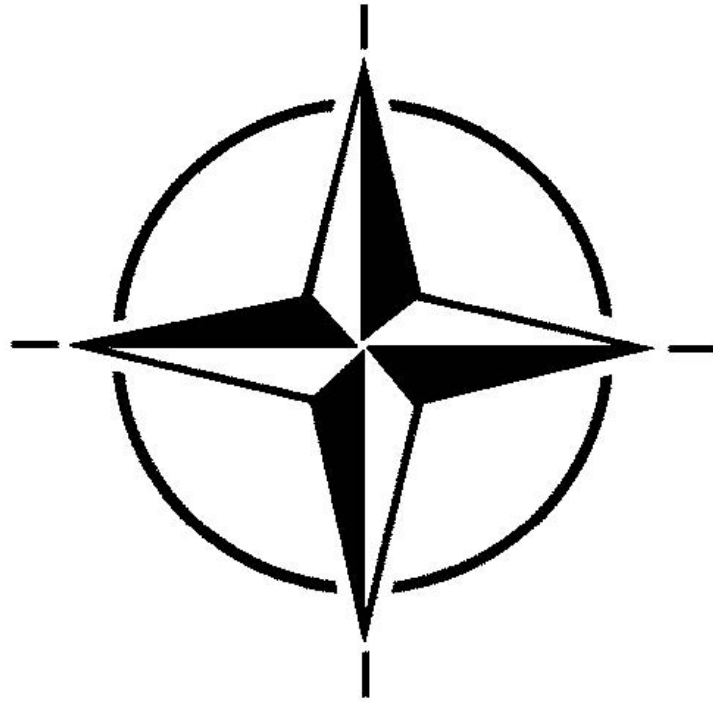


**ALLIED JOINT
DOCTRINE
FOR
NATO ASSET VISIBILITY
AJP-4.11**

(INTENTIONALLY BLANK)



**ALLIED JOINT
DOCTRINE
FOR
NATO ASSET VISIBILITY
AJP-4.11**

FEBRUARY 2011

(INTENTIONALLY BLANK)

NORTH ATLANTIC TREATY ORGANIZATION
NATO STANDARDIZATION AGENCY (NSA)
NATO LETTER OF PROMULGATION

21 February 2011

1. AJP-4.11 – ALLIED JOINT DOCTRINE FOR NATO ASSET VISIBILITY is a NATO UNCLASSIFIED publication. The agreement of nations to use this publication is recorded in STANAG 2292.
2. AJP-4.11 is effective upon receipt.



Cihangir AKSIT, TUR Civ
Director, NATO Standardization Agency

(INTENTIONALLY BLANK)

RESERVED FOR NATIONAL LETTER OF PROMULGATION

(INTENTIONALLY BLANK)

RECORD OF CHANGES

Change Date	Date Entered	Effective Date	By whom Entered

(INTENTIONALLY BLANK)

RECORD OF RESERVATION BY NATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
General	BGR, NLD, USA
Preface	
1	USA
2	
3	
Annex A	
Annex B	
Annex C	
Reference Documents	
Lexicon	

RECORD OF SPECIFIC RESERVATION

NATION	RECORD OF RESERVATION BY NATIONS
BGR	<p>1. The STANAG will be implemented only in Land Forces units declared for operations in the full-spectrum of NATO operations.</p> <p>2. Because of non-planned financial resources for application of an Automated Identification Technology, Annex A will not be implemented.</p>
NLD	The Netherlands is implementing SAP as part of the Strategic Process & ERP-Enabled Reengineering (SEER) programm. Future interoperability of the Dutch implementation of SAP with NATO LOGFAS and the foreseen overall NATO Bi-SC AIS LOG FS.
USA	<p>The United States (US) does not subscribe to the language in paragraph 0108 which states that NATO asset visibility data will be passed through a NATO data exchange service.</p> <p>Rationale: US ratification is contingent upon NATO completion of this data exchange service in order to provide US asset visibility data to NATO Logistic Functional Area Services (LOGFAS) via automated means.</p>

Preface

1. Doctrine is a framework of principles, practices, and procedures, the clear understanding and acceptance of which is a prerequisite for operations to be conducted by joint allied forces. It evolves as the political and strategic situation changes and in the light of new technology, experience and the outcome of operational analysis. North Atlantic Treaty Organization (NATO) policy and doctrine forms the fundamental principles by which NATO military forces guide their actions in support of objectives. It is authoritative, but requires judgment in application.
2. Although NATO logistics doctrine is primarily intended for NATO forces, it could be applied multinational within the framework of an Allied Joint Force (AJF). NATO doctrine could also be utilised, adapted as necessary, and agreed to by participating nations, for operations under the umbrella of the European Union (EU), or a coalition of NATO and non-NATO nations, when such utilisation would not be against NATO's interests. Interoperability between NATO nations is based upon NATO standardisation agreements, other policy documents and publications.
3. The purpose of AJP-4.11 '*Allied Joint Doctrine for NATO Asset Visibility*' is to provide asset visibility principles and guidance to NATO nations. Partnership for Peace (PfP) nations are invited to follow this guidance when acting as a sending nation (SN) in a NATO-led operation or exercise.
4. AJP-4.11 supports, in particular, the principles and policies contained in MC 319/2 *NATO Principles and Policies for Logistics* and the generic asset visibility guidance contained in AJP-4 *Allied Joint Doctrine for Logistics*. The publication has drawn upon the experience gained from NATO's involvement in operations in the Balkans and Afghanistan and the planning for contingency operations and exercises.
5. AJP-4.11 follows a logical sequence which takes the reader from the overarching publications.
It contains the following key elements:
 - a. Chapter 1 gives an overview of asset visibility and identifies the responsibilities for maintaining asset visibility.
 - b. Chapter 2 outlines principles for asset visibility.
 - c. Chapter 3 outlines principles for asset tracking (AST).
 - d. The annexes consist of the Automatic Identification Technology (AIT), visibility, transparency and tracking documents hierarchy and the list of acronyms.
 - e. The list of reference documents covers asset visibility related standardization agreements (STANAGs) and publications.
 - f. The lexicon contains those abbreviations and terms and definitions used in the area of asset visibility for this text. It is not exhaustive and Allied Administrative Publication (AAP) 6 *NATO Glossary of Terms and Definitions* and AAP-15 *NATO Glossary of Abbreviations* should be used for authoritative guidance.
6. AJP-4.11 is a living document and will need to be reviewed by the Nations and updated as required by Allied Command Transformation (ACT) with the support of the Allied Command

Operations (ACO). As such, change proposals, amendments and other comments are welcome and should be forwarded to the logistics division of those two HQ. In accordance with the guidance given in AJP-4 the NATO Response Force (NRF) logistics concept and the Joint Logistics Support Group (JLSG) are not covered in this publication.

7. After ratification of STANAG 2292 the STANAG 2184 “*NATO Principles and Policies for Asset Tracking*” will be withdrawn.

TABLE OF CONTENTS

CHAPTER 1 – CONTEXT

Page

SECTION I – INTRODUCTION

General	1-1
Background	1-1
Purpose	1-1
Applicability	1-1
Scope	1-1
Requirement	1-2

SECTION II – RESPONSIBILITIES

General	1-4
NATO commander	1-5
Nations	1-5

CHAPTER 2 – PRINCIPLES FOR ASSET VISIBILITY

SECTION I – INTRODUCTION

General	2-1
---------	-----

SECTION II – ASSET VISIBILITY

General	2-2
Boundaries of asset visibility	2-2
Purpose for asset visibility	2-3
Requirements to achieve asset visibility	2-3
Asset visibility principles	2-4
In-transit visibility of assets	2-4
Integrated data environment	2-4

CHAPTER 3 – PRINCIPLES FOR ASSET TRACKING

SECTION I – INTRODUCTION

General 3-1

SECTION II – ASSET TRACKING

Boundaries 3-1

Requirements to achieve asset tracking 3-1

Asset tracking principles 3-2

Annex A – Automatic Identification Technology (AIT) A-1

Annex B – Visibility, transparency and tracking documents hierarchy B-1

Annex C – List of acronyms C-1

Reference publications Reference-1

Lexicon Lexicon-1

CHAPTER 1

CONTEXT

SECTION I – INTRODUCTION

0101. General

Asset visibility is the ability to know the identity, location¹, quantity and status² of units, personnel, equipment and materiel at a certain time when committed to a NATO operation.

0102. Background

Previous and current NATO operations have been supported by independent, and often un-coordinated, national systems. These systems, as highlighted by operational experience in the Balkans, the First Gulf War, Afghanistan and current operations in Iraq, have resulted in significant equipment, financial and manpower inefficiencies. There has often been a lack of prior visibility at the transportation hubs utilized by those systems over the volume of incoming shipments. Moreover, users and operational commanders had limited and incomplete visibility of the assets available, resulting in wasted opportunities or the needless provision of additional supplies. The demanding of supplies has often been pre-calculated and inaccurately assessed, with little adjustment to reflect on-going reality. Overall, the methods for moving manpower, equipment and supplies have been fragmented and slow with a lack of effective management.

A more recent emphasis within NATO on expeditionary operations has generated a need for a significant adaptation of NATO's approach to logistics. Now there is a need to deploy forces rapidly to distant locations, with extended lines of communications, and with little or no host nation support (HNS) available (e.g., NATO Response Force (NRF)). This must be accomplished as efficiently and effectively as possible.

Asset visibility provides the information to anticipate resources required for efficient and expeditious movement of materiel. The result should be an increase in supply chain confidence and an optimisation of materiel maintained at the customer level, thereby reducing unnecessary management requirements.

0103. Purpose

The purpose of this document is to establish NATO's asset visibility principles. It details asset visibility principles for a NATO-wide asset visibility capability. It is the basis for the development of a standardised NATO and national asset visibility information exchange at the point of interface with existing and / or future NATO, national and commercial systems.

0104. Applicability

This document is applicable to the full spectrum of potential NATO operations and exercises.

0105. Scope

This document covers the principles for asset visibility and asset tracking (AST) as applied to logistics. The document addresses the application of Automatic Identification Technology (AIT) within these principles (see annex A). It does not dictate the use of specific

¹ In accordance with AAP-51, STANAG 2291

² In accordance with AAP-51, STANAG 2291

information systems, but recommends the use of legacy software and hardware and compliance with existing standards for joint interoperability.

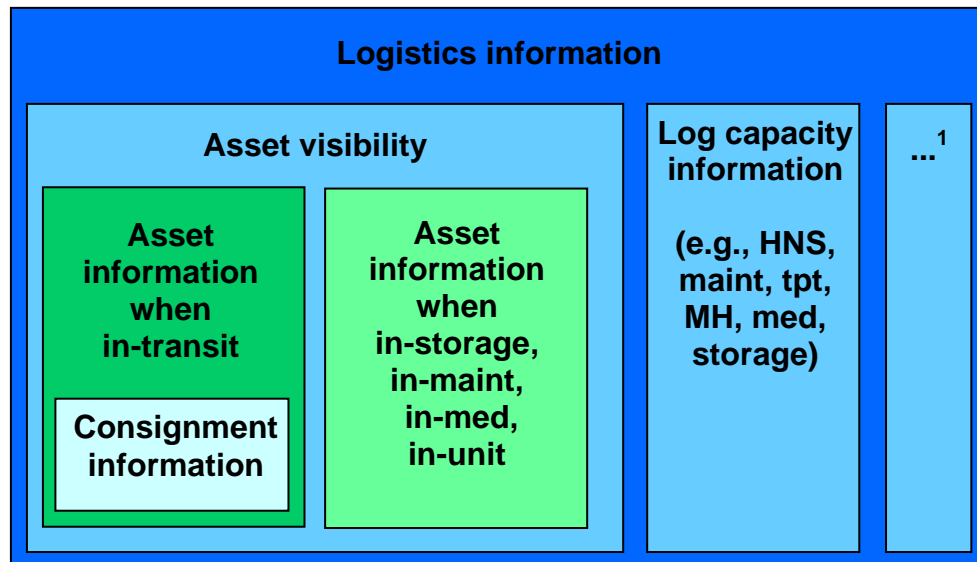
0106. Requirement

The requirement for this document is to ensure that nations have a standardised approach for accomplishing asset visibility when supporting NATO operations. This will enable a major increase in efficiency and interoperability for logistics support to NATO operations.

0107. Figure 1.1 depicts how asset visibility contributes to logistics information and it identifies the type of information required to provide the NATO commander with asset visibility. Factual information on the status and location of assets is required (asset visibility) and also information on the quantity of support means and degree of logistics capacity utilization (logistics capacity information). To be able to execute operational logistics management, asset visibility, logistics capacity information and some additional logistics indications are required.

Asset visibility is obtained when the NATO commander knows the identity, location, quantity and status of assets at a certain time when they are in-transit, in-storage, in-maintenance, in-medical treatment or in-use by unit.

This document specifically addresses the principles and concepts that form the doctrine for asset visibility.



¹ Other logistics indicators, which are outside the scope of this doctrine

Figure 1.1: Generic concept of asset visibility³

Asset visibility is the ability to know the identity, location, quantity and status of units, personnel, equipment and materiel at a certain time when committed to a NATO operation. Asset visibility is obtained by collating asset information.

Asset information consists of identity, location, quantity and status at a certain time of a specific asset when in-transit, in-storage, in-maintenance, in-use by unit or in-medical treatment.

Consignment information consists of location and status⁴ of a specific consignment. When consignment information is linked to asset data then the location of assets when in transit is known.

0108. Concept for NATO asset visibility

Figure 1.2 outlines the concept of asset visibility by providing an overview of information and data flow requirements that create asset visibility for the NATO commander. The NATO commander identifies the assets which are mission-essential for him by defining the corresponding reportable item code (RIC) in a reportable item list (RIL). The RIL may change as an operation progresses. Assets that are not put on the RIL are not deemed critical for the NATO commander and are not reported upon.

In accordance with the RIL, the nations provide agreed information to the NATO commander via Logistic Functional Area Services (LOGFAS)⁵.

The asset information reported via LOGFAS gives the NATO commander asset visibility from which he is able to assess the readiness of assets in support of the sustainability of the NATO forces.

³ Legend: HNS = Host Nation Support, Maint = Maintenance, Tpt = Transport, MH = Materiel-Handling, Med = Medical

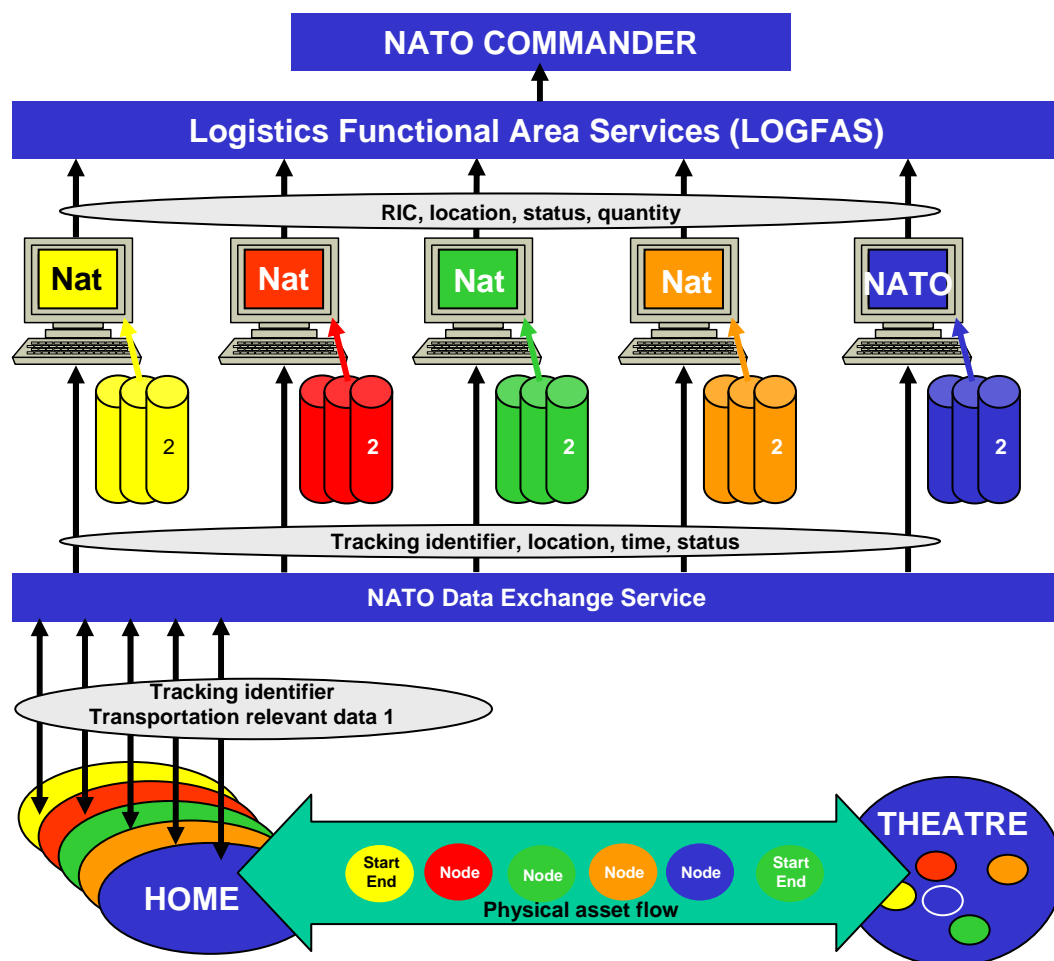
⁴ In accordance with STANAG 2291

⁵ NATO has existing Logistics Functional Area Services called LOGFAS with a database (LOGBASE) that holds data on assets committed to the NATO operation that are on the Reportable Item List (RIL).

As assets move from the home base to the theatre of operations they are tracked using consignment or asset tracking processes⁶. As a general principle, this information is held in a national system and reported to LOGFAS when required by the NATO commander. The asset visibility concept envisages that information on assets when in-storage, in-maintenance, in- medical treatment, or in-use by unit, will also be held on national systems⁷ and will be reported through a single national point into LOGFAS.

In multinational operations, the asset or consignment tracking information will in practice be held in national systems and passed to LOGFAS. When an asset or consignment passes through another nation's node with AST capability, the information will be routed from this nation through a NATO data exchange service to the owning nation. The owning nation is then responsible for ensuring the information is passed to LOGFAS.

Where possible, each tracking node location should be managed by one nation in order to optimise the logistics footprint.



¹ Transportation relevant data: weight, length, height, volume, HAZMAT

² Asset information when in-storage, in-maintenance, in-medical treatment, in-use by unit

Figure 1.2 Information flow in principle⁸

SECTION II – RESPONSIBILITIES

⁶ iaw STANAG 2291 Edition 1 (AAP-51) - NATO Consignment Tracking “To Be” Business Process Model and STANAG 2291 Edition 2 (study draft) (AAP-51) - NATO Asset Tracking “To Be” Business Process Model

⁷ A system may be electronic or manual.

⁸ Legend: Nat = Nation, RIC = reportable item code

0109. General

NATO principles and policies for logistics set out in MC 319/2 *NATO Principles and Policies for Logistics* establish the principle of the collective responsibility of nations and NATO authorities for logistics support of NATO's multinational operations.

NATO is responsible for providing a point of contact authorized to speak on behalf of NATO for all asset visibility matters. Nations are responsible for providing a point of contact authorized to speak on behalf of their respective nation on all asset visibility matters.

NATO will provide a NATO data exchange service (see figure 1.2).

NATO and nations have the responsibility to establish a communications architecture and infrastructure to support the flow of information.

0110. NATO commander

The NATO commander has responsibility in his logistics planning process for coordinating asset tracking capability in support of a specific multinational operation⁹.

The NATO commander identifies the assets which are mission-essential for him by defining the corresponding RIC in a RIL.

0111. Nations

Nations have the responsibility to use tracking identifiers in accordance with applicable STANAGs¹⁰ and for relaying tracking information through a NATO data exchange service when other nation's assets generate asset information by passing through their node.

Nations have the responsibility to provide agreed asset information from national logistics systems to NATO for assets identified in the RIL. This includes information captured by third party logistics support service (TPLSS) providers.

NATO agencies and organizations act as a participating nation.

⁹ - decision on Main Supply Route (MSR) including SPOD and APOD
- decision on the location of the multinational CT / AST nodes
- transfer of the task to operate a multinational CT / AST node (possible to a LLN each)

¹⁰ See ANNEX B.

(INTENTIONALLY BLANK)

CHAPTER 2

PRINCIPLES FOR ASSET VISIBILITY

SECTION I – INTRODUCTION

0201. General

Asset visibility provides clear benefit to the NATO commander. It enables the support to operations to be focused towards the operational requirement. Significantly greater visibility of both operational assets and the mechanisms that comprise the support chain can be provided to the NATO logistics command and control (C2) and the common operational picture (COP). Asset visibility enables support chain activity to be more responsive to the requirements of NATO operations and can inform and shape the operational plan.

Asset visibility also provides benefit to nations. The overall logistics footprint can be optimised through more efficient coordinated use of personnel and enabling support chain functions. Asset disposition can also be optimised by only locating assets to support required capabilities and asset movement can be tailored to the urgency of the requirement. Increasing asset visibility optimise unnecessary demands and, where nations agree on asset sharing (e.g. through memoranda of understanding (MOUs)), asset visibility provides the opportunity for efficient and responsive asset utilisation within the operation.

0202. Complete and accurate information¹¹ on assets must be available to assign, maintain, store and distribute assets and to ensure operational readiness. This information is also required for operational efficiency and improved transparency. Asset visibility has the potential to improve decision making about planning assumptions, storage and maintenance and to enable improved risk management.

SECTION II – ASSET VISIBILITY

0203. General

This section covers the boundaries, purpose and principles for NATO asset visibility.

0204. Boundaries of Asset Visibility

Asset visibility starts with the commitment of assets to the operation or mission and the actual transfer of authority over the asset to NATO after the receipt of a Multi National Detailed Deployment Plan (MNDDP). It ends when the assets are uncommitted from an operation and the authority is transferred back to the owning nation.

This includes assets in-transit, in-storage¹², in-maintenance, in-use by unit or in-medical treatment.

Asset visibility is limited during tactical involvement¹³. During this event, assets are shown as located at the unit headquarter position.

¹¹ iaw STANAG 2291 Edition 1 (AAP-51) - NATO Consignment Tracking “To Be” Business Process Model and STANAG 2291 Edition 2 (study draft) (AAP-51) - NATO Asset Tracking “To Be” Business Process Model

¹² In-storage verses in-stock to allow for the distinction of assets stored but not in a warehouse.

0205. Purpose of asset visibility

The purpose of asset visibility is to support the NATO operational commander's decision making

Asset visibility should fully or partially enable¹⁴:

- Identification and resolution of in-theatre logistics bottlenecks
- Determination of whether there are sufficient assets available to support the NATO operation
- Re-direction of assets to meet urgent/critical needs within national caveats and multinational agreements
- Efficient management of the logistics chain and supporting re-prioritisation as part of the wider logistics management
- Improvements to accurate operational planning, operational flexibility and increased combat readiness
- Efficient and effective use of assets
- More responsive supply support

0206. Requirements to achieve asset visibility:

- Identification of the location, identity, quantity and status at a certain time of RIL assets (As a minimum the status of an asset will be 'available' or 'unavailable'.)
- Exchange of asset information (This includes accurate and timely information about identity, location, quantity and status at a certain time of assets identified on the RIL.)
- Establish an interoperable communications architecture and infrastructure to support the exchange of information
- Standardised identification and reporting formats and procedures in place

0207. Asset visibility principles

The asset visibility principles are as follows:

- a. **Primacy of operations:** The purpose of asset visibility is to support the NATO operational commander in his decision making process.

¹³ When an asset is involved in a tactical engagement visibility will not be available through national logistics systems however information may be available from tactical systems such as 'blue force tracker', which is outside the scope of this doctrine.

¹⁴ Asset visibility can act as enabler on its own or may be combined with information, such as logistics capacity, to enable wider logistics management.

- b. **Provision of asset information:** Nations are to provide asset information for those assets identified on the RIL when required by the NATO commander.
- c. **Authority:** NATO commanders are authorised to receive agreed information to enable them to coordinate the support to NATO forces.
- d. **Sufficiency:** The asset information must contain as a minimum the identity, location, quantity and status at a certain time of the asset in the agreed standard format.
- e. **Flexibility:** The means to achieve asset visibility should be flexible enough to enable all nations involved in a NATO operation to provide asset information, for all types of NATO operations.
- f. **Accuracy:** Asset information must be accurate and timely.
- g. **Standardisation:** When providing asset information NATO must consider commercial practice and international standards. NATO will not consider the development of a separate military standard or technology for asset visibility.
- h. **Harmonisation:** Harmonisation of NATO and Nations activities is desirable in developing an interoperable asset visibility capability. NATO and nations should share their experience in the area of asset visibility.
- i. **Security of asset information and accessibility:** Security requirements are to be defined at the lowest level possible. Transfer of asset information between NATO and nations should observe a proportional level of data security especially for certain asset types or operational situations. Asset information is to be protected against unauthorised access.
- j. **Information transfer:** Automated data transfer is the preferred method; however, other methods are not excluded.

0208. In-transit visibility of assets

In-transit visibility (ITV) of assets is part of asset visibility and is the ability to know the identity, location, quantity and status at a certain time of a specific asset from the moment it leaves its dispatch location until its reception at the delivery address.

0209. Integrated data environment

Asset visibility is part of an integrated data environment (IDE) effort in which legacy systems are being re-engineered for better accessibility to, and accuracy of, information. The ability to 'see' assets and know their exact location has long been recognized as a critical need within NATO and nations. After all, 'you can't manage what you can't see'. Whether users are interested in viewing inventory, requisition, or in-transit information at the detailed or summary level, the IDE capability must provide asset visibility to satisfy both needs.

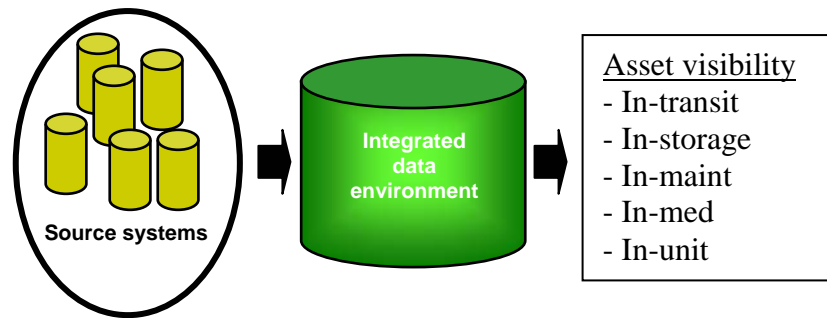


Figure 2.1 Simplified information flow

CHAPTER 3

PRINCIPLES FOR ASSET TRACKING

SECTION I – INTRODUCTION

0301. General

Tracking is the process of monitoring the location, movement, status and identity of an asset by capturing, processing, storing and presenting relevant data so as to have timely and accurate information available, and thus maintain visibility.

Asset tracking (AST) must handle a range of different types of assets, from personnel and main equipment (e.g., vehicles or aircraft), through supporting equipment (e.g., major operational components or test benches and associated spare parts) to war-consumables (e.g., ammunition or fuel) and real life-support commodities (e.g., water and food). Responsibility for such assets is held not only by the physical transportation function, but also by holding, storage, repair or medical functions. The systems used within these functional areas may all contribute information to enable the asset to be tracked. For example the inventory management systems, repair and engineering systems, medical systems, movements planning and in-transit tracking systems may all provide data that contributes to AST, most notably when the status or location of an asset changes.

The exchange of information between nations and NATO commanders is essential to ensure proper execution of the logistics responsibilities granted to NATO commanders and the continuous sustainment of deployed NATO forces. Interoperable AST systems aim to provide near real-time information about assets moving in the logistics chain.

AST offers the potential for improved logistics effectiveness and efficiency and can act as a NATO force multiplier. In order to enable interoperability between NATO nations, standardisation of the AST process is required. This should be based on commercial practice and available international standards and technology. Nations should use information systems to deliver AST where possible.

SECTION II – ASSET TRACKING

0302. Boundaries

The boundaries for AST are the same as those for asset visibility.

0303. Requirements to achieve AST

The following information is required to enable the NATO commander to:

- a. Establish basic systems requirements, by fulfilling the following conditions:
 - (1) Interoperable infrastructure and common data language / terminology within NATO which allows for the capability to communicate within and between nations or commercial systems and NATO

- (2) An agreed minimum information / data elements listing necessary to ensure success (This information should not over-burden any existing asset tracking information system or make the data collection process too extensive to be easily accomplished.)
 - (3) Application of commercial practice during the development of AST systems in NATO
 - (4) Development and use of a NATO standard for labelling and identifying assets and consignments¹⁵
 - (5) Adequate means of communication and hardware to operate in a deployed or home base environment
 - (6) A communications and information system with an appropriate level of availability and responsiveness, to include handling of high volume message traffic and density of information
 - (7) Fulfilment of NATO and national security requirements and classifications, especially for personnel data.
- b. Determine the identity, location and status of assets.
- (1) Capability to track assets or consignments from a determined point of origin to a determined destination, with confirmation of arrival provided to the system
 - (2) Provide advance information to the next nodes on the transport route (advance shipping notification)
 - (3) Updates provided when assets / consignments pass any asset tracking or consignment tracking communication node, within agreed NATO time standard targets
 - (4) Updates provided when the status of an asset changes (eg., available to unavailable)

0304. Asset tracking principles

- a. **Primacy of operations:** AST capabilities must be concentrated to logistics support being focused towards ensuring the success of operations. AST should function as an effective force multiplier and it should interface with applicable national and NATO logistics information systems.
- b. **Responsibility:** NATO and nations have a collective responsibility for logistics support of NATO's multinational operations. NATO and nations also have responsibility for movement and tracking of assets and both are responsible for providing agreed asset information for their assets on the RIL.

¹⁵ STANAGs: 2494, 2495, 4281, 4329, 2290, and 3151 (described in ANNEX B)

- c. **Provision:** It is essential that nations provide asset tracking information in the agreed data standard formats where possible using AIT and symbologies, to facilitate a NATO AST capability.
- d. **Authority:** NATO commanders have the authority to receive sufficient information to enable them to coordinate the support to NATO forces.
- e. **Sufficiency:** The asset information must contain the minimum of identity, location, quantity and status at a certain time of the assets. These are all reported initially when an asset is committed to a NATO operation and then only reported when a change occurs.
- f. **Economy:** The volume of AST data generated in a major operation will impact on available communication bandwidth, consequently all efforts to minimise bandwidth use should be taken.
- g. **Flexibility:** It is essential that AST systems in NATO are capable of rapid deployment along the logistics chain and into the theatre of operations. The AST system should be sufficiently flexible to buffer AST data if communications links fail; it should be capable of synchronising data with associated systems as soon as communications are restored.
- h. **Accuracy:** Asset information must be accurate and timely to represent the actual physical flow of assets. Therefore the use of AIT is preferred.
- i. **Standardisation:** The AST data transmitted is to be standardised to enable interoperability. NATO will not consider the development of a military standard or technology for AST. AST systems should be based on commercial practice and international standards to facilitate information exchange at the interface with other AST systems.
- j. **Harmonisation:** Harmonization of NATO and nation's planned systems and appropriate automated data processing (ADP) links is desirable in developing an interoperable NATO AST capability. NATO and nations should share their experience of hardware and software systems to spread “best practice”.
- k. **Timeliness:** When the location, or status of an asset changes this change should be reported to NATO. The update of AST information should take place within timeframes commensurate with the criticality of the asset and the relevant mode of movement. Actual timings will be determined specific to the operation.
- l. **Security of asset tracking information and accessibility:** Security requirements are to be defined at the lowest level possible. Transmissions of tracking identifiers and transport relevant data should be at the unclassified level. AST information is to be protected against unauthorized access.

(INTENTIONALLY BLANK)

ANNEX A**AUTOMATIC IDENTIFICATION TECHNOLOGY (AIT)****SECTION 1 - INTRODUCTION**

0101. General

The use of AIT is a key enabler to reducing mistakes and reducing human action for capturing information, thus enhancing the accuracy and ease of information sharing. Without AIT there is a serious risk of the decision-makers not receiving accurate information enabling them to make informed decisions. A key element to the enabling of asset visibility is the ability to capture detailed asset information in an automatic way. Some automatic identification technologies require the active participation of personnel (for example bar-code scanning), while other technologies allow data to be captured without the intervention of personnel (for example radio frequency identification (RFID)) but the use of RFID should also guarantee the aspects of IT-Security. Technologies such as RFID, therefore, provide greater potential to optimise the logistics personnel footprint on deployed operations. Overall the development of an automatic identification capability able to handle the full range of assets in an operation will be a large undertaking and a phased approach to AIT will be necessary.

0102. Asset tracking data capture technologies

Some examples of primary technologies to be employed are linear bar codes, two dimensional bar codes, data matrix, optical memory cards, RFID transponders or tags and satellite tracking. The different technologies are to be employed so that they complement each other and are integrated together to meet the desired level of operation in the most cost-effective way. Nations may use the whole range of AIT for tracking assets, within the logistics system. The data elements used must be in accordance with NATO adopted standard(s). Hardware and software used by individual nations is left to their discretion.

SECTION II MARKING AND IDENTIFICATION WITH AUTOMATIC IDENTIFICATION TECHNOLOGY MEDIA

0201. Marking

Marking of assets is a national responsibility. Marking in accordance with NATO standards of assets and consignments is the foundation to get asset information. Therefore all nodes have to have AST / consignment tracking (CT) capability. In the planning phase of an operation it is required to take this into account.

0202. Identification

Identification is a national responsibility and is necessary to fulfil the requirement for asset visibility. Therefore a reportable asset with an associated RIC and committed to a NATO operation must be identified in accordance with the NATO standards to avoid the risk of duplication or errors. The detailed NATO standard is described in the business process model for NATO asset tracking (STANAG 2291 AAP 51 "Asset Tracking "To Be" Business Process Model")

(INTENTIONALLY BLANK)

ANNEX B

Visibility, Transparency and Tracking Documents Hierarchy

Policy Documents - MC document 319/2 *NATO Principles and Policies for Logistics* formulates NATO principles and policies for visibility and transparency of logistic resources are essential for effective logistic support. NATO commanders require a timely and accurate exchange of information among nations and NATO to prioritise consignment movement into and within the joint operations area (JOA) to allow for redirection in accordance with agreements between the commander and national support elements (NSEs), and to effectively employ logistic assets within the JOA.

Capstone Document - Allied Joint Publications AJP-01 *Allied Joint Doctrine*: The logistic C2 structure must also provide the joint force commander visibility over logistic implications that will impact operations. This must include effective communications and information systems between NATO, national and multinational logistic staffs with efficient and compatible interfaces.

Keystone Document - Allied Joint Publications AJP-4 *Allied Joint Doctrine for Logistics*: Visibility and transparency of logistic resources is essential for effective logistic support. NATO commanders require a timely and accurate exchange of information among nations and NATO to prioritise consignment movement into, from and within the JOA. This allows for redirection in accordance with agreements between the commander and NSEs, and the effective employment of logistic assets.

Supporting Joint Doctrine Documents:

- Allied Joint Publications AJP-4.4 *Allied Joint Movement and Transportation Doctrine*: Consignment Tracking (CT) / In-Transit Visibility (ITV) - Nations should develop an automatic method to monitor and track their nation's shipments going to / from a NATO AOO. These developed CT / ITV systems should be fully compatible with the NATO-adopted CT / ITV system, offering full integration and automation for a NATO-led operation. Nations should fully integrate their tracking systems in their planning efforts to ensure full visibility to the NATO commanders.

Reception is the process of receiving, offloading and marshalling personnel, equipment and materiel arriving from home bases at the points of debarkation (PODs). The reception function requires visibility over arriving and departing personnel, equipment and materiel.

- Allied Joint Publications AJP-4.10 *Allied Joint Medical Support Doctrine*:

The NATO commander must be given sufficient authority over the medical resources to enable him to employ and sustain his forces in the most effective manner. If nations wish to achieve economies, especially in management of scarce assets, one way to attain this result is to allow the commander full visibility of the status and disposition of medical resources in theatre.

In order to benefit from the potential opportunities and rewards of burden sharing, nations are invited to give broad or even full visibility of their theatre medical resources. These rewards may include achieving synergy in provision of medical support services, while also attaining economy, efficiency, and effectiveness. The lack of information and coordination may result in a shortage and, at the same time, a redundancy of precious assets.

Patient tracking is the precise and continuous monitoring of the location and the intended destination of the patient in the medical treatment and evacuation chain. Keeping track of all personnel once they have been introduced into any medical evacuation chain (both national and multinational) is of crucial

importance in terms of the individual's medical status, readiness implications to the unit of origin, and media and family sensitivities regarding all casualties.

A patient tracking system should be near-real time, accurate and dynamic, using standardised procedures and involving the personnel staff at the various HQs. Failure to establish a competent system for patient tracking, to include across national boundaries, will produce national political disquiet, unnecessary administrative efforts and distress for both patient and relatives.

Joint Applicable Doctrine:**- Allied Logistic Publications ALP-4.2 Land Forces Logistic Doctrine:**

Regardless of the level of command, the ultimate aim of logistic command, control, communication and information (C3I) systems is to provide the commander with visibility of his logistic assets. Interoperable robust communications and dedicated information technology (IT) systems respectively will be needed if the flow of personnel and materiel in the line of communications (LOC) is to function most effectively. As nations move to the battlefield distribution management for support, total asset visibility (TAV) and ITV become even more important aspects of the LOC.

In NATO, AST supports C2 at different levels with the provisioning of near real-time information and accurate information on the identity, location, movement and status of units, personnel and materiel. AST capability is based upon interoperable national and NATO AST systems using international standards and best commercial practices.

Particular attention is to be paid to critical items which are items vital to operations, in short supply or expected to be in short supply. These items must be subjected to special supervision and positive controls at all levels to ensure that the appropriate priority is applied. To aid this process it is important that commanders have visibility of stocks and an ability to track key assets. As nations begin to make greater use of inter-modal containers in their respective distribution networks, it is vital that containers and their contents are known and made visible to commanders within their interest and authority.

Visibility, transparency and tracking information exchange of movement and transportation (M&T) data between NATO and national military and civil authorities is essential for the efficient planning and execution of M&T tasks. International standards for registering and marking sea containers have been established, and asset visibility and tracking systems are in wide use in many nations.

It is vital to the land force that nations maintain control over the containers and the goods within, or the support system will become wasteful, inflexible and immobile.

An essential prerequisite for spare parts management and mutual support is the ability to exchange information relevant to the materiel. The management of items of supply/ spare parts will be enhanced by the implementation of visibility and asset tracking.

- Allied Logistic Publications ALP-4.3 Air Forces Logistic Doctrine and Procedures:

A common AST System will provide the NATO commander with timely and accurate visibility over logistic resources and will enable him to maximise the effectiveness of material management. A feasibility study on the need for and the establishment of a NATO asset tracking information routing network (NAIRN) will be undertaken as part of the defence capabilities initiative (DCI).

While patient tracking is a J1 function of particular concern to national authorities, a single tracking system may be needed for all as personnel could be admitted to the nearest facility as a result of injuries sustained anywhere within the operational theatre.

Techniques, Procedures, Directives:

- **STANAG 2183 NATO Asset Tracking Communication Requirements:** The purpose of the information exchange requirements and systems architecture is to specify and standardize the exchange of information, on the identity, location, movement and condition of consignments in transit, between nations and NATO bodies using a standardised NATO CT architecture.

- **STANAG 2185 / AAP-56 NATO Asset Tracking Electronic Data Interchange (EDI):** The aim of this agreement is to standardise Standard NATO electronic data interchange (EDI) messages used in consignment tracking systems to provide NATO and national commanders with timely and accurate information on the identity, location, movement and condition of materiel in transit.

- **STANAG 2233 NATO Asset Tracking by Radio Frequency Identification:** The scope of this STANAG is limited to the use of RFID capabilities to support consignment and asset tracking and applies to NATO Operations. Nations (including NATO agencies) are encouraged to utilize the provisions of this STANAG internally. This STANAG excludes radio frequency data communications and the application of RF tracking using satellite tracking capabilities and Real Time Locating Systems (RTLS). This STANAG is in addition to the requirements of STANAGs 2494 and 4281.

- **STANAG 2290 NATO Unique Identification of Items (UID):** The aim of this agreement is to support the NATO AST initiatives through the interoperability of unique identification (UID) of items by means of a standardized structure and content for the Unique Item Identifier (UII) to be used by NATO and the ratifying nations (herein after referred to simply as "participating nations") and to provide guidance for the physical marking and content of a machine readable data matrix symbol applied directly to the item or data plate/label and packaging.

- **STANAG 2291 Edition 2 (study draft) / AAP-51 NATO Asset Tracking "TO BE" Business Process Model:** The "to be" asset tracking business process model covers three stages of an operation: deployment, sustainment, and redeployment. During deployment and redeployment: asset tracking starts with the commitment of assets to the operation or mission and the Transfer of Authority (ToA) over the asset to NATO after the receipt of a Multinational De-Conflicted Deployment Plan (MNDDP). It ends when the assets are uncommitted from an operation and the authority is transferred back to the owning nation. During sustainment: asset tracking starts after an asset has been requisitioned for the use in a particular operation and will be tracked to the point of storage or use.

A nation's asset tracking process might comprise of more than one system utilizing current and emerging technologies consistent with STANAGs.

- **STANAG 2494 NATO Asset Tracking Shipping Label and Associated Symbolologies:** The aim of this agreement is to facilitate NATO AST at the interface of national asset tracking systems by providing a guideline for application of combined two-dimensional and linear bar code shipment labels.

This agreement will provide human readable data specifications as well as the format for incorporation of UCC/EAN-128 and PDF 417 symbolologies.

- **STANAG 2495 NATO Data Formats for Asset Tracking Technology:** The aim of this agreement is to facilitate NATO asset tracking at the interface of National tracking systems (e.g. consignment tracking systems) based on preferred ISO/IEC standards for encoding and/or decoding data to and from asset tracking media. Additionally, this agreement will define the minimum and optional military data elements to be encoded on asset tracking shipping media (including NATO asset tracking shipping labels, RFID tags and optical data storage media such as optical memory cards (OMCs), compact discs (CDs) and digital versatile discs (DVDs)).

- **STANAG 4281 NATO Standard Marking for Shipment and Storage:** The aim of this agreement is to standardize, for the use of NATO forces, standard NATO barcode symbolologies (SNS) for marking, containers and documentation by means of printed automatic identification symbolologies, i.e., bar coding. Dimensions and tolerances of barcode symbol are specified in metric units. Methods and

equipment for applying or scanning barcode symbols are not included herein and remain options of the user nation.

- **STANAG 4329 NATO Standard Bar Code Symbolology:** The aim of this agreement is to standardize, for the use of NATO forces, minimum identification marking for storage and transport of military cargo, for consignments of military cargo for international movements by all modes of international transport. It is not intended to cover movements purely national in character and handled exclusively by a nation's own means of transport.

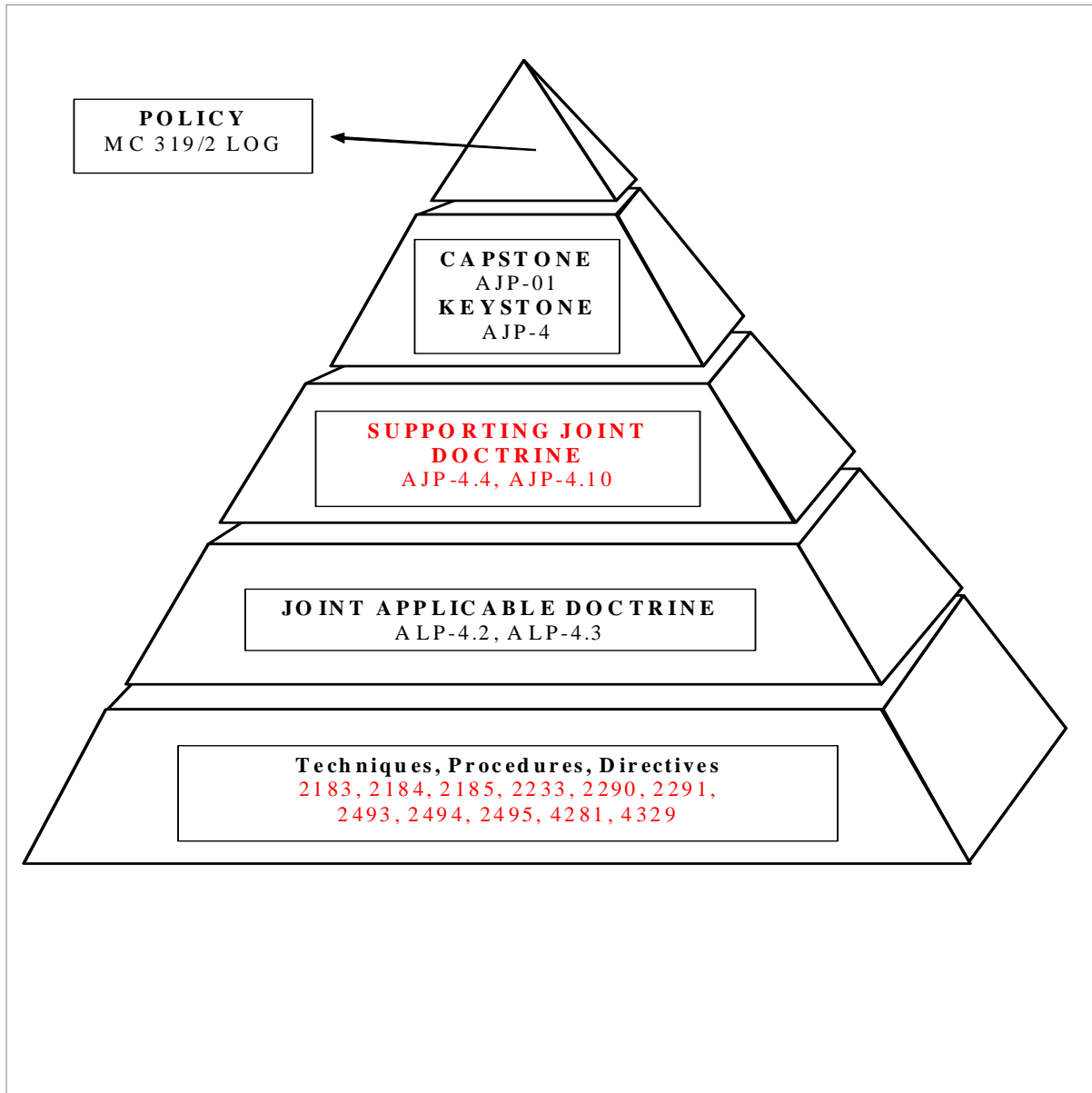


Figure 1. Visibility, transparency and tracking hierarchy

ANNEX C

LIST OF ACRONYMS

AAP

Allied Administrative Publication

ACO

Allied Command Operations

ACT

Allied Command Transformation

ADP

Automated Data Processing

AIT

Automatic Identification Technology

AJF

Allied Joint Forces

AJP

Allied Joint Publication

ALP

Allied Logistic Publication

AOO

Area of Operations

AP

Allied Publications

APOD

Airport of Debarkation

AST

Asset Tracking

CD

Compact Disc

CJTF

Combined Joint Task Force

C3I

Command, Control, Communication and Information

C2

Command and Control

COP

Common Operational Picture

CT

Consignment Tracking

DCI

Defence Capabilities Initiative

DDP

Detailed Deployment Plan

DVD

Digital Versatile Disc

EDI

Electronic Data Interchange

EP

Environmental Protection

EU

European Union

GOP

Guidelines for Operational Planning

HAZMAT

Hazardous Material

HNS

Host Nation Support

HQ

Headquarters

IDE

Integrated Data Environment

IER

Information Exchange Requirement

ITV

In-transit Visibility

JOA

Joint Operational Area

JLSG

Joint Logistics Support Group

LLN

Logistic Lead Nation

LOC

Line(s) of Communication

LOG

Logistic(s)

LOGBASE

Logistics data base

LOGCOP

Logistic Common Operational Picture

LOGFAS

Logistics Functional Area Services

LRSN

Logistic Role-Specialist Nation

Maint

Maintenance

MC

Military Committee

M&T

Movement and Transportation

Med

Medical

MEE

Mission Essential Equipment

MH

Material-handling

MNDDP

Multinational Detailed Deployment Plan

MNMF

Multinational Maritime Force

MOU

Memorandum of Understanding

MSR

Main Supply Route

NAIRN

NATO Asset Tracking Information Routing Network

Nat

Nation

NATO

North Atlantic Treaty Organization

NIC

National Identity Code

NRF

NATO Response Force

NSE

National Support Element

PfP

Partnership for Peace

POD

Port of Debarkation

POE

Port of Embarkation

RFID

Radio Frequency Identification

RIC

Reportable Item Code

RIL

Reportable Item List

SN

Sending Nation

SPOD

Seaport of Debarkation

STANAG

Standardization Agreement

TAV

Total Asset Visibility

TPLSS

Third Party Logistics Support Services

Trp

Transport

UID

Unique Identification

UII

Unique Item Identifier

(INTENTIONALLY BLANK)

REFERENCE PUBLICATIONS

The following bibliography shows the Allied Publications (APs) and other principal documents relevant to STANAG 2292 and is provided to guide the reader to a source of detail concerning the content of STANAG 2292.

Military Committee Documents

C-M(2001)44	NATO Policy for Co-operation in Logistics
MC 319/2	NATO Principles and Policies for Logistics
MC 55/4	NATO Logistic Readiness and Sustainability Policy
MC 94/3	NATO Military Exercises
MC 133/3	NATO's Operational Planning System
MC 317/1 (MD)	The NATO Force Structures
MC 324/1	The NATO Command Structure
MC 326/2	NATO Principles and Policies of Operational Medical Support
MC 334/1	NATO Principles and Policies for HNS Planning
MC 336/2	NATO Principles and Policies for Movement and Transportation
MC 343	NATO Military Assistance to International Disaster Relief Operations
MC 389/2	Military Committee Policy on NATO's Combined Joint Task Force (CJTF)
MC 400/2	Military Implementation of the Alliance's Strategic Concept
MC 458	NATO Training, Exercise and Evaluation Policy
MC 469	NATO military Principles and Policies for Environmental Protection (EP)
MC 477	Military Concept for the NATO Response Force (NRF)
MC 526	Logistics Support Concept for NATO Response Force (NRF) Operations
MC 536	Infrastructure Engineering for Logistics

Allied Publications

AJP-01(C)	Allied Joint Doctrine
AJP-4(B)	Allied Joint Doctrine for Logistics
AJP-4.4(A)	Allied Joint Movement and Transportation Doctrine
AJP-4.5(B)	Allied Joint Doctrine for Host Nation Support.
AJP-4.6(A)	Multinational Joint Logistic Centre Doctrine
AJP-4.7	Allied Joint Petroleum Doctrine
AJP-4.9	Allied Joint Doctrine for Multinational Logistic Support
AJP-4.10(A)	Allied Joint Medical Support Doctrine
ALP-4.1	Multinational Maritime Force (MNMF) Logistics (formerly ALP-11)
ALP-4.2	Land Forces Logistic Doctrine (formerly ALP-9(C))
ALP-4.3	Air Forces Logistic Doctrine (formerly ALP-13)
AAP-6	NATO Glossary of Terms and Definitions
AAP-15	NATO Glossary of Abbreviations
AAP-35	NATO Glossary of Asset Tracking Terms and Definitions
AAP-51	NATO Consignment Tracking "TO BE" Business Process Model
AAP-56	NATO Asset Tracking Electronic Data Interchange (EDI)
Bi-SC 80-3	Reporting Directive, Volume V - Logistic Reports
Bi-MNC	Concept for Implementation of the Military Aspects of PfP

REFERENCE - 1

ORIGINAL

Bi-SC FPGL	Functional Planning Guide Logistics
ACO GOP	Guidelines for Operational Planning
AD 85-6	Organisation and SOP of the ACE Logistic Co-ordination Centre

STANAGS

2183, Edition 1	NATO Asset Tracking Communication Requirements
2184, Edition 1	NATO Principles and Policies for Asset Tracking
2185, Edition 3	NATO Asset Tracking Electronic Data Interchange (EDI):
2233, Edition 2	NATO Asset Tracking by Radio Frequency Identification
2290, Edition 1	NATO Unique Identification of Items (UID)
2291, Edition 2	NATO Asset Tracking “TO BE” Business Process Model
2494, Edition 2	NATO Asset Tracking Shipping Label and Associated Symbolologies
2495, Edition 2	NATO Data Formats for Asset Tracking Technology
3151, Edition 9	NATO Codification – Uniform System of Item Identification
4329, Edition 2	NATO Standard Bar Code Symbolology
4281, Edition 1	NATO Standard Marking for Shipment and Storage

LEXICON

1. NATO agreed terms and definitions (AAP-6)

Deployment

Reallocation of forces to desired areas of operations.

Mobility

A quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfil their primary mission.

Near-Real Time

Near Real Time pertains to the timeliness of data or information which has been delayed by the time required for electronic communication and Automated Data Processing. This implies that there are no significant delays.

2. The following terms and definition are only applicable in the context of and for use in this publication:

Asset

A unit, person or item committed to a Joint Operation Area with the expectation that it will provide benefit.

Asset visibility

The ability to know the identity, location, quantity and status of assets when committed to a NATO operation.

Automatic Identification Technology (AIT)

Rapid and accurate data capture and processing technology for cognitive recognition, identification or verification purposes.

Consignment

A consignment consists of one or more transport packages sent from a consignor to a consignee and specified by a unique consignment identifier.

Consignment tracking node

A point in the supply chain or lines of communications at which data is captured or updated.

Critical asset

An asset, the lack of failure of which would cause the loss of a mission-essential operational capability.

Detailed Deployment Plan (DDP)

A standard NATO deployment plan that includes the following information :

- The path (locations) through which the deployment of a force or supply package occurs.
- Transportation assets, their schedules and manifests;
- Planned times for the movement of forces and supplies;
- Asset preferences for the movement of forces and supplies;

Information Exchange Requirement (IER)

High level information produced, exchanged and consumed by various actors.

In-transit Visibility (ITV) of assets

The ability to know the location, quantity and status of specific assets from the moment it leaves its dispatch location until its reception at the delivery address.

Item

In logistics, an article or unit of materiel.

License plate concept

A concept were the fixed code contained in an AIT Media, is used as an identifier in a database..

Logistic Common Operational Picture (LOGCOP)

The Logistic Common Operational Picture is undergoing development as a digital dashboard that facilitates the display and review of information. This application allows defining thresholds for critical supply items and alerts when there are changes to the threshold.

LOGBASE

The logistic database that stores data necessary for LOGFAS tools that uses the Reportable Item Code (RIC) as unique identifier.

Logistic Lead Nation (LLN)

One nation assumes overall responsibility for organising and coordinating an agreed broad spectrum of logistics support for all or part of a multinational force, including headquarters, within a defined geographical area for a defined period. This LLN can also provide capabilities as LRSN at the same time. (MC 319/2)

Logistics Functional Area Services (LOGFAS)

This is one of the subsystems of Bi-SC (Strategic Command) AIS (Automated Information System) that supports users with logistics-related services. Currently implemented services under LOGFAS consist of ADAMS, EVE, CORSOM, ACROSS and LOGREP.

Logistic Role-Specialist Nation (LRSN)

One nation assumes overall responsibility for providing or procuring a specific logistic capability and/or service for all or part of the multinational force within a defined geographical area for a defined period. Compensation and/or reimbursement will then be subject to agreement between the parties involved. (MC 319/2)

Mission Essential Equipment (MEE)

Equipment, the lack of which would likely preclude the successful accomplishment of the NATO commander's mission.

Movement

The activity involved in the change in location of equipment, personnel or stocks as part of a military operation. Movement requires the supporting capabilities of mobility, transportation, infrastructure, movement control and support functions. (MC 319/2)

National Identity Code (NIC)

The unique code assigned by a nation to their equipment or personnel so as to easily differentiate it from others. It is the main search key for items in the database.

Point of debarkation

The geographic point where personnel, equipment and/or stocks are unloaded from a means of transport.

Point of embarkation

The geographic point where personnel, equipment and/or stocks are loaded onto a means of transport.

Port of debarkation (POD)

A seaport, airport or railhead where personnel, equipment and/or stocks are unloaded from a means of transport.

Port of embarkation (POE)

A seaport, airport or railhead where personnel, equipment and / or stocks are loaded onto a means of transport.

Radio Frequency Identification (RFID)

The identification and tracking of a person or object by transmitting and receiving information, using radio waves.

Reportable Item Code (RIC)

A six character alphanumeric code that may be assigned to individual assets in order to categorize them according to their operational capability for use with the NATO Logistic Functional Area Services (LOGFAS) software.

Reportable Item List (RIL)

A list of Reportable Item Codes (RIC) that are important for a NATO commander for a specific operation. Subordinate units will report based on the RICs on this list.

Theatre

The geographical area where a military operation is being conducted.

Tracking

The process of monitoring the location, movement, status and identity of an asset by capturing, processing, storing, and presenting relevant data so as to have timely and accurate information available and thus maintain visibility.

Transport package

One or more items moved as a single object with a unique identifier that can be tracked.

(INTENTIONALLY BLANK)