success of interdicting contraband and assessing proper importation fees on arrival'

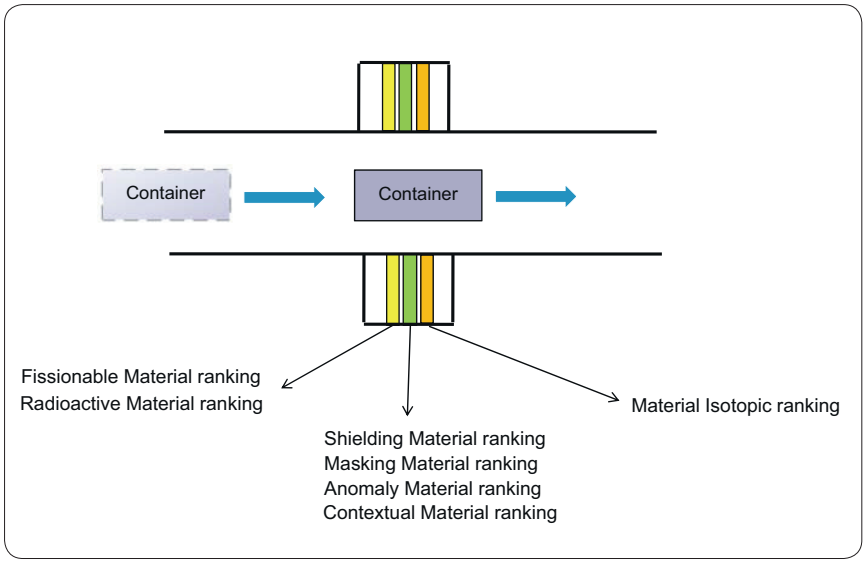

Figure 3: Container at verification centre: use of detection and identification technologies to obtain risk ranking information in a non-intrusive, non-destructive, automatic and rapid way.