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Interoperability and data flow between JTLS-GO simulation system and LOGFAS logistic system during CAX (Computer Assisted Exercise) exercises

Współpraca i przepływ danych pomiędzy systemem symulacyjnym JTLS-GO i systemem logistycznym LOGFAS w ćwiczeniach dowódczo-sztabowych wspomaganych komputerowo

Abstract: The purpose of this article is to present the results of the research concerning the possibility of interoperability between the JTLS-GO military simulation system and the LOGFAS military logistic system during Computer Assisted Exercises. The JTLS-GO system is the primary simulation system used in the Polish Armed Forced (PAF) while LOGFAS is the main logistics tool within NATO. Preparing CAXs requires extensive work in terms of building a database of military units, command and logistic structure, combat systems and supply categories. The main goal is to prepare as realistic an environment as possible enabling commanders and staff to use real IT command support systems (C4I) along with real procedures to produce orders for virtual sub-units according to the principle: "train as you plan to fight". The main benefit of CAXs is minimal cost – a real training audience uses virtual troops in a virtual world using real procedures and decision-making processes. Logistic support is one of the most important areas implemented during such exercises, and the LOGFAS system is the main tool supporting the planning and implementation of logistical support during operations.

Key words: JTLS-GO system, LOGFAS system, CAX exercise, combat system, supply category, RIC, NIC

Synopsis: Celem tego artykułu jest zaprezentowanie wyników badań dotyczących możliwości połączenia pomiędzy systemem symulacyjnym JTLS-GO a wojskowym systemem logistycznym LOGFAS, podczas prowadzenia ćwiczeń dowódczo-sztabowych wspomaganych komputerowo. Głównym systemem symulacyjnym używanym w Siłach Zbrojnych RP jest JTLS-GO, podczas gdy LOGFAS jest głównym narzędziem dla logistyków w ramach NATO. Przygotowanie ćwiczeń dowódczo-sztabowych wspomaganych komputerowo wymaga włożenia znacznego wysiłku w zakresie budowania bazy danych zawierającej: jednostki, strukturę dowodzenia, systemy walki i środki (klasy) zaopatrzenia. Głównym celem jest

przygotowanie środowiska zbliżonego do realnego, aby umożliwić dowódcom i sztabowi użycie wdrożonych systemów informatycznych wsparcia dowodzenia, i rzeczywistych procedur do wytworzenia dokumentów rozkazodawczych dla wirtualnych pododdziałów zgodnie z zasadą: trenuj tak, jak będziesz walczył. Główną zaletą takich ćwiczeń jest minimalizacja kosztów – prawdziwe ćwiczące organy dowodzenia używają jednostek wirtualnych podwładnych w wirtualnym świecie przy zastosowaniu jednakowoż faktycznie funkcjonujących procedur i obowiązującego procesu podejmowania decyzji. Wsparcie logistyczne jest z jednym z istotniejszych obszarów realizowanych podczas takich ćwiczeń, a system LOGFAS – głównym narzędziem wspierającym planowanie i realizację wsparcia logistycznego podczas prowadzenia operacji.

Słowa kluczowe: system JTLS-GO, system LOGFAS, ćwiczenia dowódczo-sztabowe wspomagane komputerowo, system walki, kategoria zaopatrywania, RIC, NIC

Introduction

In the modern world our lives are supported by IT technologies and accordingly developers support the needs of individual users with a wide range of specialised IT systems which facilitate and speed up planning process and resource management. Using specialised IT systems such as Enterprise Resource Planning (ERP) can increase enterprise profitability. Document handling systems improve the flow of documents, bills, and receipts within an organization facilitating the organisation of work, support of customers and working together with partners.

An army is an organisation the main goal of which is to defend its country's borders and its nation against potential opponents during conflict or war. To achieve this task an army needs to be trained in as realistic as possible conditions. Map Exercises (MAPEX), Command Post Exercises (CPX), Live Exercises (LIVEX) and Computer Assisted Exercises (CAX) with virtual troops, combat systems and supplies within a virtual world can provide this realism to train a Training Audience (TA) in real decision-making processes and the production of operation orders [Çayirci and Marinčič 2009].

One of the best simulation systems at the operational-strategic level Joint Theater Level Simulation – Global Operations (JTLS-GO), is used in CAXs by the Polish Armed Forces. However, at the tactical level the preferred choice is the Joint Conflict and Tactical Simulation (JCATS) simulation system. Finally, at the tactical level, Czech Bohemia Interactive Simulations Virtual Battlespace 3 (VBS3) virtual training environment based on commercial gaming technologies is used.

These three systems enable a TA to train in a virtual environment which provides virtual troops and resources (constructive simulation concept). It is also possible to deploy real troops with real equipment, weapons and ammunition against a fictional enemy (live simulation concept) or train tanks, Armoured Personnel Carriers (APCs), aircrafts squads using virtual simulation provided by any kind of link trainers [Çayirci and Marinčič 2009].

Commanders and staffs play as the training audience preparing different courses of action (COA), plans (Operation Plan – OPLAN), orders (Fragmentary Order – FRAGO, Operational Order – OPORD) with appendixes designed for each type of force (e.g. Command, artillery, engineers, logistics), Concept of Operation (CONOPS) and so on, using their operational knowledge, own experience, and skills and interacting at iterative staff

meetings as well as using real Command Control Communication Computers and Intelligence (C4I) systems. For logistics LOGFAS is NATOs standard tool for the exchange of information. An overview of both JTLS-GO and LOGFAS is provided in the next two chapters as a necessary background to the main theme of this article.

The general goal of this article is to present the possibility of interconnection between the JTLS-GO military simulation system and LOGFAS the military logistic system during Computer Assisted Exercises. This connection is required and necessary to increase overall operational logistic awareness by delivering the right data and placing it into the proper logistic tools to enable logistic planning and ensure the best support for fighting troops when considering different COA's (courses of action) in the Commander's decision making process. And finally, after the Commander has chosen his best course of action from those put forward by his staff the final order can be fully supported by the virtual logistic troops to the full advantage of the operational troops. All cells in the command post must use the mandatory decision-making process in their activities including phases, stages, steps, and the preparation of documents in accordance with their real SOP's (Standard Operating Procedures).

Overview of JTLS-GO system

The Joint Theatre Level Simulation – Global Operations [Rolands & Associates Corporation n.d.] is an interactive, Internet-enabled simulation that models multi-sided air, ground, and naval civil-military operations with logistical, Special Operation Force (SOF), and intelligence support. System JTLS-GO has been primarily used as a training support model that is theatre-independent and more importantly does not require a knowledge of programming to operate effectively.

The primary focus of the JTLS-GO system is conventional joint and combined operations at the Operational Level of War. The Simulation supports low-intensity conflict and pre-conflict operations at the level below war, as well as support of Humanitarian Assistance and Disaster Relief (HA/DR) scenarios. It has also limited nuclear and chemical effects representation.

JTLS servers run on the RedHat Enterprise Linux (RHEL) operating system, while a Java-based Web Hosted Interface Program (WHIP) client runs both the Linux and Windows operating systems. System JTLS-GO has a client–server architecture and practically the number of clients is not limited. Large scale exercises with over 100 client workstations can be run. The main WHIP window is presented in Figure 1. By default it contains on the left of the Command Hierarchy window units organized as they were set up in the Order of Battle (ORBAT), in the middle Map window the same units are placed in their positions (depending on actual map scale) and with the drawing tool and settings pane on the right, and on the left below the SitRep window (Situation Report). In the settings there is a search field and 13 icons: filters with rich and precise possibilities for filtering units, symbol size, terrain, areas, networks (road, rail, river, pipeline), range rings for different kind of weapons, routes for moving units, country boundaries, different kinds of map layers, alert messages about different warnings about fighting units, emitters, Direct Search Areas (DSAs), and chemical and nuclear contamination. The SitRep window is designed to show detailed information about one object selected from the Command Hierarchy or

a Map unit. Additionally, each operator can run in his WHIP Message Browser window (a list of messages about the actual state of units and the game), the Information Management Tool (IMT) window with combat systems or supply categories in table format, above 200 orders formats to enter specific orders for specific units. There are specialized windows for Airspace Control Order (ACO)/Air Tasking Order (ATO) Viewer, Logistic Hierarchy, link to Online Player Manual (OPM) webpage and other.

System JTLS-GO version 5.1 has a complicated structure deep inside, with many modules and uses complicated Lanchester differential equations to compute combat effects. However, it is reasonable easy to learn only requiring a two-week intensive course which looks deep inside to master the use all of the features. The software is used widely throughout NATO.
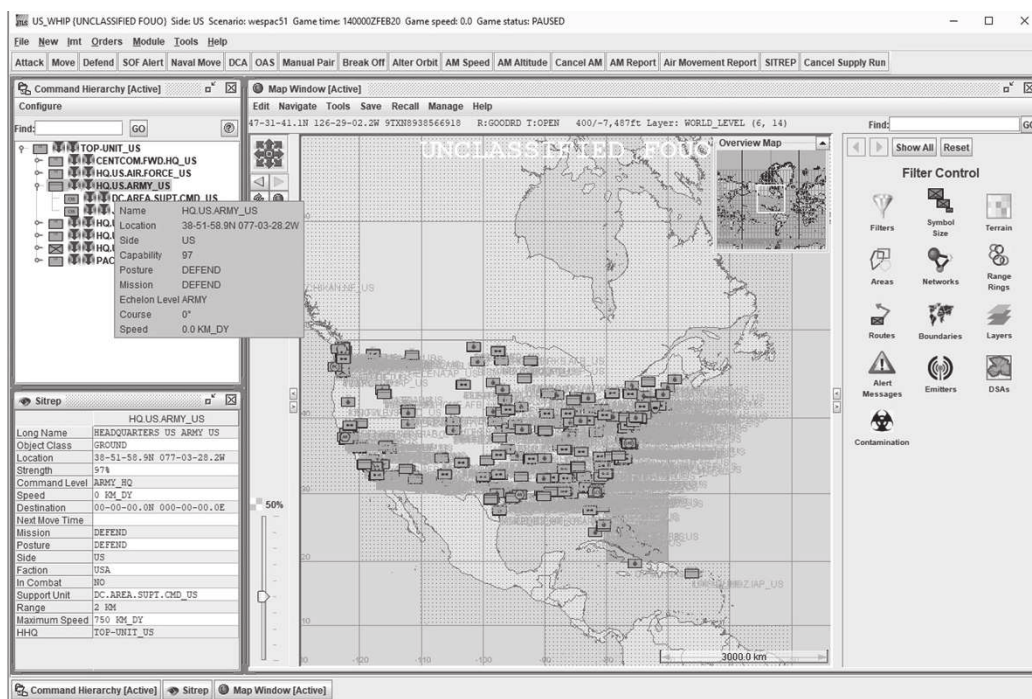
Figure 1. Java-based WHIP client for players
Rysunek 1. Oparty na Javie klient WHIP dla operatorów systemu symulacyjnego
Source: own study based on WHIP client.

Apart from operational simulation JTLS-GO also provides logistic players significant and vital capabilities to augment the automatic requisitioning and delivery processes [Byłeń and Sołoducha 2016]. Logistic players must interact with the Simulation by monitoring the IMT, requesting reports, interpreting advisory messages, scheduling resupply airlifts, sending supplies to units in trouble or lacking supporting units, changing stockage objectives and reorder levels, assigning new support units, or directing mandatory transfers of supplies. The following logistics functions are available in JTLS-GO [Rolands & Associates Corporation 2019b]:
– intra-theatre movement of supplies between units by air, truck, barge, or rail;

- mandatory transfer of supplies from one unit to another;
- creation of logistics loads for use in future orders;
- operation of pipelines, including drawing supplies from pipelines and replenishing supplies;
- modification of stockage objectives and/or reorder thresholds of one or more supply categories for either a single unit, a group of units, or all units;
- airlift operations (through the air module). An aircraft squadron or helicopter company is capable of lifting either a unit or supply load from a loading location to an offloading location;
- sealift operations (through the naval module). A naval unit or formation is capable of sealifting either units (amphibious operations) or a supply load from a loading location to an offloading location;
- evacuation of remains (Killed in Action – KIA). A fraction of killed personnel are recovered by their unit. These KIA are retained by the unit until they can be evacuated;
- use of trucks from one unit to pick up supplies from one or more other units, and deliver them to other units or locations;
- automatic or Player-directed resupply of units;
- creation of supply caches for future use;
- capture of enemy supplies and recovery of own supplies;
- change of the depot from which a unit orders its supplies or from which a pipeline is replenished;
- airdrop operations (through the air module). An aircraft squadron or helicopter company is capable of airdropping a unit or supply load at a specified primary location or alternate location;
- evacuation of casualties whose expected recovery time is longer than a Faction specific maximum time. A faction is a part or side e.g. land forces are part of Polish Armed Forces. Casualties are evacuated by convoys that deliver supplies to the unit and are evacuated to the unit's support unit.

Those activities can be done by completing logistic orders and sending them to the engine of the JTLS-GO system. The engine of JTLS-GO is called the Combat Event Program (CEP) and collects all prepared orders and executes them one by one computing the effect of each specific order changes the state of the game. The menu for some logistic orders is shown in Figure 2.

Database developers and exercise planners have total control over how a force side support hierarchy is designed, and over units' initial quantities, usage rates, and other supply status data. On the one hand, units may be given unlimited supplies. This permits assessment of operations in an environment that is totally unconstrained by availability of supplies. At the other extreme, high-resolution micro-management of the logistics situation is permitted by the very specific Directed Resupply, Airlift, Airdrop, Sealift, Reorder Level, and Stockage Objective directives. Between these two extreme conditions, simulating normal constrained availability, automatic requisitioning, and automatic (player-initiated) Push shipments provides a medium-level management-by-exception capability. An unlimited number of different supply categories can be represented. Categories of supply need not correspond to the standard military classes of supply. For example, a very small unclassified JTLS-GO database included these categories: Personnel,
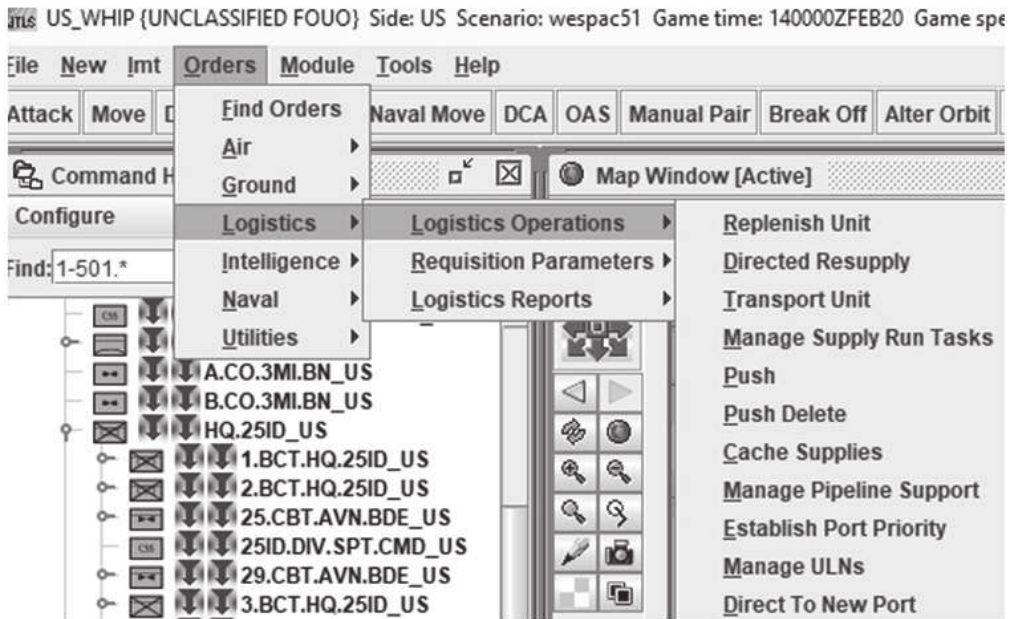
Figure 2. WHIP menu for logistic orders

Rysunek 2. Menu WHIP dla rozkazów logistycznych

Source: own study based on WHIP client.

Figure 3. IMT tables with combat systems and supply categories for specific unit

Rysunek 3. Tabele IMT z systemami walki i kategoriami zaopatrzenia dla wybranej jednostki

Source: own study based on WHIP client.

Aviation Fuel, Ground Fuel, Major End Items, General Ammunition, Artillery Ammunition, Mines, Engineer Supplies. Units combat systems (Table of Equipment – TOE, manned, available, in maintenance, cumulative KIA and Wounded in Action – WIA, etc.) and supply categories with quantities (on hand, reorder level, stockage objective, due in etc.) can be accessible anytime in the game via IMT window (Figure 3).

Overview of LOGFAS system

The Logistics Functional Area Application Service (LOGFAS) [North Atlantic Treaty Organization] delivers applications which enable the users to collect, store, manage, analyse, present, and distribute information in support of logistics operations. The main processes supported are: Stockpile planning, Deployment and sustainment planning, Movement and transport of personnel and equipment, Reception, staging, onward movement and integration and Logistics reporting. The NATO LOGFAS system consists of several components: Allied Deployment and Movement System (ADAMS), Effective Visibility Execution (EVE), Logistics Reporting (LOGREP), Allied Commands Resource Optimization Software System (ACROSS), Coalition Reception, Staging and Onward Movement (CORSOM). LOGFAS servers run on Windows Servers and use open source Apache server for webhosting and open source PostgreSQL databases for data storing. Additional LOGFAS modules are: LOGFAS Connection Manager – LCM, LOGFAS Data Management Module – LDM, Supply Distribution Model – SDM, Sustainment Planning Module – SPM, User Management Module – UMM, GeoManager Module – GeoMan and PostgreSQL Admin Tool console. Actual used version of LOGFAS has number 6.4, the newest one 6.5.

ACROSS supports the stockpile planning efforts of the SCs and nations across all component operations. ACROSS consists of several sub-software modules. All sub-systems follow target orientated methodology and are used to calculate requirements on battle decisive munitions to defeat targets by conventional means.

ADAMS supports strategic deployment planning and facilitates multinational deployment planning and information transfer. ADAMS assists movement and transportation planners in developing deployment plans and testing their feasibility by enabling the rapid preparation, de-confliction and dissemination of plans between nations and NATO commands.

CORSOM enables the performance of detailed planning for reception, staging and onward movement (RSOM) and provides visualization and oversight of theatre movements during both deployment execution and sustainment operations.

EVE Websupports the prioritization, de-confliction and coordination of actual movement flow execution plans and provides visibility of movement. During execution, planners are able to monitor, with the support of EVE the progress of planned activities and adjust plans to meet operational objectives.

The Sustainment Planning Module (SPM) enables NATO and national planners to calculate sustainment requirements for operations, to check the sustainability of a given set of units in a given time interval, to calculate the packaging requirements for the sustainment of a set of forces assigned to an operational plan and to support the calculation of strategic stockpile planning for supplies other than battle decisive munitions.

As mentioned above, LOGFAS has wide-ranging possibilities for use within NATO during national as well as allied operations. Figure 4 shows the LDM Module screen filled with forces and equipment (which is equal to combat systems in JTLS-GO system) and supplies (which is equal to supply categories in JTLS-GO system). On the right the command hierarchy is organized as a Force Profiles and Holdings. First pane on the top presents equipment and supplies of the one unit chosen from the tree on the left. In the middle, choosing country from the list, cause displaying all units belonging to this specific country. Below this table, choosing country from the list, presents list of all equipment and supplies belonging to this specific country with assigned RIC and NIC codes.
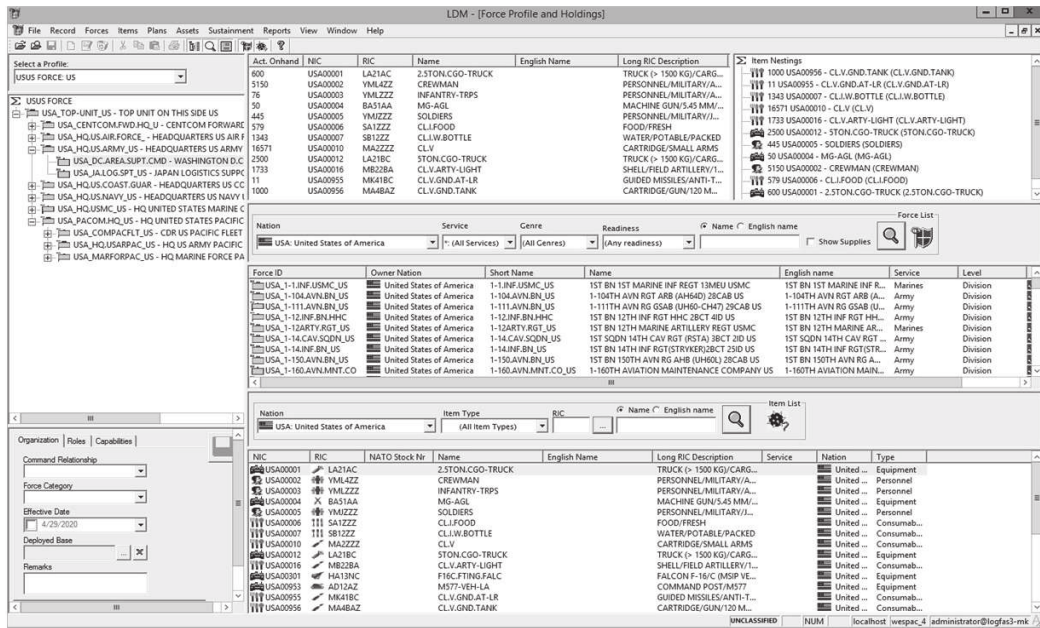

Figure 4. LOGFAS LDM module
Rysunek 4. Moduł LDM systemu LOGFAS

Source: own study based on LDM module.

The RIC, NIC concepts are essential to manage resources and for planning process. RIC – Reportable Item Code and NIC – National Item Code are categorized and coded list of combat systems (weapons, vehicles, APC's, tanks, aircrafts, ships) and supplies (food, water, munition, fuel, etc.) using six letter-number code which precisely assign specific combat system or supply to specific code. RIC codes are organized in hierarchical tree which means that mowing down this tree, like from branch to leaves, drive database users from general category to more detailed categories of combat systems or supply categories. Those codes are organized as the hierarchical tree shown on Figure 5. Each branch far from the tree root add new letter or number for specific resource. E.g. Vehicle (RIC: LA), has Truck category (RIC: LA2), Cargo subcategory (RIC: LA21), Up to 2 1/2 tonne sub-subcategory (RIC: LA21A) and finally High Mobility Sub-Sub-Subcategory (RIC: LA21AC). This same happened to resources: while the Subsistence has RIC code S, looking down leads to Canned Goods which have RIC code SA5. NIC are used and prepared by specific country according their national needs.
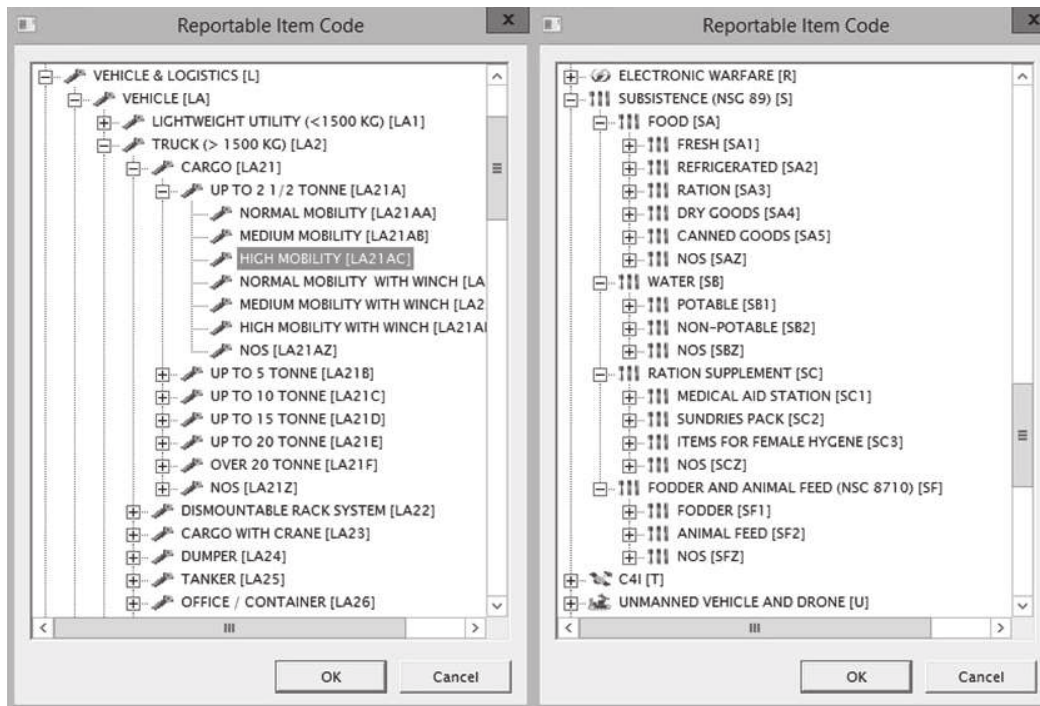
Figure 5. RIC hierarchical tree
Rysunek 5. Hierarchiczne drzewo kodów RIC

Source: own study based on LDM module.

Detailed description of LOGFAS system goes beyond of capacity of this article. Readers who need more information are pleased to read Polish article concerning different aspects of LOGFAS system use [Kupiec 2012, Sieczka 2012, Kupiec 2013a, b, c, Kupiec and Sieczka 2015, Sieczka and Kupiec 2015] or as well as logistics doctrine [NATO Standarization Office 2018] or LOGFAS User Documentation [LOGREP 2009, SPM 2009, SDM 2010].

Research goal and methodology

Due to COVID-19 restrictions the trials were carried out as a remote experiment. Two servers: JTLS-GO and LOGFAS were located in the War Games & Simulation Centre (WG&SC) server room and were accessible via Virtual Private Network (VPN) to all participants of the experiment. Technical administrators prepared a configured environment for tests for both systems. JTLS-GO Database Development System (DDS) database users prepared right data in proper tables using logical, but not tested settings, especially in terms of RIC and NIC codes. Some other analysts used their knowledge and experience about how data should be prepared and how to set up two different systems to make a one-way connection possible. It is important to stress that no member of this team was experienced in this type of connection. On the one hand, JTLS-GO has prepared internal services which can generate export files for both a STARTEX state and states during the

running game. On the other hand, LOGFAS has an ensured option and wizard for importing data from external sources in xml format with an established file structure. There is therefore the technical possibility of transferring data from JTLS-GO to LOGFAS. However, this possibility has never been fully tested.

The primary hypothesis concentrated on how to continuously transfer data from the JTLS-GO database to the LOGFAS database during a few days of CAX exercise.

Questions/Problems to resolve were:

1. How to fill the DDS database tables with real RIC and NIC codes to achieve a one to one relationship between a specific combat system in JTLS-GO and the RIC, NIC hierarchical codes tree in the LOGFAS system? This is an important issue in order that units in JTLS-GO and subsequently data processing in LOGFAS have the same equipment and supplies with the correct quantities in both systems.

2. Which NIC code formats (in terms of naming convention and length of the NIC codes) should be used to make it possible for JTLS-GO to produce correctly formatted export data for LOGFAS to import without any issues and overwriting of data? The assumption was that no even a single record should be lost.

3. How does changing combat system and supply category data in the JTLS-GO system as a result of enemy/opponent activities influence changing data in the LOGFAS system?

To sum up, the research concentrated on the idea of how to connect two quite different systems which are designed to work in different areas and achieve unidirectional data flow from the JTLS-GO simulation system into the LOGFAS logistic system. The next step in the development of the CAX exercises conducted with the Armed Forces Support Inspectorate (AFSI) every two years in WG&SC at the War Studies University in Warsaw is to connect these two systems on the next exercises. No one tried connecting these two systems before. AFSI is responsible for the national database of NICs and RICs and keeping it updated in coordination with other users (divisions, brigade etc). This is the national RIC and NIC master database.

The process of populating ORder of BATtle (ORBAT), forces, combat systems, supply categories data into internal DDS database in the JTLS-GO system and putting them without any errors into the LOGFAS database must be done in the following steps:

1. Firstly, the JTLS-GO and LOGFAS servers should be installed, configured, running and available for the users. This is the responsibility of technical administrators for both systems;

2. Secondly, an established force structure using their own combat systems and supply categories should be written and stored in the internal JTLS-GO database. The DDS database is accessible via a webpage which runs as a client similarly to WHIP for Players in JTLS-GO. Those clients are managed by WG&SC Operational Branch specialists who input all this data into DDS tables. In order to do that the DDS base needs to be filled with right data for units, combat systems, supply categories, targets and so on. Each combat system and supply category need to have their own RIC and NIC code which is recognized and used in LOGFAS. This data is confirmed during conferences which take place in the CAX development process in exercise control (EXCON) before an exercise runs for a training audience (TA). These are: Initial Planning Conference (IPC), Main Planning Conference (MPC) and Final Coordination Conference (FCC) [Çayirci and Marinčič 2009, North Atlantic Treaty

Organization 2013]. Between some of these conferences database workshops occur to develop the concept of the exercise to prepare the right environment for the TA. This virtual environment is necessary to develop the intended key processes and training objectives in order to achieve the desired planning outcomes. The final step is "frozen" in the DDS database, which cannot be changed after this time. This base is called the STARTEX database which is the database for the start of the exercise.

3. Thirdly, after preparation of the DDS base in JTLS-GO, the initial transfer of this data should be done. In this step it is mandatory to prepare right internal JTLS service setup. This service is called the LOGFASTS – LOGFAS Transaction Service [Rolands & Associates Corporation 2019a]. After running this service files should be created to enable export of the DDS data from the JTLS-GO simulation system. This data needs to be in a file and structure format which is recognizable by the LOGFAS system.

4. Fourthly, the technical administrator needs to prepare the LOGFAS server and configure an empty database ready to import data from the JTLS-GO system. The difference between LOGFAS and JTLS-GO is that LOGFAS can work with many databases simultaneously but that JTLS-GO only works with one in the same time. After creating the base, STARTEX data from the JTLS-GO DDS database need to be imported into the empty LOGFAS database enabling the creation of the Force Holding and Profile in the LOGFAS Database Management (LDM) module.

5. Fifthly, the JTLS-GO LOGFASTS service needs to be running during the whole game without any interruption to create update files at every set up period e.g. two hours.

6. Sixthly, during the execution phase of CAX exercise updates JTLS needs to sequentially update the state of all required objects in the LOGFAS system. Only then will the data in the LOGFAS guarantee proper logistic planning and command over logistics troops based on true quantities of equipment and supplies in all units.

Research results

Steps one to four were completed without any issues. All efforts were focused on sending the one to one ORBAT structure with command and logistics hierarchy as well as units with their own combat systems and supply categories. Some problems occurred when combat systems and supply categories needed to be relabelled with the right NIC and RIC codes. It turned out that during the STARTEX data preparation phase some of the NIC codes were too long and, in some cases, the imported data was overwritten causing errors.

Drilling down into the export files was needed to find the reason for the bugs in the LOGFAS database and comparison with the JTLS-GO database. After several trials operational branch specialists prepared the right methodology for inputting NIC codes.

During testing a few questions arose and needed explanation:

1. JTLS-GO generates information about Combat Systems, Aircraft, and Supplies, which is then sent to the LOGFAS LDM, but the simulation system does not generate this kind of information about Targets, which are very important for the players – the participants of the exercise. The question is: how is it possible to send information about

Targets (Air Defense Class, Bridge Class, SSM (Surface-Surface Missile) Class, Jammer Type, Sensor Type) to the LOGFAS LDM?

2. During the game, JTLS-GO periodically generates files for the LOGFAS LDM. What should these files contain and how do they need to update data in the LOGFAS LDM?

Figures 3 and 6 show JTLS-GO IMT tables containing 1-501.ABN.INF.BN_US unit combat systems. Upper table in Figure 3 shows combat systems before the pre-strike of opposing force whereas Figure 6 shows those combat systems after the post-strike. It is noticeable that most changes happened in HMMWV-Armor vehicles (15 destroyed in Cumulative KIA column), Infantry-Trps – infantry troops (11 killed in action in Cumulative KIA column), Crewmen (eight killed in action in Cumulative KIA column, seven wounded in action in Cumulative WIA column).

Figure 6. IMT Table showing Combat Systems of 1-501.ABN.INF.BN_US after strike of opposing force

Rysunek 6. Tabela IMT ze środkami walki batalionu 1-501.ABN.INF.BN_US po uderzeniu przeciwnika

Figure 7. LOGFAS LDM module showing 1-501.ABN.INF.BN_US after strike of opposing force – no changes in Combat Systems

Rysunek 7. Moduł LOGFAS LDM ze środkami walki batalionu 1-501.ABN.INF.BN_US po uderzeniu przeciwnika – brak zmian w środkach walki

Source: own study based on LDM module.

Source: own study based on WHIP client.

Meanwhile, in Figure 7 showing the screen from LDM LOGFAS after updating data, there are no changes in active combat systems, which is obvious incorrect. These questions are still open and need to be resolved.

Unfortunately, these iterative tries provided proof that the update files from JTLS-GO were unexpectedly generated in a random time period and contained small items of wrong data. As one of many international users of the JTLS-GO system, the WG&SC, which is also the owner of contracted support rights according to a signing agreement, sent these conclusions to the JTLS-GO producer in order to initiate the process of fixing the bugs in the simulation system code and improve service work.

Summary and conclusions

As mentioned above six basic steps are needed to achieve full success. Unfortunately, the trials showed that only the first four steps could be completely successfully. The internal update service in the JTLS-GO system which is used to fill and update data in the LOGFAS system definitely was the interoperability issue. It was the first time, that this connection was made by the PAF (Polish Armed Forces), and it is quite probable that it was also the first time within NATO. The trial suggests that there is an issue with the data update process after each game turn. We believe that this issue has not been raised before with Roland's & Associates Corporation and hope that this problem can be resolved promptly by the issue of a patch or in the next version. This will enable input to prepare a much more precise and realistic environment for training audiences during CAX exercises.

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