GLOBAL SUPPLY CHAIN STANDARDS AND SOLUTIONS IN THE PRACTICE OF THE NATIONAL DEFENCE OF THE VISEGRAD (V4) COUNTRIES

CONFERENCE PROCEEDINGS
27th of October 2015
Budapest

GLOBAL SUPPLY CHAIN STANDARDS & SOLUTIONS IN THE PRACTICE OF THE NATIONAL DEFENCE OF THE VISEGRAD (V4) COUNTRIES PROJECT

The Global Supply Chain Standards and solutions in the practice of the National Defence of the Visegrad (V4) Countries Project aim is sharing the information in the framework of a thematic international conference and in a related publication the methods and extent of civilian global supply chain standards & solutions already operating in the defence procurement and supply processes of V4 and other major countries in line with the principles of NATO's National Codification System, promoting opportunities for national suppliers to join the effort to establish the V4 countries' common defence system.

The project based mainly on scientific exchange and mainly financed by the International Visegrad Fund within the scheme of Standard Grants and co-financed by project coordinator the National University of Public Service and project co-organizer the GS1 Hungary Nonprofit Ltd as well as three partner institutes and universities from Visegrad countries, namely: the Armed Forces Academy of General Milan Rastislav Stefánik – Slovakia, Institute of Logistic and Warehousing, GS1 Poland – Poland, University of Defence in Brno - Czech Republic.

The project was conducted in the years of 2015 and 2016.

Project Leader:

Name of the organization in English: **National University of Public Service (NUPS)**
Address: Ludovika tér 2., Budapest, 1083, HU
Statutory representative: Prof. Dr. András Patyi, Rector

Project members:

Name of the organization in English: **GS1 Hungary Ltd.**
Address: Fáy utca 1/B., Budapest, 1139, HU
Name of the statutory representative: Béla Magyar

Name of the organization in English: **Institute of Logistics and Warehousing**
Address: ul. Estkowskiego 6, Poznań, 61-755, PL
Statutory representative: Dr. Grzegorz Szyszka

Name of the organization in English: **Armed Forces Academy of General Milan Rastislav Štefánik**
Address: Demänová 393, Liptovský Mikuláš, 031 01, SK
Statutory representative: Brig. Gen. Boris Ďurkech Ph.D

Name of the organization in English: **University of Defence in Brno**
Address: Kounicova 65, Brno, 662 10, CZ
Statutory representative: Brig. Gen. Prof. Ing. Bohuslav Přikryl, Ph.D.

Organizing committee

Chairman:

Péter Lakatos, PhD, Associate Professor, National University of Public Service, Faculty of Military Science and Officer Training

Vice-Chair:

Ms. Katalin Kecskés, Corporate Relations Manager, GS1 Hungary Nonprofit Ltd.

Members:

Mr. Zoltán Krázli, Implementation Director, GS1 Hungary Nonprofit Ltd.

Dr. Elżbieta Halas Pełnomocnik Dyrektora ds. Systemu GS1 CEO GS1 Poland Instytut Logistyki i Magazynowania IB. GS1 Polska

Colonel Dr. habil. Ing. Pavel Foltin, Ph.D, Head of the Department of Logistics, Faculty of Military Leadership University of Defence, Brno

Ing. Ladislav Boka, Erasmus+ Coordinator, Department of Science and Foreign Relations

Project Coordinator:

Mr. Csaba Iványi-Windhoffer, International Relations Officer, National University of Public Service

International conference

„GLOBAL SUPPLY CHAIN STANDARDS AND SOLUTIONS IN PRACTICE OF NATIONAL DEFENCE OF VISEGRAD (V4) COUNTRIES"

supported by the International Visegrad Fund (IVF) under Grant Agreement No. 21510165

October 27, 2015

Location:

Ceremony Hall, Ludovika Campus, NUPS, Ludovika tér 2, 1083 Budapest

Main Patron:

Brigadier General Imre Pogácsás, PhD Chief of Logistics Directorate General Staff, HDF

Chairmenship of the Conference:

Col. Prof. Dr. László Kovács, Vice Dean for Science and International Affairs, National University of Public Service

Mr. György Viszkei, President, GS1 Hungary Nonprofit

Ret. General Prof. Dr. Zoltán Szenes Head of Department, National University of Public Service, Member of the UN Association of Hungary

Péter Lakatos, PhD, associate professor, National University of Public Service, Faculty of Military Science and Officer Training

Chair:

Ret. Brigadier-General Dr. Gyula Keszthelyi, President of he Hungarian Military Logistics Association

Co-chair:

Mr. Dávid Kétszeri, Corporate Relations Director, GS1 Hungary Nonprofit Ltd.

Conference programme

Welcome speech:	Col. Prof. Dr. László Kovács, Vice Dean for Science and International Affairs, National University of Public Service
Welcome speech:	Mr. György Viszkei, President, GS1 Hungary Nonprofit Ltd.
Key note speech:	Ret. General Prof. Dr. Zoltán Szenes, Head of Department, National University of Public Service, Member of the UN Association of Hungary

NATO Challanges and Standardization

Invited German speech:	Thorsten Kirschner, Senior Manager Tchnical Industries, GS1 Germany Gmbh

Development and implementation of GS1 standards in the German defence sector

Czech approaches to the project topic:	Maj. Dr. Martin Vlkovský, Vice-Dean for Research, Faculty of Military Leadership University of Defence, Bruno

Introduction of research areas

Col. Dr. habil. Ing. Pavel Foltin, Ph.D
Education/training & Research and scientific area

Dr. Petr Neměc
NATO Codification System Tool MC CATALOGUE

Slovak approaches to the project topic:	Asoc. Prof. Dr. Ing. Miroslav Školník, Armed Forces Academy in Liptovský Mikuláš

Legislative and structural tools of Ministry of Defence of the Slovak Republic in alliance cooperation

Polish approaches to the project topic:	Ms. Anna Kosmacz-Chodorowska, Project Leader and Ms. Agata Horzela, Senior Specialist, Insitute of Logistics and Warehousing, GS1 Poland

Coding of military supplies according to GS1 – good business practices and their implementation in the Polish Armed Forces

Presentation of the Hungarian military expert:	Maj. Béla Rebák, Ministry of Defence, Defence Economic Office, Research and Development, Quality Assurance and Security Investment Directorate, National Codification Bureau

Introduction of NATO Codification System and NATO Stock Number – the DNA of modern logistics

Panel session: „to share a bit more information" moderated by Mr. Dávid Kétszeri, Corporate Relations Director, GS1 Hungary Nonprofit Ltd.

Panel members:
Thorsten Kirschner, Senior Manager Technical Industries, GS1 Germany Gmbh

Maj. Dr. Martin Vlkovský, Vice-Dean for Research, Faculty of Military Leadership University of Defence, Bruno

Ms. Anna Kosmacz-Chodorowska, Project Leader and
Ms. Agata Horzela, Senior Specialist, Insitute of Logistics and Warehousing, GS1 Poland

Maj. Béla Rebák, Ministry of Defence, Defence Economic Office, Research and Development, Quality Assurance and Security Investment Directorate, National Codification Bureau

TABLE OF CONTENTS

NATO CHALLANGES AND STANDARDIZATION[1]

Gen (ret.) Prof. Zoltán Szenes

The purpose of this paper is to justify the direct connection between NATO new security challanges requesting new military capabilities and standardization. The major interrelations between the two issues are very clear: as better standardization as stronger NATO. The article discusses the current threats from East and South and reviews the new NATO initiative program (NATO Forces 2020, Smart Defence, Connected Forces Initiative, Readiness Action Plan) enhancing interoperability in the Alliance. The author argues for importance of standardization and explains the current NATO standardization system, functioning and results. The lecture is concluded with emphasizing the importance of standardization as a new potential for success in building better integrated NATO forces.

Key words: NATO, new threats, standardization, interoperability, standards, NATO Standardization Office

Introduction

Currently NATO face with threats from the East and the South. In 2014 Russia illegally occupied Crimea and launched agression in Eastern Ukraine. The Russian politics is undermining decades of work by the international community to create a Europe (as it is stated in NATO Strategic Concept) whole, free and at peace.[2] And it is violating the principles of the international rules -based system: respect for borders, the equality of nations, and the settling of disputes by peaceful means. NATO Allies do not and will not recognise the annexation of Crimea. NATO believe that the full implementation of the Minsk Agreement represents the best hope for peace in Ukraine. Russia is a full party to the conflict and a signatory of the Minsk Agreement, and therefore carries a special responsibility to move from confrontation back to cooperation.

---

[1] The article is based on the lecture provided in the international conference: *Global Supply Chain Standards and Solutions in practice of the National Defence of the Visegrad (V4) Countries.* Budapest: National University of Public Service, October 27, 2015)
http://www.gs1hu.org/FTP/documents/1_SZENES_Nato_Challanges_Standardization.pdf (15.03.2016)

[2] NATO Strategic Concept: Active Engagement, Modern Defence. 2010. p.2
http://www.nato.int/lisbon2010/strategic-concept-2010-eng.pdf (10.03.2016)

Russia has also supported the government of Syria since the beginning of the Syrian Civil War in 2011 with military aid, politically, and in the form of direct military involvement since 30 September 2015. Syria is fighting against numerous opposition factions, including a moderate opposition, extremist groups, south as Islamic State (ISIL) which is banned in a range of countries including the United States and Russia led international coalition. Russia has been assisting the Syrian Forces in their anti-terror campaign, conducting airstrikes against ISIL targets in Syria and providing all necessary military support from military equipment through training to intelligence.

NATO is making efforts to cope with these security challenges and threats. NATO leadership is focusing on the implementation of Wales Summit decitions against Russian threats. USA is leading the coalition of countries to degrade and defeat ISIS. In the same time the Alliance is making efforts to build stronger and more integrated forces using the existing standardization system.

NATO Policy against the new threats

NATO is responding to the emerging hard security challenges and threats in the east and the south. The North Atlantic Council (NAC) had a Summit meeting in Wales in September 2014, where the Allience reaffirmed its commitments to Article 5 of the founding treaty, which says *that an attack on one Ally is an attack on all.* And NATO member countries agreed to implement the largest increase in the defence posture since the Cold War.[3]

The centre piece of the Wales Summit is the **Readiness Action Plan** (RAP),[4] which is already under the implementation. As a result of the plan visible military presence has been increased in the Central and Eastern Europe, with a larger air policing operation,[5] greater troop numbers on the ground, and an enhanced maritime presence in the Baltic and Black Seas. NATO is setting up local command centres *in six eastern Allies* (including Hungary). There was decision to double the size of NATO Response Force, with a Spearhead Force (VJTF), able to responding[6] to a crisis in any part of the Alliance at very short notice. In July 2016, NATO will convene its biennial summit to discuss the current security challenges facing the Alliance. Warsaw Summit comes at a crucial time as major security concerns have emerged to both the east and the south of Europe. These threats have materialized in the form of a revanchist Russia, terrorist attacks on NATO members and continuing instability in the Middle East and North Africa. Consequently, NATO is working in parallel on long term future issues and the current crisis in Ukraine and the Middle East. Threats from the East and the South are shown in Picture 1.

---

[3] Wales Summit Meeting. 05 Sept. 2014. http://www.nato.int/cps/ic/natohq/official_texts_112964.htm (12.02.2016)

[4] Szenes Zoltán: Új bor régi palackban? A walesi NATO csúcs (New Wine in the Old Bottle? The NATO Wales Summit). Hadtudomány (Military Science Journal), XXVII. Évf. 4-4. Szám, 2014.december, pp.6-8

[5] The Hungarian Air Force also contributed to the Baltic Air Policing Mission from September to December 2015. The Task Force (80 soldiers, 4 JAS-39 Gripen fighters) managed 25 scrambles with Russian war planes during a half year service. http://www.mfa.gov.hu/kulkepviselet/BRUSSELS_NATO/en/en_Hirek/20160112_Grippen_home.htm (12.02.2016)

[6] Very High Readiness Joint Task Force (VJTF) is part of the NATO Response Force (NRF) with the purpose to respond *to emerging security challenges posed by Russia as well as the risks emanating from the Middle East and North Africa.* This force (one brigade-size joint battle group) is now in transition to be fit into the overall NRF structure. http://www.shape.nato.int/nato-response-force--very-high-readiness-joint-task-force (12.02.2016)
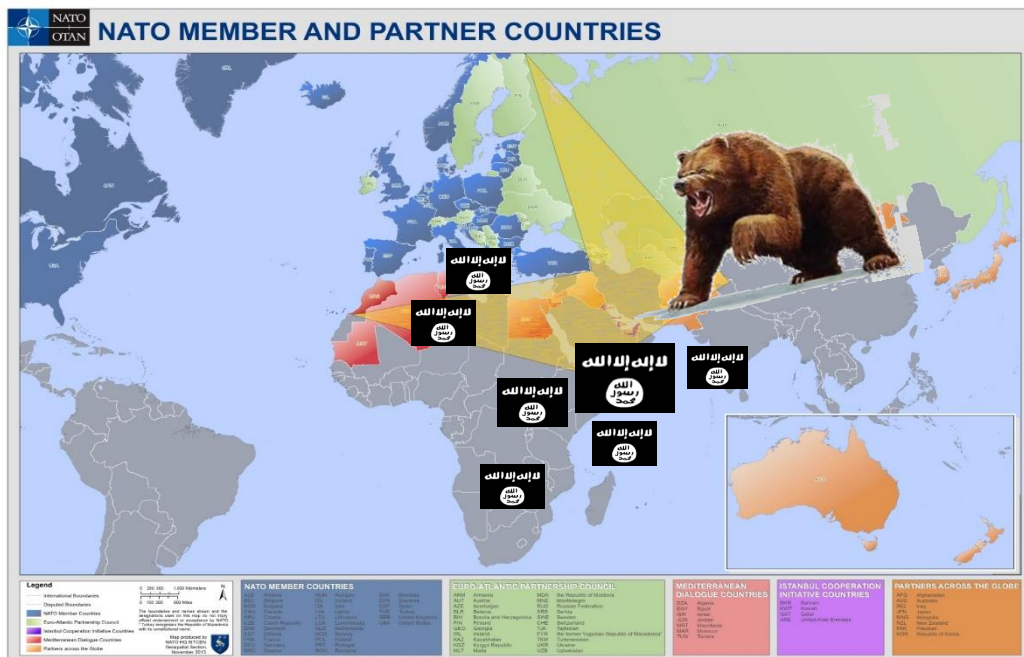
Pict.1 - *Threats to NATO from East and the South*

The situation in Ukraine is deteriorating.[7] Kiev finds itself on the brink of a political crisis in March 2016, and the war is still going on in the East. Two years after the Maidan revolution, Ukraine's slow pace of reform has without doubt created *public frustration*. The economy has tanked, corruption is very high, changes within the leadership and administration have been insufficient. If the internal crisis continues, Ukraine's backers (including NATO) will find themselves in trouble. The IMF has warned that a $40 billion bailout migh be put at risk.[8] Meanwhile, *the conflict between government forces and Russia-backed separatists continues unabated* - and has worsened again in February and March 2016. The war has caused more than 9,000 deaths in two years. OSCE international monitors say the fighting has recently reached levels not seen in months, with numerous ceasefire violations, including the use of heavy weaponry which should have been pulled back from the front line.

A deepening political crisis in Ukraine could threaten the Minsk ceasefire agreement, whose full implementation (which was initially planned for December 2015) had already been pushed back to an uncertain date this year. While each side in the conflict accuses the other of not fulfilling its commitments, political events in Kiev could offer Russia a new pretext to refuse handing over the control of the border to the central government. The OSCE has recently spoken of "circumstantial evidence" that Russia is rearming the separatists.

For all this, developments in Ukraine point to the need for more, not less, *western and European focus.*[9] Both international financial assistance and diplomatic efforts should be kept on track if Ukraine is to be able to stabilise. With all the other problems facing Europe, that may be a hard sell. But it is the European

---

[7] Ukranian Crisis- Latest news and developments. The Guardian, Tuesday 12 March 2016. http://www.telegraph.co.uk/news/worldnews/europe/ukraine/ (12.03.2016)

[8] IMF warns Ukraine it will halt $40bn bailout unless corruption stops. The Guardian, Wendesday, 10 February 2016. http://www.theguardian.com/world/2016/feb/10/imf-warns-ukraine-halt-40bn-bailout-corruption-christine-lagarde (12.03.2016)

[9] Alexander J. Motyl: Ukraine as a Vital Security Interest for Europe. World Affairs, 31 March 2015. http://www.worldaffairsjournal.org/blog/alexander-j-motyl/ukraine-vital-security-interest-europe (15.10.2015)

interest to engage, not turn away. *NATO should also support the military reforms* in the country and building new military capabilities.

The situation in Syria is much better as the UN- brokered Peace Talks started in Geneva.[10] Fighting in Syria has slowed considerably since a fragile "cessation of hostilities agreement" brokered by the United States and Russia came into force on 27 of February. Russian airstrikes continue to target mainstream elements of the Syrian armed opposition, despite the ongoing cessation of hostilities agreement. However, the overall level of violence in the country has been reduced by 80-90%. The resumption of Geneva peace talks is coinciding with *the fifth anniversary of a conflict* that began with protests against President Bashar al-Assad. The long multi-sided civil war has drawn in foreign governments and allowed the growth of ISIS militants in Syria and Iraq. After five years of civil war that has killed 250,000 people and driven some 11 million from their homes. Currently Syria's territory is already split between various parties, including the government and its allies, Western-backed Kurds, opposition groups and ISIS militants.

The UN Peace Talks now are discussing *the possibility of a federal division* of the war-torn country that would maintain its unity as a single state while granting broad autonomy to regional authorities. The major powers, including United States and Russia, also support the idea. The peace talks are going to be long and hard but carry the hope for the future. The major power endorsed road-map outlining an 18-month political transition (an agreement within *half a year*, followed by election under a new Constitution within *further 12 months*) for Syria. It is working with and counting on Russia to help convince the Syrian president to step aside. With the US and Russia having engineered the cease-fire and cooperating on making it work, it seems, the sides on the ground have to comply it.

The international community is hoping that if the cease-fire continues to hold, it will ease the refugee flow toward neighboring countries and Europe. But the truce would have to be sustained for weeks, if not month, to discourage people from fleeing and for refugees to contemplate returning. It is encouraging that president Putin ordered to Russian force to leave from Syria in the middle of March.[11]

As a result of permanent attacks of anti-ISIS coalition and Russian air strikes ISIS lost a major resource hub in north eastern Syria and was expelled from its positions in Western Iraq, Ramadi. ISIS responded by launching a military campaign against Kurdish and the Syrian regime forces. [12]ISIS also launched a wave of explosive attacks across Iraq and Syria with the aims to increase overall disorder by attacking civilian and military targets linked to Shia's governments in Damascus and Baghdad.

The Iraqi Security Forces and the Iranian-backed Iraqi Shi'a militias are also conducting offensive operations in order to recapture desert terrain in the northwest of Baghdad. Meanwhile, ISIS is launching successful and spectacular attacks in Babil and Baghdad with the intention to incite sectarian tentions and force the Iraqi government to redeploy for defensive measures away from forward operations.

---

[10] Few signes of compromise as Syria war talks resume. World Affairs, March 15, 2016. http://www.worldaffairsjournal.org/content/few-signs-compromise-syria-war-talks-resume?utm_source=World+Affairs+Newsletter&utm_campaign=18a000a466-March_14_2016_WNN3_14_2016&utm_medium=email&utm_term=0_f83b38c5c7-18a000a466-294688121 (15.03.2016)

[11] Putin orders to begin withdrawal of Russian Forces from Syria starting March 15. TASS Russian News Agency, March 14, 2016. http://tass.ru/en/world (15.03.2016)

[12] Corry Siemaszko: ISIS Attacks Are On Rise in Syria Despite Russian Airstrikes. NBC News, Feb 23 2016. http://www.nbcnews.com/storyline/isis-terror/isis-attacks-are-rise-syria-despite-russian-airstrikes-n524186 (10.03.2016)

NATO programs and standardization

In order being successful in operations, *NATO is planning and operationalising changes in the international security environment.* The main aim of the Allience is to achieve **the organic jointness**. In the twenty-first century technology, capability and capacity will mean that no force will exclusively own any domain and yet all forces will need to be credibly effective across *all seven domains* of military effect: air, sea, land, cyber, space, information and knowledge.

NATO Forces 2020 strategy envisages[13] modern, tightly connected forces equipped, trained, exercised and commanded so that they can operate together and with partners in any environment. Maintaining a strong defence industry in Europe and making the full possible use of the potential of defence industrial cooperation across the Alliance remain an essential condition for delivering the capabilities needed for 2020 and beyond.

Smart Defence *is at the heart of this new approach*.[14] The development and deployment of defence capabilities is first and foremost a national responsibility. But as technology grows more expensive, and defence budgets are under pressure, there are key capabilities which *many Allies can only obtain* if they work together to develop and acquire them. NATO encourages member nations to take forward specific multinational projects, including for better protection of coalition forces, better surveillance and better training. These projects will deliver improved operational effectiveness, economies of scale, and closer connections between our forces. They will also provide experience for more such Smart Defence projects in future.

But *Smart Defence* (SD) is more than this. It represents a changed outlook, better standardization, opportunity for a renewed culture of cooperation in which multinational collaboration is given new options for developing critical capabilities. Developing greater European military capabilities will strengthen the transatlantic link, enhance the security of all Allies and foster an equitable sharing of the burdens, benefits and responsibilities of Alliance membership. In this context, *NATO will work closely with the European Union*, as agreed, to ensure that Smart Defence and the EU's Pooling and Sharing Initiative *are complementary* and *mutually reinforcing*. The two international organizations are focusing on the areas of air-to-air refuelling, medical support, maritime surveillance and training. NATO also encourages the national efforts in these and other areas by European Allies and Partners. NATO operation over Libya showed once again the importance of such connections; as soon as the political decision was taken to initiate the NATO mission, Alliance pilots were flying wing to wing with each other, and with pilots from non-NATO European and Arab partner countries. That was essential to the military and political success of the mission.

---

[13] NATO 2020: Assured Security; Dynamic Engagement. Analysis and Recommendations of the Group of Experts on a New Strategic Concept for NATO. NATO Public Diplomacy Division, 17 May 2010. http://www.nato.int/strategic-concept/expertsreport.pdf (15.10.2015)

[14] Antonin Novotny: Smart Defence – A new way of Looking at the Capabilities of the Alliance. In: Majer, M., Ondrejcsak, R, Tarasovic, V. (Eds): Panorama of Global Security Environment, 2012. Bratislava: Center for European and Nord Atlantic Affairs (CEENA) Analysis, pp.155-167. http://cenaa.org/analysis/smart-defence-a-new-way-of-looking-at-the-capabilities-of-the-alliance/ (10.03.2016)

Another concept in achieving NATO Forces 2020 is the **Connected Forces Initiative.**[15] *CFI covers three areas: expanded education and training; increased exercises focussed on the NATO Response Force and better use of technology.* The Alliance expands education and training of personnel, complementing in this way essential national efforts. The Alliance is enhancing exercises in line with RAP. To handle the threats from the east NATO is strengthening the bonds between NATO Command Structure, the NATO Force Structure, and our national headquarters. NATO member countries are enhancing cooperation among Special Operations Forces including through NATO's Special Operations Forces Headquarters in Mons, Belgium. NATO is strengthening the use of the NATO Response Force with developing very high level joint force (VJTF), so that it can play a greater role in enhancing the ability of Alliance forces to operate together and to contribute to NATO deterrence and defence posture in the eastern frontline. In the new security environment NATO also steps up connections with Partners as much as possible. To transfer these requirements NATO adopted different *Defence Packages* in Chicago and Wales that will help member states develop and deliver the capabilities future missions and operations require.
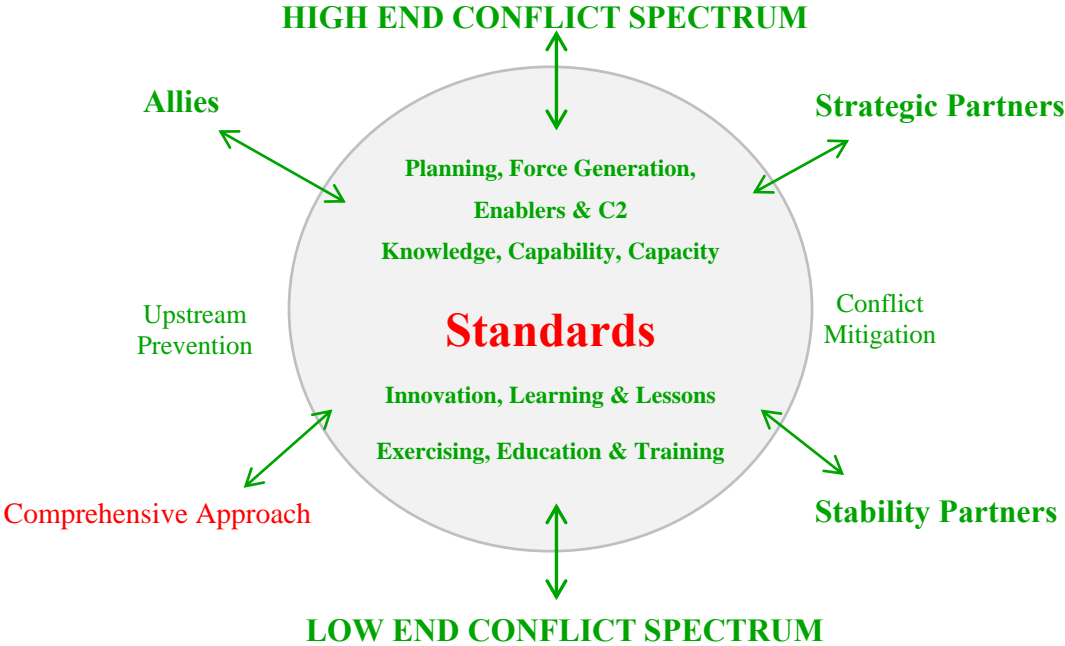
Pict. 2 - *NATO as a Combined and Joint Strategic Hub*

The *picture 2* explains the interrelations of NATO Forces 2020 strategy with the Smart Defence and the Connected Forces Initiative. NATO must have the necessary forces from low- end conflicts through peace support operations to high-end warfare. To achieving the main goals NATO should cooperate with member nations and partners using the comprehensive approach principle. In this efforts the European Union (EU) represents a strategic partner. The two concepts (SD, CFI) should be reflected in the whole work of NATO covering planning, force generation, enablers, command and communications (Smart Defence areas) and education, training, exercises, lessons learned and innovation (the Connected Forces Initiative areas) as well.

---

[15] M. Misera, P. Macko: NATO Forces 2020: Role of Connected Forces Initiative. Bratislava: CEENA Policy Papers 6/2013 http://cenaa.org/wp-content/uploads/2013/06/PP-6-2013-NATO-Forces-2020-Role-of-connected-forces-initiative.pdf (10.03.2016)

Interoperability and Standardization

The aim of NATO Standardization is enhancing operational effectiveness through *interoperability* among Alliance forces, and between NATO forces and forces of Partners and other nations. *NATO's interoperability defines the term as the ability for Allies to act together coherently, effectively and efficiently to achieve tactical, operational and strategic objectives.*[16] Specifically, it enables forces, units and/or systems to operate together and allows them to share common doctrine and procedures, each others' infrastructure and bases, and to be able to communicate. Interoperability reduces duplication, enables pooling of resources, and produces synergies among the 28 Allies, and partners. It is very important requirement as for instance in NATO ISAF Operation in Afghanistan 50 countries served together and achieved higher and higher level of interoperability during the years. Interoperability does not necessarily require common military equipment. What is important is that the equipment can share common facilities, and is able *to interact, connect and communicate, exchange data and services with other equipment.* Interoperability has different dimentions: *technical* (including hardware, equipment, armaments and systems), *procedural* (including doctrines and procedures) and *human* (including terminology and training) ones.

Consequently, NATO standards are normally classified into one of three main areas as follows, although some standards may apply to more than one area:[17]

- **Operational standards** are those standards which affect future and/or current military practice, procedures or formats. They may apply among other things, to such matters as concepts, doctrine, tactics, techniques, logistics, training, organizations, reports, forms, maps and charts.

- **Materiel standards** are those standards which affect the characteristics of future and/or current materiel to include telecommunications, data processing and distribution. They may cover production codes of practice as well as materiel specifications. Materiel includes complete systems, including command, control and communications systems, weapons systems, sub-systems, assemblies, components, spare parts and materials and consumables (including ammunition, fuel, supplies, stores and consumable spares).

- **Administrative standards** primarily concern terminology - which apply to both the "operational" and the "materiel" fields - but this category also includes standards which facilitate Alliance administration in fields without direct military application (e.g. reporting of defence economic statistics).

The Interoperable solutions can only be achieved through the defence planning,[18] **effective employment of standardization**, training, exercises, lessons learned, demonstrations, tests and trials. By strengthening relationships with the defence and security industry and by using open standards to the maximum extent possible, NATO is pursuing interoperability as a force multiplier and a streamliner of national efforts.

---

[16] NATO Glossary of Terms and Definitions AAP-06. Edition 2015. P. 2-I-8. http://www.google.hu/ (12.03.2016)

[17] NATO Logistics Handbook. NATO Public Diplomacy Division, Brussels, 2012. p.65. http://www.nato.int/docu/logi-en/logistics_hndbk_2012-en.pdf (14.03.2016)

[18] Florian Ciocan: Perspective on Interoperability integration within NATO Defence Planning Process. Journal of Defence Resources Management, Volume 2, Issue 6, 2006. http://journal.dresmara.ro/issues/volume2_issue2/06_ciocan.pdf (16.10.2015)

The ability to work together in the new security environment is more important than ever for the Alliance. States need to share a common set of standards, especially among military forces, to carry out multinational operations. By helping to achieve interoperability among NATO's forces, as well as with those of its partners, standardization allows for more efficient use of resources and thus enhances the Alliance's operational effectiveness.

NATO standardization is the development and implementation of concepts, doctrines and procedures to achieve and maintain the required levels of compatibility, interchangeability or commonality needed to achieve interoperability. The differentiation between the three levels of interoperability is important because they represent different level of joint operations. Compatibility is being able to fit in NATO system or work with other types of equipment (in case of the Hungarian Defence Forces with Russian equipment). Interchangeability is being able to be exchanged one for another. In operation nations can exchange with all types of resources. Commonality expresses a state where various groups use common resources or have common aims.[19] As Picture 3 shows the whole integration process starts with standardization which is resulted in a higher level interoperability which is leading to more integration among NATO forces, and between NATO forces and partner nation forces.

The standards are collected in the NATO Standardization Document Database (NSDD) which is avaible in the Standardization Office website.[20] 1 200 NATO Standards are avaible now for download for registered users. In addition, some 8 000 stantardized documents avaible in webside. The NSDD is the main tool for providing the Alliance and its partners with standardization documents. In average month, some 30 000 standards are downloaded from 90 countries.[21]
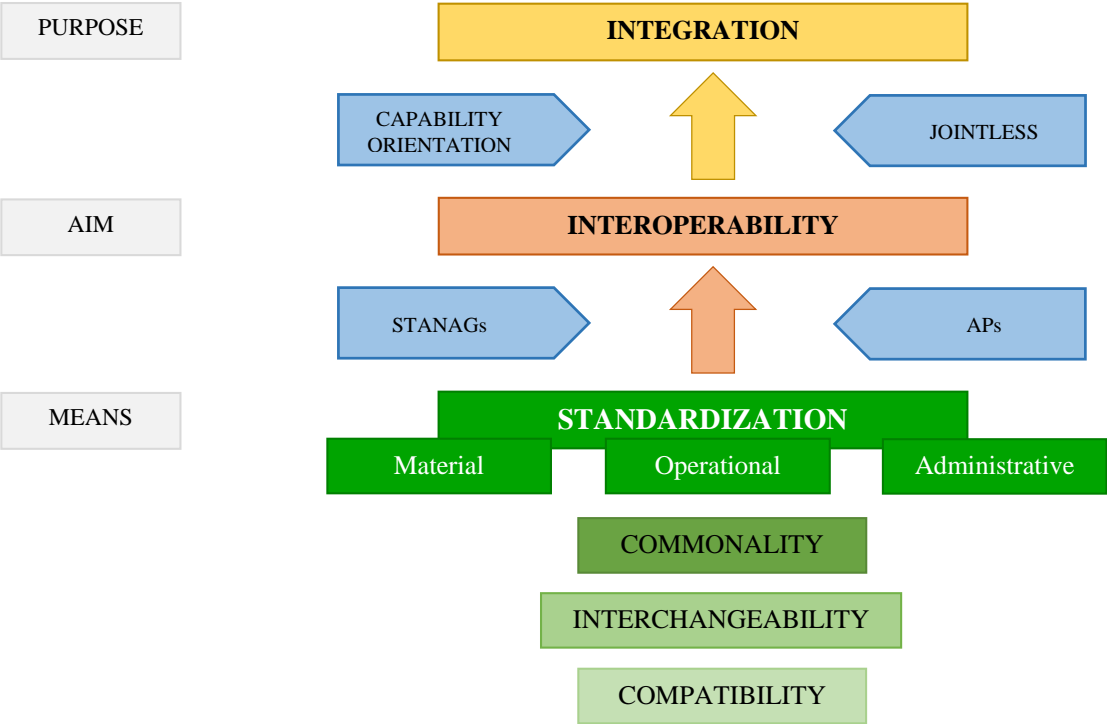
Pict. 3 - *Interrelations between standardization, interoperability and integration.*

---

[19] Richard Bowyer (ed): Dictionary of Military Terms. Third edition, Bloomsbury, London, 2004, pp. 53,54,129.
[20] http://www.nato.int/cps/en/natohq/topics_124879.htm (12.03.2016)
[21] Cihangir Aksit: Smart Standardization: a historical and contemporary success at NATO. NATO Standardization Agency, 2014. http://www.nato.int/nato_static/assets/pdf/pdf_2014_05/20140528_140528-smart-standardization.pdf (12.03.2016)

Standardization affects the operational, procedural, material and administrative fields. This includes a common doctrine for planning a campaign, standard procedures for transferring supplies and interoperable material between troops on the ground, in air and at sea. **Standard** *is published in a document*, established by consensus and approved by a recognized body (Committee for Standardization)[22] which provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Standardization Agreement (STANAG) is a NATO standardization document that specifies the agreement of member nations to implement a standard, in whole or in part, with or without reservation, in order to meet an interoperability requirement.

In standardization process the NATO Standardization Office (NSO) plays key role. NSO is one of the oldest NATO bodies (it was established in 1951)[23] which was not the subject of the last NATO Agency Reform. Although it is also went through the changes it's independency was never questioned during the 2010-2011 years review. The NSO initiates, coordinates, supports and administers NATO standardization activities conducted under the authority of the Committee for Standardization (CS). The CS is the senior NATO body for Alliance standardization composed primarily of representatives from all NATO countries. Operating under the authority of the North Atlantic Council (NAC) it issues policy and guidance for all NATO standardization activities.
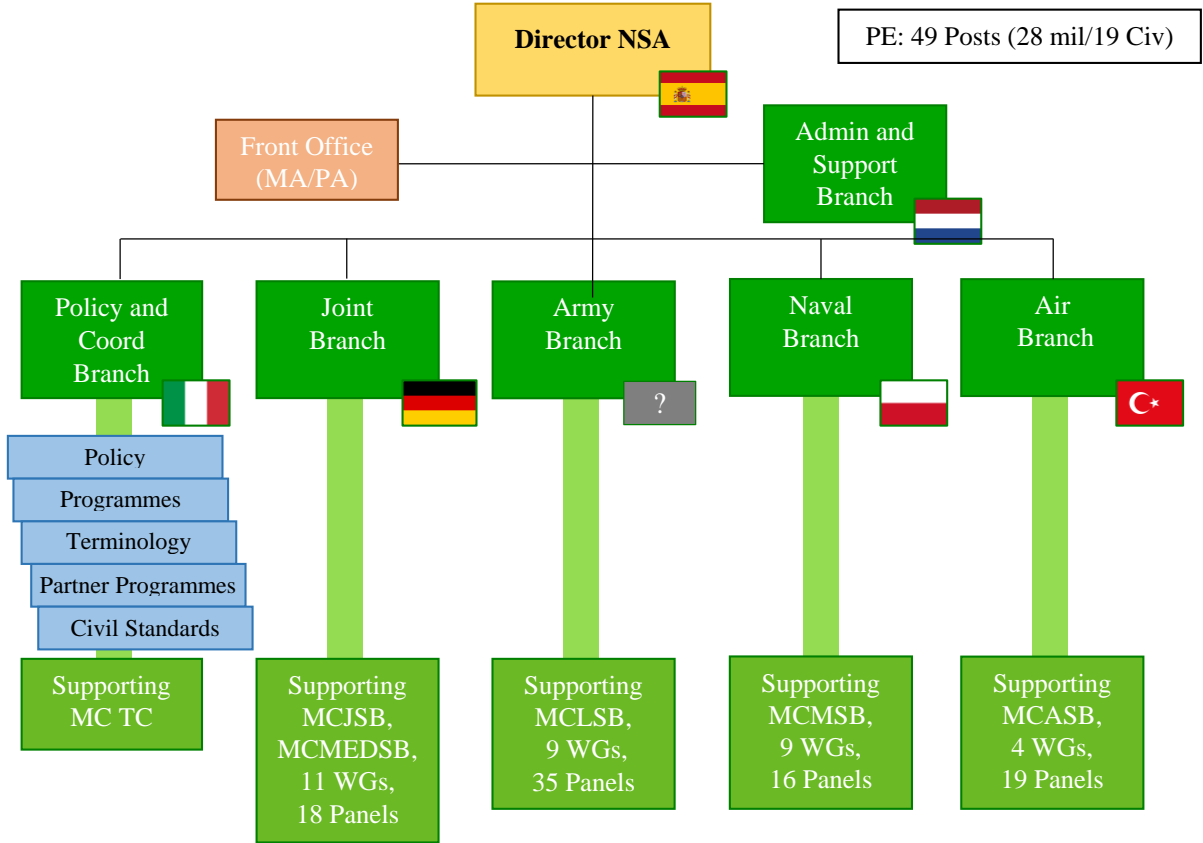
Pict. 4 - *Structure of the NATO Standardization Office*
(*http://nso.nato.int/nso/#nogo*) *(15 October, 2015)*[24]

---

[22] http://www.nato.int/cps/en/natohq/topics_69277.htm (12.03.2016)
[23] http://www.nato.int/cps/en/natohq/topics_124879.htm (12.03.2016)
[24] Cihangir Aksit: The Importance of NATO Standardization. NSA, 2012. http://www.defenceprocurementinternational.com/Uploads/Editor/A%20Summer%20editorial%202012/AKSIT%20Nato%20copy.pdf. p.2.

The **NATO Standardization Office** is run by Director which position is filled by application under the authority of the NATO Military Committee. The director manages the standardization activities of the NSO and is responsible for the efficient functioning and administration of the Office. He is the principal advisor to the Military Committee on development and coordination of standardization activities. He promulgates all ratified STANAGs and Allied Publications (APs) The director liaises directly with the Chairmen of NATO committees, staffs, the Strategic Commands, and communicates directly with any NATO command, agency or staff on matters of standardization. He is also liaises with civilian standards-developing organizations (agencies) and acts as the NATO standardization management staff focal point with these bodies.

In 2012 the NSO supported 86 meeting under the auspices of NATO Military Committee where about 6 000 subject-matter experts attended from 32 NATO and partner nations. The Office also reserves posts for partner nations to prepare them for standardization work at home country. [25]

The Office has four branches: joint, army, naval and air, about 50 people.[26] The branches directly support MC Standardization Boards consisting of members of the appropriate services of the national armed forces and the NATO Strategic Commands. NSO Boards are in permanent session and generally meet once a month. Decisions are normally reached on the basis of unanimity. However, as standardization is a voluntary process, agreements may also be based on majority decisions. The NATO Strategic Commanders have a representative on each Board but do not have a vote. The *Joint Branch* deals with the MC Joint Standardization Board (MCJSB) and the Medical Standardization Board (MCMSB) The Joint Standardization Board deals with joint and overarching standardization policy matters, affecting two or more Services. It manages working groups dealing with Allied Joint Operations Doctrine, information exchange requirement/ message text format harmonization, joint intelligence issues, environmental protection, and NBC defence operations. The Medical Standardization Board manages the standardization efforts of working Groups and expert panels dealing with military medical structures and operations procedures, military health care, medical standardization, and NBC medical. The *Army Branch* is responsible for the work of the Land Standardization Board (MCLSB). LSB manages working groups dealing with land Operations, artillery, combat engineering, explosive ordnance disposal, helicopter operations, ammunition interchangeability, logistics doctrine, medical support, asset tracking, materials handling/ distribution, movements and transport, range safety, NBC defence operations and NBC medical operations. The *Naval Branch* supports the activity of the Maritime Standardization Board (MCMSB) manages working groups dealing with maritime operations, amphibious operations, helicopter operations from ships other than aircraft carriers, mine warfare, maritime logistics, NATO shipping, replenishment at Sea, submarine escape and rescue, underwater diving and maritime information exchange requirements. Finally, the *Air Branch* supports the work of the Air Standardization Board (MCASB).[27] The ASB manages working groups and panels dealing with air operations and all aspects of operational doctrine, air Transport, air-to-air refueling, search and rescue, flight safety, aeromedical, aircraft/ aircrew integration, aircraft servicing and standard equipment, avionics systems, aircraft gaseous systems, and air electrical and electromagnetic considerations.

[25] Cihangir Aksit (2014): Ibid, p.4.
[26] http://nso.nato.int/nso/boards.html (20.10.2015)
[27] Péter Nagy: GIS standardization in NATO. AARMS, Vol.3, No.4 (2004) p. 603.
 http://www.zmne.hu/aarms/docs/Volume3/Issue4/pdf/12nagy.pdf.(13.03.2016)

Standardization process

The NATO standardization process encompasses the formulation and subsequent national agreement on standardization objectives[28] which are based on standardization requirements from the strategic commands and nations (top-down structure) and on standardization proposals, which are, in most cases, generated by the specialized NATO groups of experts (bottom-up structure). The process ends with the implementation of approved STANAGs, APs and/or bilateral/multilateral agreements developed from work in NATO fora.

Standardization process has to go through the following steps: [29]

- *Identifying Standardization Requirements/Deficiencies.* Standardization requirements are derived from either the top-down or the bottom-up approaches. They identify the capability to be achieved and the required level of standardization. Those that form part of the NATO Standardization Programme (NSP) are referred to as Alliance Standardization Requirements (ASRs).

- *Formulating and Agreeing Priority Standardization Objectives.* Based on the agreed requirement, priority standardization needs are identified and the standardization objectives (SOs) are formulated.

- *Formulating or Updating of NATO Standards.* The formulating or updating of NATO standards is inherently international in character and hence must be coordinated internationally in the applicable NATO bodies. In view of the wide range of Alliance activities for which standards are desirable, the formulation of proposed NATO standards will normally be decentralized. Formulation of NATO standards can best be accomplished by multinational bodies of national experts.

- *Ratifying NATO Standards by Nations Individually.* Specific proposed standards may not be relevant to all Alliance nations. A proposed standard may be ratified and designated a NATO Standard if several (not necessarily all) Alliance nations agree that it is acceptable as a goal for implementation. Likewise Partner nations can adopt NATO standards as a goal for implementation.

- *Promulgating NATO Standards.* After sufficient nations have ratified the proposed standard it will be promulgated by Director of Standardization Office.

- *Implementing Agreed NATO Standards as a Matter of National Policy.* Implementation of agreed NATO standards is a national responsibility. NATO strongly encourages implementation of ratified STANAGs, by observing, monitoring and reporting results on a nation-by-nation and case-by-case basis.

- *Verifying and Validating the Implementation of Agreed NATO Standards.* Verification of standardization may be carried out in PSOs, exercises and other operations. The verification should be carried out on the basis of a verification plan. Validation of verification information may result in the adaptation and/or deletion of certain STANAGs.

---

[28] NATO Standardization Agency (NSA) and GS1 Sign Technical Cooperation Agreement. 31 January, 2006. http://www.gs1.org/docs/media_centre/gs1_pr_310106.pdf (15.03.216)

[29] NATO Logistics Handbook, 1997. Chapter 7. http://www.nato.int/docu/logi-en/1997/lo-1709.htm (12.03.2016)

Picture 6 is summarizing the difference between the two standardization approaches. Top-down process is initiated by the two Strategic Commands (Allied Command of Operations, Allied Command of Transformation) identifing the military standardization requirements (MSR)

Top-Down

- initiated when the Strategic commands identify **Military Standardization Requirements** (MSR)

- part of the Force Proposals for nations participating in the Force Planning Process

$\Rightarrow$ **longer and slower**

Bottom-Up

- initiated by reporting standardization needs and/or deficiencies by Nations or NATO commands

- followed by **Standardization Proposals** (SPs), formulated by NATO Working Groups,

- validated by the appropriate Authority who has to confirm the SP before the development of STANAG/AP starts.

$\Rightarrow$ **react in short time to shortfalls/ interoperability gaps**

Pict. 5 - *Top-down and bottom-up standardization*

The MSR becoming part of the Force Proposals in the defence planning process and plays an important role in building integrated NATO Force. Although the top-down approach is slow and takes longer time, it is used for building of new system-oriented standards. The bottom-up approach is faster and reacting to shortfalls or interoperability gap quickly. In case of bottom-up standardization the initiative comes from the nations or NATO Commands in form of standardization needs. The suggestion is formulated into Standardization Proposals (SP) by NATO working groups and confirmed by the appropriate authority.

NATO Standardization system looks like any other complex system requiring inputs, processes, output and feedback. All components from the contractors[30] to the users are functional and relevant for NATO.

---

[30] Standardization Systems in the Defence Industries of the European Union and the United States. ESL & Network. Litton, TASC, Sept. 1999. p.112 http://aei.pitt.edu/40273/1/A4667.pdf (10.03.2016)
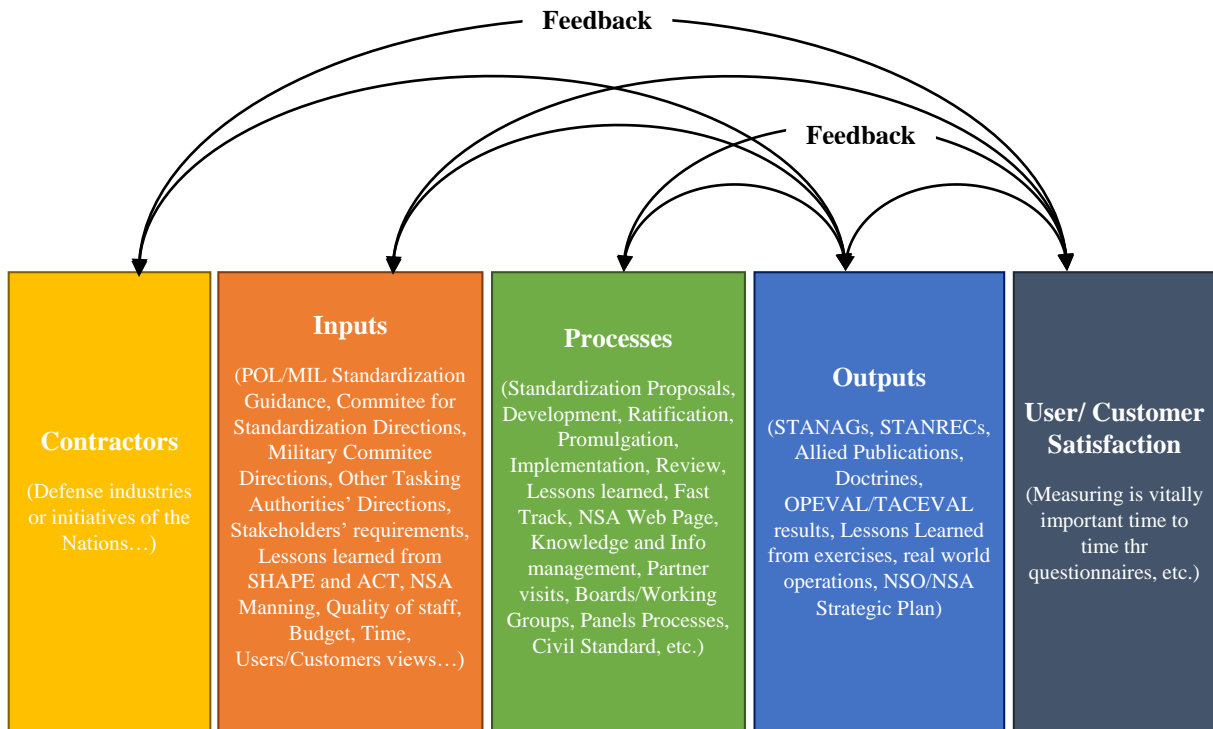
Pict. 6 - *NATO Standardization as the System*[31]

No capability without interoperability

As a result of constant standardization work interoperability between Allience members as well as with partner nations has been developed since the foundation of NATO. Picture 7 principally shows the evolution of NATO interoperability during the Cold War, after 9/11, and today. During the Cold War interoperabilty had primarily developed between services and a little among the nations. As more NATO peace support operations were conducted as increased the level of interoperability. Particularly, USA playes important role in this matters. She has always promoted the Alliance ability to act together coherently and effectively to achieve tactical, operational and strategic objectives. NATO has gained interoperability –building experience in 27 peace support operations, some of them like ISAF Operation in Afghanistan (2004-2014), air war in the Balkans (1999) and Lybia (2011) were particularly valueable. USA's wars of coalition (Iraq, Afghanistan, global war against terrorism) have also brought experience in the cooperation which was learnt from NATO prospective as well. After the Ukrainian Crisis NATO sets up new level of interoperability which is going to achieve through intensive series of combined and joint exercises.

---

[31] Cihangir Aksit (2014): Ibid, p.3.
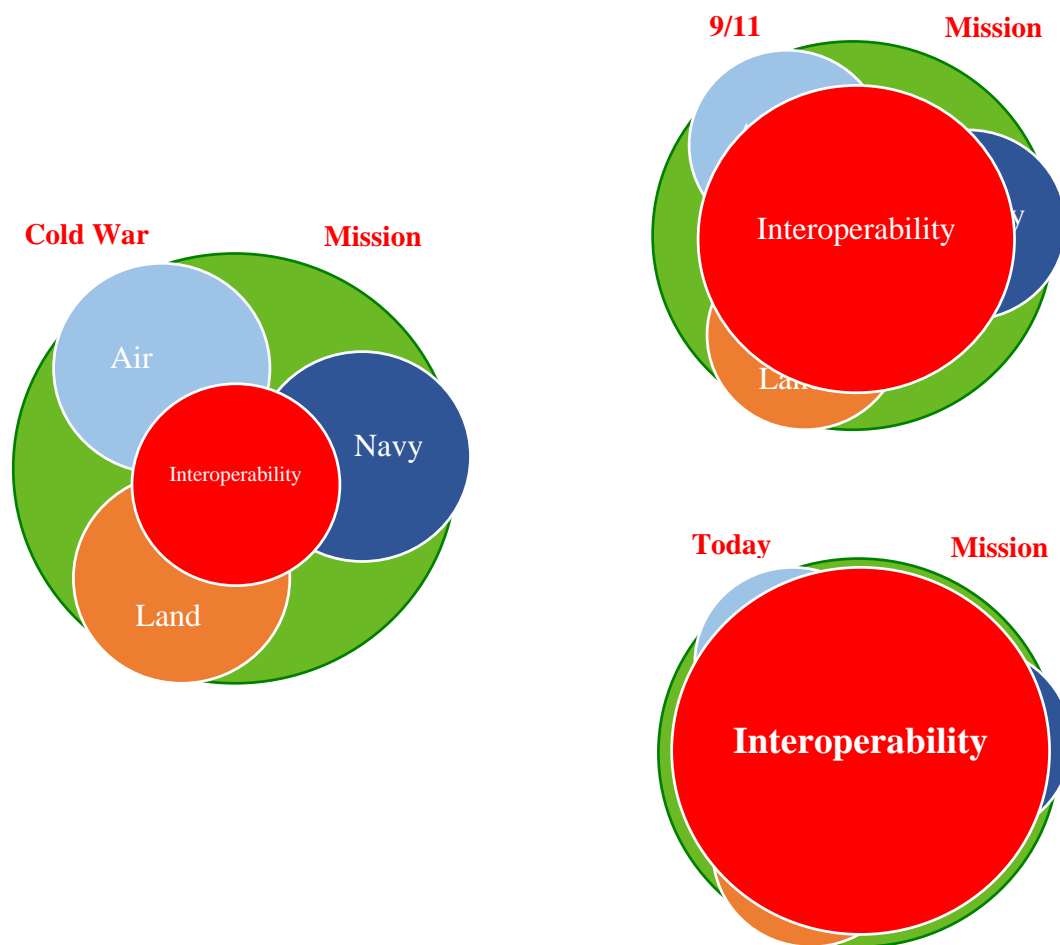
Pict. 7 - *Evolution of interoperabilty in NATO as result of standardization*

Participation in NATO Operations has varied greatly from situation to situation, from theatre to theatre, and over time. The implication is that interoperability planning needs to be adaptive enough to accomodate the possibility of countries of different sizes, and composed of different NATO members and partner nations. „Plug and play" is a concept well known at the technological level, but it also is required at national level. There are many examples from the NATO operations, for example, to provide for the possibility of different combinations of troop contributing nations (TCN); and to manage the comings and goings of nations as the mission focus changes and / or missions are added, completed, or abandoned, while minimizing disruptions in the overall NATO effort, as we saw in case of Afghanistan. This requirement suggest a broad range of interoperability solutions, including organizations, doctrine, procedures, and systems that can improve the ability to accomodate the dinamic character of NATO Forces, including transitions.

In light of „hybrid" or „non-linear" warfare conducted by Russia in Ukraine and Syria, NATO must explore new Russian operating concept (use of SOF, electronic warfare) and prepare to counter them. Particularly, NATO forces should increase joint training against conventional and unconventional Russian military scenarios, allowing the Alliance to strengthen its response, practice its interoperability, and signal its defensive resolve. Ultimately, NATO must learn how to assess its own strategy, doctrine and tactics against an adversary whose expertise in hybrid warfare is growing by every day.

Conclutions

It is necessary to view NATO interoperability in a way that the interoperability issues and problems can arise at each level of military operations or exercises. Therefore, any interoperability initiative must be considered the feasibility and potential impact at each level. Although *the NATO standardization system is able to handle the complex interoperability issues and problems,* including those arising from the Russian hybrid threats, it is clear that the performance and the speed of the system **must be increased**. The experience of NATO operations shows that standardization must focus on *C3ISR* (command, control, communications, intelligence, surveillance, and reconnaissance) *interoperabilty*, offer short and medium solutions *in five areas (readiness, deployment, effective engagement, logistics, new generation weapon systems),* and analyzes several new types of military benefits that might be expected from interoperabilty enhancements.

The standardization is one of the most important ways to achieve interoperability. It is a 65-year normative success in NATO to contribute to achieving high level interoperability in NATO world. No doubt that the standardization community and subject - matter experts inside and outside of NATO will continue developing standardization in a new, more dangerous world. „Be wise - Standardize" [32]

---

[32] Slogan of NATO Standardization Office.

DEVELOPMENT AND IMPLEMENTATION OF GS1 STANDARDS IN THE GERMAN DEFENSE SECTOR

Thorsten Kirschner

Senior Manager Technical Industries, GS1 Germany GmbH

Abstract

Automatic identification in the German Armed Forces - Increased transparency in material tracking

From manufacturing to shipment and storage to the place of operation ("from factory to foxhole") - through the standardized marking and identification of products and shipments, the German Armed Forces want to ensure effective material tracking. The GS1 Standards shall serve as a key to the globally valid transparent supply chain. The Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr (BAAINBw; The Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support) states clearly: According to the technical terms of delivery TL A-0032, products, which are catalogued or to be catalogued, further onward supply items (VersArt), to be delivered to the German Armed Forced, have to be marked unambiguously and as permanently as possible with a GS1 data carrier. The goal is to ensure a machine-readable identification across all logistic processes and guarantee the completely transparent flow of information and of goods.

Within the framework of Automatic Identification Technology (AIT), the GS1-128 barcode or the GS1 DataMatrix are principally to be used for product marking. For the labeling of shipments within the logistic process, the GS1-128 barcode is to be used solely, upon prior contractual agreement.

This document summarizes the most important regulations for labeling via the GS1-128 barcode and/or the GS1 DataMatrix. Regulations correspond to all companies intended to be TL A-0032 compliant.

1   GLOBAL LOCATION NUMBER (GLN)

The GLN key is both prerequisite and basis for the formation of the Global Trade Item Number (GTIN) and the Serial Shipping Container Code (SSCC).
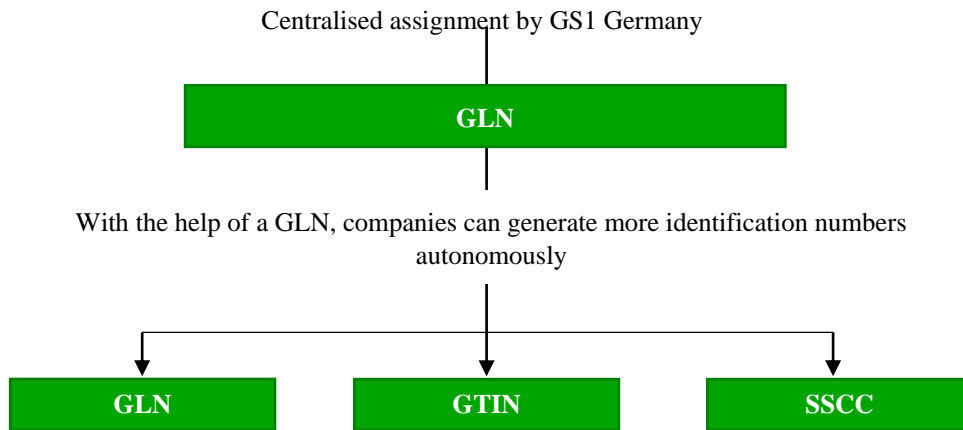
Pict. 1 - *Assignment of a Global Location Number (GLN)*

The allocation of the GLN keys occurs within the application process. The GLN has the following structure:

Global Location Number (GLN)		
Number assigned by GS1 Germany		
Company prefix	Individual numeric components	Check digit
4 0 1 2 3 4 5	0 0 0 0 0	9
4 2 1 2 3 4 5 6	0 0 0 0	5
4 3 1 2 3 4 5 6 7	0 0 0	5

Pict. 2 - *Structure of the GLN*

The length of the GS1 company prefix depends on the number of required GTIN keys (formerly known as EAN-article numbers). You have the choice of range between a GLN for 100,000 GTINs, 10,000 GTINs or 1,000 GTINs. The following basic rule applies: The longer the GLN company prefix, the less global article numbers are at your company's disposal.

On the basis of the requested GLN company prefix, your company generates its Trade Item Number autonomously.

Global Trade Item Number (GTIN)		
GTIN generated by companies		
Company prefix	Individual numeric components	Check digit
4 0 1 2 3 4 5	0 0 0 2 5	2

Pict. 3 - *Structure of the Global Trade Item Number (GTIN)*

Companies place the company prefix in the first part of the GTIN: essentially, the first 7, 8 or 9 digits of the GLN (in this example the first 7 digits).

After placing the prefix, companies allocate GTINs autonomously to their trade items (in this example 00025). Following the recommendation the numbers used have to be non-descriptive and non-sequential.

The last digit, the so-called check digit, has to be calculated for each newly assigned GTIN. Generally, the check digit is calculated according to the modulo 10 algorithms with a weighting factor of 3. In the above example for the GTIN 40123450000252, the check digit is therefore a "2".

During the logistic process, the SSCC is a key-element for unambiguous labeling and identification of shipments. The SSCC can solely be used in combination with the GS1-128 barcode. As with the GTIN, the SSCC is derived from the GLN (see Pict. 1). Once assigned by the sender, it can be used by all parties of the supply chain for seamless Tracking & Tracing as well as for efficient consignment tracking.

The SSCC is - as is the GLN and the GTIN - an exclusively numeric data element, an 18-digit code which is structured as follows:

Serial Shipping Container Code (SSCC)			
Extension digit	Company prefix of the GLN	Individual numeric components	Check digit
3	4 0 1 2 3 4 5	1 2 3 4 5 6 7 8 9	5
3	4 2 1 2 3 4 5 6	1 2 3 4 5 6 7 8	0
3	4 3 1 2 3 4 5 6 7	1 2 3 4 5 6 7	6

Pict. 4 - *Structure of the Serial Shipping Container Code (SSCC)*

1.1   Extension digit:

Previously, the place of the extension digit as the "marking digit of the packaging" could be occupied by "speaking" content. The extension digit is an extra digit on position 1, preceding the GPC that increase the capacity of a SSCC by a factor of 10.

1.2   Company prefix:

The 7 to 9-digit company prefix is adopted from the GLN. This number ensures the unambiguous identification and the worldwide absence of overlapping SSCCs.

1.3   Continuous number:

Depending on the length of the company prefix, the sender has 9, 8 or 7 digits for a continuous numbering at his disposal. Thereby, he has the possibility to generate one billion, 100 million or 10 million SSCCs.

1.4   Check digit:

A check digit from the previous 17 digits concludes the code. The calculation of the check digit is based on the same procedure as the calculation for the GLN and the GTIN.

In total, extension digit, company prefix, continuous numbering and check digit have to form 18 digits' code.

2   AIT-LABELING REQUIREMENTS FOR THE GERMAN ARMED FORCES

Let's suppose that step one has been completed successfully as described above. As a company, you have created global article numbers independently and forwarded them to the German Armed Forces. Generally, these numbers are to be associated to the products either represented as a GS1-128 barcode or as a GS1 DataMatrix. Besides the GTIN key, a serial number or a batch number can also be added to the labeling if required.

During this process, the GS1 concept of data description is to be respected. This principle is identical for the GS1-128 barcode and for the GS1 DataMatrix meaning that there is one uniform and globally coordinated concept for differentiating data carriers and applications (product/shipment). At this point it has to be respected that the brackets () which enclose the application identifier in the plain text, are not encoded within the GS1 Codes themselves.

Currently, the following application identifiers are approved for the German Armed Forces:

Application Identifier	Coded data content	Format characteristics	Application
(01)	GTIN	n2 + n14	product
(21)	Serial number	n2 + an..20	product
(10)	Batch number	n2 + an..20	product
(00)	Serial Shipping Container Code (SSCC)	n2 + n18	shipment

Pict. 5 - *Approved application identifiers according to TL A-0032*

numerical 2-digit = application identifier "01"; "10"; "21"; "00"

n14 = numeric 14-digit = GTIN with leading "0"

an..20 = alphanumerical up to 20-digit

n18 = numeric 18-digit = SSCC with leading "3"

2.1 Exemplary realization of the GTIN 4012345000016 of a product with the serial number ABC17829 in the GS1-128 barcode

(01)04012345000016(21)ABC17829

Pict. 6 - Exemplary GS1-128 barcode with GTIN and serial number

2.2 Exemplary realization of the GTIN 4012345000016 of a product with the serial number ABC17829 in the GS1 DataMatrix

(01) 0 4012345 00001 6 (21) ABC17829

Pict. 7 - Exemplary GS1 DataMatrix with GTIN and serial number

2.3 Exemplary type plate of German Armed Force supplier Krauss-Maffei Wegmann (KMW) including GS1 DataMatrix with GTIN 4052497002971 and serial number 000438

Pict. 8 - Exemplary type plate of KMW including GS1 DataMatrix

The coding of the 13-digit GTIN must always be implemented in GS1-128 barcode and GS1 DataMatrix, numerically in 14-digits and a leading "0" (see Pict. 6 and 7).

With the GS1-128 barcode, the GTIN and, if required, the related serial number or batch number are to be listed in plain writing below the data carrier.

Also, when using the GS1 DataMatrix, it is necessary to list additional information in plain writing; the GTIN always below the data carrier and, if necessary, the serial number or the batch number above the GS1 DataMatrix. In case GS1 DataMatrix is used you are allowed to omit the written information, on conditions when it is not possible to list them for reasons of space (see Pict. 8).

Within the logistic process it is necessary to mark shipments with an SSCC in the form of a GS1-128 barcode. The GS1 DataMatrix is not permitted.

2.4 Exemplary realization of a logistic label for the identification of a shipment with the SSCC 340123450000216753

Pict. 9 - *Logistic label with SSCC 340123450000216753 according to NATO STANAG 2494*

3 ESSENTIAL CHARACTERISTICS OF THE GS1-128 BARCODE

In the GS1-128 barcode, the required AIT data content (GTIN, SSCC and if necessary serial numbers or batch numbers) can be displayed in a machine-readable way in the form of barcode symbols.

GS1-128 barcode symbols have the following characteristics, inter alia:

- The dark bars and the light spaces are composed of dark or light modules of uniform width. The width of these modules is referred to as "X"—see Pict. 10.

- In the barcode-symbol, each character is built of 11 of such modules, with the exception of the stop character, which consists of 13 such modules.

- In the nominal size (magnification factor = 1.0), the normal theoretical width of a module is 1.0 mm (equivalent to X-module).
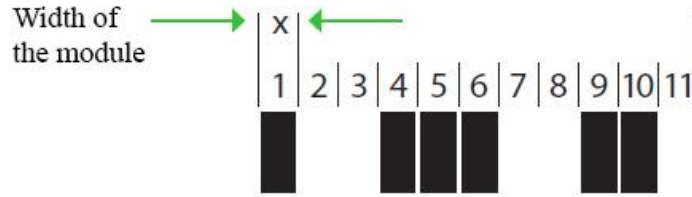
Pict. 10 - *Schematic representation of a symbol character*

The technical basis of the GS1-128 barcode is very extensive. It is fully described in comprehensive detail in the international standard "ISO/IEC 15417, Information Technology - Automatic Identification and Data Capture Techniques – Appendix 2".

3.1 Allowed Dimensions of the GS1-128 barcode for products and shipments

Application	Magnification factor – width (mm)		Height at given widht (mm)	
	minimum	maximum	at manimum width	at maximum width
product with GTIN	0,25	0,495	12,7	12,7
shipment with SSCC	0,495	0,94	31,75	31,75

Pict. 11 - *Dimensions of the GS1-128 barcode for products and shipments*

4 ESSENTIAL CHARACTERISTICS OF THE GS1 DATAMATRIX

The GS1 DataMatrix is a two-dimensional matrix symbology, which consists of square modules within a bordering search pattern. GS1 DataMatrix symbols can be read by 2D-imaging scanners or camera systems. Reading devices, which do not have a two-dimensional image buildup, cannot generally detect GS1 DataMatrix symbols.

Different methods of printing can be used for the product application of the GS1 DataMatrix:

- by laser,

- by needle or matrix print,

- by chemical etching,

- inkjet printing,

- via label printing by means of thermal transfer mode or,

- via label printing by means of applied laser technology.

Regardless of the chosen printing method the company owner of the data has to ensure that the GS1 DataMatrix, being applied directly or indirectly, is as permanent as possible to the extent defined by the operational environment of the product it is being used.

Basic requirements for labels including GS1 DataMatrix for the defense sector in Germany:

- scratch-proof and abrasion-proof lettering

- permanent affixation or adhesion on myriad materials especially metals and plastics

- UV resistance

- resistance to weathering

- good aging-resistance

- stability at extremely high temperatures

- special military requirements such as low reflection, no impairment or damage of camouflage

- not easily removable using standard tools

- general requirements: economic efficiency, favorable price

The technical basis of the GS1 DataMatrix is also very extensive and is described in comprehensive details in the international standard ISO/IEC 16022 "Information technology -international symbol specification - DataMatrix".

5   SUMMARY

The Automatic Identification Technology of the German Armed Forces creates new demands for many participants along the supply chain. It is crucial for a company's' successful implementation to choose the correct form of labeling for each application. Easily readable data carriers enables the standardized labeling, identification of products and shipments to be fully exploited.

With the GS1-128 barcode and the GS1 DataMatrix you have two practice-tested, efficient and approved data carriers at your disposal serving as means for the optimization of the entire supply chain. In the end, all companies involved gain profit from the increased security, transparency and leaner processes.

INFLUENCING SECURITY FACTORS OF MILITARY LOGISTICS CHAINS

Col. Dr. habil. Pavel Foltin,

Department of Logistics, Faculty of Military Leadership, University of Defence in Brno

Assoc. Prof. Miroslav Pecina

Department of Logistics, Faculty of Military Leadership, University of Defence in Brno

Col. (ret.) Eng. Roman Dufek

Multinational Logistics Coordination Centre in Prague

Abstract

The Article deals with the possible approaches to risk classification in the area of supply chain security. There are discussed; the different and joint approaches of supply chain security in private sector, with possible applications to military logistics chains.

1   MILITARY LOGISTICS AND POSSIBLE INTERACTION WITH CIVILIAN SECTOR

Stock and supply are one of the key elements of today's society. Logistics support system lies in ensuring adequate material flows by which key logistics functions are fulfilled. The most important logistics function is the supply function which is created by a comprehensive flow of material together with mutual information flow and continuously provided services. The goal of individual logistics flows is meeting the requirements of end customer; in the military this means end user, i.e. an individual or unit. It is similar in warfare where the logistics support of the units of armed forces is crucial for performing the tasks which the units have been assigned [1]. From the military viewpoint it means the integration of military operations when a separate deployment of national contingent is nowadays practically impossible.

Military units and their systems of logistics support currently focus on core activities directly connected with military orders issued for military units. For other services which are not directly related to performing military tasks, there is an effort to ensure them by external providers and supporting contractors. Since the end of the Cold War, this trend has considerably modified the structures and abilities of armed forces of the vast majority of NATO member states. The main purpose of this approach was to reduce the costs and to increase the agility and sustainability of the units in operations [2]. Growing dependence of military and security organizations on civilian entities, and thus growing vulnerability of logistics chains of armed units is perceived negatively. One of the reasons of limited functionality is the insufficient interdependence of information and financial systems of civilian suppliers and service providers with information systems of the logistics of armed forces [3]. Furthermore, the initial assumption of the introduction of outsourcing as a tool aimed to reduce costs and life cycle of logistics items has not been fulfilled in many respects. As a result of these measures, the vulnerability of logistics support system as a whole has further grown, particularly by maximum effort to include civilian components as integral part of military contingents into multinational operations [4].

2   MAIN AIM AND METHODS

The article aims to discuss the interpenetration of military requirements and possible approaches from private companies and contractors to support the military units of logistics effort in the area of responsibility (AOR). The main research question is: "*What are the possible approaches of civil (private) organizations, which could increase the sustainability of military supply chains?*". The principal research methods are a comparison method and especially grounded theory. The literature survey is also used, together with relevant standards analysis. The output of the analysis is to formulate proposals that may contribute to increased reliability and sustainability of military logistics chains.

3   MAIN SOURCES OF RISK IN SUPPLY CHAINS

Supplying function is the key part of processes in logistics chains, both in civilian and military ones. As a risk to these supply chains a random event can be considered that may possibly occur [5] and might disrupt the flow of materials on their journey from initial suppliers through to end consumers [6]. These negative consequences can affect all functional areas of logistics chains, see Pict. 1.
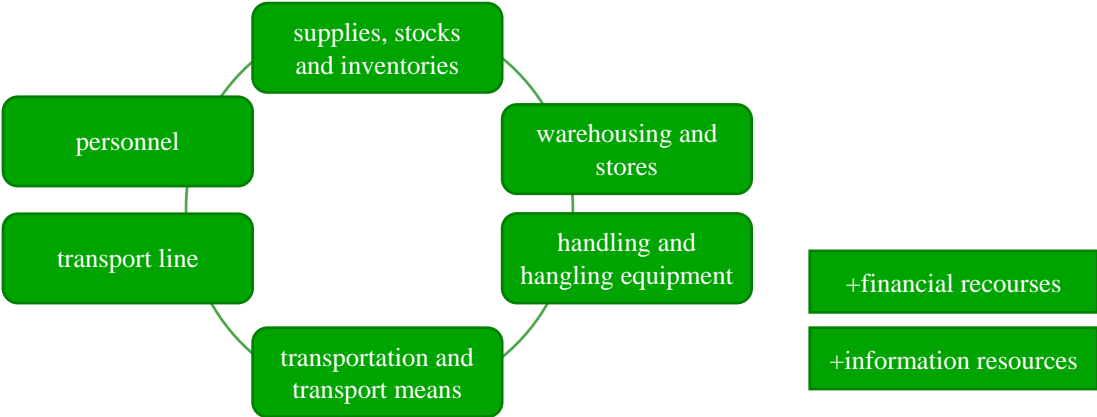
Pict. 1 - *Functional areas of logistics chains.*

At the same time, disruption in flows might easily and rapidly spread and be amplified up and down within the logistics chain. Because supply chain performance is inherently unpredictable and chaotic, supply chain practitioners must often seek safety mechanisms to protect themselves against unforeseen events [7]. The origin of threats is most likely to be in irregular, catastrophic, and hybrid threats of purpose emerging from hostile design or threats of context emerging in the absence of hostile purpose or design [8].

The crucial element is their impact on material flow; nevertheless, disruption of information and financial flows is also significant and frequent. In terms of the nature of potential negatively affecting factors, it is possible to identify three groups of the disruption of logistics chain [9]:

- factors internal to the military unit or the supporting third logistics party (contractors),

- factors external to the military unity or supporting organization but internal to the supply network,

- factors external to the network as a whole.

Risks can appear in so many different forms that they can disrupt either supply or demand side. Generally, there are two types of the disruption of logistics chains. The first type is the disruption caused by intentional human action. The second type is the disruption caused without human fault; this means primarily by natural disasters and adverse weather conditions. Risk effects can range from short-term and lasting only a few minutes to permanent damage. At the same time, effect might be localized in one part of supply chain or passed on to threaten the whole chain.

Based on its nature, uncertainty in the logistics chain may manifest itself in three broad forms [10]:

- deviations in chain: i.e. a change of one or more parameters, such as changes in costs, demand or delivery times, in comparison with originally expected or intended values, however, without a change in original structure of logistics chain, i.e. particular vertices and edges;

- disruption of chain: i.e. a significant change of logistics chain structure because of the non-availability of some vertices or their edges due to unexpected events caused by human or natural factors;

- disaster disruption of chain: i.e. temporarily irreversible closing of logistics chain due to unexpected disaster causing overall disruption of vertex and edge functionality.

In terms of potential impact of both types of disruption, it is possible to identify two basic categories. The first one is the disruption of elements of logistics chain in such a way that partial deviations from planned logistic actions occur. The second category is the disruption of logistic flow, either in the logistics vertex itself, or on the edge between vertices. If deviations occur, the renewal of initially realized logistics actions is relatively fast and cheap. For this reason, the vulnerability of civilian partners considered a significant factor in the planning and implementation of the logistic support of multinational operations.

4   POSSIBLE APPROACHES IN CIVIL SECTOR

Third logistics parties and contracting entities seeking ways to counter the risks described above. As a very important tool to deal with these risk are international standards which creates joint background for prevention of possible supply chain disruptions and cross border (international) cooperation. From the supply chain security point of view, the most important ones are the ISO 9 000 *Quality Management Systems*, ISO 14 000 *Environmental Management* and especially ISO 28 000 *Security Management Systems for the Supply Chain*. These international standards could be considered as initial significant factors of the security and sustainability approaches provided by supporting contractors.

To facilitate supply chain security of related issues within the EU, an Authorized Economic Operators (AEO) program was created. This program under the umbrella of customs requirements creates the security framework of multinational logistics chains within EU, but also into and outside the EU countries. According to this program civilian (private) supporting companies to military logistics have to follow the activities to secure its procedures and cooperation with their contractors and business partners. The contractors certified in accordance with AEO requirements are more reliable to the whole logistic chain.

As far as the intentional risk e.g. terrorism is concerned, there individual security programs are also available. Similar to AEO, the USA have organized a program purely on the voluntary basis of individual private companies, to foster the counter-terrorism cooperation. This is the Customs-Trade Partnership Against Terrorism (C-TPAT) Program, which helps to improve and secure supply chains security against intentional threats. In 2004 the International Ship and Port Facility Security Code (ISPS Code) was also implemented addressing the port and vessel segment of the maritime trade and transport security.

There is also a valid agreement between the European Community and the USA on customs cooperation and mutual assistance in customs matters (CMAA), signed in 1997. The agreement was extended in 2004 and its scope broadened to cover cooperation on securing the international trade supply chain, strengthening the security of maritime container transport while facilitating legitimate trade through reciprocal security standards and industry partnership programs [11].

5   CONCLUSIONS

Uncertainty cannot be removed, but we can work with it, reduce its probability - act proactively and minimize risks, or to enhance the ability of flexible response, if uncomfortable situation had occurred. What is important is the synergy of the two approaches, i.e. not to focus only on one aspect. Cooperation with civil sector is critically important for ensuring the ability of logistical support to fulfill military objectives. On the other hand, it is difficult to ensure the full range of information sharing with civilian contractors, especially in multinational operations with dynamically changing and evolving security environment. For this reason, it is essential to explore new approaches usual in civilian sector (private companies), and look into the possibilities of their use and suitable application in terms of military logistics.

Literature:

1. Christopher Martin. *Logistics and supply chain management: creating value-adding networks*. 4th ed. New York: Financial Times Prentice Hall, 2011, p. cm. ISBN 978-027-3731-122. p 3-4.

2. Yost David. *Adapting NATO´s Deterrence Posture: The Alliance´s New Strategic Concept and Implications for Nuclear Policy, Non-Proliferation, Arms Control, and Disarmament: A Report on a Workshop in Tallinn*, 4 6 May 2011. p 3.

3. Kaplan Stanley; GARRICK, B., John. *On the Quantitative Definition of Risk. Risk Analysis*. 1981, Vol. 1, 1. p 11.

4. Foltin Pavel. *Selected aspects of logistics chains security of armed forces*. Brno: University of Defense, 2012, 72 s. ISBN -. DOI 10.13140/2.1.2759.1364.

5. Csaba Zágon. *Border traffic risk assessment. Academic and Applied Research in Military Science*. 2012, Vol. 11, Issue. 2, p. 273-285. 1788-0017. Available from: http://www.zmne.hu/aarms/docs/Volume11/Issue2/pdf/11.pdf.

6. Waters C. *Supply chain risk management: vulnerability and resilience in logistics*. Philadelphia: Kogan Page, 2007, viii, 256 p. ISBN 978-0-7494-4854-7. p 7.

7. Christopher Tang, CHUNG-PIAW a Wei KWOK-KEE. *Supply chain analysis: a handbook on the interaction of information, system and optimization*. 1st ed. New York: Springer, 2007, p. cm. ISBN 978-0-387-75240-2. p 203.

8. Freier Nathan. *Known Unknowns: Unconventional "Strategic Shocks" in Defense Strategy Development*. Carlisle: Strategic Studies Institute, 2008. p. 52. ISBN 1-58487-368.

9. Zsidisin George A. *Supply chain risk: a handbook of assessment, management, and performance*. 1st ed. New York: Springer, 2008, p. cm. ISBN 03-877-9934-6. p 55.

10. Christopher Tang, CHUNG-PIAW a Wei KWOK-KEE. *Supply chain analysis: a handbook on the interaction of information, system and optimization*. 1st ed. New York: Springer, 2007, p. cm. ISBN 978-0-387-75240-2. p 206.

11. *Container Security: EU/US agreements*. Brussel: EU, 2004. [Decision 2004/634/EC]. Available from: http://eur-lex.europa.eu/legal-content/CS/TXT/?uri=URISERV:l06026.

POSSIBILITIES OF ADVANCED TECHNOLOGIES AND INFORMATION TOOLS APPLICATION IN THE CZECH ARMY

Maj. Dr. Martin Vlkovský

Vice-Dean for Research, Faculty of Military Leadership, University of Defence in Brno

Eng. Kateřina Pochobradská, Eng. Alice Chrobáková

Abstract

The paper presents progressive technologies and information tools applicable in army logistics. It deals with new possibilities of military vehicle storing in active packaging and possible implementation of compostable packaging. In a separate subsection the possible areas of simulation application are covered. The aim of the paper is to find new approaches in logistics that can bring financial savings, time savings and environmentally friendly solution.

Introduction

Logistics in the civil sector has undergone a number of changes in the last decade. The common denominator is usually modern technology and information technology (IT) tools that allow achieving higher efficiency of logistics processes with respect to environmental requirements. A standard packaging technology is currently used in the Army of Czech Republic (ACR) as well as last two decades are concerned. Information support is represented especially by Information System of Logistics. The use of modern active, respectively compostable packaging and simulation software in logistics is still the music of the future.

1   ACTIVE PACKAGING FOR CORROSION PROTECTION

The deficiency of financial means for the military vehicle operation and maintenance leads, in certain cases, to long-term inoperability of military vehicles adversely affecting their reliability. Military vehicles often have to operate in diametrically different climatic conditions with high relative humidity, temperature and dustiness. This lays increased demands on their reliability, which can be defined as a general system property resting in the equipment ability to perform required functions while maintaining determined operating indicator values within the limits and time as per technical conditions [5].

The financial value of military transport vehicles, including those stored or inoperable on a long-term basis, is substantial. For this reason, it is required to identify environment-friendly storage methods maintaining the existing reliability with minimum costs [2].

In global scale, corrosion poses a technical and technological problem with considerable economic impacts. It is estimated that corrosion attacks and destroys 10 to 12 % of annual production of metal materials. The total of direct (relating to the restoration of corrosion-attacked parts) and indirect (relating to equipment unavailability for e.g. production process) losses is estimated to as much as 3 % of annual gross domestic product of developed industrial countries [1, 7].

Corrosion can be classified as atmospheric and electrochemical. Due to its goal and scope, this paper is only concerned with the atmospheric corrosion. In statistical terms, the atmospheric corrosion is the cause of up to 80 % of all losses incurred as a result of corrosion. Corrosion is the boundary between a normal and failure state. As a rule, corrosion occurs at weakened and most loaded spots in material. It has a cumulative effect that grows exponentially in time. For this reason, the failure occurrence probability cannot be determined, and the frequency of possible failures cannot be affected. This also leads to unexpected expenditures in the military vehicle maintenance system in the ACR. Military vehicle repairs cannot be effectively scheduled and financial means cannot be optimally utilized in the system of state property management [6].

1.1 Military Vehicle Storing

The Armed Forces of the Czech Republic make use of short-term and long-term storage. Short-term storage preserves military vehicles against ageing and corrosion effects in the period of up to one year, and should be applied to vehicles out of operation for longer than 30 days. This type of storage involves basic maintenance and reduced scope of preservative work [6].

Long-term storage is a set of technical-organizational measures resulting in a long-term military vehicle preservation for the period of 1-5 years. In the ACR, dynamic and static storage methods are both applied. As far as the dynamic method is concerned, special drying equipment is employed for dehumidification and to maintain optimum microclimate. This method involves consumption of electrical energy leading to additional operating costs. In addition, military vehicles also have to be kept in a roofed space (storehouse), which may generate further additional costs. As for static storage, "removing" water molecules by means of preservative oils, greases, or special coatings and sprays are normally applied in the ACR. To a limited extent, older types of driers, e.g. on silica gel basis, absorbing excessive humidity, are also utilized. The above-listed preservative (depreservative) agents are mostly environmentally-unfriendly, and their disposal gives rise to further additional costs [2, 9].

1.2 Utilization of Vapor Phase Corrosion Inhibitors

Currently, specific progressive approaches to corrosion protection involve the use of Vapor Phase Corrosion Inhibitors (VpCI) in various forms (e.g. powder, active packaging, etc.). Using VpCI can be classified as a modified static method of storing military equipment, which has not yet been implemented to the ACR. Vapor Phase Corrosion Inhibitors create in closed environment a protective gas atmosphere which "condensate" at all metal surfaces, including cavities, grooves, holes, corners, etc. The use of Vapor Phase Corrosion Inhibitors protect against corrosion even without direct contact, are easy to apply and saving cost. There are primarily no additional costs associated to the "repeated preservation", preservation removal and ecological disposal [4, 12].

Strengths and weaknesses of active packaging with VpCI and potential benefit to ACR are in Tab. 1.

STRENGTHS	WEAKNESSES
Environmentally responsible	The higher price of active packaging
The absence of heavy metals, chromates, nitrides and chlorinated hydrocarbons	Utilization of personal protective equipment
Cost savings for the whole preservation process	
Saving time in the whole preservation process	
Universality and simplicity	
Possible utilization in almost any environment	

Tab. 1 - *Strengths and Weaknesses of VpCI Technology*

2   ENVIRONMENTALLY FRIENDLY COMPOSTABLE PACKAGING

Although compostable plastic packaging is very dynamically developing segment of the market, it is getting to the army conditions very slowly. A gradual application of some BioViron product series GreenCell in North Atlantic Treaty Organization (NATO) environment is visible. Selected BioViron products (there are OK Compost) have been gradually implemented in the US Armed Forces and British Armed Forces. Currently the compostable plastic packaging is unfortunately not an issue for the ACR, even though waste management in multinational operations is an expensive and time consuming problem. As it was mentioned above it is a logistical and security problem as well. The future can be the compostable plastics utilization, as evidenced by the gradual introduction of compostable plastic products in NATO, as well as research projects e.g. research project of United States Department of Defense (US DOD) [3].

The project WP-1479 US DOD indicates orientation to weight reduction of packaging of high consumption supplies, including army food rations – Meal Ready-to-Eat (MRE) in relation to sustainability of troops in multinational operations. The goal was to reduce packaging weight and to verify the possibility of composting MRE packaging. The result was the identification of suitable materials and weight reduction of examined packaging by 18 % [8].

More recent research WP-201 218, which is not yet completed, was focused especially on MRE and based on the statistic figures of 2011, when the US Armed Forces produced with 1,429,995 active personnel around 4,000 tons of waste only from MRE packaging. The prerequisite is, along with technological advances in compostable plastics; to use such packaging more widely – mainly for packaging high consumption supplies, where the volume of waste is one of the largest [10].

Generally speaking, the use of compostable plastic products in multinational operations will enable to avoid environmentally unfriendly waste incineration as it was in the past, respectively in the areas of transport costs and ecological disposal. An increasing problem is the water supply as well, especially of drinkable water, because of storing limitations storing (e.g. in the Czech Army conditions only 48 hours in cisterns or water tanks). Units operating in JOA face in relation to food supply the difficult question today is, whether to use the classic dishes or disposable dishes. The classic dish solution is an

environmentally friendly solution, however, it is necessary to use large amount of drinkable water for washing. However, on the one hand the utilization of disposable dishes from petroleum plastics does not require drinkable water for washing, on the other hand, it generates additional costs (purchase, storage, transportation, etc.) and therefore it does not represent environmental friendly solution. The compostable plastic products (not only packaging) thus offers a compromise option, when the ecological disposal of these products is resolved relatively simply and moreover, with zero water consumption [3].

Table 2 illustrates a simple comparison of common (petroleum) plastics, oxo-degradable plastics and compostable plastics.

Description	Common plastics	Oxo-degradable	Compostable
Raw materials	Fossil raw materials (oil, natural gas…)	Fossil raw materials (oil, natural gas…) + oxo additives	Plant origin (corn, potatoes…)
Product	Polymers HDPE, LDPE…	Oxo materials based on HDPE, LDPE…	OK Compost materials
Waste	Almost no degradation	Decomposition into tiny pieces of HDPE, LDPE…	Decomposition into biomass, water, minerals, CO_2
Disintegration Time	More than 500 years	2-3 years	3-8 weeks
Environmental Impact	Long-term negative environmental impact	Soil contamination by tiny pieces of HDPE, LDPE…, "visual" ecology	Biomass residues enrich the soil, environmental friendly solution

Tab. 2 - *Comparison of Selected Plastics*

Tab. 2, which is a modification of plastics comparison of TART Company, shows that in researched areas the compostable plastics (packaging) are very advantageous. A certain disadvantage is the price, which thanks to the so far limited use of compostable plastics, is still approximately 3-4 times higher (see the price list of TART Company). The initial economic costs don´t reflect the entire life-cycle costs (LCC), which would have been probably higher at least of petroleum plastics [3].

3   SIMULATION SOTWARE TO SUPPORT PLANNING PROCESS OF THE ARMY

Currently, information support is essential part of a functioning information flow in logistics. In the civil sector, in many cases a progressive approach allows to managing the information flow and it represents a major competitive advantage and ensures not only survival, but also sustainable company growth. In military, although the competitive advantage is not important, but the sustainability of logistic support is crucial. The aim of this part of paper is to highlight the possible development of existing systems, which has been long entrenched in military. In the Czech Army it is mainly the Information System of

Logistics, which provides information support to logistics in peacetime, as well as in multinational operations.

3.1 Applications Areas of Simulation

The trend, used e.g. in transport and supply chain, is to apply simulation software that allows to create simulation models based on queuing theory (SIMUL8, SIMIO, WITNESS etc.).

In peacetime, such a software enables to achieve higher efficiency e.g. within the handling and transport of supplies and especially during a planning process of such activities. Another equally important factor is their usage in training when required activities can be practiced using a simulation model created with a minimum expenditure. Excellent complements are the outputs from the simulation that offers hard statistical data and can be used as lessons learned.

In operating conditions – in Joint Operation Area (JOA), the importance of simulation is even more higher- not only the simulations of combat actions - and again mainly during the planning process. E.g. deployment, when the simulation is the only way to practice the whole complexity of activities, including the Reception, Staging and Onward Movement (RSOM) processes. Application areas could be other hubs as well, i.e. not only ports/points of debarkation/disembarkation (PODs), but also logistic bases (in rear support area or even in forward support area). The possibility of simulation software application is offered for the universal mobile packaging line, which the Czech Army is having for the configured loads creation for the forces deployment.

Simulation software WITNESS enables to reach higher efficiency of the existing activities, but also to design new more efficient systems. Simulation time is adjustable and it is possible to quickly evaluate different options of the proposed solutions of the problem. The most important step in optimal path finding is to obtain a valid simulation model of the problem or process on which it is possible to simulate any proposed alternative in a relatively short time at minimal cost.

Assumptions for using such software are:

- their knowledge – i.e. training of selected personnel,

- identification of areas of application,

- creation of simulation models for a given area,

- ensuring the principle of modularity – usability for different units.

There is also a recommendation to create a database of simulation outputs and to evaluate the involvement of specific units and activities in the simulation.

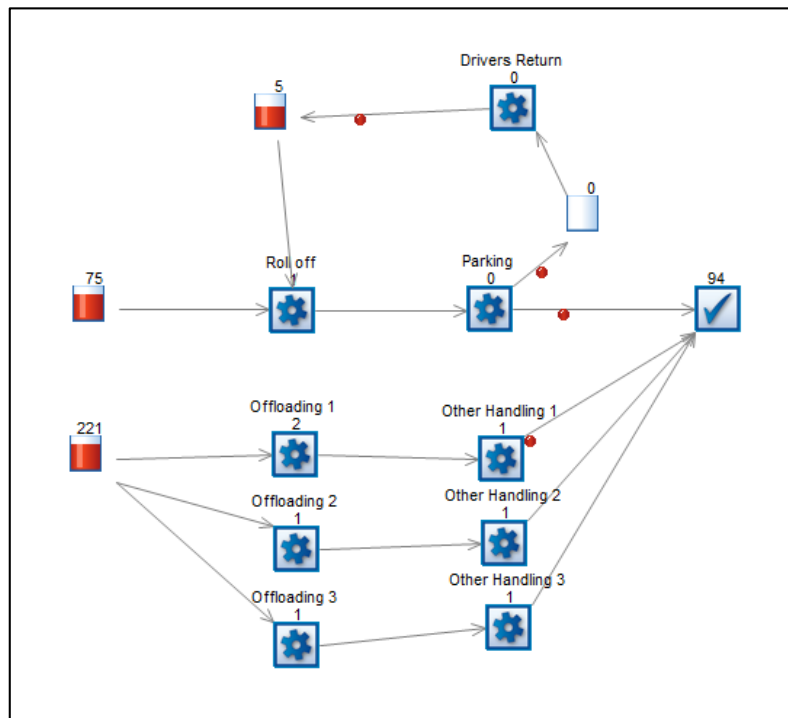## 3.2 Visualization of Simple Simulation Model

An example of a simple simulation model creation may be the aforementioned RSOM process. The coordination of the individual handling and transport activities in hubs (PODs) can be an expensive and possible it can be downtime costly (e.g. because of aircraft or ship waiting).

The SIMUL8 visualization on Pict. 1 shows a model situation of vessel offloading – specifically Ro-Ro/Container ship, commonly used by military. The visualization is captured in the progress, with the goal to coordinate unloading container units with military vehicle offloading. The model enables to determine the required number of cranes for unloading and a way how to ensure drivers (in cycles) for roll-off military vehicles.

The aim of the simulation is to find out (preferably within the planning process) how to do the whole complexity of handling activities providing ship downtime in port as short as possible. The model can also offer extensions toward the modular principle, when it is possible to reveal the parameters for different types (sizes) of units with different military vehicles and supplies.

The red tanks on Pict. 1 indicate (from above) – number of drivers for roll-off vehicles, number of vehicles and finally number of container units. The blue activities are as follows:

- roll off – roll off activity of vehicles,

- parking – parking of vehicles to the dedicated area,

- drivers return – activity providing drivers cycle,

- offloading – offloading activities by three cranes (1, 2, 3),

- other handling – transport of container units to the dedicated area.

Pict. 1 - *Simple Simulation Model in SIMUL8*

After entering the basic parameters for calculation using queuing theory the program allows, to acquire the basic characteristics of the system, a visual output of the simulation, graphical and numerical outputs, and the repeating the simulation (defined number of repetitions) etc.

Literature:

1. Rostron, P., Belbarak, Ch. *Atmospheric Corrosion Issues in AbuDhabi. Materials Performance*, Volume 54, Issue 1, 1 January 2015, p. 56-62.

2. Vlkovský, M. et al. *The Optimization of Long-term Storage of Selected Military Transport Vehicle Type in the Czech Army Forces Conditions*. Economics and Management, no. 2/2013, p. 134-141. ISSN 1802-3975.

3. Vlkovský, M., Pochobradská, K., Taksás, B. *Compostable Plastic Packaging in the Army*. Economics and Management, no. 2/2015. ISSN 1802-3975.

4. Vlkovský, M. et. al. *The Military Vehicle Storing in Active Packaging*. In: Manažment – Teória, výučba a prax 2015. Liptovský Mikuláš, Slovakia: Armed Forces Academy of General Milan Rastislav Štefánik, 2015, p. 335-340. ISBN 978-80-8040-516-8.

5. Braun, P., Vala, M. *Military Wheeled Vehicles I: Construction Basics*. [Textbook]. Brno: Military Academy, 1996. 379 p.

6. Čorňák, Š. et al. *Operation and Maintenance of Combat and Special Vehicles II*. [Textbook]. Brno: University of Defense. 2007, 147 p. ISBN 978-80-7231-487-4.

7. Dvořák, I. *Degradation Processes and Limit States*. [Textbook]. 2nd Ed. Brno: Military Academy, 2003. 217 p.

8. NATICK/TR-12/023 Technical report. *Lightweight and Compostable Fiberboard for the Military*. [online]. Natick, 2012. [vid. 2012-09-20]. Available from: https://www.serdp-estcp.org/content/download/14661/169819/file/WP-1479-FR.pdf .

9. TART. *Compostable Packaging Envira*. [online]. Brno, 2015. [vid. 2012-09-28]. Available from: http://www.tart.cz/kompostovatelne-obaly-envira/>.

10. WP-201218. *Lightweight and Compostable Packaging for the Military*. [online]. Natick, SERDP. [vid. 2012-09-20]. Available from: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Waste-Reduction-and-Treatment-in-DoD-Operations/WP-201218/WP-201218/(language)/eng-US.

11. TART. *Catalogue 2013*. Division of Anticorrosion Materials Cortec [online]. © 2015 [vid. 2015-09-10]. Available from: http://www.tart.cz/files/download-katalogy/2013/katalog-cortec-cz-2013-2-email.pdf.

12. MILCORR. *Asset Preservation System for the Military*. Documents/Guides – Restricted Area [online]. © 2015 [vid. 2015-07-09]. Available from: http://www.milcorr.com/?id=docs.

INTERPENETRATION OF NATO STANDARDIZATION ACTIVITY ORGANIZATION AND REALIZATION OF PRACTICAL EXERCISES CAPABLE LOGISTICIAN FOR NATIONAL LOGISTICS

Lt. Col. Assoc. Prof. Jaromír Mareš

University of Defence in Brno

Abstract

The article aims to discuss the interpenetration of NSO and CL and their significance for logistics. It also highlights benefits for logistics of the national armies. There are characterized standardization tasks, the management and the creation of new standards for individual states of NATO and PfP their applications and functionality. The functionality has been validated within the CL 13 and CL 15 within various multinational units (MILU). The main methods are the comparative method and application during exercises. The materials used are Standards and applications at the field units in. The result is a functional verification of standards and their applicability at the national units, demonstrating interoperability within applications.

1   CURENT SITUATION IN LOGISTICS AND THE MAIN DIRECTION

It is a well-known fact, that logistics is a discipline supporting overall activities in both civic and military areas. To put this simple, it is a framework of managing entire activities despite the definition of logistics especially in military area being addressed as a special problematic. However, numerous experts [1] agree that the main mission of logistics is the service and support. The service for supporting of a business entity, in this case - supporting an army. The definition of US military logistics states, that the foundation of logistics are several pillars – among others: design and development; acquisition, storage, movement, distribution, maintenance, and disposition of materiel; acquisition or construction, maintenance, operation, and disposition of facilities; and acquisition or furnishing of services [3]. Nowadays most of the NATO and a Pfp armies try to sort the situation in a sense of increasing budgets for their operations. Especially within the armies of Eastern Bloc all spending on modernization was frozen during the crisis period. In the last ten years most of the armies have been reduced. Large cuts were made through the reduction of personnel within the defense departments but the main area affected was the acquisition of modern technology and its maintenance and especially the running cost. This situation has caused difficulties particularly in the cooperation within the international mission areas primarily in the field of interoperability.

To alleviate this situation there is a task for various NATO panels, one of which was NSA panel (NATO Standardization agency), renamed in 2014 to NSO (NATO Standardization Organization). The substantial support for the preparation of logistics in international missions is provided by various logistic exercises on both national and international levels. The important contribution to international

logistics was a formation of international Logistics center in Prague in 2008. It is the Called Multinational Logistics Cooperation Centre and based on the needs of multinational cooperation and its founding states were Czech Republic, Hungary, Poland etc. The founding agreement was signed at the University of Defense in Brno and the Department of Logistics has largely contributed in the preparation and organization of this event significant for both Czech and international logistics [2]. Currently MLCC consists of 13 members of whom permanent members come from the armies of the Czech Republic, Slovakia, Hungary, Poland, Greece, and Austria. There are 6 countries waiting for active membership. MLCC is fully recognized by all NATO armies. This ambitious activity is strongly supported by main players within NATO that maybe proofed via an offer made to the previous MLCC director to be a chief of logistic assigned in Kiev to coordinate NATO support in war-tormented Ukraine [3].

2   MAIN AIM AND METHODS

The article aims to discuss the interpenetration of NSO and CL and their significance for logistics. It also highlights benefits for logistics of the national armies. The main methods used are a comparison method and an application of the standards during the exercises. The materials used are the standards and their application within the units in the field. The result is a verification of the functionality of the standards and their applicability within the national units, the proof of interoperability whilst in the use.

3   USUAL TASKS IN NATO STANDARDIZATION PANEL

Amongst the common activities of panel NSA (NATO Standardization Agency), now NSO (NATO Standardization Organization) were and continue to be innovation, adjustment and creation of the new standards. Standards are modified within the main work group and individual work groups. In total, there are work groups for transportation, services, maintenance and others. Each group focuses on specific Standards, which are initially discussed and then the national systems of each partnering armies are presented. A stand is taken on particular differences and the phase of modification starts. This version covers the opinions of all partners, who have a mandate from their army. It is followed by the period between meetings, when the modified material discussed at the national level. Then there will be reciprocate discussion and incorporate the comments of the various points of dispute. On agreement of all parties involved the relevant document is given to the Secretary of main working group to Major Craig BUTERA, who is USA representative, and than an approval process in Brussels follows [5]. When authorized, the full version of the Standard is submitted for ratification on each national level.

The author of this paper has been a member of the panel "Maintenance" since 2010 and has been delegated to this position by Director of Support Division after recommendation of Chief of military equipment and material of operation service, from Logistics Agency.

During this period several standards have been in the process of approval, some of which are still valid due to their functionality being significant and crucial in the capacity of interoperability in the field. Particularly AEP 13, which, after initial problems has started to be fully realized thanks to Canadian army and their proactive attitude and software provided. The database is updated by significant logistic details on the technology of each of the NATO member armies, including some members of Pfp. This standard was especially scrutinized within the scope of the exercise CL13 in Slovakia at the military exercise area Lešť.

Currently the following standards were in the process of revision: The standards related to basic terms under the doctrines AAP-6 and ALP 4.2 are being modified - repair, equipment casualty, equipment evacuation, recovery task force, maintenance point and maintenance collection point.

In the last few panel meetings the finishing phase started the work on the standards including STANDARD 2375 (AEP–13) – Battlefield Vehicle Recovery & Evacuation Guide, STANDARD 2399 – Battlefield Recovery/Evacuation Operations, STANDARD 2400 (AEP–17) – Battlefield Vehicle Recovery – User Handbook, STANDARD 2418 – Procedures for Expedient Repair, including Battle Damage Repairs and Status of Change Proposal for MtP series and APP-14 [7], [8]., [9], [10].

Further onward, the activities were started in connection with the modification of the standards for maintenance already under discussion in the meetings in Romania. Here, a presentation took place of the maintenance systems of USA, UK and Holland. In the last meeting in Amersfoort a French representative presented a briefing on their own maintenance system (Lessons learned from the Operation Survey in Mali). A delegate from Denmark provided an exchange of information possibility regarding the experience with recovery and rescue equipment of the other nations. German army, represented by the chairman of the panel provided an exchange of information regarding the experience with "3D-print" of the other nations. During the current autumn meeting participants will present maintenance systems of other countries that are members of the Alliance, including ACR.

# 4   SPECIAL MISSION OF PRACTICAL LOGISTICS EXCERSIZES

Mission of MLCC is based on coordination of multinational logistics cooperation. The structure was created for the national benefit. It is based on a voluntary basis of national contributions.

The MLCC was established by nations in order to solve problems mainly on the areas of recognized critical logistics shortfalls, in order to improve nation's visibility of capabilities and plans to assist nations to better understand NATO requirements: Increase confidence between nations and NATO in each other's support capabilities, to facilitate cooperation in national and multinational logistics training and practical exercises, to enhance logistics standardization and interoperability. The MLCC objectives are the development of Multinational Logistics Capabilities by means of leading projects like Smart Defense, development of V4 JLSG HQ as a support to partner nations. MLCC coordinates logistics education, training and exercises. Aspirant will be a Department Head for NATO Logistics Education and Training, organization of international logistics exercise Capable Logistician and education institutes intended to prepare LOG courses (JLSG HQ, RSOM and courses for partners). The mission of MLCC is to range international activities of related organizations of the recent years CL13 a CL15, having several individual aims. Main idea of CL 13 was the verification of standards' functionality. There were working areas divided to small working units, MILUs. There were tasks to monitor performance of standards. Questionnaires were created in different languages. Summary of operating units carry out evaluation and assemblies can be seen in Tab.1. and from the generated Graph 1. These questionnaires were used for the assessment of interoperability in activities during exercise CL15 [6], [11], [12]. The results are not yet known.

#	Question		Y/N			
1.	Was the recovery operation successful?	1	Y	1	1	1
		1	N			
2.	Did you receive the recovery task by radio?	2	Y			
		2	N	1	1	1
3.	Was the task information clear?	3	Y	1	1	1
		3	N			
4.	Did you have to disconnect brakes to do the recovery?	4	Y			
		4	N	1	1	1
5.	Did you have to disconnect driveline to do the recovery?	5	Y			
		5	N	1	1	1
6.	What means were used during the recovery operation?	6	Y			
	Rope? Chains? Pulleys?	6	N			
7.	Was there any evacuation of damaged equipment?	7	Y	1		
		7	N		1	1
8.	How many vehicles were used during the recovery?	8	Y			
		8	N			
9.	Did the info in AEP 13 help you?	9	Y			
		9	N			
10.	Was the info in AEP 13 correct?	10	Y			
		10	N			
11.	Was it enough info in AEP 13 for this task?	11	Y			
		11	N			
12.	Did you find any missing recovery info from the catalog M&R?	12	Y			
	If yes, which number?	12	N			
13.	Was it enough tools in the recovery vehicle for this job?	13	Y		1	1
		13	N	1		
14.	Was it enough tools in the casualty for this job?	14	Y		1	1
		14	N	1		
15.	Were all safety precautions taken?	15	Y	1	1	1
		15	N			
16.	Did you use hand signals?	16	Y	1	1	1
		16	N			
17.	How long did the recovery operation take?	17	Y			
		17	N			
18.	How far from maintenance point was the brakedown	18	Y			

Pict. 1 - *Task from created questionnaire*

From MLCC point of view the main aims of CL 15 were the following ones: To exercise multinational logistics aspects of V4 EUBG16/1, to test interoperability and Standardization in Logistics, to exercise Smart defense projects and provide training opportunity for TRJE15 participants. The effort was carry out in order to enhance cooperation with EU and demonstrate SMART ENERGY project
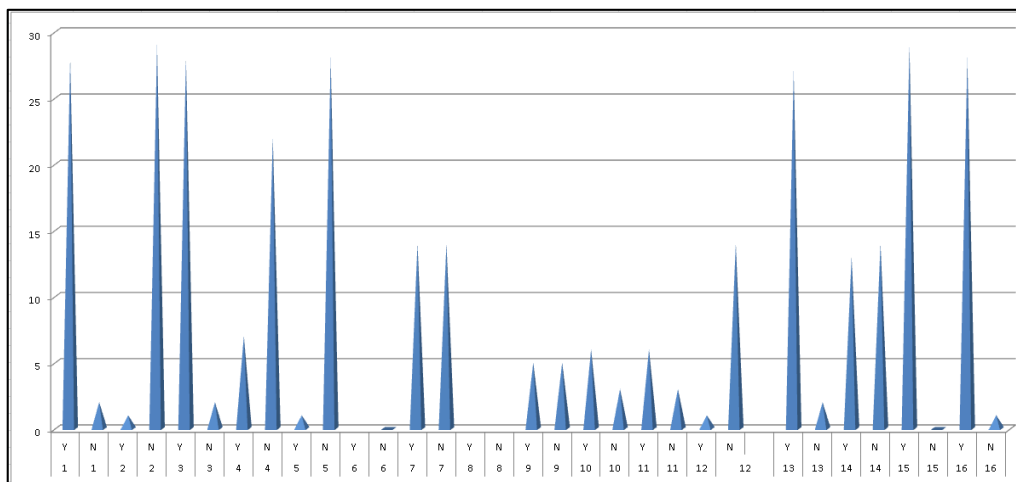
Graf. 1 - *Graphical evaluation of the survey at MILU M&R CL 13*

5 CONCLUSIONS

It is certainly clear that there is a deep permeability presented issues in the standardization activities of the panel in favor of the creation and innovation standards and in favor of ACR and NATO armies. It is the process of debugging at the national level and subsequent verification in practice. Standards are tested in exercises, initially at national level. The best, however, to verify the standard of international operations, which becomes a significant need for interoperability between the different operating units. Fulfillment of tasks is implemented by high intensity.

Such verification capabilities currently contribute to the development of the capacity to cooperate at an international level, based on the irreplaceable forces of cooperating armies Visegrad Four (V4). For the individual steps leading to a successful cooperation and efficiency and achieve positive results it is necessary to build an international team to support the introduction of project solutions and their application in practical use.

One of the important conclusions from the panel meetings is a recommendation to test the results of the standards – for example STANAG 2399 ATP-83, 2418 AEP-13 final databases, enlivening the various national and international exercises in 2016. Other conclusion is to focus on requirements of an eventual correction of the software database.

Examples include the preparation of the team exercises of Capable Logistician 2013, when the team cooperating within the NSO panel worked on the preparation exercises CL 13. The test results were the compiled questionnaires to acquire the data being used by statistical methods. Thus the benefits of interoperability to exercise CL 13 were evaluated and used for the evaluation of the CL 15.

In the future, there are further possibilities for cooperation within the V4 to establish a new logistics projects for securing and improving logistics capabilities of cooperating armies.

Literature:

1. Komar, A. *Discussions concerning the definition and importance of logistics [Personal communication]*. Brno, October, 15, 2007.

2. Dufek, R. *Multinational Logistics Coordination Centre*, Brno, 2015, 13 sl.

3. Cahill, S. *US Logistics Strategy Brief. Conference CATE* 2015, Brno, 13 sl.

4. Jedlink, P. *Note by the CL13 Project Director*. Prague, 2011, 16 p.

5. Butera, C. *Military committee land Standardization Board, - Order for 19th MC Combat Service Support Working Group (CSS WG) meeting with panels*, Brussels 2015, 35 p.

6. Mareš, J. Křížek, P. Koudelová, L. *The latest findings in interoperability of units focused on recovering and evacuation of damaged equipment. In: The 20th international conference. Man within the Knowledge Based Organization.* Sibiu, Rumania: Publishing House of Land Force Academy in Sibiu, 2014, p. 43-49. ISSN 1843-6722.

7. *STANAG 2375 Battlefield vehicle recovery and evacuation guide - AEP-13*, Brussels, 1996.

8. *STANAG 2399 Battlefield recovery/Evacuation operations*, Brussels, 1992

9. *STANAG 2400 BM (Edition 2) – Battlefield vehicle recovery - User handbook AEP 17 (A).* Brussels, 1996.

10. *STANAG 2418 (Edition 2) – Procedures for expedient repair, including battle damage repair.* Brussels, 2009.

11. Mareš, J. *Layouts of exercise evaluator. Exercise CL13*, Lešť, 2013.

12. Iversen, K. Morales, A. and Mares, J. *Evaluation international logistics exercise CL 13*, Lest, 2013.

NATO CODIFICATION SYSTEM TOOLS

Dr. Petr Němec

Department of Logistics, Faculty of Military Leadership,
University of Defence in Brno

Eng. Zdeněk Buřival

AURA s.r.o.

Abstract

The article deals with software tools for NATO Codification System. Although here it tis introduced briefly, but in relevant details, it is one of the most worldwide spread software applications - MC CATALOGUE. This tool is used in 15 countries and the compliance of MC CATALOGUE with ACodP-1 was proven several times in the Tier 2 compliance tests. Part of the article is dedicated to Document Management System for defense standardization - IS STAN.

Introduction

The NATO Codification System (NCS for short) is used to identify, classify and number items of supply. The system is applicable to items, (e.g., spare parts, equipment, food items, etc.), which are repetitively stocked and used. The consecutive result of the application is a unique and unambiguous identification and a data set that can be easily shared by all of users – National Codification Bureaus (NCB) by electronic data exchange using the NATO Mailbox System (NMBS). The other available form for the defense industry for sharing is the NATO Master Catalogue of References for Logistics (NMCRL), which is distributed by NATO Support Agency (NSPA) using DVD or a web application [1].

The process of codification has the following steps: naming, classifying, and describing the item and assignment of a 13-digit NATO Stock Number (or NSN). The system supports logistics processes, to be included in supply, purchasing, maintenance, warehousing, transportation, planning, etc. activities. It allows different organizations and countries, to cooperate in the provision of logistics support to military, disaster relief, peace keeping and similar operations. At present, more than 60 countries participate in the NCS [2].

The NCS is a complicated system and its usage is not possible without sophisticated software tools. The MC CATALOGUE introduced briefly in this article is one of the most worldwide spread software applications for NATO codification.

1   MC CATALOGUE

MC CATALOGUE is in operational use at the Ministry of Defense and the Armed Forces of the Czech Republic as a module of the Information System for Logistics (ISL). This smart user-friendly tool is used for materiel codification according to the standards of the NATO Codification System supporting activities of National Codification Bureaus (NCB). MC CATALOGUE Service is designed for codification agencies, defense industry and for NCB codifiers without on-line access to MC CATALOGUE.

The provider of the system – AURA, s.r.o. is a Czech company - focused on the development and delivery of individual information systems 'tailored' to the user needs since its establishment in 1989, supporting the business sector customers, service sector customers, state organs and institutions throughout the whole lifecycle of their information systems and information technology. AURA has developed application software for logistics information system of the Ministry of Defense and the Armed Forces of the Czech Republic.

1.1   Key features

MC CATALOGUE (Materiel Codification CATALOGUE) is a Military Off-The-Shelf codification tool supporting the NCB staff in daily work.

The key features are:

- Technology based on Java EE

- Platform independent web application

- Windows oriented graphical environment

- Integrates all activities related to codification

NCBs in 15 countries have decided to use MC CATALOGUE. The compliance of MC CATALOGUE with ACodP-1 was proven several times in the Tier 2 compliance tests. Currently four countries – Finland, Norway, Russia and Morocco – have passed the Tier 2 tests with the support of AURA.

MC CATALOGUE can be provided also in form of Software as a Service (SaaS). This means that the server which is running MC CATALOGUE is administered by AURA and the customer accesses the application through the Internet. This way, MC CATALOGUE is used by Estonia, Latvia, Lithuania, Croatia and Hungary. AURA recently won a tender for a delivery of the codification software for the Brazilian Armed Forces and Australia.

MC CATALOGUE is a multilingual application – it can be translated into any language including languages with non-Roman characters. The translation can be done on the user interface and also on the data level. MC CATALOGUE can be tailored to specific customer needs taking into account national requirements. The application is fully compatible with ACodP-1 and other NCS standards.

MC CATALOGUE supports international data exchange in NADEX and XML format through the NMBS (NATO Mailbox System).

1.2 Advanced features

MC CATALOGUE can be interfaced with other systems such as logistic, ERP (SAP) or financial systems. The interface is always tailored according to the customer's requirements and is based on strong security technologies such as digital signatures of transferred data and others. Data exchange with other systems was proven by a long term operation of the SAP interface in Finland and Norway and recently a new interface is implemented in Slovakia. Morocco is using the interface to the S.I.S.MAT logistic system. In the Czech Republic, MC CATALOGUE is integrated as a module in the Information System for Logistics developed by AURA.

The application enables easy distribution and control of work by using the Codification Workflow module. The module is configured to fit the customer's organizational structure and style of work.

MC CATALOGUE contains powerful search functions. It is possible to search according to any field on the form, save custom user queries for repeated use and more.

Except the codification of items, MC CATALOGUE supports also the codification of services by using the eOTD module package, which is not only a simple module as in other commercial products but the package consisting of six other modules providing the complex solution to the customer [3]. MC CATALOGUE can be operated on mobile devices such as smart phones and tablets.

1.3 Special features

There are some special features of MC CATALOGUE:

- it is possible to copy an existing item including characteristics and use it as the template for new item codification.

- enables to import multimedia files such as pictures, documents or video sequences as attachments to item.

- it is possible to generate a bar code for an item.

- a special function called Stack enables to store a package of items for later processing. The items are available immediately without necessity to search them again in the database.

- contains a seamlessly integrated reporting module. Except several types of charts, system enables also the automated generation of the ESR1 and ESR2 reports requested by NSPA.

Import of data from external sources is supported by the application. This function is useful e.g. for regular update of data provided by DLIS, import of codification contracts and others. It is also possible to migrate the data from legacy systems by importing them in KFF and KHN format. If the data for migration cannot be provided in such format, AURA team will do the data analysis and transfer of the data from a legacy system the other way.

MC CATALOGUE can be opened in multiple windows. This allows the user e.g. to work in the codification module in one window and browse the table (such as H2, H6 or other) in the second window. The help system contains the latest version of ACodP-1, complete list of IIGs, User guide and video tutorials for basic tasks performed in the application. System brings integrated instant messaging system for communication between the NCB staff. Instant messaging system is also used for notification and communication with manufacturers when using the MC CATALOGUE Industry configuration.

1.4   Security features and interoperability of MC CATALOGUE

MC CATALOGUE has been proven by long term operation in a highly secured military environment in several countries. The provider – AURA Company has number of quality and security certificates, such as ISO 9001, AQAP 2110 or ISO 8000. AURA has security clearance up to the confidential level and the ISO/IEC 27001 security certification. MC CATALOGUE has implemented security features such as the public key infrastructure (PKI), single sign on/single sign off, SSL encryption of communication, web services or digital signatures.

MC CATALOGUE Industry is a specific configuration for support of codification processes in the defense industry. It has the following key principles:

- The work is distributed between manufacturers by the NCB staff. NCB also approves the data processed by the manufacturer before its transfer into the MC CATALOGUE database;

- Manufacturers provide the technical data only – knowledge of NCS is not required, because MC CATALOGUE Industry contains simplified forms. The manufacturer doesn't need to have any deep knowledge of codification; an operator inserts the technical data only. The NCS related information is added later by the NCB staff;

- MC CATALOGUE Industry is ready for implementation of support for input of data directly from manufacturers' information systems to fully support the Supplier Sourced Codification (SSC);

- The application contains several types of check in order to eliminate duplicates in data and errors in data Exchange;

- MC CATALOGUE instant messaging system is used for notification and communication between the NCB staff and the manufacturer.

MC CATALOGUE Industry can be used by the manufacturer for management of information about its own items (so called master data).

1.5   The basic principle of MC CATALOGUE Industry

The NCB performs the analysis of input data in MC CATALOGUE. In case when additional information is requested from the manufacturer, the NCB transfers the request to MC CATALOGUE Industry and assigns it to the particular manufacturer. The manufacturer provides the missing data through simplified forms of MC CATALOGUE Industry. NCB checks and approves the data gained from the manufacturer, transfers it into MC CATALOGUE and finishes the process of item identification. As a result, an NSN is assigned to an item. Once the process is completed, the NCB updates the data available to the manufacturer in MC CATALOGUE Industry.

1.6   The training courses and provision of support and maintenance to the customer

A set of training courses for MC CATALOGUE operation is available. This set covers the tasks performed by the MC CATALOGUE users, NCB administrators – responsible for the configuration of users, regular update of system tables, etc. and system administrators – responsible for system operation, MC CATALOGUE update and upgrade, etc. Number of course repetitions as well as the content and duration of courses can be adapted based on the customer's requirements.

In order to provide the best services to the customers, there are several ways available how to contact the support team. It is possible to use e-mail, hotline or the help desk tool OfficeMan which is available for the customer's users and system administrators free of charge. AURA also provides on-site support for the customer during the MC CATALOGUE implementation.

New versions of MC CATALOGUE are released usually once a year and are included in the basic scope of a support and maintenance contract for no additional fees. Several times a year AURA issues updates and patches for customers. They are delivered to the customers also as a part of system support and maintenance for no additional fees.

2   NCS COLLEGE

The Czech University of Defense and the Group of National Directors on Codification (AC/135) in cooperation with AURA, jointly organized the 2nd NATO Codification System (NCS) College in Brno, Czech Republic, in the year 2014. The purpose of this event is to train, in biennial cycles, managers and logisticians in administration of codification processes as well as codifiers in execution of specific codification activities. The NCS College is primarily designed for codification personnel of nations participating in the NATO Codification System (more than 60 nations) and those waiting for admission into this community. This NCS College 2014 was attended by students representing 12 nations from all over the world.

The NCS College 2016 will be again composed of two courses:

- NATO Codification System Course for Managers & Logisticians scheduled for 29 August - 2 September 2016. This course is designed for logisticians at a managerial level dealing with codification and its interrelations, for NCB personnel and other professionals who participate in NCS management at national and international levels;

- NATO Codification System Course for Codifiers scheduled for 5 - 23 September 2016.

This course is designed for personnel who are or will be dealing with practical issues of codification and who have already acquired basic knowledge of codification processes. It is suitable for those who participated in the NCS Course for Managers & Logisticians.

3 DEFENCE STANDARDIZATION – DOCUMENT MANAGEMENT SYSTEM

Defense standards are of a high importance for defense forces and for their proper implementation it is necessary to manage them efficiently. The Document/Content Management System (DMS/CMS) IS STAN is used for this purpose at the Czech Ministry of Defense and Armed Forces [4].

IS STAN was developed by the Czech company AURA, s.r.o. in a close cooperation with professionals of the Czech Ministry of Defense (MoD) responsible for management of defense standards. The system meets specific requirements for defense standardization and is ready to implement new requirements (e.g. for another country that would decide for IS STAN).

IS STAN is in operational use at the Ministry of Defense and Armed Forces of the Czech Republic. The main user – authority responsible for management of defense standards – is the Defense Standardization, Codification and Government Quality Assurance Authority, Defense Standardization Department (DSD).

IS STAN supports the Defense Standardization Department in managing defense standards and publishing them. All authorized personnel of the MoD and Armed Forces can search and read defense standards using IS STAN.

IS STAN supports planning and execution of all key defense standardization processes including Standardization NATO Agreements (STANAG) ratification and implementation, Standardization NATO Recommendation (STANREC) approving and National Defense Standards creation, and thus increases the effectiveness of the defense standardization authority's activities.

IS STAN is based on the state-of-the-art Java EE technology and thus it is independent of hardware platform, operating system and database system.

IS STAN manages Standardization Agreements, Standardization Recommendations and Allied Publications according to AAP-3(J) Directive for the Development and Production of NATO Standardization Agreements (STANAGs), Standardization NATO Recommendations (STANRECs) and Allied Publications (APs).

IS STAN achieves following major objectives:

- To provide support for planning and execution of all key defense standardization processes in the Ministry of Defense and Armed Forces of the Czech Republic:
    - Allied Publications (AP) translation,
    - Standardization NATO Agreements (STANAG) translation, ratification and implementation,
    - Standardization NATO Recommendations (STANREC) translation and approving,
    - SD EU (EU defense related standard),
    - National Defense Standards (CDS) creation and revisions.

- To support participation in working groups:
    - NATO Working Groups,
    - EU Working Groups.

- To provide up-to-date read-only standardization documents for all authorized personnel of the MoD and Armed Forces.

- To provide various reports for publication on an intranet and the Internet.

IS STAN meets requirements for information systems supporting management of defense standardization documents. IS STAN features the following basic capabilities:

- Creating a uniform central database of defense standardization documents and their metadata – documents of various formats (doc, docx, xls, xlsx, pdf, etc.) are created, stored, maintained and accessed via an intranet or the Internet.

- Grouping standardization documents into various profiles:

  - AP – Allied Publications;

  - STANAG – Standardization Agreements;

  - STANREC - Standardization Recommendations;

  - CDS – Czech Defense Standards;

  - WG – Working Groups.

It is possible to customize the current profiles and add new profiles according to the specific requirements during the customization process.

- Support of the whole life cycle of documents – IS STAN supports planning and performing activities during the whole life cycle of a document: creation or adoption, translation, ratification, publication, revision etc.

- Advanced search for profiles and documents – IS STAN allows searching documents and profiles practically by all data elements.

- Full text search by document content – IS STAN allows full text searching documents by any character chain.

- Setting of user rights – IS STAN allows assigning a user to a given group of users, having specific rights (e.g. to maintenance the STANAGs, creating reports, planning defense standardization tasks etc.).

- Smart web user interface – all user forms are accessed by standard web browser and offers graphical well-arranged design and comfortable user control.

- Accessibility from anywhere – up-to-date Java EE architecture allows secure access to IS STAN from any equipment (PC, notebook, PDA) connected to an intranet or the Internet without necessity to install any software on it.

- Use of relevant information from legacy information systems – in order to ensure a smooth transition when establishing the new system, IS STAN is capable of enabling batch input (migration) of all necessary defense data from the legacy information systems currently operated at the MoD and Armed Forces.

- Statistics and reports – IS STAN allows displaying and printing the statistical data for MoD Bulletin, Technical Instruction and Timed Tasks Fulfilment.

- Use of national language – IS STAN is multilingual and user can switch the language on the application level. The user interface is currently accessible in English and Czech and is ready for translation to any other national language. IS STAN allows storing text data, by data elements where it is needed in English and a national language.

- Import of drawings, pictures and video sequences – it is possible to import images (drawings, photos etc.) and video sequences for the WG, AP, CDS, STANAG and STANREC items. The following formats are currently supported: bmp, jpg, gif, pdf, avi, mpg and wmv.

- Bar code – IS STAN allows printing a bar code for a document with a reference number, security level, origin and year of issuing.

- History – IS STAN stores all changes of documents and their metadata and allows searching historical changes for authorized personnel.

- Integration – IS STAN is ready for integration into portals and for interfacing with other information systems.

- Access to Helpdesk system – easy way to report new requirements and problems.

- Service Oriented Architecture – the core architecture of IS STAN was developed in a service-oriented way. The business logic is exposed through Java service interfaces. It is possible to use IS STAN through these services – for example the presentation layer is completely separated from business logic and uses the service methods to access data. IS STAN services can be described and used in an interoperable way – for example web services (WSDL and SOAP protocol). A message oriented middleware can be added to support asynchronous calling of services. Other aspects, such as security, message reliability and transactions may be supported by the services.

4   CONCLUSIONS

To identify, classify and number items of supply the NATO Codification System is used. Unique and unambiguous identification and a data set can be easily shared by all of users.

The NCS is a complicated system and its usage is not possible without sophisticated software. Around the world 15 software tools are used thus the decision process during tendering is very complicated. Information provided in this article are hopefully useful for decision making experts and can be used in multi-criteria analysis method.

Literature:

1. NATO. *NATO Codification System*. [online]. © 2015 [vid. 2015-07-09] Available from: http://www.nato.int/structur/AC/135/welcome.htm

2. NATO. *STANAG 3151. Codification – Uniform System Of Item Identification*. [online]. [9th edition]. Brusells, 2004. [vid. 2015-09-09]. Available from: http://www.dskm.mod.gov.rs/3151.pdf

3. Moravec, M. Možný, S. Rejman, S. *Ověření a odzkoušení katalogizace majetku a služeb podle eOTD na testovacím vzorku dat pomocí ověřovací softwarové aplikace*. POV-eOTD-DIK 004/13. [firemní interní dokumentace]. Brno: AURA s. r. o., 2013. 92 s.

4. Moravec, M. Možný, S. Rejman, S. *Současný stav systému pro katalogizaci služeb v tuzemsku a ve světě*. POV-eOTD-DIK 001/11. [firemní interní dokumentace]. Brno: AURA, s. r. o., 2011. 107 s.

LEGISLATIVE AND STRUCTURAL TOOLS OF THE MINISTRY OF DEFENSE OF THE SLOVAK REPUBLIC IN ALLIANCE COOPERATION

doc. Ing. Miroslav Školník

PhD., Department of Management

Mgr. Lenka Nagyová

Department of Social Sciences and Languages

Abstract

The paper analyses the NATO Codification System, explains basic terms and definitions, analyses the NATO codification policy and basic principles, characterizes the procurement system and NATO related codification procedures applied within the Armed Forces of the Slovak Republic and describes the supply and stock system implemented at the Ministry of Defense of the Slovak Republic.

Introduction

The term „codification" is used especially in relation to a standard for a language that defines official rules for its implementation (enactment) or in relation to law codification, which is the process of systematic collecting of legal regulations in certain areas of jurisdiction into a complete or a partial complex (code of laws, codex, directive, etc.).

Each weapons system used in the armed forces consists of many parts – groups, subgroups – items. To maintain operability of such a system requires storage of a necessary number of spare parts. As a result, the bases and other logistics units within the Slovak Armed Forces store thousands of items plenty of which have the same technical and functional properties but different identification marking. The codification system seeks to eliminate the risk of duplication by the systematic and coordinated maintenance of all identification data on individual items. It creates a database of weapons, ammunition, equipment and spare parts that are used for national defense. Furthermore, it makes this extensive database available to all entities, involved in development, production, delivery and storage of military technologies. This way, it facilitates the international harmonization of weapons systems and of logistic support, particularly in peacekeeping missions.

Codification is mainly aimed to define each item of supply as a concept that meets requirements of the biggest possible number of users, regardless of the system to which the item belongs.

On 1 April 2004, the Slovak Republic became a member of NATO and, thus, accepted the NATO Codification System requirements by developing a legal basis for codification – the Act No. 11/2004 of the National Council of the Slovak Republic, as last amended, came into effect.

1 IMPLEMENTATION OF NATO CODIFICATION AND STANDARDISATION ACTIVITIES IN THE ARMED FORCES OF THE SLOVAK REPUBLIC

NATO Codification System (NCS) is based on principles and procedures generally binding for all member states but, at the same time, it allows adaptations to national requirements and particularities. The NCS is a basic tool for effective logistic support in the armed forces. Indeed, the NCS is DNA of modern logistics. The main objective of this system is to make sure that military personnel deployed in joint operations can be sure about correctness of items that will be supplied to them according to their requirements. The NCS is also used or implemented by several dozen non-NATO states that are interested in participating in joint logistic support.

The foundation for the contemporary NATO Codification System was laid by the US Congress and the US President Roosevelt at the end of World War II. That time, the USA had large quantities of material, which was marked and classified in many different ways, in stores all over the world. Different marking or designation of the same item resulted in surplus and waste of materials (were purchased even though they were available in stores) as well as critical shortage of important spare parts and failure of technologies. This was happening due to the fact that there was no cataloguing system that would unify marking and identification of products from different producers.

As a result, the U.S. Congress approved the Defense Cataloguing and Standardization Act No. 436 on 1 July 1952. Pursuant to this act, cataloguing of an item/product must include designation, classification, description and numbering of each item repeatedly used, purchased, stored or distributed by the Ministry of Defense or its sections in such a way that the same item is identified by only one unique distinguishing combination of letters or digits. The procedure that included all these steps was called "the Federal Cataloguing System", which was later adopted by other NATO member states as the NATO Codification System (NCS) and which serves as a basic logistic element of the item lifecycle management.

1.1 Basic definitions and terms

CODIFICATION OF PRODUCTS – means a complexity of services providing identification, classification and assigning of a stock number to individual stock items belonging to NATO member states. The purpose of codification is to implement an uniform language for identification of stocks. The rule is that each item of supply is assigned with an unique stock number. NATO codification involves maintenance of existing registers and development of updated information for all countries that are registered as users of individual items of supply.

CODIFICATION SYSTEM – is a basic system for implementation of an uniform language used for identification, classification, numbering and recording of producers, suppliers as well as for maintenance of databases that include records of individual stock items. The codification system is a tool of logistics management.

NCS (NATO Codification System) – is a system described in detail in the AcodP-1 NATO Manual in Codification and in NATO standardization agreements.

CODIFICATION DATA – all data related to items of supply, e. i. parameters for items of supply (their characteristics), parameters and data on producers as well as data on users. All these data are recorded in the national database of each member state (for example, in the Total Item Record (TIR).

NCB (National Codification Bureau) – is a central body of each state that is responsible for implementation and maintenance of the NATO Codification System. The NCB is a connecting link

between armed forces of individual countries, NATO member states and the NATO Support Agency, the main logistics and procurement agency of the North Atlantic Treaty Organization. Furthermore, the NCB represents its country in the NATO Cadre Group of National Directors on Codification AC/135 and it is also responsible for the application of national and international codification procedures.

AC/135 MG – NATO Cadre Group of National Directors on Codification is subordinate to the Conference of National Armaments Directors – CNAD. AC/135 MG is composed of national directors of NATO member states' codification bureaus. This group is responsible for development, implementation and maintenance of the NATO Codification System while providing technical and logistic support for participating nations. It is divided into three subgroups: PANEL A, NMBS and TriCOD.

NSPA (NATO Support Agency) – is the main NATO agency that focuses on logistic support, including armaments and individual items of supply. The NSPA has developed, implemented and maintains the NATO Mailbox System, which is a means of international data exchange in electronic format. In addition, the NSPA maintains and processes a complex database of NATO codified products and producers.

DLIS (Defense Logistics Information Service) – provides complex integrated logistics and IT service for the U.S. Department of Defense, national agencies and international partners. On behalf of NATO, the DLIS maintains identification guides FIIGs, MEDCAT, H-Series resource files and various additional codification manuals.

NCAGE (NCAGE – NATO Commercial and Governmental Entity Code) – NATO code for producers and organizations.

NSC (NATO Supply Classification) – is a system that divides items of supply into groups and classes, especially for the purpose of efficient supply and storage.

NSN – NATO (National) Stock Number

AIN (Approved Item Name) – is thoroughly selected and assessed designation of items of supply with similar properties.

NAIN (Non-Approved Item Name) – is a name given to an item of supply by a producer or an agency according to their specialization when an Approved Item Name is not available.

INC (Item Name Code) – every item name in the NATO Codification System is assigned with an 5-digit item name code in order to facilitate exchange of data within the ADP System. Each approved item name has its own individual code. Each non-approved item name is assigned with the 77777 Code.

BN (Basic Name) – is a noun or a noun phrase that constitutes the part of an approved item name.

CIN (Colloquial Item Name) – any item name different from an approved item name, which is used for designation of items of supply for which an approved item name has been developed.

RN (Reference Number) – is a number used for designation of items of production or identification of items of supply, individually or in connection to other reference numbers. Reference numbers can be, for example, numbers of producers' components, drawings and models or producers' model numbers, producers' management sources, management of technical specifications, producers' commercial name if an item is assigned only with a commercial name, NATO stock numbers, technical specifications and standards or corresponding designations.

ADP – Automatic Data Processing

NMBS – NATO Mail Box System

NABS – NATO Automated Business System

MOE – Major Organizational Entity – code of major organizational entity

SSR System Support Record – records of the NATO Codification System Support

Item of Production – contains parts or objects that are grouped under the same producer's reference number and that have common design documentation, technical standards and acceptance tests.

Item of Supply – in the NATO Codification System, the term Item of Supply designates an object or a group of objects that have been defined by an authorized logistics group for the purpose of fulfilling certain requirements. The precise definition of an Item of Supply depends on logistics consideration on the basis the user specifies characteristics and extent of the concept that is compatible with his needs.

Quality of reference numbers – reference numbers are defined more in details by adding information on their category, diversity, acquisition, availability of technical documentation and the reference number format for designation of their potential modification.

Proposal of codification data – the producer or the supplier prepares basic data on defense-related products in an electronic form and also in a special electronic format that is compatible with the codification information system of the Office of Defense Standardization, Codification and Government Quality Assurance in Trenčín. In the Slovak Republic, only the entity that fulfills the requirements under the Section 11 – Codification Agency, of the Act No. 11/2004, as amended, can process proposals of codification data.

1.2   NATO codification policy

The NATO Codification System is aimed to reach maximum effectiveness of national and international logistic support and facilitating supply data management as well as identification of items that are different but fulfill the same requirements. This will allow reduction of supplies (equipment, assembly systems, components and spare parts) and keeping necessary amounts of supplies under control.

The NCS uses an uniform system for classification and identification of items of supply and it seeks to:

- avoid different identifications of the same item of supply,

- determine which items are interchangeable

- support standardization,

- improve logistic support of NATO and other participating forces,

- enhance interface between defense codification systems and industries,

- improve property management by increasing effectiveness and efficiency of logistic operations.

According to the NCS, all signatories shall use the common terminology (a common supply language) for logistics and all defense purposes. Implementation of the NCS is based on ratification of the Standardization Agreements (STANAG). From the establishment of NATO to present days, all member

states have made their national systems compatible with NATO by ratification of the standardized agreements on codification.

As a result, the NCS principles are implemented in national legislation and member states become compatible as far as defense logistic support is concerned.

The following basic NATO Standardization Agreements allow a clear definition and effective application of the NCS:

STANAG 3150 – Uniform System of Supply Classification;

STANAG 3151 – Uniform System of Item Identification;

STANAG 4177 – Uniform System of Data Acquisition;

STANAG 4199– Uniform System of Exchange of Material Management Data;

STANAG 4438– Uniform System of Dissemination of Data Associated with NATO Stock Numbers.

These standardization agreements are regarded to have been implemented when the provisions of these agreements are included in the corresponding national documentation. The Office of Defense Standardization, Codification and Government Quality Assurance ratified these standardization agreements on codification as of 1 May 2004.

Principles and provisions of individual agreements are included in the national legislation of the Slovak Republic – the Act No. 11/2004 as later amended, the MoD Directive No. 476/2011 MO SR, guidelines and standard procedures. The structure of the defense standardization in the Slovak Republic is depicted in the following picture.
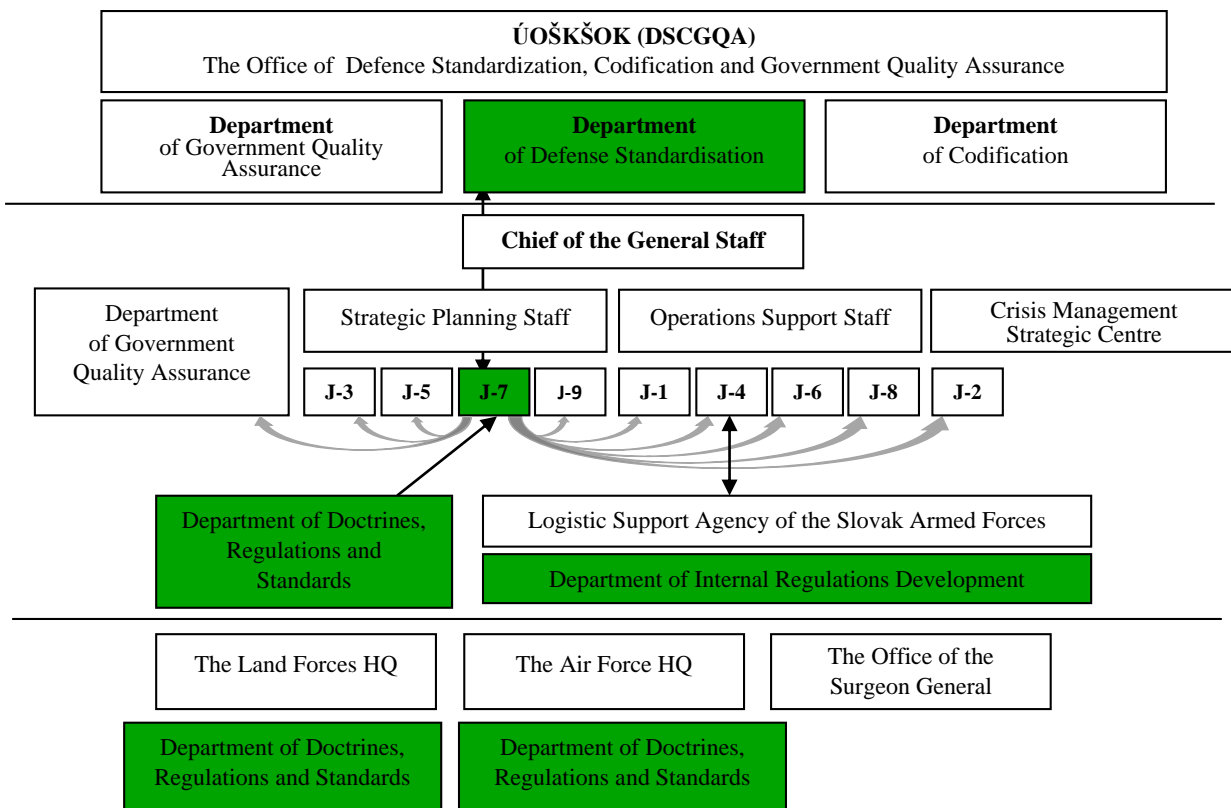
Pict. 1 - *Structure of the Defense Standardization System in the Slovak Republic*

Legend:

ÚOŚKŠKOK – The Office of Defense Standardization, Codification and Government Quality Assurance

1.3 Basic principles of the NCS
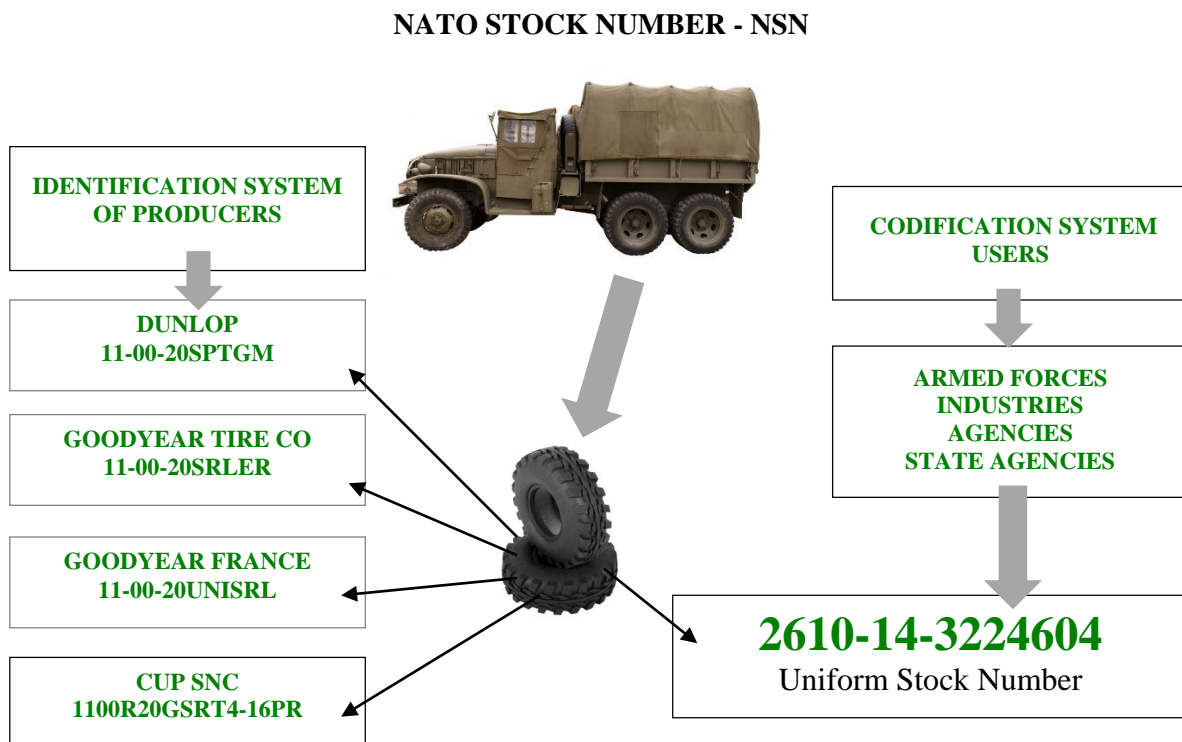
One Item of Supply - One Stock Number

For each item, which is repeatedly used, purchased, stored and distributed, only one type of unique identification (one NATO Stock Number – NATO NSN) is used for all supply functions.

Each Item of Supply that is to be implemented in the supply system must be designated, identified and classified in such a way that it can be assigned with only one NSN.

National Responsibility

The National Codification Bureau – NCB – is responsible for codification of all items of supply for all NCS participating nations even if some items of supply are not used by armed forces of a particular country that is responsible for codification.

Each nation that wants to use such codified items must sign up as an user by means of the MOE Code. An item of supply, which has not been produced by the NCS participating nation, must be codified by the nation that implements this item in the NCS and manages its data.

NATO STOCK NUMBER - NSN

IDENTIFICATION SYSTEM OF PRODUCERS		CODIFICATION SYSTEM USERS
DUNLOP 11-00-20SPTGM		ARMED FORCES INDUSTRIES AGENCIES STATE AGENCIES
GOODYEAR TIRE CO 11-00-20SRLER		
GOODYEAR FRANCE 11-00-20UNISRL		**2610-14-3224604** Uniform Stock Number
CUP SNC 1100R20GSRT4-16PR		

Pict. 2 - *Assignment of NATO Stock Number - NATO - NSN*

Codification Process

The NCS is based on the concept of an item of supply, which is the subject of all codification processes. An item of supply is an item of production that is repeatedly purchased, stored, and used for the defense logistic support.

An item of supply is composed of parts (components) or subjects grouped under the same reference number of a particular producer. The reference number gives the product unique identification by means of a technical drawing, standard or other kind of identification used by its producer. It is necessary to follow the rule that an item of production is not necessarily an item of supply.

Designation of an Item of Supply

Each item of supply must be designated according to the NCS rules. Designation of items of supply is usually an Approved Item Name (AIN) and this designation is regarded as a basic step of codification. Application of an approved name with a corresponding five-digit Item Name Code (INC) enhances international standardization and provides further information such as definitions, item classification codes and procedures for descriptive identification. When a corresponding approved item name is not available, a non-approved item name is used with its INC = 77777.

Classification of an Item of Supply

NATO Supply Classification is a system that classifies items of supply according to different groups and classes, especially for the purpose of efficient supply and storage.

Criteria for combining items into groups and classes are as follows:

- physical or performance properties,

- relation of their components and accessories to nearest groups of a higher unit for which they are designed,

- the fact that the items are normally procured and supplied together.

The result of NATO classification of items of supply is the assignment of a four-digit code to each item of supply. However, classification of an item of supply may alter during its lifecycle. Classification is performed in accordance to H2SK (AcodP-2).

Identification of an Item of Supply

Identification of an Item of Supply means acquisition and processing of minimum data necessary for fulfilment of a certain requirement and determination of basic characteristics that make an item of supply unique and different from all other items of supply.

Items of supply are normally identified by means of two basic identification methods, e. i. reference and descriptive methods.

Reference method

Reference method applies identification by means of item identification data processed by the producer (or the supplier) and its recording. This method uses so-called Reference (REF), which consists of the Reference Number (RN) and NCAGE. The reference number usually stands for a number of drawing or other markings applied by the user – model, type. Reference identification also involves determination of the reference number value in terms of identification and acquisition by means of reference number codes (e. g. RNCC, RNVC, DAC, RNSC, RNFC, RNJC.).

Descriptive method

Descriptive method applies recording of technical, performance and other properties of items of supply according to the procedure included in the Item Identification Guide (IIG). Item characteristics are recorded in codes in order to provide international standardization and safe electronic transmission.

Identification of Producer of Item of Supply

Identification of the real source of each item of supply is one of the basic prerequisites for proper implementation of the uniform item identification system. The source can provide necessary documentation and information on codification responsibilities. Each reference number, which is listed in the NATO Codification System, must be connected to **NCAGE** (NATO Commercial and Government Entity Code) before this number - a number of the producer's component – is put into the Total Item Record (TIR), which is maintained by individual national codification bureaus.

NCAGE – is a five-digit alphanumeric code the structure of which is specified by international standards. NCAGE is assigned to an entity by a national codification bureau of the country where the entity has its seat. Entities – producers or suppliers – in non-NATO member states or in TIER-1 countries are given these codes by NSPA.

Assignment of NATO Stock Number - NSN

The NATO Stock Number is a 13-digit code for an item of supply that has its standard structure and standard methods of assignment thus it always remains unique. The NATO Stock Number is issued by the national codification bureau in accordance to the national responsibility principle. The NSN structure is depicted in Picture 3.

Assignment of other data

After the above-mentioned codification procedures are completed, data records of items of supply are supplemented with another data that are specified by principles concerning storage and management of items of supply. Extent and structure of these data depend especially on the roles that the codification system plays in the national environment. These are especially specific matters of individual users or nations.

NATO STOCK NUMBER STRUCTURE
13 – digit alphanumeric code
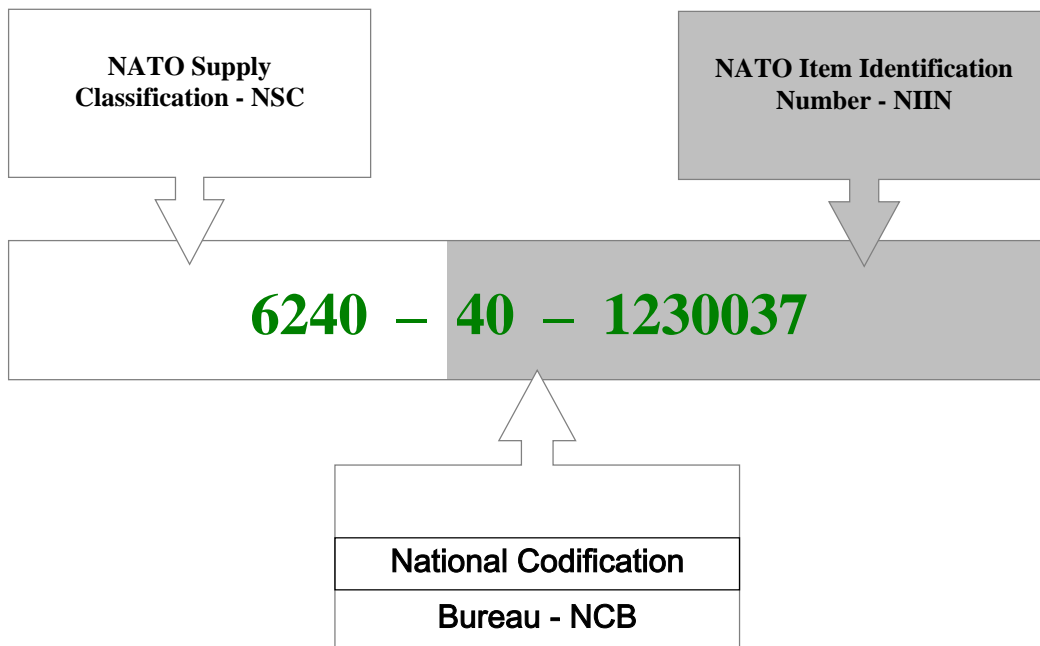
Pict. 3 - *Structure of NATO Stock Number*

Provision of NATO Stock Numbers and Item Identification Data

National codification bureaus of NATO nations or TIER 2 nations are responsible for providing the NSPA or a procuring nation with the NATO Stock Numbers and data on item identification. This provision is in accordance to the NATO Codification System requirements.

1.4   International exchange of information

Exchange of Data by Means of ADP

Quality of the codification system is associated with the ability to search information in a particular environment (procedures, documentation, database of suppliers, references, manuals, catalogues).

Codification data are available to the NCS participants by means of an uniform system of automated exchange of data between countries. This system is defined on the basis of explicit rules that specify standardized formats for exchange of codified data by means of ADP. These electronic transactions of data elements are called segments.

NATO Mailbox System (NMBS)

The NSPA is the center for coordination of data exchange. It runs the NATO MAILBOX SYSTEM - NMBS, and, thus, provides distribution services focused on electronic transactions between individual

countries. The NMBS provides the central hardware and software platform with various pre-defined connection settings. It uses various safety coding protocols.

A sending unit delivers its data to the NMBS in accordance to this system's rules and notifications. The NSPA checks all transfers in the NMBS and stores the data in electronic boxes so that they can be retrieved by a receiving unit in approved intervals. The mailbox is a common transmission station that stores the NATO codification data. Countries participating in the NCS are assigned with their mailbox which receives messages addressed to the National Codification Bureau and messages addressed to all NCS users.

NATO Automated Business System (NABS)

NATO Automated Business System (NABS) is an official instrument for management of documentation in AC/135 used for development of automated programs for meetings of the Main Group, Panel A and work teams. The NABS applies standardized software technologies as a commercial and publicly available COTS programed file. This system allows its users electronic processing, delivery and management of documents.

Furthermore, the NABS enables sending and storage of documents used for business meetings in an electronic format as well as an immediate access to documents in portable personal computers during business meetings. In addition, this system provides committee members with an access to information on the meeting's program and documentation that is to be used during the meeting. As a result, participants of meetings can discuss individual points of the program having the same documents.

Electronic Connection to Both Above-Mentioned Systems

Nowadays, both systems are accessible over the Internet by means of a coded access at the entry page. After users enter the code for a particular system, they can use either the NMBS or NABS programs which perform selected operations (input/output transactions, replies to delivered applications, documents and forms).

Terms and Connection of the Slovak Republic to NMBS/NABS by ADP means

Pursuant to ACodP-1, activities associated with data exchange through NMBS and NABS can be performed only by a national authority on codification (NCB), which is the Office of Defense Standardization, Codification and Government Quality Assurance based in Trenčín. Since 15 June 2004, the Codification and Information System of the Slovak Republic has been connected to the NSPA by means of the NMBS and since then it has been performing all automated transactions within the international data exchange system.

2 PROCUREMENT AT THE MINISTRY OF THE DEFENSE OF THE SLOVAK REPUBLIC

To ensure uniform implementation of the Act No. 25/2006 on Public Procurement, as amended (hereinafter referred to only as the "Act"), the Ministry of Defense of the Slovak Republic (hereinafter referred to only as the "Ministry") follows the MoD Public Procurement Directive from 17 March 2014.

This directive determines procedures for procurement of products, performance of construction works and provision of services (hereinafter referred to only as "procurement").

The directive applies to:

- the Ministry's organisational sections,

- offices and facilities supporting the Ministry,

- Military Police,

- organisational sections of the General Staff of the Slovak Armed Forces,

- offices and facilities under the direct commend of the General Staff of the Slovak Armed Forces,

- Land Forces HQ, Air and Air Defense Forces HQ, Training and Support Forces HQ, bases, units, offices and facilities of the Armed Forces of the Slovak Republic.

Regulations and procedures arising from this act are not applied when some of the terms, defined in Section 1, Par. 2 and 3 of the Act; in this case, a public procurer can follow respective provisions of the Commercial Code.[33])

Non-profit organizations and contributory organizations under the Ministry's authority can apply public procurement by means of a contract of mandate within the scope of allocated budget funds as long as such procurement is efficient.

2.1 Public procurement bodies at the ministry of defence of the Slovak Republic

Public procurement at the ministry is delegated to:

- the Acquisition Agency

- offices and facilities supporting the Ministry, Military Police, bases, units, offices and facilities of the Armed Forces of the Slovak Republic (hereinafter referred to as "other public procurers ").

The Acquisition Agency acquires contracts pursuant to Appendix 1 of this directive (central procurement). If the Ministry considers central procurement as ineffective in a particular calendar year and the total of expected value of contracts for a particular product, service or construction work does not exceed the financial limit in accordance to Section 9, Par. 9 of the Act, the head of the Department of Methodology on Public Procurement and EU Funds may allow procurement done by other public procurer, based on the proposal formulated by the submitter.

Other public procurers shall acquire the contract in accordance to Section 9, Par. 9 of the acts within the defined extent (decentral procurement), whereby financial limits defined in Section 4 of the act apply to all sections of the ministry. Procurement of contracts done by other public procurers depends on the

---

[33] Section 281 and 288 the Act No. 513/1991, the Commercial Code, as amended.

total of accepted values of contracts. If the total of these contracts exceeds the financial limit defined in Section 9, Par. 9 of the act, the contract shall be acquired by the Acquisition Agency.

Acquisition Agency:

- coordinates, manages and assesses the public procurement process,

- performs public procurement on the basis of the request for contract subject acquisition and approved plan of contracts acquisition,

- suggests procedures of public procurement pursuant to the act,

- ensures fulfilment of the obligation to notify the Public Procurement Office and the European Union,

- processes, registers and stores all documents about the applied public procurement procedures and enters selected data about the public procurer in the integrated information system,

- cooperates with the **Department of Methodology on Public Procurement and EU Funds** (hereinafter referred to as "department") and submits each public procurement to this department for analysis before it is announced (concerning especially specification of public procurement procedures, a call for tenders, launching invitation to tender, tender documents).

The department controls the methods of public procurement within organizational sections of the ministry, office and facilities supporting the ministry and the Armed Forces of the Slovak Republic.[34])

2.2 Request for contract subject acquisition

Request for Contract Subject Acquisition results from the ministry's program plan and budget, which defines contracts necessary for organizational sections within the scope of competence of budget managers at the Ministry's Central Logistics Office, the Modernization and Support Section and the Department of Assets and Infrastructure who are exclusive submitters of requests for the Acquisition Agency (hereinafter referred to as "request submitter"). The request has a written and an electronic form. The request for contract subject acquisition is usually submitted for three years according to ministry's budget proposal with estimated funds and resources for the fourth year when a framework agreement is signed.

Priority request for contract subject acquisition (hereinafter referred to as "priority request") is a request on the basis of which the Acquisition Agency can open a public tender and conclude contracts before the ministry's budget proposal for the particular fiscal year is approved. The submitter submits a priority request to the managing director of the Ministry's Department of Economy who reviews it and submits it further to the Minister of Defense of the Slovak Republic (hereinafter referred to as "minister"). After the minister approves the priority request, its submitter sends it to the Acquisition Agency by a deadline determined by the head of the Acquisition Agency, which precedes the year when the subject matter of the contract is supplied.

---

[34] Article 76e of the Organizational Rules of the Ministry of Defence of the Slovak Republic No. OOd-37/2012 from 30 November 2012, as amended.

Submitters ensure and confirm budget coverage for priority contracts in the budget proposal for a particular fiscal year. The Acquisition Agency has an authorization to sign corresponding implementation agreements before the fiscal year. Budget coverage of priority contracts is binding for submitters throughout the whole procurement process.

Request for purchase of small-scale merchandise, performance of construction works and provision of services (hereinafter referred to as "request for purchase of small-scale merchandise) results from the ministry's program plan and budget the estimated value of which does not exceed the financial limit defined by the Section 4, Par. 3 of the act. The request for purchase of small-scale merchandise, which is included in the list of small-scale contracts, has a written or electronic form.

The submitter of a request for signing of an implementation agreement ensures full financial coverage. When the subject of the request is signing of a framework agreement, financial coverage does not have to be ensured for the whole period of contract's validity; the submitter states that the subject of the contract is covered only according to the amount of allocated finances in individual years of framework agreement's validity.

Submitters alongside the Defense Standardization, Codification and Government Quality Assurance Authority shall emphasize the necessity for government quality verification in the request; such a request includes a form called *Identification of Product's and Producer's or Supplier's Risks*, which will be filled in by the budget manager. Requests for government quality assurance inspection are applied mostly with products and services. The Government Quality Assurance System is depicted in Picture 4.

Procurement Plan

Procurement plan is a document for coordination of procurement that contains the list of products, construction works and services procured in a particular fiscal year for the purpose of fulfilling the assigned tasks and activities. On the basis of preliminary financial limits and estimated value of the contract classified according to CPV[35]) Code, the Acquisition Agency defines the public procurement procedure in accordance to the act as well as the procurement schedule included in the procurement plan.

The procurement plan is made on the basis of procurement requests in a written and electronic format by means of generation from the ministry's integrated information system, including highlighting of priority requests. Basic documents for the procurement plan are written by submitters. Electronic requests for the procurement plan are made by representatives of other public procurers in accordance to submitters' instructions or instructions issued by the **Ministry's Department of Economy.**

---

[35] Common Procurement Vocabulary (CPV) is a uniform classification system for subject matters of public contracts that is used in the EU countries for uniform description of products, works and services by assigning them with a numerical code (hereinafter referred to as "CPV Code").
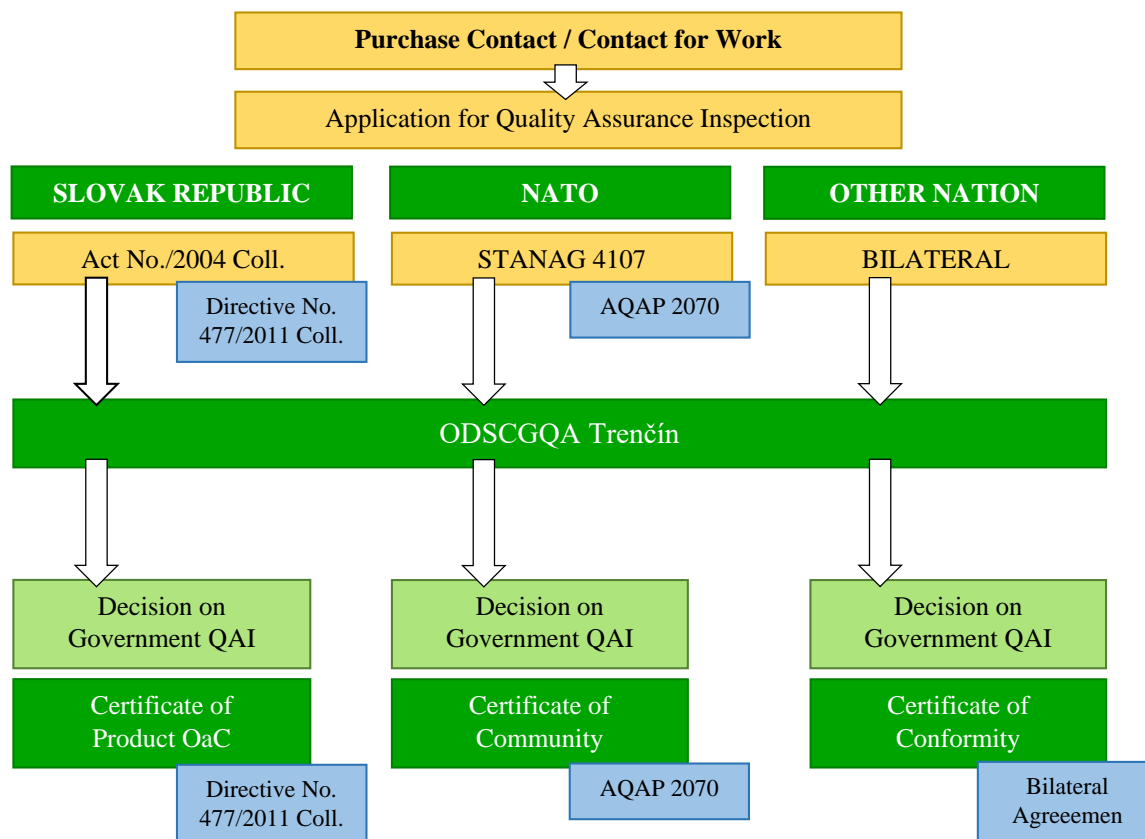
Pict. 4 - *The Government Quality Assurance System*

Legend:

ODSCGQA – The Office of Defence Standardization, Codification and Government Quality Assurance

QAI - Quality Assurance Inspection

QaC - Quality and Completeness

The List of Small-Scale Contracts and Plan of Purchase of Small-Scale Contracts

The **Office of Central Logistics (OCL)** or **the Department of Assets and Infrastructure** annually create the list of small-scale contracts acquired by other public procurers. This plan is developed after determination of an estimated value of contracts for the budget organization RO 02 for decentralized procurement in accordance with Appendix No.1 to this directive and the Section 5 and Par. 12 of the act.

The Office of Central Logistics and the Department of Assets and Infrastructure verify estimated values of contracts for corresponding CPV Codes before they submit the budget proposal for a fiscal year to the Minister's Advisory Board. If the total of estimated values of contracts for corresponding CPV Codes within the budget organization RO 02 exceeds the financial limit defined by the Section 9, Par. 9 of the act, the office and the department include the request for small-scale contract in the procurement plan and submit it to the Acquisition Agency within 90 days from the budget approval. The OCL and the Department of Assets and Infrastructure file for other CPV Codes of decentralized procurement, which

the central procurement is inefficient for the budget organization RO 02, in the list of small-scale contracts.

The products, construction works and services with their corresponding CPV Code, which are included in the list of small-scale contracts, are acquired by other public procurers within the financial limit that is approved by the Office of Central Logistics and the Department of Assets and Infrastructure.

The plan of small-scale contracts acquisition is approved by the Office of Central Logistics and the Department of Assets and Infrastructure.

Procurement and Evaluation of Tenders

Public procurers are responsible for processing of tender documents and invitations to tender and for their legal compliance. The submitter of request is responsible for contents of tender documents or invitations to tender in technical and economic terms. Public procurers submit tender documents according to individual subject matters of contracts to particular submitters for their approval.

The tender documents include:

- bussiness terms (proposal of contract or framework agreement),

- description of the subject matter of the contract.

Public procurers submit business terms of contracts (proposals of contracts or framework agreements) to the **Ministry's Department of Legislation and Law** for their approval.

Signing of contracts and framework agreements

Contracts and framework agreements related to public procurement, which is performed by the Acquisition Agency, are signed by the managing director of this agency.

Contracts and orders associated with public procurement, which is performed by other public procurers, as well as implementation agreements and orders resulting from framework agreements signed by the Acquisition Agency, are signed by executive staff of other public procurers, as indicated in the framework agreement.

Before signing the contract and its subcontract, public procurers send contract and subcontract proposals to a particular submitter for approval. The submitter considers the proposals and reserves financial resources (reservation document) within three working days from the delivery of proposals.

Before signing the contract, public procurers send the proposal of the contract, framework agreement and subcontract to the Department of Legislation and Law for consideration.

Then they send the written evaluation of contract and subcontract proposals to particular public procurers. Methods and procedures of financial resources reservation (development of reservation documents) were specified by the Ministry's Department of Economy.

The Acquisition Agency includes SAP number of the structured project element that is being procured and the number of the element, from which the advance payment agreed or in the contract shall be provided, in each contract (subcontract) that is associated with the defense development program.

2.3 The office of central logistics and its responsibilities

The Office of Central Logistics (OCL) is the Ministry's organizational section that carries out activities and tasks related to logistic management of weapons and ammunition systems, land and air technologies, engineering and air services, military health services, general material, food supplies, fuels and lubricants as well as personal equipment and services. The OCL develops and updates concepts associated with development of routine and standard operation, maintenance and renovation of the state movable assets, supplies and services within the Ministry of Defense.

Furthermore, the OCL directs planning of material and financial resources and administers the Ministry's budget as the second-level budget manager in the area of logistics, besides communication and information systems, infrastructure of the state movable assets and development projects. The OCL also performs administration and registration of the state movable assets within its authority pursuant to the Act No. 278/1993 on Administration of the State Property, as amended, the Accounting Act No. 431/2002, as amended, as well as the Ministry's internal regulations.

In addition, the OCL administers the database of codification and logistic data in the Codification and Information System of the Slovak Republic in accordance with the Act No. 11/2014 on Defense Standardization, Codification and Government Quality Assurance, as amended. It also administers the internal procurement catalogue in IIS and modules IIS MM – Material Management and Supplies as well as OM – Operations Management; the OCL is also a warrantor for modules FA / Financial Accounting – movable assets, MM and OM.

The OCL manages supply of material resources necessary for the Ministry's activities in a crisis situation in peace, when national security is threatened or in a state of war. It manages preparation and placement of contracts for supply of goods and services in cooperation with the Ministry's Acquisition Agency. Moreover, the OCL participates in development of the procurement plan and manages processing and submission of requests beyond the procurement plan. It also verifies the purposefulness, necessity and efficiency of submitted requests.

The OCL sets standards and limits for operation of technologies and material supplies in coordination with the Armed Forces of the Slovak Republic and it manages and evaluates the operation and repairs of equipment in its scope, except repairs done by military personnel within individual units. More over, the OCL specifies the principles for planning of armaments and equipment. It sets standards for the treatment techniques, corrective and annual operating standards as well as standards for fuels and lubricants of armaments and equipment. The Office evaluates the state of stocks of movable state assets in its jurisdiction.

It manages the collection and processing of proposals for unneeded state property and its transfer to the Agency of Property Management in its jurisdiction. It manages and controls the fulfilment of contractual relationships in the field of movable state assets and provision of services and adherence to specified procedures associated with taking the delivered goods and services within its scope of responsibilities.

Furthermore, the OCL drafts proposals of internal rules and methodological guidelines to ensure administration and registration of movable state assets and provision of services within its scope of responsibility.
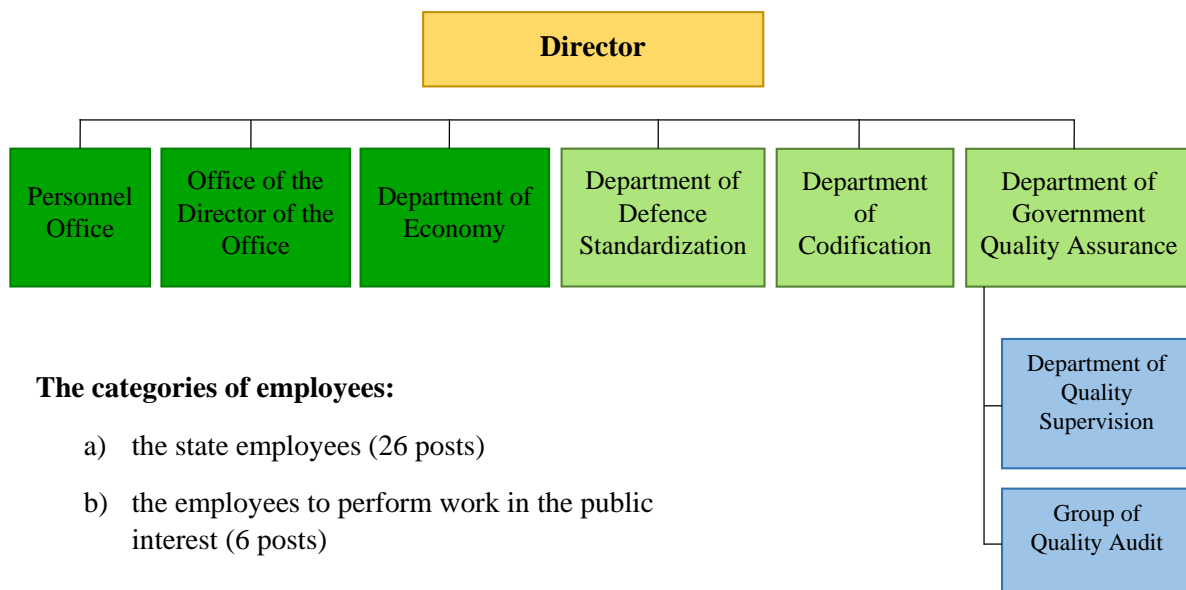
2.4 Office of defence standardization, codification and government quality assurance

The Office is a state administrative body with nation-wide scope in Defense Standardization, Codification and Government Quality Assurance to the extent provided by law. The Office is a budget

organization, whose income and expenditure are linked to the state budget through the budget of the Ministry of Defense of the Slovak Republic.

The organizational structure consists of (Pict. 5):

- Director,

- Office of the Director

- Personnel Office,

- Department of Economy,

- Department of Defence Standardization,

- Department of Codification,

- Department of Government Quality Assurance with the Department of Quality Supervision and Group of Quality Audit.

```
                            ┌──────────────┐
                            │   Director   │
                            └──────────────┘
```

| Personnel Office | Office of the Director of the Office | Department of Economy | Department of Defence Standardization | Department of Codification | Department of Government Quality Assurance |

Department of Quality Supervision

Group of Quality Audit

The categories of employees:

a) the state employees (26 posts)

b) the employees to perform work in the public interest (6 posts)

Pict. 5 - *The structure of the Office of Defense Standardization, Codification and Government Quality Assurance*

In the process of defense standardization, the Office provides the support of interoperability among the NATO members in operational, procedural, material, technical and administrative areas. The office cooperates with the ministries, the central government authorities, with public authorities and legal and physical entities. The office also cooperates with the NATO authorities and NATO member states.
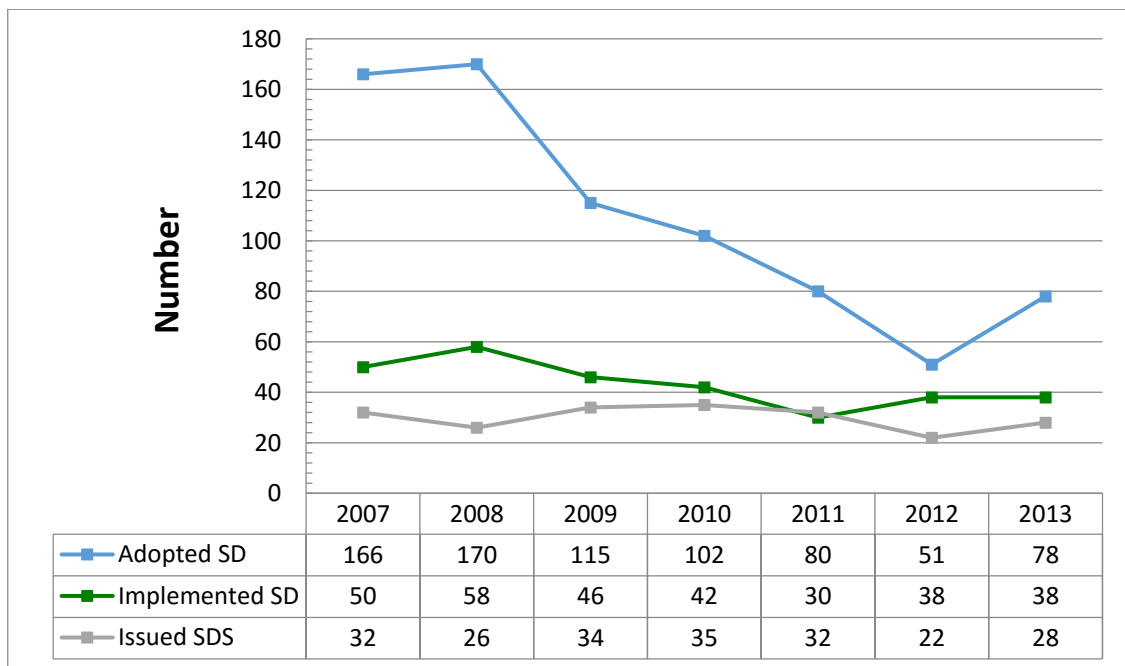
The priority of the office is to ensure adoption and implementation of NATO Standardization Agreements. As shown in the graph, the largest number of adopted standards was observed in the years following the year 2004, when Slovakia joined the NATO. The decline in the following years is associated with the gradual fulfilment of the needs of the Ministry of the Armed Forces of the Slovak

Republic, to adopt and implement NATO standardization agreements in order to achieve interoperability.

Active participation of the Director of the Department of Defense Standardization in the NATO Committee for Standardization and active participation of the department's employees in the Committee's five working groups enabled the Slovak Republic to participate in the development of new standardization structure, new standards or their supplements. Furthermore, this participation allowed the Slovak Republic the acquisition of the most current scientific information and their application at national environment. As a result, fulfilment of the objectives of the Armed Forces of the Slovak Republic and achievement of the required level of interoperability were accelerated.
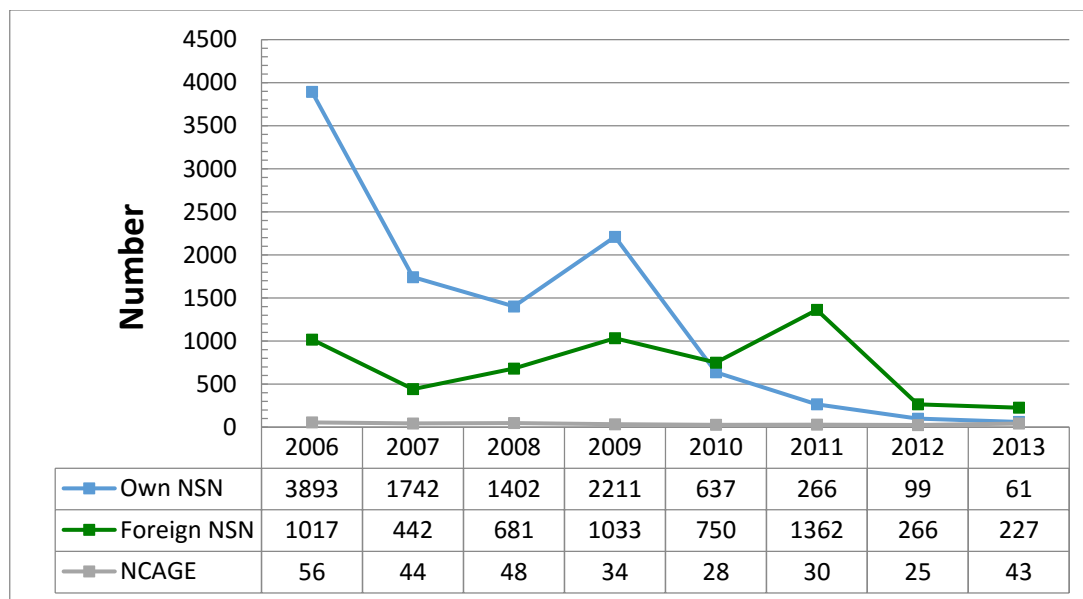
The participation in the working group called Material Standardization and Harmonization Team of the European Defense Agency provides necessary information associated with harmonization of standardization between NATO and the EU in connection with Defense Industry.

The office uses every opportunity to obtain expert information and practical experience from the NATO headquarters and the member states for further development of the strategy and policy of defense standardization in support of our armed forces for international missions.

	2007	2008	2009	2010	2011	2012	2013
Adopted SD	166	170	115	102	80	51	78
Implemented SD	50	58	46	42	30	38	38
Issued SDS	32	26	34	35	32	22	28

Pict. 6 - *The overview of the number of adopted and implemented standardization documents (SD) and issued Slovak Defense Standards (SDS) for the years 2006 to 2013.*

In the codification process, the Office acts as the central authority of the state responsible for implementation and maintenance of the NATO Codification System. It constitutes a mandatory component between the armed forces of individual countries, NATO nations and the NATO Agency for Technical Security, Supply and Codification Data Exchange. The Department of Codification focuses mainly on acquisition, processing and updating of codification data on items (products) and their producers.

	2006	2007	2008	2009	2010	2011	2012	2013
Own NSN	3893	1742	1402	2211	637	266	99	61
Foreign NSN	1017	442	681	1033	750	1362	266	227
NCAGE	56	44	48	34	28	30	25	43

Pict. 7 - *The overview of the number of Slovakia's own and foreign NATO Stock Numbers (NSN) and allocated NATO Commercial and Governmental Entity Code (NCAGE) for the years 2006-2013.*

The codification process includes extensive work tasks and it requires permanent and flexible coordination and close cooperation of the staff with all parties involved in the process of codification.

At the end of this process, a decision is to be taken on the international importance of approval/disapproval of item data and allocation/not allocation of NATO Stock Number (NSN) to the item (product) in favour of NATO.

Within the government quality assurance, the Authority fulfils conceptual, methodical and coordination tasks in the Slovak Republic. The government quality assurance is executed by inspection of quality and the audit of quality, used for the fulfilment of contractual demands to certify the quality of defense-related products and services and for the system of ensuring quality of suppliers. The government quality assurance is performed upon request of public authorities or regional administration, which fulfil defense tasks, and upon the request of NATO competent authorities, competent authorities of NATO member states and competent authorities of other nations.

For the creation of documents and discussion of professional issues within NATO and the European Defense Agency, the office delegates representatives of the Slovak Republic and the Ministry of Defense, to work in working groups of standardization authorities.

In order to clearly define the mission, vision, strategic objectives and tasks of the Office, the Head Office staff led by the Director decided to implement the project called "Long-Term Plan of Training and Development of the Office with a vision to 2020" (hereinafter referred to as "long-term plan of the Office"). The decision was made at the end of the year 2009 within the "2010 Action Plan". This key document was prepared through broad discussion and proposals in each organizational unit and before its approval, it was commented by means of meetings with managers and employees of organizational units. The Head Office staff and the Director of the Office agreed on the final version. The long-term plan defines its mission as follows: „Performance of tasks of the national authority in the area of defense standardization, codification and government quality assurance in accordance with legislation of the Slovak Republic and standardization documents of NATO." The vision is formulated as follows: „The Office desires to be a credible, internationally recognized national authority in areas of defense standardization, codification and state-level quality control recognized in the Slovak Republic and in

the international community of EU and NATO member states." Furthermore, the document defines specific missions and visions of individual organizational units, their goals and roles. The Program Declaration of the Government of the Slovak Republic from the year 2012 is incorporated within and, for that reason, we consider it to be a living document.

2.5 Basic steps of suppliers in the process of codification of products intended for defence purposes

If the supplier, either the manufacturer or provider of services, wants to deliver or provide products for defense purposes, for example for the Armed Forces of the Slovak Republic (hereinafter referred to as "armed forces"), he must meet the conditions related to public procurement, which also include commitment that with the product supplied he also delivers proposal of codification data on the product.

Pursuant to the Act No. 11/2004 on the Defense Standardization, Codification and Government Quality Assurance of the Slovak National Council, only those applicants who agree with codification of the product that is not included in the Codification System of the Slovak Republic can supply products intended for defense purposes. This prerequisite must be stated in the contract.

The subject matter of the contract signed between the procurer and supplier on delivery of products for defense purposes includes the delivery of the proposed codification data. This means that the supplier, in addition to the physical delivery of products, agrees with the delivery of the proposed codification data, which are subject to codification in the period specified in the contract.

Pursuant to Section 13, Par. 2 of the act, the contractor informs the office that the Ministry of Defense has signed the contract for the supply of the product intended for defense purposes. The information also indicates whether the procurer in the concluded contract requires delivery of the proposed codification data or whether the user has announced that the procured product is not included in the codification system of the Slovak Republic.

If the contractor does not have an assigned manufacturer / supplier code (NCAGE), he shall apply for its assignment with the Office of Defense Standardization, Codification and Government Quality Assurance ("the Office"). The application form is published on the Office's website www.uosksok.sk).

Pursuant to letter a), par. (1), section 13 of the act, the contractor is obliged to deliver proposal of codification data in the structure defined in the Appendix to the Directive No. 476/2011, in each contract, which includes a codification request.

The proposal includes the following files:

- General information,

- Products

- Applications

- Implementation

If the procurer in the contract with the supplier asks for a delivery of proposed codification data for products the supplier purchases from another manufacturer / supplier, according to NATO Manual on Codification ACodP STS-1, the contractor in the contract with the supplier enforces a demand for their

codification. It is important to apply this requirement, particularly for products the contractor purchases from some NATO member states, or from another country that uses the NATO Codification System (NCS hereinafter).

If the supplier purchases the delivered product from the manufacturer in a country that does not apply the NCS, it is recommended that the contractor in the concluding agreement with a manufacturer enforce requirement for the supply of product data, which are necessary for description of its identification.

The contractor who supplies products purchased from a foreign manufacturer / supplier from the countries that apply NATO Codification System is obliged to notify the Department of Codification with the following:

- number of the contract the supplier signed with the procurer, including request for codification of the products,

- the product name and reference number of the product specified in the contract with the procurer,

- the number of the contract signed with his foreign supplier, indicating whether any requirements concerning the codification were made,

- foreign supplier's organization name, address and contact telephone, fax, mail and www,

- the name of the product used by foreign suppliers in English or in the language of the supplier and the reference number that the supplier uses to describe his product, if they are different from the reference numbers specified in the contract with the supplier's procurer.

In order to process the proposed codification data on the basis of contracts concluded with the procurer, the supplier has the possibility to approach and select an agency for codification, which has a valid certificate of competence to process proposals of codification data for products. They will make a contract for processing proposed codification data for products, which require codification. An overview of agencies for codification with a valid certificate is given to www.uosksok.sk.

The contractor is obliged to provide the agency for codification, he concluded the contract with on development of the proposed codification data, with the following:

- basic information known to him,

- a list of products being codified in a form of table,

- further special requirements placed by the user, e. g. specific properties (e.g. technical parameters of the producer or the product – heat resistance of protective clothing, etc.),

- the parameters, data and characteristics, which the agency for codification will specify from the relevant guidelines on identification (FIIG - FEDERAL IDENTIFICATION ITEM GUIDE) for the specific supply item (INC - ITEM NAME CODE),

- documentation access route for data checking. The Contractor shall make documentation available for the user and the processor, that means the Agency for the codification and the codification department office.

In order to create sufficient time for processing of the proposal for codification data, it is appropriate that the contractor knows, whether the products to be supplied or provided, are or are not codified in a country that uses the NATO Codification System. If they are already codified, he needs to know what NSN they have been assigned with and whether or not these products are included in the codification system of the Slovak Republic.

While processing the proposed codification data, the agency for codification will:

- Search - check whether a product is included in the codification system of the Slovak Republic in the SKMCRL database, which is part of SK - code. Check whether the product is not yet codified within the alliance published in the NMCRL database.

- It processes different types of applications as follows:

  - If the product is codified within the alliance (is assigned with NSN), it shall make a proposal to supplement the Slovak Republic as a new user and the request for the inclusion of the product into the codification system of the SR will be processed by LAU,

  - If the product with foreign NSN is also manufactured and supplied by a Slovak manufacturer or producer who is also a supplier for Slovakia from a country that does not apply the NATO Codification System, it shall make a proposal to supplement information about the manufacturer and its product, application LAR,

  - If the product is not codified and the supplier buys it from foreign producers in the country that uses the NATO Codification System, it shall make a proposal for codification in the country of the producer, request L07 with LSA,

  - If the product is not codified and if it is made by a producer from Slovakia or from another country that does not apply the NATO Codification System, the agency processes the request on the codification to the Slovak Republic LNC.

- It processes the file "Contract Fulfilment" in which for each codified item with RN, NCAGE and name it will state the DIC processed application type, DCN application (the number under which the application for the codification of items was processed) and indicate the image name provided with the item.

The codification agency will process different types of applications according to the requirements of the codification department and hands them over in an agreed manner to the contractor on the agreed date.

The contractor shall submit the proposed codification data in the time and manner specified in the contract at the office address along with three copies of the delivery order.

A codification department employee will check the basic data and compare the list of products subject to codifications under the contract with a list of products for which proposed codification data were supplied. Subsequently, he will carry out import of proposed applications and import of contract fulfilment file. If the imports are without shortcomings, he confirms the delivery orders - enters the proposed data delivery, puts the seal of the office and his signature. One copy shall be submitted to the contractor, one is sent to the procurer referred to in the contract, and one is filed with the contract at the codification department.

If the contractor does not supply the codification data proposal by the date specified as the date of delivery, the codification department shall notify the procurer upon demand with this fact.

In the event that errors appear in the protocols of import, the codification department will send error reports with the relevant proposed codification data for correction to the agencies for codification which processed it. The agency shall forward the revised proposal to the codification department under the original DCN number. The codification department shall simultaneously notify the supplier of the possibility of objections to the proposed codification data. If the agency does not remove erroneous data within the deadline of 10 days, the codification department will in writing notify the contracting authority of this fact. The procurer alongside the supplier shall begin the complaint procedure in accordance with the provisions of the contract concerned. In the event that the revised proposal for codification data is flawless, the codification department confirms the delivery order.

If no mistakes are found with the imports, the executive of the codification department will project the LNC request to the SR codification system, which will generate the so-called temporary NSN. In case an error message appears, he will refuse the proposal of the application and forward it to the codification agency for reprocessing (deadline for elimination of errors is usually 10 days). The agency sends the edited draft back to the department of codification under the original DCN number. In the event that the agency does not correct errors by the deadline, the codification department will send a complaint proposal to the procurer concerning the incorrect proposed codification data.

If the request is projected to the codification system without errors, the executive of the codification department shall perform revision of the proposal by segments. In the event that he does not find any shortcomings, he will approve the proposal, which will generate a permanent NSN. If he finds some reasons why the proposal should not be approved, he shall refuse the approval and state the reason for rejection into the protocol. The reason for refusal shall be sent by means of the application processing protocol to the competent agency for codification. If it is necessary to process a new proposal, he shall state the date by which he asks the codification agency to process or correct this proposal. The agency will send the corrected draft back to the department of codification under the original DCN number.

If the proposed codification data meet the requirements of the Slovak codification system and comply with the applicable guidelines established by the codification department for assessment of the competence of the applicant or agency:

- The codification department assigns the individual products, to which the LNC transaction has been processed, with a NATO Stock Number - NSN, and includes them in the codification system of SR and sends data to the NAMSA Agency on their inclusion in the alliance database NMCRL.

Note:

If the NAMSA agency refuses to include products in the NMCRL, the conflict will be resolved by the agency responsible for codification.

- For other applications, the department of codification will follow the STS-ACodP-1. The department of codification can include these items in the codification system of the Slovak Republic after the adoption of codification data items from the NCB of the country.

After inclusion of the products in the codification system of the Slovak Republic, the information on these products will be published on the codification department's website in the Internet version SK - code "Codification code lists and an overview of products included in the codification system of the SR"

Note:

If suppliers wish to make communication in the codification process more effective, they should develop the "Type Catalogue" (Catalogue of Items of Supply) for their items and incorporate the following data:

- *The item name (the name that you use to communicate with customers),*

- *RN (reference number, e. g. a drawing number, catalogue number),*

- *NSN Items (NATO Stock Number),*

- *NCAGE (code of manufacturer, supplier).*

3 SUPPLY IN THE ARMED FORCES

3.1 Slovak Armed Forces Classes of Supply

Slovak Armed Forces Supply Classes compatible with NATO Classes of Supply.

Class of Supply number	Name - Content	Comment
I.	Rations, Forage	
II.	Armaments and Equipment (for which allowances are established by tables of organization)	
III.	Fuels and Lubricants	
IV.	Construction Material	
V.	Ammunition	

Pict. 9 - *Slovak Armed Forces Classes of Supply*

CLASS OF SUPPPLY I

Within Class of Supply I (under the authority of the Section of Food Supply Services of the Logistic Support Office), the plan of material and technical support (hereinafter referred to as "plan") is developed at tactical level (unit, brigade) and at the operational level of command. Command of basic units evaluates the plan for its directly subordinate units and facilities, processes and approves the summary plan.

Regular supply of military units and facilities of the Slovak Armed Forces is performed:

- from logistics supply bases – applies to material procured by public authorities on the basis of the approved "Procurement Plan" (hereinafter referred to as "plan"). Distribution of material is carried out according to the distribution list approved by the chief of the Section of Food Supply at the Logistic Support Office of the Slovak Armed Forces.

- from the civilian sector - applies to material procured by public authorities on the basis of the procurement plan and other public authorities on the basis of the approved "Plan for small purchases of products, works and services ".

CLASS OF SUPPLY II

The basic form of regular supply of units and facilities in the Slovak Armed Forces is supply by means of the processed and evaluated material and technical support plan (hereinafter referred to as "the plan"). This plan is the basic document for management of material and technical support of units linked to the supply process in the Class of Supply II. Its basic objective is to obtain an objective overview of users' material needs in order to perform tasks in the relevant training year.

Units incorporate all material needs, which are related to performance of common everyday tasks into the plan, together with the requests for replenishment of individual kinds of prescribed stocks at particular level. Equipment, technologies and material, for which allowances are established by tables of organization, shall not be included in the plan.

Requirements related to the plan are processed at all command and control levels and submitted to the Joint Centre of Material Management by the predefined deadline.

Individual sections of the Class of Supply II of the Logistic Support Office of the Slovak Armed Forces summarize and evaluate requirements for all components of the Armed Forces of the Slovak Republic.

CLASS OF SUPPLY III

Supply of military units and facilities of the Slovak Armed Forces is implemented through:

- logistics supply base
  - regular supply
  - emergency supply
- from the civilian sector
  - supply from production plants
  - supply from gas stations via credit cards

Supply is performed from the logistics supply base. Military units and facilities plan and request deliveries in writing.

The Slovak Armed Forces apply the directive method of petrol, diesel and aviation fuel supply.

Supply is carried out in different ways according to convenience, the distance and possibilities of the logistics supply base.

CLASS OF SUPPLY IV

The complex system of material supply, management and registration within the Class of Supply IV is determined by individual methodological instructions developed by the Chief of the Department of the Supply Class IV.

CLASS OF SUPPLY V

Supply of military units and facilities of the Slovak Armed Forces with ammunition and explosives is carried out through regular or emergency supply from ammunition depots of the logistics supply base.

Amount of funds allocated for the entire command of basic units for the purchase of ammunition and explosives for a particular training year is the decisive criterion of the proper supply of ammunition and explosives as allocated funds for the purchase of (replenishment of the depleted training) ammunition and explosives are far from covering the quantitative standards.

Units draw ammunition according to accounting documents issued by the logistics supply base within the deadlines agreed in writing, by telephone or by fax and confirmed by the quartermaster of the ammunition depot.

CONCLUSION

The armed forces in the past were based on static logistics, which resulted from the creation of large stocks of materials and technologies. Due to the development and modernization of the armed forces, the current logistics is changing into a dynamic one, where the main mission and goal is more efficient use of allocated resources.

Approximation to the "just in time" principle has resulted in a substantial reduction of armed forces capital in the stock of materials and technologies. However, these measures do not exclude the existence of a certain amount of material inventory in stock. On the contrary, deepening dependence on the supply of materials from outside or the "just in time" supply system, places increased demands on the resistance of producers, suppliers as well as logistics or transport units, or civilian transporters and makes logistics considerably vulnerable with potential fatal impact on the operational capability of the support and supply units.

Codification - means the whole system of services providing identification, classification and assignment of a stock number to the individual items of supply within supplies of NATO nations. The aim is to establish a common language for designation of supplies, which is based on the concept - one item - one number. NATO Codification includes maintenance of existing registers with records and generation of updated information for all states that are registered as users of individual items.

Codification and standardization according to the NATO uniform system is an essential step towards implementation of the uniform designation and classification of material for external suppliers with an emphasis on civilian contractors.

NATO headquarters have already increased their demands concerning interoperability with adequate impacts on the process of defense standardization as well as a broader connection of the civilian standardization with the defense standardization. As a result, higher demands will be placed also on the personnel of the Office of Defense Standardization, Codification and Government Quality Assurance in the process of defense standardization, codification and government quality assurance.

The proposed project submitted within the V4 countries can greatly assist in coordination and cooperation in the area of standardization and codification of supply chains within the alliance.

Literature:

1. *Odborné pokyny č. 1/2011 k zásobovaniu materiálom v zásobovacích triedach I, II, III, IV a V.* č.: SCMM-1/1-27/2011, Spoločné centrum materiálového manažmentu Trenčín.

2. Gubáš, F. *Proces evaluácie vojenských zdrav. zariadení OS SR v kontexte ich interoperability v operáciách NATO. In: Národná a medzinárodná bezpečnosť 2013: zborník 4. medzinárodnej vedeckej konferencie.* Liptovský Mikuláš: Akadémia ozbrojených síl. 2013. s. 208 – 215. ISBN 978-80-8040-475-8.

3. Marchevka M. *Vytváranie zásob pre krízové situácie. Zborník z konferencie „Národná a medzinárodná bezpečnosť 1015. AOS, Katedra bezpečnosti a obrany.* Liptovský Ján. 2015. ISBN-978-80-8040-427-07.

4. *Smernice Ministerstva obrany Slovenskej republiky č. 15/2014 zo 17. marca 2014 o verejnom obstarávaní.*

5. Školník, M., Morong, S. *Vojenská logistika. Základy vojenskej logistiky a materiálového manažmentu. Vysokoškolská učebnica.* Liptovský Mikuláš: Akadémia ozbrojených síl generála M. R. Štefánika, 2013. 198 s. ISBN 978-80-8040-485-7.

6. Školník, M., TarcsI, G. *Vybrané úlohy strednodobého plánovania v kontexte krízového manažmentu. In Manažment - teória, výučba a prax 2013. Zborník z medzinárodnej vedeckej konferencie.* Liptovský Mikuláš: Akadémia ozbrojených síl generála M. R. Štefánika, 2013. s. 98. ISBN 978-80-8040-477-2.

7. *Zákon č. 11/2004 Z. z. z 3. decembra 2003 o obrannej štandardizácii, kodifikácii a štátnom overovaní kvality v znení neskorších predpisov.*

8. *Bulletin č. 5 Veliteľstva síl výcviku a podpory ozbrojených síl SR.* Kodifikačný systém Slovenskej republiky v roku 2012. BULL-10-5. Trenčín. 2012. 77 s.

9. *Bulletin č. 1 Štandardizácia, kodifikácia a štátne overovanie kvality na účely obrany.* BULL-11-1. Trenčín. Úrad logistického zabezpečenia ozbrojených síl Slovenskej republiky. Trenčín. 103 s.

MILITARY SUPPLIES CODING ACCORDING TO GS1 – GOOD BUSINESS PRACTICES AND THEIR IMPLEMENTATION IN THE POLISH ARMED FORCES

Ms. Anna Kosmacz-Chodorowska, Dr. Elżbieta Hałas

Instytut Logistyki i Magazynowania

Abstract

Using of automatic barcode-based identification as a tool for communication in the supply chain is an example of a civilian technology that is also coming to be adopted in military logistics. Due to the multi-sector nature of military supplies, first NATO, and then also the Polish Armed Forces decided that it would be beneficial to take advantage of civilian experience and the associated synergy in the field of military supplies. The Polish Armed Forces are reorganizing their logistics by establishing large warehouses where ADC systems are implemented based on barcodes, in accordance with the GS1 system. Experience from projects that have been completed by the military indicates that one of the challenges is to define new functions of packages in the supply chain, which determine, among other things, the type of barcode and the scope of the data that are coded and exchanged. This paper presents examples of practical solutions, implementations in this area, as well as the challenges associated with the military sector and their possible solutions.

Key words: GS1, ADC, barcodes, global standards, logistics, functions of packages, military

Introduction

Automatic Data Capture (ADC) is a basic information technology tool and its implementation facilitates information and material flow along supply chains. Effective management of supply chains requires good synchronization of the flow of products, information, and financial streams through all the organizations constituting part of the chain, which in turn requires the use of a common language that is understandable both for humans and IT devices. The role of such a language is performed by the standards that are necessary for the effective automation of communications; especially the global GS1 standards. GS1 standards, that have so far been used by civilian companies in Poland, are now - following a decision of the Ministry of Defense announced in January 2014 - being implemented by the military suppliers and will be used in the Polish Armed Forces.
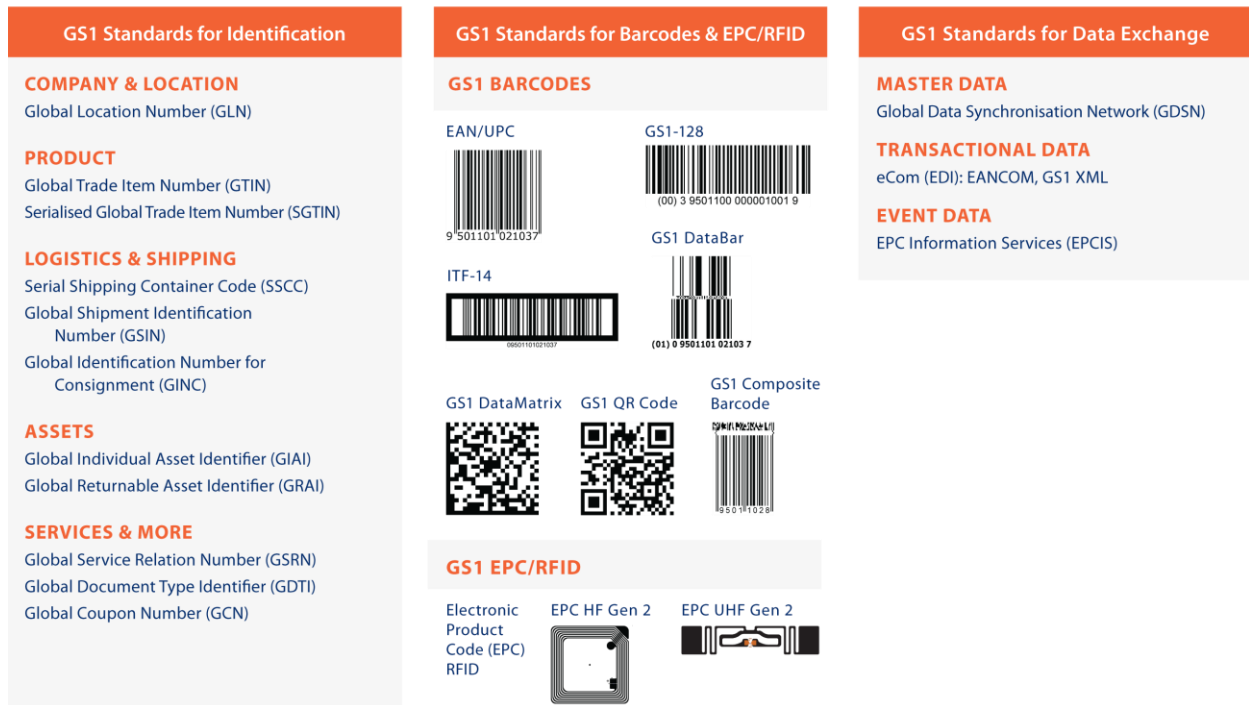
Pict. 1 - *GS1 Standards*

Source: *GS1 internal sources*

This decision is a consequence of the current strategy for the broad use of so-called dual-use technologies, or standards shared by the civilian and military sectors [1]. This approach facilitates the process of implementation of new technologies in areas common to both sectors, and makes it possible to take advantage of the related synergies. Good examples for the synergies are the mutual adaptation of the delivery and warehouse handling processes in combination with inventory maintenance, and those ones of manufacturing, distribution, and supply processes. This results in a higher level of customer services and better use of resources, at lower inventory levels [2].

The military sector in many countries is aware of making improvements on supply chain management in order to implement in practice the principle of tracking the movement and origin of goods "from factory to foxhole" [3]. The GS1 system is accepted and implemented in applications used by NATO and a number of national militaries (e.g. those of the USA, Australia, Brazil, and Germany), including Poland. A particular area of cooperation and implementation of the GS1 system in military logistics is broadly defined, its principles and standards must be based on modern technologies used in both military and civilian sectors. The principles of civil-military cooperation, are most of all the NATO requirements and the market-based principles of outsourcing, require the Polish Armed Forces to participate actively in of logistics developments, including the area of automatic identification of products, resources, services, and locations. The GS1 system fulfills the the NATO program requirements of standardization and interoperability, since it improves the operating capacity of multinational armed forces by means of

universal standardization and a high level unification of the basic procedures and components in military logistic supply chains [5].

We present here the results of several-years cooperation with the Ministry of Defense's Support Inspectorate, responsible for military logistics in Poland. Use is also made of experience gained in the course of work carried out in the last two years with nearly 300 military suppliers making efforts to meet the requirements of the Ministry of Defense with regard to coding of supplies, and in the course of cooperation with military procurement agencies and institutions involving the provision of support in defining detailed requirements in this regard.

ADC TECHNIQUES IN CIVILIAN AND MILITARY LOGISTICS

Automatic Data Capture (ADC) is defined as automatic and direct entry of data into computer systems or other microprocessor-controlled equipment using special interface devices, without the need of keyboard-data inputs [6]. Such data-entry techniques at the required level of details, using special electronic devices called readers or scanners, are quick and error-free methods compared with time-consuming manual ones, which might lead to frequent errors. Because of aforementioned advantages, ADC information technology systems are widely used to improve the effectiveness of repeated, cyclical operations, such as record-taking, transactions, inspection and control.

ADC techniques are applied in various processes, especially in warehousing, supply and distribution. Among others ADC techniques improve the efficiency of the following warehouse operations:

- receipt of materials and goods via automatic checking of deliveries (goods, quantities, supplier, date and series, etc.),

- turnover record-keeping with automatic update of inventory, including all important data;

- storage and relocation of materials and goods with automated tracking of their location (original location, target location),

- collection and preparation of supplies for production or use and of external deliveries, with automatic control of outgoing items,

- inventory checking,

- traceability of products.

ADC techniques are used in a broad range of NATO military asset tracking systems in many of the allied countries, also including, in the near future, the Polish Armed Forces. Tracking activities are overlapping the entire supply (support) chain, from the manufacturing plant, through warehousing and distribution sites to military units, from the preparation of supply sets and their transportation to their destinations, up to the final use or consumption (by the end user), performed via different means of transport and in various forms of packaging.

Although ADC systems are incorporating various type of techniques, two most common in both civilian and military logistics are the barcodes and RFID tags. Bar codes, which are the most easily applicable and also the cheapest technique, are successfully utilized in warehousing and in supply chains. A few out of several hundred selected barcodes (linear and matrix) as universal, international standards are commonly used, especially in logistics. This technique is extensively used among others by the USA

and Brazil departments of defense l [5]. NATO adopted the GS1 global standards in 1998 (then referred to as EAN.UCC), and introduced them in its Standardization Agreements (STANAGs) [7].

THE REORGANIZATION OF LOGISTICS IN THE POLISH MILITARY AND THE SCHEDULE FOR IMPLEMENTATION OF ADC

The GS1 Poland national organization has begun its cooperation with the military and defense sector as early as 1999. During the course of 2000–2006, the defense sector made unsuccessful attempts to introduce a bar codes based ADC system utilizing its own solutions. Further efforts in the implementation of standard solutions resulted the signing of a co-operation agreement with active participation of 60 military units in the GS1 system (2005). Ongoing organizational changes in the military infrastructure caused additional delays in the implementation of a uniform ADC system.

In the meantime, a decision was made to reorganize the logistics of the Polish military forces by gradually eliminating small, scattered warehouses and replacing them by three large warehouses; in central, northern, and southern Poland. The effective operation of such huge warehouses, containing the nearly three million stock keeping units in the central resource database, requires extensive automation and the use of an ADC system, together with the consequent implementation of barcodes. Between 2010 – 2012, with GS1 Poland's assistance, the principles of the military resource and supply coding and the consequent specifications for an ADC system were developed. The final decision to implement the system was taken in January 2014 [8], and in April 2014 the first deliveries identified via GS1 codes were received by the military.

Further to that, principles for the coding of current military inventories with so-called "restricted circulation numbers (RCNs)" were jointly drawn up in order to identify such inventory stocks via barcodes and logistic labels in accordance with the GS1 system standards. Planned gradual implementation in the large warehouses will be beginning from 2015 (through 2016, and by 2020) and then further proceeding in other smaller warehouses (by 2018). By 2018, all goods and resources of the military forces will be identified by GS1 key-based barcodes.

GS1 Poland continues its close cooperation with the military forces, mostly in the areas of validation of the specific requirements of individual military unit buyers, the validation of the suppliers' technical codes based on the international GS1 procedures.

THE GS1 SYSTEM AND STANDARDS IN THE CIVIL ECONOMY AND IN THE POLISH MILITARY

The GS1 system is a set of multi-sectorial identification and communication standards intended for use in logistics processes along supply chains according to a commonly agreed rules. The system has been known globally for 40 years and used by more than 1.5 million companies worldwide. In Poland, it is being used by about 20,000 companies. The most important element that integrates all components of the system is the uniform method of identification, especially: of goods – via GTIN numbers (former name EAN); of companies and physical locations – via GLN numbers; and of logistics items – via SSCC numbers. The identifiers used are globally unique. The elements of the GS1 system provide tools to enable the performance of the following functions:

- unique identification of products and items in any supply chains,

- automatic gathering of data on delivered products/goods and logistics items (loads),

- sharing the information of goods and loads, as well as of all related events, with other participants of the supply chain.

For many years, the activities of the GS1 organizations were focused on the requirements of consumer product manufacturers and retailers. Recent years, more and more attention has been paid to other sectors too, for example to the health care, the military, and above all the transport and logistics sector. In Poland, familiarly to other countries, the GS1 system is managed and implemented by a national GS1 organization, (the Institute of Logistics and Warehousing in Poznań the same institute carrying its continuous activity from the very beginning), authorized, to register companies and institutions in the system together with the provision of other services.

The implementation of the ADC system for the identification of items in the military sector based on the use of the same standards as in the civil sector, i.e. the GS1 standard, together with the NATO sector-specific standards:

- identification standards, including global identifiers of:

  - retail and non-retail trade items: GTIN (Global Trade Item Number), chiefly GTIN-13 and GTIN-14, and sector-specific NATO identifiers of trade items: NSN (for products that have them)

GS1 Prefix in Poland	Company Identification Number	Item Reference	Check Digit
590	J1 J2 J3 J4	T1 T2 T3 T4 T5	K
590	J1 J2 J3 J4 J5	T1 T2 T3 T4	K
590	J1 J2 J3 J4 J5 J6	T1 T2 T3	K
590	J1 J2 J3 J4 J5 J6 J7	T1 T2	K

Tab. 1 - *GTIN-13 Data Structure*

Source: *GS1 General Specifications*

- logistics items: SSCC (Serial Shipping Container Code) numbers

AI	Extension Digit	GS1 Prefix in Poland	Company Identification Number	Serial Reference	Check Digit
00	D	590	J1 J2 J3 J4	S1 S2 S3 S4 S5 S6 S7 S8 S9	K
00	D	590	J1 J2 J3 J4 J5	S1 S2 S3 S4 S5 S6 S7 S8	K
00	D	590	J1 J2 J3 J4 J5 J6	S1 S2 S3 S4 S5 S6 S7	K
00	D	590	J1 J2 J3 J4 J5 J6 J7	S1 S2 S3 S4 S5 S6	K

Tab. 2 - *SSCC Data Structure*

Source: *GS1 General Specifications*

- locations: GLN (Global Location Number) and sector-specific NATO supplier identifiers: NCAGE (not used in the ADC)

GS1 Prefix in Poland	Company Identification Number	Location Reference	Check Digit
590	P1 P2 P3 P4	L1 L2 L3 L4 L5	K
590	P1 P2 P3 P4 P5	L1 L2 L3 L4	K
590	P1 P2 P3 P4 P5 P6	L1 L2 L3	K
590	P1 P2 P3 P4 P5 P6 P7	L1 L2	K
590	P1 P2 P3 P4 P5 P6 P7 P8	L1	K
590	P1 P2 P3 P4 P5 P6 P7 P8 P9		K

Tab. 3 - *GLN Data Structure*

Source: *GS1 General Specifications*

- symbol standards – GS1 barcodes, including EAN/UPC, ITF-14, GS1-128 (formerly called UCC/EAN-128 or EAN-128),

- GS1 global Application Identifiers (AI). The AI-s are used to provide additional data on non-retail trade items and all logistics items,

- GS1 logistic labels.

Also, trade and logistics items with homogeneous content are labeled additionally with national trade item identifiers, called JIM (used only for visual readout). JIM is an acronym meaning Uniform Material Index *(Jednolity Indeks Materiałowy)* and it has the role of a classification identifier in the database has been developed in the Polish military over many years.

PRINCIPLES OF THE GS1 STANDARD BASED ADC SYSTEM iMPLEMENTATION FOR MILITARY LOGISTICS IN POLAND

The basic requirement for proper implementation of an ADC system in any civilian or military entity is the correct identification and coding of items such ones like supplies, finished products, and resources.

Proper labeling with barcodes, to ensure identical interpretation by all users of the ADC system in the supply chain, should meet the adopted requirements specifying:

- the type of information and coding method,

- the type of barcode symbols used,

- the location of the barcode on the item.

The type of information and coding method, together with the presentation in specific barcode symbols at a specific location, are regulated by Decision no. 3 of the Ministry of Defense [8]. The decision had

been developed as a result of the aforementioned long cooperation with the Support Inspectorate of the Ministry that enabled the unique needs of the military sector to be taken into account.

Thus the development of a systematic approach coping the military supplies coding problem taking into account the basic supply coding principles became possible with regard to the determinants like:

- the function of at product in a given form of packaging in at supply chain (package as a trade item, retail or non-retail, and as a logistics item, trade or non-trade),

- the content of at package: discrete products or products of variable quantity in a specified unit of measurement, e.g. meters, and with a specified accuracy, e.g. 1 centimeter; homogeneous content, including a standard mix, or non-homogeneous content),

- sector-specific characteristics of the goods.

The aforementioned decision converted the determinants into specific requirements must be met by suppliers, and by military purchasers as well.

CODE INFORMATION ACCORDING TO SECTOR

Under Decision no. 3 of the Ministry of Defense, all goods must be coded according to their sector-specific characteristics. This involves a different scope of additional information given in the barcode on the label of a non-retail sales package or a logistical package with homogeneous content. Based on the sector-specific characteristics, five assortment groups, also called material groups, are identified:

1. **Food, healthcare, and medical products**

Pict. 2 - *Examples of products from 1st assortment group.*

Source: *Internet*

2. Uniform and equipment items (underwear, uniforms, helmets, boots/shoes, etc.)

Pict. 3 - *Examples of products from 2nd assortment group.*

Source: *Internet*

3. Munitions (ammunition etc.)

Pict. 4 - *Examples of products from 3rd assortment group.*

Source: *Internet*

4. Fuel, lubricant products, construction materials, and cleaning products

Pict. 5 - *Examples of products from 4th assortment group.*

Source: *Internet*

5. Other products, including military equipment other than those listed above (military weapons and equipment – weapons and their subassemblies and parts)

Pict. 6 - *Examples of products from 5th assortment group.*

Source: Internet

Products included in specific groups are assigned a list of data to be included in their GS1 barcodes. These requirements have been defined for most, but not all of the products in each group: For example, in the case of a medical product like gauze, the basic standard data specified for the goods in this group will be required (e.g. lot number); while in the case of a medical device, included in the very same group, the serial number of the device should be given instead of the lot number.

CODE INFORMATION ACCORDING TO FUNCTION

The information to be presented in a barcode is to be selected according to the function of the product package in the supply chain, e.g. whether it is a trade item or a logistics item, or both.

According to the GS1 definition [8], a trade item is any item that is ordered, priced, and invoiced. Trade items include all products used by the military, some of which are assets, while others are products issued as consumables. Each trade item must have at least a Global Trade Item Number (GTIN) assigned. Logistics items (also called transport items, shipping items, or loading items) could be any combinations of trade items created for storage or transport in order to identify and track those units in at supply chain. Each logistics item must have an individual Serial Shipping Container Code (SSCC) assigned.

Logistics items can also be trade items. For example, a tank should be identified as a non-retail trade item and as a logistics item.

Depending on the specific function of an item in the supply chain (trade item or logistics item), its value and form of packaging, five types are distinguished in practice:

- a retail trade item: a unit package (e.g. a pair of gloves) or a multi-unit package (e.g. a 6-pack of 1.5-liter water bottles),

- a non-retail trade item: a unit package (e.g. a 20 kg sugar bag), item without package (large-size resources, e.g. a tank), a multi-unit package (e.g. a case of cartridges, a box of socks) or a standard mix (e.g. a box with 5 loaves of wheat bread and 5 loaves of whole-meal bread),

- a retail trade item that is also a logistics item (e.g. a refrigerator),

- a non-retail trade item that is also a logistics item (e.g. a pallet with a set of tires),

- non-trade items that are logistics items with homogeneous content (e.g. a pallet with 10 cases of cartridges) or logistics items with non-homogeneous content (non-standard mix, e.g. a box or pallet with small spare parts of different kinds).

Each of the above functions, dependent upon the given sector-specific characteristics of goods, requires a slightly different set of data to be contained in barcodes.

IN SUMMARY:

- Retail trade items for the military are coded in the same way as those used in the civilian sector – using GTIN number in EAN/UPC codes.

5 901234 123457   **4711 2346**   **8 59563 00386 3**

Pict. 7 - *Examples of GS1 barecode symbols using in the Polish military sector for retail trade items (for all assortment groups): EAN-13, EAN-8, UPC-A*

Source: *GS1 internal resources*

- Non-retail trade items for the military should be coded with GS1-128 code, because supplementary information must be provided in addition to the GTIN key. Such supplementary information includes one of the following dates: the best before date (food products), the expiry date (medicines and medical products), and the manufacturing date (other supplies). The code also includes at lot number/production series number or at serial number.

(01) 0 5901234 00001 7 (15) 120628 (10) ABC123

(01) 0 5901234 00002 4 (17) 120919 (11) 110915

(01) 0 5901234 00005 5 (17) 161231 (21) 00005678

(7001) 1234567890123

Pict. 8 - *Examples of GS-128 barecode symbols using in Polish military sector for non-retail trade items (for all assortment group). The additional information encoded in barecode depends on the specyfic assortment groups.*

Source: *GS1 internal resources*

- All logistic items for the military are labeled and identified in the same way as those used in the civil sector, i.e. by at GS1 logistic label (with GS1-128 code) and by the SSCC number; other information on the label depends solely on the content of at specific logistics item.

Dostawca XYZ Sp. z o.o.
ul. Militarna 23, 12-345 Wojnowo
tel: +48 22 1234567, fax: +48 22 1234567
www.xyz.mil.org, office@xyz.mil.org

MĄKA PSZENNA 10 x 1 KG

CONTENT / ZAWARTOŚĆ:	BEST BEFORE / NAJLEPSZE DO:
05901234560116	31.12.2012 (dd.mm.yyyy)
COUNT / LICZBA:	BATCH / LOT / SERIA:
40	ABC123
SSCC:	PURCHASE FROM / KUPIONO OD:
059012340000000062	5909876543213

(02) 05901234000116 (412) 5909876543213 (37) 40

(15) 121231 (10) ABC123

(00) 059012340000000062

Dostawca XYZ Sp. z o.o.
ul. Militarna 23, 12-345 Wojnowo
tel: +48 22 1234567, fax: +48 22 1234567
www.xyz.mil.org, office@xyz.mil.org

MUNDUR POLOWY TYP ABC ROZM. XXL

CONTENT / ZAWARTOŚĆ:	PROD. DATE / DATA PROD:
05901234000123	15.09.2011 (dd.mm.yyyy)
COUNT / LICZBA:	USE BY / ZUŻYĆ DO:
56	31.12.2015 (dd.mm.yyyy)
NSN:	PURCHASE FROM / KUPIONO OD:
1234567890123	5909876543213
SSCC:	JIM:
059012340000000079	1250PL1234567

(02) 05901234000130 (412) 5909876543213 (37) 56

(11) 110915 (17) 151231 (7001) 1234567890123

(00) 059012340000000079

Dostawca XYZ Sp. z o.o.
ul. Militarna 23, 12-345 Wojnowo
tel: +48 22 1234567, fax: +48 22 1234567
www.xyz.mil.org, office@xyz.mil.org

AMORTYZATOR TYP 456

CONTENT / ZAWARTOŚĆ:	PURCHASE FROM / KUPIONO OD:
05901234000154	5909876543213
COUNT / LICZBA:	USE BY / ZUŻYĆ DO:
25	31.12.2016 (dd.mm.yyyy)
SSCC:	
059012340000000109	

(02) 05901234000154 (37) 25

(17) 161231 (412) 5909876543213

(00) 059012340000000109

Dostawca XYZ Sp. z o.o.
ul. Militarna 23, 12-345 Wojnowo
tel: +48 22 1234567, fax: +48 22 1234567
www.xyz.mil.org, office@xyz.mil.org

PURCHASE FROM / KUPIONO OD:	PACK DATE / DATA PAKOW:
5909876543213	15.10.2011 (dd.mm.yyyy)
SHIP TO LOC / WYSŁAĆ DO:	ORDER NUMBER / NR ZAMÓWIENIA:
5909988776653	NZ123456
SSCC:	
059012340000000116	

(412) 5909876543213 (410) 5909988776653

(13) 111015 (400) NZ123456

(00) 059012340000000116

Pict. 9 - *Examples of GS1 logistics labels beingused in the Polish military sector for logistic items (for all assortment groups). The range of information encoded in the barcode depends on the content of logistisc unit.*

Source: *GS1 internal resources*

GS1 logistic labels, which are required by most retail supply chains and manufacturers can also be used in military supplies. The military sector requires only two set of supplementary information, both in the case of non-retail trade items and in the case of homogeneous content logistics items:

- JIM national military identifier, visually readable representation,
- NSN - in the case of NSN assigned products, the digits shall be given in the barcode.

For an effective implementation of an ADC system in military environment one of the most important element was the defining a list of recommended business information to be provided as barcodes on individual products in specific forms of packaging. Out of the several dozen GS1 Application Identifiers, those ones that are the most common in civilian use were adopted for military purposes. They are listed in Table 1.

No.	GS1 AI	Use
1.	AI 00	to identify all logistics items with an SSCC number
2.	AI 01	GTIN to identify each non-retail trade item
3.	AI 02	to identify the content of a non-trade logistics item with homogeneous product content according to the GTIN

No.	GS1 AI	Use
5.	AI 11	to identify the date of manufacture of technical products
6.	AI 13	to identify the date of packing of logistics items of mix type
7.	AI 15	to identify the quality date: best before in the case of food products
8.	AI 17	to identify the expiry dates of medicines and, optionally, of other technical products
9.	AI 21	to identify the serial numbers of products that have them
10.	AI 10	to identify the manufacturing series/lot of all other products
11.	AI 310n	to identify variable quantity of products in kilograms
12.	AI 311n	to identify variable quantity of products in meters
13.	AI 315n	to identify variable quantity of products in liters
14.	AI 400	to identify the purchase order number on logistics items of mix type
15.	AI 410	to identify the supplier's GLN on each logistics item
16.	AI 412	to identify the buyer's GLN on logistics items of mix type
17.	AI 7001	to identify the NSN of products that have a NATO stock number

Tab. 4 - *List of GS1 Application Identifiers adopted by the military.*

Source: *GS1 internal resources*

While implementating the provisions of Ministry of Defense Decision no. 3, it turned out that the decision has not covered identification for goods contained in more than one package. For such cases GS1 system has a separate Application Identifier, AI 8006. Moreover, AI 90 application identifier (used for bilateral agreements), included to identify the so-called munitions assembly batch, became unnecessary, since this information turned out to be equivalent with the manufacturing series number identified by AI 10. Consequently, GS1 Poland and the representatives of the military sector are working on the development of a draft amendment relevant to Decision no. 3.

PRODUCT SHEET FOR PRODUCT DATA EXCHANGE

The GS1 system recommends that product data exchange between trade partners should be performed using the Electronic Data Exchange (EDI) method or the Global Data Synchronization Network (GDSN). None of these two recommended solutions haven't been used in Poland yet. Consequently, before the first physical delivery of each product, at supplier sends its company data to at recipient, using GLN keys for party identification and GTIN keys for product identification, in at form called a product sheet. The product sheets used by the Polish military are similar to product sheets commonly used by retail supply chains in their communications with suppliers. Decision no. 3 specifies the format of product sheets. Electronic version of product sheets must be filled out by at supplier and sent to at buyer sufficiently early to enable the buyer to enter the data into its central product database, called the Uniform Material Index (JIM).

PRODUCT SHEET

KARTA WYROBU			
Wniosek zgłoszeniowy do Systemu JIM dla wyrobu jednostkowego i hierarchii opakowań identyfikowanych numerami GTIN wg systemu GS1, występujących w dostawach wyrobów do resortu obrony narodowej.			
CZĘŚĆ A: DOTYCZY WSKAZANIA JIM I NSN DLA WYROBU JEDNOSTKOWEGO - wypełnia odbiorca wyrobu			
1.	Nazwisko i imię osoby rozpatrującej wniosek:		[WYMAG]
2.	Data rozpatrzenia:		[WYMAG], [D]
3.	Komórka organizacyjna:		[WYMAG]
4.	Telefon kontaktowy:		[WYMAG], [TS] lub [TK]
5.	Kontaktowy adres poczty elektronicznej (e-mail):		[WYMAG]
6.	Numer wniosku wg rejestru:		[WYMAG]
7.	Status wniosku:		[WYMAG]
8.	Wskazany JIM dla wyrobu jednostkowego:		[WYMAG]
9.	Wskazany NSN dla wyrobu jednostkowego:		
10.	Informacje dodatkowe:	[c200]	
CZĘŚĆ B: DOTYCZY IDENTYFIKACJI PRODUCENTA LUB DOSTAWCY NA ETYKIETACH LOGISTYCZNYCH Z KODEM KRESKOWYM - wypełnia zamawiający w uzgodnieniu z wykonawcą, który zawarł umowę w sprawie zamówienia			
1.	Numer identyfikatora GLN:		[WYMAG] [n13]
2.	Nazwa podmiotu gospodarczego:		[WYMAG]
3.	Adres siedziby głównej:		
	- miejscowość (poczta):		[WYMAG]
	- ulica, nr domu (miejscowość):		[WYMAG]
	- kod pocztowy:		[WYMAG]
	- inne dane:		
4.	Numer REGON:		[WYMAG] [REGON]

5.	Numer NIP:		[WYMAG] [NIP]
6.	Nazwisko i imię osoby zgłaszającej wniosek:		[WYMAG]
7.	Data zgłoszenia:		[WYMAG] [D]
8.	Telefon kontaktowy 1:		[WYMAG] [TS] lub [TK]
	Telefon kontaktowy 2:		[TS] lub [TK]
9.	Numer fax:		[WYMAG] [TS]
10.	Kontaktowy adres poczty elektronicznej (e-mail):		[WYMAG]
CZĘŚĆ C: DOTYCZY OPISU WYROBU JEDNOSTKOWEGO - wypełnia zamawiający w uzgodnieniu z wykonawcą, który zawarł umowę w sprawie zamówienia			
1.	Nazwa producenta wyrobu:		[WYMAG]
2.	Numer identyfikatora GLN producenta wyrobu:		[PRODUCENT] [n13]
3.	Kod GTIN dla opakowania jednostkowego:		[WYMAG] [n14] [G_1]
4.	Numer NSN – jeżeli istnieje:		
5.	Nazwa wyrobu jednostkowego:		[WYMAG]
6.	Podstawowa jednostka miary:		[WYMAG] [JM]
7.	Rodzaj opakowania		[WYMAG] [OPAK]
8.	Parametry wyrobu jednostkowego		
8 a.	Okres trwałości:		[WYMAG] [TRWAŁ]
8 b.	Waga w kilogramach	[WYMAG]	
	- brutto:		[WAGA]
	- netto:		[WAGA]
8 c.	Objętość w litrach	[WYMAG]	
	- ilość:		[OBJĘTOŚĆ]
8 d.	Wymiary w metrach	[WYMAG]	
	- długość:		[WYMIAR]
	- szerokość (wymiar w głąb):		[WYMIAR]
	- wysokość:		[WYMIAR]
8 d.	Symbol katalogowy producenta:		
8 e.	Norma jakościowa:		

9.	Ilość nadrzędnych rodzajów jednostek handlowych w hierarchii opakowań, oznaczonych własnymi numerami GTIN:		[WYMAG], wynika z ilości załączników - części D
10.	Opis uzupełniający do wyrobu jednostkowego:	[c200]	

CZĘŚĆ D: DOTYCZY OPISU OPAKOWANIA ZBIORCZEGO	
- wypełnia zamawiający w uzgodnieniu z wykonawcą, który zawarł umowę w sprawie zamówienia	
Uwaga: Każdy załącznik stanowiący cześć D opisuje jeden typ opakowania nadrzędnego w hierarchii opakowań. Do jednej części A-B-C należy dołączyć tyle części D, ile jest form opakowań nadrzędnych w hierarchii opakowań wyrobu jednostkowego.	

1.	Kod GTIN dla formy opakowaniowej:		[WYMAG] [n14] [G_2]
2.	Nazwa wyrobu dla formy opakowaniowej:		[WYMAG]
3.	Rodzaj opakowania		[WYMAG] [OPAK]
4.	Ilość opakowań jednostkowych wg części C:		[WYMAG]
5.	Parametry wyrobu w danej formie opakowaniowej		
5 a.	Waga w kilogramach	[WYMAG]	
	- brutto:		[WAGA]
	- netto:		[WAGA]
5 b.	Objętość w litrach	[WYMAG]	
	- ilość:		[OBJĘTOŚĆ]
5 c.	Wymiary w metrach	[WYMAG]	
	- długość:		[WYMIAR]
	- szerokość (wymiar w głąb):		[WYMIAR]
	- wysokość:		[WYMIAR]
6.	Opis uzupełniający do formy opakowaniowej:	[c200]	

LEGENDA:

[WYMAG]	–	Pole wymagane.
[TK]	–	Format zapisu numeru telefonu komórkowego: „+AB CDEFGHIJK", gdzie: AB - nr kierunkowy kraju, CDEFGHIJK – dalsze cyfry numeru telefonu.
[TS]	–	Format zapisu numeru telefonu stacjonarnego: „00AB(CD) EFGHIJK", gdzie: AB - nr kierunkowy kraju, CD - prefiks regionalny kraju, EFGHIJK– dalsze cyfry numeru telefonu.
[D]	–	Format zapisu daty „RRRR-MM-DD", gdzie RRRR - rok (4 cyfry), MM - miesiąc (2 cyfry), DD - dzień (2 cyfry).
[c200]	–	Format zapisu tekstu, gdzie przykładowo c200 oznacza ciąg o maksymalnej długości 200 znaków alfanumerycznych.
[n13]	–	Format zapisu numeru, gdzie przykładowo n13 oznacza ciąg 13 cyfr.
[REGON]	–	Format zapisu numeru w Rejestrze Gospodarki Narodowej (REGON), który wynosi 9 znaków numerycznych dla numeru REGON 9 cyfrowego lub 14 znaków numerycznych dla numeru REGON 14 cyfrowego.
[NIP]	–	Format zapisu 9-cio znakowego numeru identyfikacji podatkowej (NIP): „nnn-nnn-nn-nn", gdzie n – pojedyncza cyfra.
[G_1]	–	Należy podać numer GTIN według struktury: ➢ GTIN-8, GTIN-12 lub GTIN-13 uzupełniony z przodu zerami dla formy zapisu czternastu znaków numerycznych, ➢ GTIN-14 z cyfrą 9 z przodu dla wyrobu o zmiennej ilości.
[G_2]	–	Należy podać numer GTIN według struktury: ➢ GTIN-12 lub GTIN-13 uzupełniony z przodu zerami dla formy zapisu czternastu znaków numerycznych, ➢ GTIN-14.

Pict. 10 - *Product sheet, which suppliers are required to fill out before the first delivery*

Source: *GS1 internal resources*

PROBLEMS TO BE SOLVED IN COMMUNICATIONBETWEEN SUPPLIERS AND THE MILITARY

Many military suppliers, also military purchasers, are not experienced in working with barcodes and are not familiar with the related standards. The requirement for the use of codes in military supplies at all packaging levels both by manufacturers and also by vendors, requires them all to become familiar with the new techniques in a relatively short time. Correct coding of military supplies requires consultation and support upon membership agreement set with the GS1 organization, as well as the provision of specific solutions, among others technical ones, to cope with a number of problems. The results of these consultations and agreements will be included in the expanded version of the Ministry of Defense decision and should eventually be included in the military technical and process documentation (MTPD) pertaining to the supply coding requirements. The most serious challenges included:

- assignment of GTIN keys by the owners of commercial brands, including for those products where the owner of the brand is the Ministry of Defense, e.g. uniforms or food rations, thus the GTIN key need not to be changed when the supplier is replaced,

- agreement on the nomenclature between the military and the suppliers for each trade item, including rules for providing the Uniform Material Index (JIM) number, due to the fact that large number of indices (over 3 million) different descriptions are still sometimes assigned to the same goods,

- precise definition of the function of each form of packaging in the supply chain: be it purely a trade item, a retail or a non-retail item, a trade and logistics item or purely a logistics item, especially in the case of multiple-unit packages of small goods, specially in cases the buyer has not yet completed relevant training on this matter,

- introduction the standard identifications of products that do not fit into one package, since such supplies were not taken into consideration in the process of drawing up the requirements, in spite of the fact that they do occur in practice,

- introduction of the requirement to create logistics items, preferably pallets with homogenous content, since so far such items have been rarely used in military supplies, even though they are required for the storage of goods in large warehouses,

- simplification of the process of filling out product sheets, for example when the only difference between products is a parameter such as the size of a uniform or shoes, thus avoiding the need to prepare multiple separate product sheets, and instead the preparation of a single sheet with the supplier's details and with additional information given in an annex, such as a detailed description of, for example, the model and color of the shoes in individual sizes assigned with corresponding GTIN keys,

- provision of the GLN key of recipients and buyers, especially if different military consignees receiving the same goods, provided these data is available in electronic form, thus enable suppliers to use them in a fast an error free manner for the identification of logistics items of mixed type.

COOPERATION WITH GS1 POLAND AT THE SUCCESSIVE STAGES OF OF MILITARY SUPPLY CODE IMPLEMENTATION PROCESS

The national organization of GS1 in Poland cooperates closely also with current and potential military suppliers. Some of them are member of the GS1 system and, often through many years, have been creating relevant code identifications, including GS1 logistic labels.

Other suppliers, especially those offering typical military supplies, are not very familiar with coding of supplies. Therefore, GS1 Poland offers various forms of assistance, such ones like information mailed on the Internet, provision of access to publications, online training, training organized in cooperation with military organizations and with suppliers' associations, dedicated training, face-to-face and telephone consultations, published lists of solution provider companies supplying various equipment and software, together with comprehensive code identifier and GS1 logistic label validation.

The matter of importance for the increment the number of new participants in the GS1 system is the required assistance in the determination of the pool of required GTINs, especially when the company is not the owner of the commercial brand of all of the products supplied to the military, e.g. spare parts for their products.

Quite a number of military suppliers are only intermediaries, and they have to obtain either GTINs from the owners of the brands, or at least obtain a temporary authorization to assign GTINs to their products from their own pool.

In order to create global GTIN, GLN, and SSCC identifiers, GS1 Poland supports suppliers via the provision of a free online software for the creation and management of the relevant registers.

CONCLUSION

In view of the many years of experience and extensive know-how behind them, the use of GS1 standards should help in the prompt adaption of the ADC technologies in military goods supply chains. As practical implementations have been demonstrated, GS1 standards are ready to accommodate the requirements and constraints derived from the specific characteristics of civil and military logistics.

The adaption of civil standards adapted them to military requirements can only enable suppliers' IT systems to be integrated into military supply chains. In turn, such supply chains provide a foundation for the effective practical implementation of the principle of "tracking from factory to foxhole."

Literature:

1. Hałas E., Kosmacz-Chodorowska A., *ADC i EDI jako efektywne technologie logistyczne podwójnego zastosowania [ADC and EDI as effective dual-use logistics technologies],* paper presented at the 6th International Academic Conference of Applied Logistics, "Complementarity of civil and military logistics. Theory and Practice, KNLS '14," Military University of Technology, Warsaw 2014.

2. Kisperska-Moroń D., Krzyżaniak S. (2009), *Logistyka [Logistics],* Poznań: Biblioteka Logistyka.

3. Harps L. H. (2005). *From Factory to Foxhole: The Battle for Logistics Efficiency,* http://www.inboundlogistics.com/cms/article/from-factory-to-foxhole-the-battle-for- logistics-efficiency/

4. http://www.defenseindustrvdailv.com/rfid-technologv-keeping-track-of-dods-stuff-05816/ http://www.rfidiournal.com/blogs/rfid-iournal/entrv78874

5. *Technische Lieferbedingungen*, TL A-0032, Kennzeichnung der Versorgungsartikel

6. *Australian Defence Standard, ADF Packaging Standard*, DEF(AUS)/1000C/Issue2/Type2/Dated 25 September 2005.

7. NATO standards: *STANAG 2493 – NATO Glossary of Asset Tracking Terms and Definitions; STANAG 2494 – NATO Asset Tracking Shipping Label and Associated Symbologies; STANAG 2495 – Data Formats for Asset Tracking Technology; STANAG 4281 – NATO Standard Marking for Shipment and Storage; STANAG 4329 - NATO Standard Bar Code Symbology; STANAG 4553 – Electronic Commerce.*

8. Decision no. 3/MON of the Minister of National Defense of 3 January 2014, on guidelines defining the requirements relating to barcode identification of products supplied to the Ministry of National Defense (Official Journal of the Minister of National Defense, 7 January 2014, item 11).

9. *Collective work: Kody kreskowe i inne globalne standardy w biznesie [Barcodes and other global business standards],* Poznań 2012, Biblioteka Logistyka.

10. Kosmacz-Chodorowska A., *Funkcjonalność opakowań w łańcuchu dostaw w aspekcie ich kodowania dla potrzeb systemów automatycznej identyfikacji [Functionality of packaging in chains of supply from the point of view of their coding for automatic identification systems],* paper presented during the 3rd International conference "Product and Packaging - Contemporary Challenges. P&P 2014," Łódź University of Technology, Łódź 2014.

11. Kosmacz-Chodorowska A., *Wdrażanie kodów kreskowych w wojsku – współpraca z dostawcami [Implementation of barcodes in the military – cooperation with suppliers*], paper presented at the 7th International Academic Conference of Applied Logistics, "Complementarity of civil and military logistics. Theory and Practice, KNLS '15," Military University of Technology, Warsaw 2015.

INTRODUCTION OF NATO CODIFICATION SYSTEM & NATO STOCK NUMBER – THE DNA OF MODERN LOGISTICS

Maj. Béla Rebák

Ministry of Defense, Defense Economic Office, Research & Development, Quality Assurance and Security Investment Directorate, National Codification Bureau

This article allows you for a bit to gain insight view into the NATO Codification System (NCS). It will introduce the development of the system, from the origins through the recent and nowadays identified challenges till the future potential, and the scope on the provided benefits. I try attempt to explain the reason why the NATO Stock Number (NSN) is known as the 'DNA of the modern logistics'.

THE ORIGINS OF NATO CODIFICATION SYSTEM (NCS)

According to the generic point of view, the logistics was invented and developed during the course of the centuries by the military. The origin of the word is Greek – "logos", it means reason, sense.

Logistics[36] is the management of the flow of objects between the point of origin and the point of consumption in order to meet requirements of customers or corporations. The resources managed in logistics can include physical items, such as food, materials, animals, equipment and liquids, as well as abstract items, such as time and information. The logistics of physical items usually involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security. The minimization of the use of resources is a common motivation in all logistics fields.

Until the end of World War II. logistics as a category has belonged mainly to the military. Some typical instance from the military history:

- "The line between disorder and order lies in logistics…" − *Sun Tzu*

- Staggered fact of the Great War is, the largest amount of the transported supply was not the ammunition nor the food of troops, but the forage of the artillery horses.

- "During the last war, eighty percent of our problems were of a logistical nature" – *Field Marshall Montgomery*

- "Military speaks about strategy and tactics, the professionals about the logistics" – *General Norman Schwartzkopf*

---

[36] From Wikipedia, the free the encyclopedia.

Some historians, who have studied the history of the Second World War, claimed it could have been shortened by several months, both in Europe and in the Pacific, if the logistics supply of the allied armies had been alike as it is today.

The military interpretation of the satisfactory logistics supply means that the right equipment timely supplied in the right place, and to assure that it is the right equipment, and not another, being shipped, and the item must have been described without any ambiguity.

Heaving learned the historical lessons the demand have arisen for a comprehensive logistical item identification system. On January 18, 1945, President Roosevelt ordered the development of an effective item identification system that would avoid duplicates caused by different names, different manufacturers or different reference numbers. The task was to develop a proper method to identify any item of supply in a unique way using appropriate codes. This is how the "Federal Catalog System" was born.

The system was established on the policy of ´One item – one identification Number (Federal Stock Number – FSN)´ and was based; on the Classification Handbook "Groups and Classes" for the item of supply, on the item name directory and on the ´Federal Item Identification Guide − FIIG´ or otherwise the method to identify any item of supply.

A few years later, all signatory countries of the North Atlantic Treaty Organization adopted the American system and called it the ´NATO Codification System´. Codification is actually a system for cataloging and assigning an exact name to the items of supply using codes. The Federal Stock Number used to identify the items in the cataloging system was used from 1945 to 1975, and than it was replaced by the NATO Stock Number.

INTRODUCTION OF NATO CODIFICATION SYSTEM

The NCS is a uniform and common system for the identification, classification and stock numbering of Items of Supply (IoS) of the user nations. It is designed to achieve maximum effectiveness in logistics support and to facilitate materiel data management. The System has been agreed by all signatories of the Alliance and sponsored by non-NATO countries for use in identifying equipment and supplies.

The principal document of the System is the Allied Codification Publication No 1 (ACodP-1), also known as the NATO Manual on Codification, which describes the system operating procedures. In its military application the System has been accepted under two NATO Standardization Agreements (STANAGs) - STANAG 3150 (Uniform System of Supply Classification) and STANAG 3151 (Uniform System of Item of Supply Identification). The System, which is based upon the United States Federal Catalogue System, is also used by the Civil Departments of some NATO nations. It is governed by the NATO Group of National Directors on Codification (AC/135) and implemented by the National Codification Bureau (NCB) of each user nation.

The establishment, operation and maintenance of the NATO Codification System provide a uniform identification language for use within national activities (e.g. supply management, standardization etc.) and among member nations, including non-NATO nations that are sponsored members of the NCS.

Its use is based on the principle that responsibility for codification of an IoS rests with the nation that controls the design of the IoS, even if the IoS is not used within that nation. In these circumstances the purchasing nation has to request codification action from the design control nation.

For codification of IoS produced by manufacturers not located in a NATO nation or Tier 2 Sponsored nation, special rules apply (as detailed in ACodP-1).

ITEM OF SUPPLY

The NATO Codification System is based on the "IoS concept" and requires a unique IoS Identification of each IoS. An IoS is an Item of Production has been determined by a responsible supply management authority as in order required to meet a specific logistics requirement.

Within the limits set by the concept, an IoS may be:

- A single Item of Production with a single NATO Stock Number.

- Two or more interchangeable Items of Production from one or several manufacturers all with a single NATO Stock Number.

- A quality controlled, precise tolerance IoS, selected from a normal production process allocated to a discrete NATO Stock Number to differentiate it from the normal item in the production process.

- A production line IoS with a special modification and with a discrete NATO Stock Number to differentiate it from the normal item in the production process.

The various operational requirements frequently require an Item of Production to be used for different purposes thus consequently may in a valid, but not necessary way, cause an Item of Production to be referenced by more than one NATO Stock Number, due to a broader or narrower IoS concept.

CLASSIFICATION

Military inventories are complex and comprehensive. To enable efficient management of these complex inventories in the NCS the element or objects of the inventory are organized into a hierarchical structure of discrete Groups and Classes along the hierarchical branches. Each Group is formed by Items of Supply categories of the same physical or performance characteristics or utilization in the same application, and is indicated by a 2 digit code (NATO Supply Group) NSG.

Within each Group, Items of Supply categories are further divided into Classes. These Classes are identified by an additional 2 digit code forming, altogether with the Group code, a 4 digit NATO Supply Classification (NSC) code. The NATO Supply Classification System is uniform throughout all the nations and each IoS concept identified using this System shall be assigned to a unique 4 digit Classification code.

The Multilingual NATO Classification structure of all groups and classes and their definitions, is published online on behalf of the Group of National Directors on Codification (AC/135) by the NATO Support and Procurement Agency (NSPA) as ACodP-2 (Allied Codification Publication No 2).

The classification structure and codes are also included on the NATO Master Catalogue of References for Logistics (NMCRL).

ITEM NAMES

To ensure uniformity the System employs rules for naming each IoS using Approved Item Names (AIN). These AINs are defined in National Codification Handbooks (H-6) and ACodP-3. Approved Item Names are published together with their definitions and Item Name Codes (INC) and are used for classification of the Items of Supply and descriptive identification of IoS and, where applicable, for reference identification of IoS. The H-6 also defines colloquial names which are cross-referenced to Approved Item Names. When a manufacturer's Item Name cannot be related to an Approved Item Name, it may, exceptionally, be used as a Non-Approved Item Name (NAIN). The naming and nomenclature of an IoS is crucial for future linkage between the NCS and emerging international standards.

AC/135 has published online a Multilingual NATO IoS Name Directory, known as Allied Codification Publication No 3 (ACodP-3), a comprehensive and internationally agreed dictionary of Approved Item Names required in the preparation of all IoS identifications. A National Codification Bureau having a requirement for an IoS Name not included in ACodP-3 must request its assignment in accordance with prescribed rules. However, H-6 handbooks are still maintained by several nations to serve as guides for IoS identification in their own language. Approved Item Names and related codes in the national H-6 handbooks conform to ACodP-3.

Each Approved Item Name is referenced in the ACodP-3 to one or more NSC codes.

ITEM OF SUPPLY IDENTIFICATION

IoS identification is the most important element of the NATO Codification System, as it prescribes the characteristics required to uniquely identify an IoS Concept.

The IoS identification consists the minimum amount of data required to establish clearly the essential characteristics of the IoS, i.e. those attributes which give the IoS its unique character and differentiate it from any other IoS. The basic rule of thumb is "One IoS, One NATO Stock Number (NSN)".

There are two methods of IoS identification; the descriptive method and the reference method. In both approaches, the identification of the True Manufacturer or Design Authority of an IoS is essential for the proper application of the Uniform System of Item Identification (STANAG 3151). Similarly the recording of the individual part or drawing numbers all known manufacturers/suppliers of an IoS is also important. This process ensures that codification data users in the logistics chain are aware where the Intellectual Property Rights (IPR) of any given IoS lie and that all known sources of that IoS are known to Acquisition Officers in national procurement organizations.

The data sets "Identification" and "Management" has led those two additional STANAG:

By means of STANAG 4199 – "Codification – Uniform System of Exchange of Material Management Data" countries agree to exchange equipment management data according to a uniform system framework.

By means of STANAG 4177 – "Codification – Uniform System of Data Acquisition" countries agree to include a contract clause requiring their national manufacturer to provide the technical data necessary for accurate identification of the item to be codified.

The - third – STANAG 4199 application enables the incorporation of the required (logistics) management data elements within the product identification data package. According to STANAG 4199 participating countries are exchanging the supply item management data within a unified framework.

Member states - taking the obligatory for the utilization of the STANAG 4199 by means of the ratification of the standard - undertook themselves that the product identification data will incorporate the product management/logistic data (to be understood as: the collected data for unambiguous identification of the product, should incorporate the required management/logistics attributes) within a uniformed, integrated system.

In order to ensure the provision of technical data necessary to identify items to codify, countries have agreed on a new STANAG, STANAG 4177.

Countries ratifying the STANAG 4177 agree to include in their material acquisition contracts, a codification clause which requires the manufacturer of the item to provide accurate identification data for his country NCB.

NATO COMMERCIAL AND GOVERNMENT ENTITY CODE – NCAGE

As indicated in previous Paragraphs, it is necessary to record manufacturers' names against codified Items. In order to meet this requirement, a 5 character NATO Commercial and Government Entity Code (NCAGE), is assigned to each manufacturer. The structure of NCAGE coding is set out in ACodP-1. Details of individual NCAGEs are published online in the NATO Master Catalogue of References for Logistics (NMCRL) and in various national codification publications.

NATO Stock Number – NSN

Federal Stock Number - FSN

3139 – 121 - 6210	1949

NATO Stock Number - NSN

3139 – 00 - 121 - 6210	1975
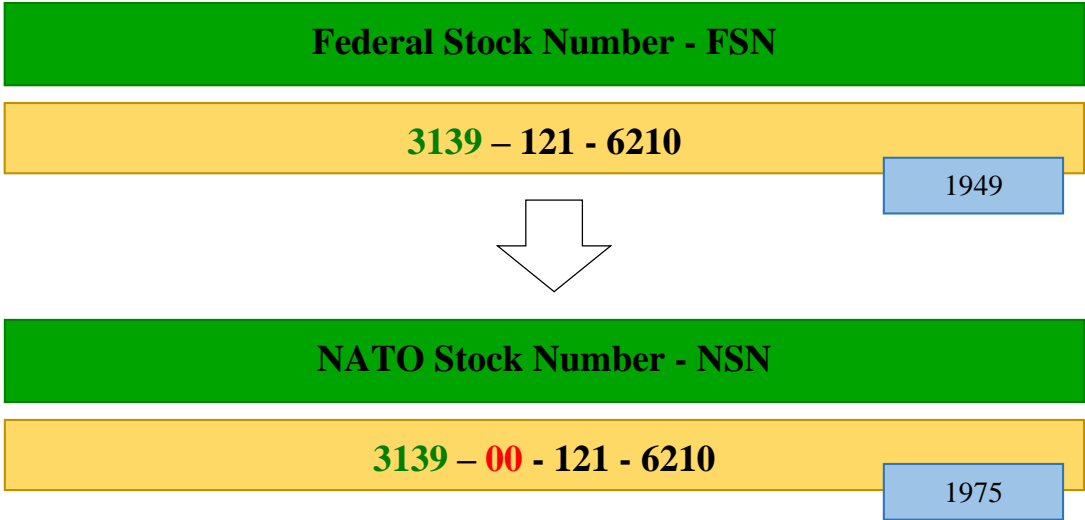
When it is proved that an Item of Supply is unique, its identity is fixed through the assignment of its identical NATO Stock Number (NSN). NSNs are issued by NCBs.

The NSN is a 13-digit number and is divided into 3 parts:

- The first 4 digits are the NATO Supply Classification Code and relate the IoS to the group and class of similar Items of Supply.

- The next 2 digits indicate the NCB assigning the NSN.

- The final 7 digits of a NSN are computer assigned and have no inherent significance other than to uniquely identify the IoS they are allocated to. In practice, this means that no inference should be drawn by the logistician or other data user in the supply chain to be based on any apparent serial progression. These 7 digits are assigned to one IoS within the originating nation's codification database; they may be duplicated in the Total Item Record (TIR) of another NCS user nation.

To enable user friendly reading of NSN data, a "dash" it is common to be inserted at strategic points in the NSN e.g. (1005-13-123-4567). However, whenever a NSN is read in an Automatic Data Processing system (ADP environment), the NSN will be represented in its true, original form, (i.e. 1005131234567) as a thirteen (13) digit string.

The NATO Item Identification Number (NIIN) (Last Nine (9) Digits of an NSN) are the fixed part of the NSN, and it remains associated with the IoS concept throughout its life cycle. However, the NSC (First Four (4) Digits) may vary if there is a revision of the IoS Classification structure.

The principal benefits of the NSN are:

- Uniformity. It is uniform in composition, length, structure and use.

- Adaptability. It supports both the nationally and internationally varying requirements of logistics management in a supply system, from the initial procurement to final disposal of the IoS.

- Simplicity. It is applicable without modification to all Items of Supply, it is unique, easy to assign, it is flexible to maintain and it is readily recognized throughout the user nations of the world.

- Stability. The NIIN is associated with only one IoS in perpetuity, it is never re-allocated to another IoS even when the original IoS is no longer in use.

- Compatibility. The NSN and its related data can be recorded and communicated manually or by all types of ADP systems (there are no two user nations having the same hardware / software configuration). Provided, by means of the fixed format rules of the NATO Data Exchange (NADEX) system, elegant solutions have emerged to coop with the communications problems raised by the use of diverse operating, communication and supply systems in the present user countries.

Further to aforementioned details the system provides expandability; ten million different Items of Supply may be recorded for each NCB code.

ORGANIZATIONAL BACKGROUND

The NATO Codification System is managed and operated by a NATO Cadre Group consisting of the National Directors of Codification Allied Committee 135 (AC/135), under the authority of the Conference of National Armament Directors (CNAD). The AC/135 has signed a Memorandum of Understanding (MoU) with the NATO Support and Procurement Agency (NSPA) for the provision of specific technical and administrative support.
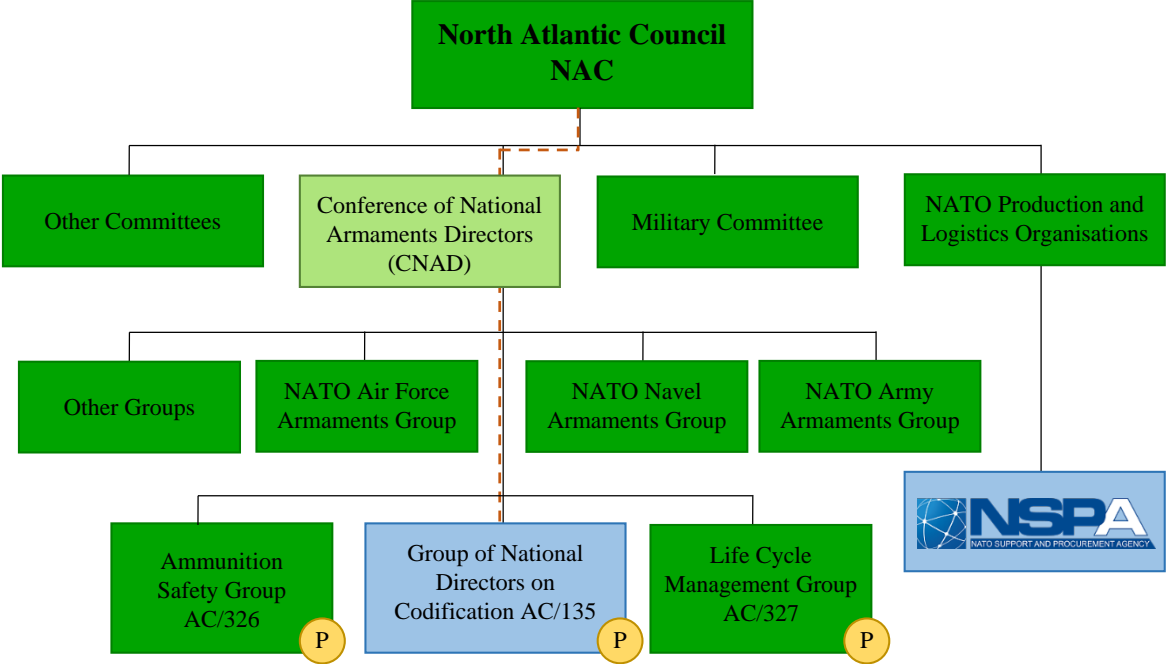
P = Partnership Group

Within each nation, a National Codification Bureau (NCB) is responsible for the maintenance of the Total Item Records (TIR) and support files (manufacturers, item names, Item Identification Guides, classification). Each NCB is the sole responsible authority and contact point for the other nations as far as data exchange and codification services are concerned. Some nations have extended the use of the NCS to ministries or governmental agencies as external units of Defense.

More and more nations outside the NATO, including Partnership for Peace (PfP), Mediterranean Dialogue (MD) and Pacific Area Nations, are using the NCS. These nations recognize the benefits of adopting the NCS for internal purposes, for business transactions with NATO nations and for bilateral business transactions between each other.

The Group of National Directors on Codification recognizes that there are potential advantages for both NATO and non-NATO nations to be gained via the adoption of the NCS. The Group Policy provides possibilities for allied and friendly nations around the world to take part in the NCS. To facilitate and

formalize this participation, the AC/135 has initiated the Sponsorship Program. Participation in the Sponsorship Program is subject to a formal agreement between the non-NATO nation and the AC/135.

The Sponsorship Program is designed to assist candidate nations on the road to become full members of the NCS community and it will safeguard the systems and procedures already in place to ensure the continuous availability of high quality services and information.

BENEFITS OF NATO CODIFICATION SYSTEM

The NCS provides accurate information of the identity of an IoS, permits the recording of the sources of supply and provides other management data. Finding solutions for supply management problems is supported by ready access provision for data users to a single up-to-date source.

Every holder of materiel, be it a manufacturer or a user, requires a specific service to identify an item. Manufacturers have developed particular systems to meet their specific needs. Consequently, similar types of items meeting comparable or compatible needs, but produced by different manufacturers (e.g. companies), will be identified by different numbering schemes. This scheme does not meet the military users' requirements since armed forces manage their inventories by item type, rather than origin or use. For them, it does not matter who is the end user or what system or equipment the particular item is used for; as long as it has the same characteristics (*form, fit and function*)[37], it will be assigned to the very same unique NATO Stock Number (NSN). That NSN will then be used for the management of that item by the Logisticians of all NATO nations and Armed Forces.

OPERATIONAL ADVANTAGES & TOOL FOR INTEROPERABILITY

Logistics operations can be classified into five main areas:

1. Development of a Support Solution;

2. Acquisition of Materiel: Initial purchase and re-provisioning;

3. Management of Resources; Warehousing; Distribution and Redistribution of materiel;

4. Maintenance (Repair or Overhaul);

5. Disposal.

In a Treaty Alliance such as NATO, the concept of interoperability is of prime importance and should be vigorously applied in each and every one of these areas.

---

[37] **Form:** the shape, size, dimensions, and other physical measurable parameters that uniquely characterize a product. For software, form denotes the language and media.
Fit: the feature of a product enables to interface or interconnect with an integral part of another product.
Function: the actions that a product is designed to perform.

The main operational advantages are the follows:

- Enhanced opportunities for standardization, by the recording and revealing the unique characteristics of Items of Supply in user nations supply systems, allowing parts from a number of various weapon systems to be used efficiently and effectively.

- The NCS provides access to the full range of information on all Items of Supply in the inventories of user nations. Thus NCS allows users to pool resources and share the burden in regard to the acquisition of spare parts and the maintenance of common equipment. During operational deployment the NCS also facilitates minimization of the supply requirement in terms of spares and consumables.

- An accurate description of the IoS permits users to readily identify spares or substitute Items of Supply meeting the requirement of a given weapon system thus reducing downtime and support of force multiplication.

- The use of a common supply language understood by all users simplifies the technical dialogue between participating nations and other users.

- The use of applied computer technology allows the recording, processing and transmission of IoS identification data and related management support data in an efficient and user friendly manner.

Basic interoperability requirements:

- In order to facilitate:

  - national Armed Forces (land, air, sea) to working with and supporting each other,

  - Armed Forces from any NATO nations working with and supporting each other,

  - NATO Armed Forces working with and supporting Armed Forces of Partner nations,

  - maximum effectiveness of the utilization of resources in an operational theatre, whether it is national, NATO wide or international.

- The codification system must:

  - provide accurate data on all items of supply for all participating nations in time of peace or war,

  - allow prompt access to data,

  - provide a common language understandable by all parties.

For over 45 years, NATO Codification has been utilized by the military forces of NATO to promote 'national' and 'international' inter-operability.

The NCS is an integral part of supply operations throughout the world. It furnishes accurate information to all participating nations on the characteristics and properties of millions of items. It simplifies the resolution of supply data management problems by providing quick responses from a single, up-to-date

source. The NCS offers many significant advantages to NATO and non-NATO nations, as well as to private sector participants outside the defense community.

ECONOMIC ADVANTAGES

- The data base allows the designer and project manager to search for parts already stocked in the supply system and could be utilized instead of producing a new IoS concept. This practice reduces the variety of Items of Supply to be managed and eliminates unnecessary costs for identification, storage and other related supply functions. Nearly 50% of the components used in the design of new equipment are already codified in the NATO inventory.

- Improved determination of materiel requirements and budgeting through greater knowledge of Items of Supply in stock.

- Effective co-ordination in procurement by enabling the elimination of concurrent acquisition and disposal of the same IoS, consolidating orders from several users to benefit from price reductions on bulk purchases and having the visibility of several potential sources of supply.

- Effective use of assets by enabling supply support exchange between linked organizations and between nations.

- Reduction of national and NATO inventories, warehouse space, data maintenance and personnel through the elimination of duplication or multiplication of an IoS.

- Improved surplus and excess materiel disposal operations through the uniform identification of each Item of Supply, including the prevention of erroneous disposal.

CODIFICATION WITH REGARD TO ACQUISITION OF MATERIEL

Procurement of materiel is realized following a detailed assessment of the requirement.

The Codification System answers questions raised by purchasers:

- Who manufactures the required item?

- Does the item proposed by the manufacturer meet the requirement?

- Are there restrictions on purchasing activities?

- Is the item already in use nationally or in another NATO nation?

The system then provides:

- a list of manufacturers likely to provide the required item,

- a detailed description of the item, covering all of its related: physical, qualitative and/or performance characteristics. Descriptions must be comparable, irrespective of their source of supply, and must therefore be based on a universal language,

- access to information on unit prices and procurement conditions to promote competitiveness between manufacturers.

CODIFICATION WITH REGARD TO MANAGEMENT OF RESOURCES

NATO Logistics organizations:

- manage their materiel by type and application, notwithstanding the origin of the items;

- warehouse and store items under appropriate conditions to ensure their operational readiness;

- deliver the required materiel to the specific customer on time and using the most appropriate mode of transportation;

- distribute and redistribute the equipment according to specific requirement and the resources available among the various users.

The system therefore:

- identifies items of supply satisfying the same requirement by a unique number, regardless of the referencing system used by the manufacturer;

- specifies packaging requirements, warehousing conditions and expected shelf-life;

- indicates the users of a specific item and / or specifies transportation information required for delivery of the materiel.

- informs the logistics managers on all the resources available among the users.

CODIFICATION WITH REGARD TO MAINTENANCE

Personnel responsible for maintaining equipment will need answers to the following questions:

- what spare parts are required to be purchased and where should they be delivered?

- what are the given maintenance capabilities and resources available on site?

- are the spares needed available somewhere in the national and/or NATO wide system?

The codification system presents:

- relationships which exists between all parts of a system and its components or sub-assemblies,

- list of national and international registered users,

- possible Interchangeability between items in order to maximize the use of available resources.

CODIFICATION WITH REGARD TO DISPOSAL

Disposal of an item of supply can be related to its usefulness (obsolescence, replacement of the main equipment...) or its condition (non-repairable).

When it becomes necessary to dispose the unusable equipment to reduce warehousing costs, it is important to:

- eliminate only those items which cannot be reused by another user,

- salvage components or substances which can generate savings through recycling,

- guarantee the protection of the environment during disposal actions.

To this extent, the codification system contains data that:

- identifies potential users for surplus equipment,

- lists the nature of components and constituent elements of a given item, as well as its recoverability criteria,

- indicates the disposal procedures for hazardous or polluting materials or substances.

ADDITIONAL BENEFITS

- The NATO Codification System and its item description patterns offer advantages even for participants outside the defense community such ones like Non−NATO Countries & Organizations, Non−Governmental Organizations, industrial and commercial entities.

- Many non-NATO nations have adopted the NATO codification system because of their requirement to codify equipment supplied by the manufacturers. The manufacturers having access to the NATO database can meet their customers' requirements at a lower price.

- Descriptions of items enable design engineers to accurately search for and select components or equipment meeting technical or functional characteristics more efficiently than in any commercial catalogue.

- Relations and understanding between governments (purchaser) and manufacturers (provider) are greatly enhanced by the use of a common language.

- Better tracking of vendors: The NCS includes a system for identifying and tracking commercial vendors. Combined with procurement systems, managers can systematically track critical information such as past performance by the contractor, addresses and telephone numbers, and political/social data (such as geographical distribution of vendors and manufacturers within a nation).

- History of commercial sources: Logisticians can use the NCS to determine former sources for purchases of the item of supply. This can be useful when items are difficult to obtain.

- Aid domestic industrial base: When a company reference number is recorded on an item of supply in the NATO Master Catalogue of References for Logistics (NMCRL), it becomes visible to other nations as a potential source for that particular item. Thus, the opportunity of the company for sales is improved.

STANDARDIZATION ORGANIZATIONS

The accurate descriptions (characteristics, specifications and drawings) provided in the supply system disclose varieties, types and dimensions for items of supply facilitate the work of standardization agencies responsible for developing guidelines.

Military Logistics doctrines and practices are increasingly based on commercial disciplines and standards. The Group of NATO National Directors on Codification are continually enhancing the NCS

and this evolution has kept pace with, and has often been at the leading edge, so that it can truly be referred as the key to modern Logistics.

The way the NCS records information about "Commercial and Government Entities" has been accepted by the International Standards Organization. The NATO Commercial and Government Entity (NCAGE) system has been assigned as International Code Designator (ICD) 0141 under ISO 6523 - Structure for the Identification of Organizations and Sub-Organization.

The NCS is cognizant and has been enhanced to align very closely with other ISO standards. AC/135 has also made progress in linking the NCS with the overall concept of STEP technology of the ISO Standard 10303. The NCS has also been recognized as a specific function within the NATO Life Cycle Management concept and been added to the Life Cycle Data Model. The NATO Life Cycle Management concept is almost entirely based on ISO 15288, Life Cycle Management - System Life Cycle Processes.

Furthermore, the Electronic Commerce Code Management Association (ECCMA) has developed a commercial version of the NCS called the ECCMA Open Technology Dictionary (eOTD). ISO has recognized eOTD as a draft standard and assigned it ISO Standard 22745. AC/135 and ECCMA have formalized their cooperation in a Memorandum of Agreement. ISO Standard 22745 includes the concept of tagging characteristics data compatible with eOTD in STEP design files.

The NCS can also recognize part numbers provided by manufacturers and vendors in bar code format. A linkage between the NCS and the EAN International scheme has been developed. By adding further data to the NCS the aspect of Logistics operations has been broadening. Military Logistics applications can now perform a cross-reference operation within the NCS domain, and provide a "dual" recognition of certain items of supply in NSN and EAN format. This is the enhancement that facilitate dialogue between military Logisticians and commercial manufacturers and suppliers.

Finally, the NCS has been linked to the United Nations Common Coding System (UNCCS). This simple linkage will allow NATO Logisticians to better communicate with UN authorities for materiel management Proposals.

ENVIRONMENTAL AGENCIES

The in-depth knowledge of the composition of materiel's, through detailed descriptions, promotes proper hazardous material handling and recycling activities that will ensure the protection of the environment and avoid prohibitive restoration costs of polluted sites. This information also ensures the required demilitarization activities of military equipment.

Track important information: The system eases the reorganization of precious metals may occasionally be embedded in a supply item, and decide whether it is hazardous to the environment, or represents such high value that it requires special storage procedures. Data in the system can also alert users when supply items may be susceptible to harm during storage or transportation, thus it requires special handling.

FUTURE POTENTIALS

AC/135 is committed to increase effectiveness and efficiency of global logistics systems and operations for participating nations. It aims to improve the level of supportability of national and multinational military missions. It will provide the bridge necessary to facilitate global logistics operations.

The mission of the AC/135 NATO Group of National Directors on Codification makes the NCS as efficient as possible in order to better meet the logistics requirements of the forces involved in joint

operations. **Within the framework of constant political, economic and technical changes, AC/135 carries out its mission by the implementation of a strategic plan aiming to:**

- Support national and international Logistics management systems and system requirements within NATO,

- Provide uniform codification for the support of standardization and interoperability within NATO,

- Enhance global military co-operation and industrial partnership,

- Harmonize the NCS with international product data standards.

SUPPLIER SOURCED CODIFICATION – SSC

Supplier sourced codification means the outsource of the item identification to the originator of the item, since it is obvious that no one knows better the certain product than its manufacturer. The tools of this activity are provided by the ECCMA eOTD and the ISO 22745 standard. This automated process may take over the heavy burden from NCB`s of countries having a broad range of defense industry.

LINKAGE WITH GS1

During logistical operations the suppliers, the stock keepers and the users need various additional but indispensable information that cannot be provided by the NCS such as packaging data, volumetric data and production and expiration−dates. This range of data may be provided by another global logistic system; such one like GS1.

A study conducted by GS1 Australia published in 2010 indicated that there is a level of correlation between the data contained in the NCS and that ones incorporated in the GS1 GDSN data pools of the operational Global Data Synchronization Network (GDSN).

The GS1 Australia study and following discussions during meetings between representatives of GS1 and AC/135 during the course of 2013 led to the conclusion that GS1 and AC/135 could benefit from setting up a data exchange process between the two organizations and to the idea for another study. In case of AC/135data exchange could create way for NCBs to obtain data for NSN databases in an automated way. As far as GS1 is concerned, the data exchange could help them expand their mission into the defense sector and benefit their members by being able to access the enormous amount of product data that the NCS contains.

The objective of the study was to compare various facets of the NCS and GS1datasets to determine the extent of commonality thus enabling AC/135 and GS1 to decide whether it would be worthwhile to conduct a pilot project related to data exchange between the two systems that in turn, if being successful, could lead to ongoing data exchange.

The definition of the study objective directed the focus to the following areas:

- Commonality Items in both Systems

- Commonality between the Properties used in the NCS and the GDSN Data Pools

The overall conclusions of the study are as the follows:

- There may be a broad range of overlapping items between the two systems originating from large, global corporations that have large sales both in the retail arena and in the governments' market segment that are part of the NCS. There is definitely a large overlap between the commodities that are part of GS1 system and the commodities in the NCS

- The commonalty between the properties contained in the GDSN data pools and in the NCS are insufficient to justify a pilot project for the testing of data exchange between the two systems related to properties, dates and time.

However, there are a couple of areas that may be worth to explore within the framework of future cooperation between AC/135 and GS1:

- GDSN and NCS contain properties that may be of considerable value for both GS1 and AC/135, respectively, such as volumetric data in the AC/135 domain and precious metals data in the GS1 domain. The key elements of cooperation here would be the matching of the NCS NSN and reference numbers with the same items in GDSN, where the primary identifier is the Global Trade Identification Number (GTIN).

- It would be worthwhile for GDSN contributors (and other companies that are part of the GS1 system) to review NCS data whether they are applicable to their companies for correctness/currency.

The NCS is often referred as an international language of logistics. It is not an inventory control system; it is the logistics language used by such systems. Likewise, it is not a supply accounting system, but the logistics language used by supply systems. This also applies to procurement systems, maintenance systems, and transportation systems. This system is an integral part of the supply operations of NATO nations and also many non-NATO nations.

The benefits are recognized by its logistics users. This system has established a single supply language, provides accurate information on the identity and characteristics of an item of supply and avoids duplicates.

Source: www.nato.int/codification

GLOBAL SUPPLY CHAIN STANDARDS AND SOLUTIONS IN THE PRACTICE OF THE NATIONAL DEFENCE OF THE VISEGRAD (V4) COUNTRIES

9 786155 057717

CONFERENCE PROCEEDING
27th of October 2015
Budapest