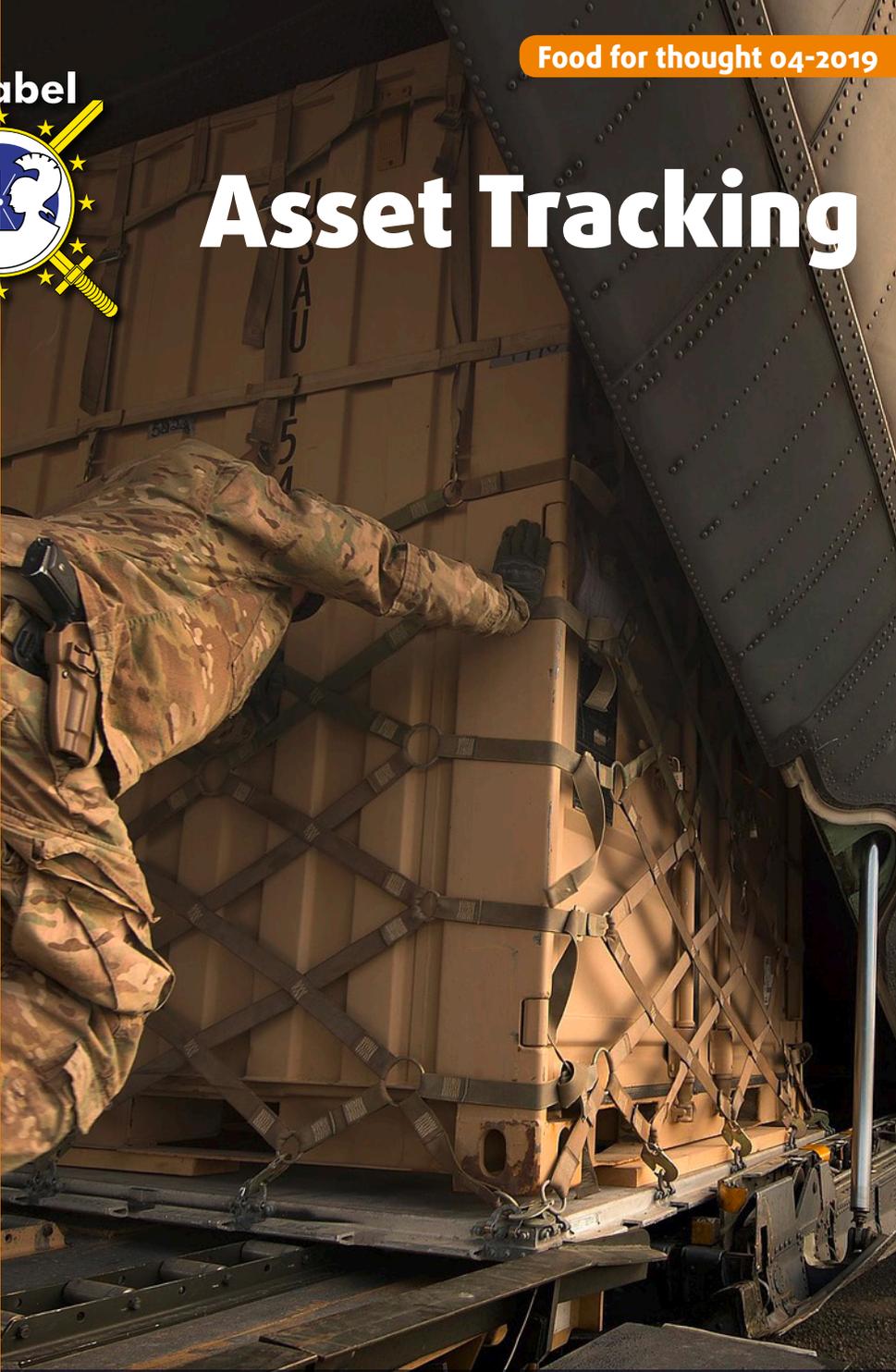


Finabel



Asset Tracking

AN EXPERTISE FORUM CONTRIBUTING TO EUROPEAN
ARMIES INTEROPERABILITY SINCE 1953



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European Army Interoperability Center

This paper was drawn up by the European Researcher Team of the Permanent Secretariat.

This Food for Thought paper is a document that gives an initial reflection on the theme. The content is not reflecting the positions of the member states, but consists of elements that can initiate and feed the discussions and analyses in the domain of the theme. It was drafted by the Permanent Secretariat of Finabel.



INTRODUCTION

This Food for Thought paper examines military asset tracking and how it contributes to the effectiveness of both national and multi-national operations. We examine the potential benefits to be had from asset tracking and how interoperable standards and processes work to provide in-transit visibility. Finally we look at the cost saving potential of asset tracking for the military.

DEFINITIONS, TERMS & CONCEPTS

It is important to ensure that there is a common understanding of the definitions, terms and concepts involved in military asset tracking. NATO's standardisation organisation through its multi-national Asset Tracking Working Group (AST WG) have done a lot of work in this area and we will refer to their published definitions and terms here to set out what asset tracking is about.

Asset tracking is an important, if not critical, component of military logistics. NATO defines logistics as the science of planning and carrying out the movement and maintenance of forces. The asset itself is defined as being units, personnel, equipment and material. Generally asset tracking to date monitors the movement of individual material assets collated as a Transport Package. The Transport Package itself is identified usually with a Serial Shipping Container Code which is a commercial standard from the GS1 organisation. Transport packages travelling from the same consignor to the same consignee are then monitored as a Shipment.

Asset tracking itself consists of “the identification, collection, recording, monitoring, sharing and presentation of information on the location and condition of assets moving within the supply chain” (2018, SCT Technology). In-transit visibility itself has been defined as the “capability that [...] is designed to provide the logistics customer with maximum visibility and near real-time status on the movement of all classes of supply” (2018, US Army Combined Arms Support Command). Further definitions and terms relating to the technology used for asset tracking are examined and explored in the section below on asset tracking technology.



POTENTIAL BENEFITS OF ASSET TRACKING

So, why is asset tracking important for military forces and what are the potential benefits? A useful way of answering this question is to consider the scenario of a war-fighting operation that has recently started in a theatre of operations some distance from the European continent. At both a national and coalition level the operational commander will have knowledge of the forces / military assets being deployed and therefore available to him to prosecute his mission. These assets are likely to be dispatched from a number of dispersed geographical locations – military airfields, ports and depots for example. Without asset tracking the commander's staff will only know that the forces / assets have left the home base and a lack of in-transit visibility hampers and can severely delay any efforts to find any specific assets which might need to be redirected or re-prioritised in order to meet the overall mission needs.

The benefits of asset tracking can be summarised as improving logistic efficiency (doing the same with less) and logistic effectiveness (doing more with the same) - often quoted as ensuring the “Right Equipment to the Right Place at the Right Time and at the Right Cost”. More specifically, asset tracking provides the ability to forecast accurate delivery

of essential equipment, it provides consignees with visibility of when equipment will arrive and it replaces manual processes which tend to lead to inaccurate recording of asset moves. In addition it reduces the need to have manpower record shipment flow and search for missing assets. From a logistic staff/headquarters perspective it provides the ability to monitor supply chain flow, the ability to pre-empt supply chain delays and the ability to redirect and re-prioritise in-transit shipments.

Asset tracking data also enables the management of the ‘In-Transit Flow’ (SCT Technology, 2018). This is the movement of assets between consignors and consignees. To manage the flow you need data, data which is translated into actionable intelligence. This intelligence includes where the assets are, being alerted when the flow is delayed/late, when assets are diverted from authorized routes and security alerts when an asset is being tampered with. With this intelligence you can now manage the In-Transit Flow. You can change transit routes to avoid further delays, identify resources (manpower, handling equipment and storage) to efficiently deal with the inbound flow and identify risks to the efficiency of the flow and make changes to shipping plans accordingly.



French Armed Forces Warehouse



ASSET TRACKING INTEROPERABILITY

Providing logistics at the right time and at the right place, as well as being sure that the equipment needed is actually that being delivered, is challenging enough even when dealing with only one single nation involved, as demonstrated by the operations Desert Storm and Desert Shield (1994, United States Accounting Office, Desert Shield and Desert Storm Reports and Testimonies: 1991 - 1993). However, when talking about multinational operations, the complexity increases. Different nations use different doctrines. Hence, different task organisations, equipment allocations, infrastructure, and planning priorities (2015, Cpt. Theresa Christie, Multinational Logistics Interoperability).

Since creating a single overarching doctrine is unlikely in the foreseeable future, nations are able to increase interoperability through logistics through the use of standardised asset tracking processes and technology such

as the use of active RFID and GPS systems. The standardisation of asset tracking technology enables a higher level of interoperability between the different forces involved in multinational operations. Concerning these multinational operations, it is crucial to have clear standards of communication, as well as a functional system to deliver and keep up to date the different actors involved. Consequently standardisation in logistics contributes to fuller interoperability, as “logistics interoperability offers real prospects for moving beyond coordination to the full sharing of assets” (2009, Maj. Susan Carson, *The Road to Interoperability*).

NATO’s standardisation office via the AST WG has worked diligently to produce asset tracking standardisation agreements and a business process model (AAP-51). The AAP-51 states the following with respect to operational needs: For the NATO commander to

be able to optimize the prioritization and coordination of the flow of logistic resources and provision of services into, within and out of a NATO joint operations area, significantly improved visibility of the logistic resources domain is required. Such asset visibility is a key component of the recognized logistics picture and applies to the operations logistics chain in all its forms: in maintenance, in store, in use, in medical treatment and in transit.

Asset tracking meets these objectives by: providing for the identification and monitoring of, and collection, recording, sharing and presentation of information on, the static and dynamic elements that comprise an asset tracking network and the traceable items that flow across it. When adopted and implemented, asset tracking provides partners in the operations logistics chain greater potential to fulfil operational needs.

Benefits include:

- improved visibility of key assets and the force as a whole;
- expedited shipping of urgently required items while in-transit;
- enhanced logistic management efficiency;
- increasing the ability to locate delayed, missing or lost items;
- greater assurance regarding high-value, high-risk or sensitive items while in-transit;
- better predictive and analytic models of the logistic chain;
- much earlier awareness of exception situations, e.g., the late arrival of an expected shipment; and
- increased collective ability to manage shipments and transportation loads while preserving visibility.

A great success of asset tracking standardisation within NATO has been the design, development, promulgation and use of an inter-

operability message set (STANAG 2185) that is triggered when a national tracking system reads a tag or barcode that belongs to another nation or alternatively when the asset being tracked is en route to a theatre of operations and the NATO staff have identified it as mission essential equipment and in that case tracking information is automatically forwarded to the NATO system (LOGFAS) or to the lead nation. The advantages of this data exchange capability are clear to see in that it provides a tracking network that expands national asset tracking visibility by exploiting partner infrastructure.



ASSET TRACKING TECHNOLOGY

Radio-Frequency Identification (RFID) is the most commonly used technology for asset tracking. RFID is a method of automatic identification and data collection (AIDC), which uses transponders (commonly referred to as 'tags') to "locate, identify and transmit information on items or people that carry the tag" (2019, MHI, Automatic Identification and Data Collection). AIDC itself can be defined as the methods and supporting techniques involved in automatically identifying objects, collecting data about them and entering that data directly into computer systems.

Tracking of military assets in-transit uses a range of automatic identification technologies that starts with barcodes through IUID markings to RFID tags. The most common

has been, and remains, the active RFID tag - tens of thousands of active RFID tags are in everyday use by the US DoD and several other NATO nations. Recently there has a move towards greater use of GPS tracking devices along with Bluetooth asset tags - the latter being more suitable for monitoring assets in storage whereas GPS and active RFID are better suited for the in-transit phase.

COST SAVING POTENTIAL

As well as the prime objective of supporting the front line, military logisticians rightly have to consider the costs involved. Asset tracking has been proven to have potential to save cost and indeed being able to identify, track and locate a single hi-value scarce asset in theatre versus procuring and shipping a second asset can itself save far more than the cost of the asset tracking system.

A good example of cost saving potential is that of Pipeline stock. That element of your inventory that is moving through the material flow process – essentially that which has been issued from the warehouse and has yet to be received by the consignee. When you don't have visibility of where the pipeline stock is and when it is going to arrive, the tendency is for your consignees to lose confidence that their demand is being satisfied and they re-order. When you are able to track those warehouse issues, users can monitor the progress of their demands and that visibility means a reduction in duplicate demands – these savings are not only limited to your overall inventory levels but also directly impact trans-

port costs. In addition, when using security and environmental sensors (such as temperature, humidity and shock) you can be notified when an in-transit asset has an issue and rather than finding out when the item reaches the consignee, you can reorder and reship a replacement straightaway.

Much effort has been made in modern asset tracking systems to improve the information available to logistic staff deployed forward. For example, when a supply chain handling node or consignee knows what is going to arrive and when, the planning and use of resources such as manpower and mechanical handling equipment can be far more efficient. For example, if the airport knows that in the next 24 hours the inbound cargo will require a specific piece of mechanical handling equipment then that equipment can be allocated or hired as needed rather than being unused just in case. Equally, with visibility into the in-transit shipments weights and dimensions, decisions can be made on the number of staff required and when they are needed.



In past coalition operations, there have often been more national support element personnel deployed than fighting troops. Asset tracking interoperability can contribute to saving costs and reducing the logistic footprint. When your assets are moving along a multinational supply route, the use of proven and widely-deployed RFID and GPS tags means that your assets no longer require any manual involvement to report on location and movement. NATO's Asset Tracking interoperability standards have provided for a set of template XML (Extensible Markup Language) messages that facilitate the sharing of RFID reader infrastructure along with the ability to track nested multi-national shipments. The end result is that you no longer need to deploy national support elements to receive and on-ship your in-transit assets.

When you have in-transit visibility, the utilisation of logistic assets – such as pallets, containers and vehicles – becomes clear in terms of how many assets are in use and where they are. In the past, logistic assets were often difficult to recover as when offloaded at a consignee site, for example, and if not turned around immediately and returned they tend to disappear and be reused elsewhere. When you are able to identify and recover your logistic assets there is a saving to be had from reducing replenishment buys and for rented shipping containers, assets can be returned sooner thereby reducing hire and demurrage fees.

When you track your asset shipments, you can start to build a picture of how well the supply chain is operating and what a realistic pipeline time is. Consignees tend to want everything as a Priority One shipment – a classification that often automatically triggers the use of the fastest and most expensive transport mode, such as airfreight. With the right system your logistic staff can

identify that some of these priority demands can reach the consignee within the pipeline time by a cheaper and more efficient mode of transport.

Finally with regards to potential cost savings, the increased visibility into your supply chain means you can monitor and audit the capability providers. It is common today to use industry for just-in-time supply of capability such as aircraft engines and similar high value assets. By monitoring and tracking these assets as they enter and leave the supply chain you are able to not only maintain visibility of where the asset is but to also audit the supplier against contracted service levels – i.e., were the aircraft engines delivered on-time and to the right location?

CONCLUSION

This paper has identified asset tracking as an important part of military logistics. In-transit visibility of assets moving to and from a theatre of operations means the operational commander can better control the order of arrival of mission essential equipment, prioritising and re-directing as needed.

Asset tracking with modern technology such as RFID and GPS generates data, data which can be processed into actionable intelligence to enable better management of the supply chain flow. Alongside asset tracking at a national level sits the multinational interoperability with a comprehensive set of standards and business process models from NATO. As well as improving the efficiency of multinational operations asset tracking provides a range of cost savings for the nations ranging from reduced inventory through to logistic asset fleet management and utilisation.

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Created in 1953, the Finabel committee is the oldest military organisation for cooperation between European Armies: it was conceived as a forum for reflections, exchange studies, and proposals on common interest topics for the future of its members. Finabel, the only organisation at this level, strives at:

- Promoting interoperability and cooperation of armies, while seeking to bring together concepts, doctrines and procedures;
- Contributing to a common European understanding of land defence issues. Finabel focuses on doctrines, trainings, and the joint environment.

Finabel aims to be a multinational-, independent-, and apolitical actor for the European Armies of the EU Member States. The Finabel informal forum is based on consensus and equality of member states. Finabel favours fruitful contact among member states' officers and Chiefs of Staff in a spirit of open and mutual understanding via annual meetings.

Finabel contributes to reinforce interoperability among its member states in the framework of the North Atlantic Treaty Organisation (NATO), the EU, and *ad hoc* coalition; Finabel neither competes nor duplicates NATO or EU military structures but contributes to these organisations in its unique way. Initially focused on cooperation in armament's programmes, Finabel quickly shifted to the harmonisation of land doctrines. Consequently, before hoping to reach a shared capability approach and common equipment, a shared vision of force-engagement on the terrain should be obtained.

In the current setting, Finabel allows its member states to form Expert Task Groups for situations that require short-term solutions. In addition, Finabel is also a think tank that elaborates on current events concerning the operations of the land forces and provides comments by creating "Food for Thought papers" to address the topics. Finabel studies and Food for Thoughts are recommendations freely applied by its member, whose aim is to facilitate interoperability and improve the daily tasks of preparation, training, exercises, and engagement.



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