

# JTLS-GO

## Version Description Document

September 2019



DEPARTMENT OF DEFENSE  
JOINT STAFF J7  
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JOINT THEATER LEVEL SIMULATION - GLOBAL OPERATIONS  
(JTLS-GO 5.1.4.0)

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## ABSTRACT

The Joint Theater Level Simulation - Global Operations (JTLS-GO<sup>®</sup>) is an interactive, computer-based, multi-sided wargaming system that models combined joint and coalition resource air, land, naval, and Non-Governmental Organization (NGO) environments.

This *JTLS-GO Version Description Document (VDD)* describes the new features of the Version 5.1.4.0 delivery of the configuration-managed JTLS-GO software suite.

JTLS-GO 5.1.4.0 is a Maintenance release of the JTLS-GO 5.1 series that includes an updated wespac51 demonstration database as well as updated repository data held in the repository51 database. There are no major Engineering Change Proposals (ECPs) included with this release, but there are a few minor ECPs that required no new data or data format changes, which are summarized in Chapter 2. Code modifications that represent corrections to known Software Trouble Reports (STRs) are described in Chapter 3. Remaining and outstanding STRs are described in Chapter 4.

This publication is updated and revised as required for each Major or Maintenance version release of the JTLS-GO model. Corrections, additions, or recommendations for improvement must reference specific sections, pages, and paragraphs with appropriate justification and be forwarded to:

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## 1.0 INTRODUCTION

### 1.1 SCOPE

This *JTLS-GO Version Description Document (VDD)* describes Version 5.1.4.0 of the configuration managed Joint Theater Level Simulation - Global Operations (JTLS-GO<sup>®</sup>) software suite. JTLS-GO 5.1.4.0 is a Maintenance release for the JTLS-GO 5.1 series.

JTLS-GO 5.1.4.0 includes the entire JTLS-GO suite of software, a repository of engineering level data, and a realistic demonstration scenario based on the Western Pacific theater of operations, called “wespac51”. No database format modifications have been made for this release, but a static data error for allowable OTH-Gold Ship Types was corrected in Version 5.1.1.0. This does require a user to execute a correction procedure for all of their Version 5.1.0.0 scenarios loaded in Oracle. Information on this procedure can be found on [Page 1-11](#).

Descriptions of minor Engineering Change Proposals (ECPs) implemented for this release are provided in [Chapter 2.0](#). Explanations of all Software Trouble Reports (STRs) corrected in this release are provided in [Chapter 3.0](#). Outstanding STRs are provided in [Chapter 4.0](#). Changes made to the JTLS-GO 5.1 engineering data repository are provided in [APPENDIX C](#).

JTLS-GO 5.1.4.0 executes on the Red Hat Enterprise Linux Version 7.6 64-bit operating systems. The Web-Hosted Interface Program (WHIP<sup>®</sup>) user workstation interface can be executed on any operating system from any Java-compatible Web browser.

### 1.2 INVENTORY OF MATERIALS

This section lists documents and software that are relevant to JTLS-GO. All JTLS-GO documents included in this delivery are provided in Portable Document Format (PDF) within a documents subdirectory.

#### 1.2.1 Obsolete/Outdated Documents

No documents have been deleted or become outdated as a result of this release.

#### 1.2.2 Unchanged Documents

- *JTLS-GO Analyst Guide* (JTLS-GO Document 01, Version 5.1.3.0)
- *JTLS-GO Configuration Management Plan* (JTLS-GO Document 03, Version 5.1.2.0)
- *JTLS-GO Controller Guide* (JTLS-GO Document 04, Version 5.1.3.0)
- *JTLS-GO Data Requirements Manual* (JTLS-GO Document 05, Version 5.1.2.0)
- *JTLS-GO Director Guide* (JTLS-GO Document 07, Version 5.1.2.0)



- *JTLS-GO Executive Overview* (JTLS-GO Document 08, Version 5.1.3.0)
- *JTLS-GO WHIP Training Manual* (JTLS-GO Document 10, Version 5.1.3.0)
- *JTLS-GO Player Guide* (JTLS-GO Document 12, Version 5.1.3.0)
- *JTLS-GO Repository Description* (JTLS-GO Document 14, Version 5.1.2.0)
- *JTLS-GO Software Maintenance Manual* (JTLS-GO Document 15, Version 5.1.2.0)
- *JTLS-GO Technical Coordinator Guide* (JTLS-GO Document 16, Version 5.1.3.0)
- *JTLS-GO Entity Level Server User Guide* (JTLS-GO Document 19, Version 5.1.2.0)
- *JTLS-GO Federation User Guide* (JTLS-GO Document 20, Version 5.1.2.0)
- *JTLS-GO C4I Interface Manual* (JTLS-GO Document 21, Version 5.1.3.0)
- *JTLS-GO Air Services User Guide* (JTLS-GO Document 24, Version 5.1.2.0)

### 1.2.3 Updated Documents

- *JTLS-GO DDS User Guide* (JTLS-GO Document 06, Version 5.1.4.0)
- *JTLS-GO Installation Manual* (JTLS-GO Document 09, Version 5.1.4.0)
- *JTLS-GO Version Description Document* (JTLS-GO Document 17, Version 5.1.4.0)

### 1.2.4 New Documents

No new documents are delivered with JTLS-GO 5.1.4.0.

### 1.2.5 Delivered Software Components

JTLS-GO 5.1.4.0 may be delivered either on a CD or as a set of compressed TAR files to be downloaded. Either method includes the complete suite of software executable code and command procedures. The following software components are included with this release:

- Combat Events Program (CEP)
- Scenario Initialization Program (SIP)
- Interface Configuration Program (ICP)
- Reformat Spreadsheet Program (RSP)
- JTLS Symbols Application (JSYMS)

- Database Development System (DDS)
  - Database Configuration Program (DCP)
  - DDS Client User Interface (DDSC)
- ATO Translator Service (ATOT)
- ATO Generator Service (ATOG)
- ATO Retrieval Program (ATORET)
- JTLS Convert Location Program (JCONVERT)
- Count Critical Order Program (CCO)
- JTLS HLA Interface Program (JHIP)
- After Action Review Client (AARC)
- Scenario Data Client (SDC)
- Order Entry Client (OEC)
- Order Verification Tool (OVT)
- JTLS Object Distribution Authority (JODA)
- Web Services Manager (WSM)
- Web-Hosted Interface Program (WHIP) and its component programs:
  - Apache Server (APACHE)
  - JTLS XML Serial Repository (JXSR)
  - Order Management Authority (OMA)
  - Synchronized Authentication and Preferences Service (SYNAPSE)
  - XML Message Service (XMS)
  - Total Recall Interactive Playback Program (TRIPP)

When operating the TRIPP capability in current JTLS-GO releases, users are not prevented from logging into an actively running TRIPP making a connection to the same Replay JXSR. A TRIPP, as documented, requires its own Replay JXSR to control and perform the replay of the recorded simulation events.

This situation as a consequence can have more than one user concurrently control the playback of the game, as the shared Replay JXSR will honor each of the user's playback requests and will then change what each connected user sees on their TRIPP instance. This issue will be addressed in a future JTLS-GO release by only permitting one login per TRIPP user instance, such as a WHIP login prevents from users logging into the same WHIP instance.

- Entity Level Server (ELS)
- JTLS Operational Interface (JOI) for both OTH-Gold and Link 16 generation
- Tactical Electronic Intelligence (TACELINT) Message Service
- KML Operational Interface (KOI)
- JTLS Transaction Interface Program (JTOI)
- JTLS Interface Network Navigator (JINN)
- JTLS Order of Battle Editor (JOBE)
- JTLS Geographic Information System (GIS) Terrain Building Program

Instructions for installing JTLS-GO 5.1.4.0 are provided in the *JTLS-GO Installation Manual*. Installing a previous version of JTLS-GO prior to installing JTLS-GO 5.1.4.0 is not necessary. No other upgrade beyond installation of the compressed TAR files (or CD) is required. The software provided with this delivery is a complete release that includes all files and code required to execute JTLS-GO.

### 1.2.6 Released Databases

This release includes the following sample unclassified databases:

- The scenario "repository51" serves as a repository of engineering level data. Although not useful as a scenario, it does follow all of the database requirements for a scenario, and should be loaded into your Oracle scenario table-space. With JTLS-GO 5.1.4.0, it is possible to access and copy records from the repository51 database into your own developed scenarios.

- The scenario “wespac51”, which is based on the Western Pacific theater of operations and is suitable for training and demonstrations.

### 1.3 INTERFACE COMPATIBILITY

#### 1.3.1 Support Software

JTLS-GO 5.1.4.0 requires the following versions of support software, including operating systems, compilers, scripting utilities, database tools, transfer protocols, and display managers:

- Operating system for the model: Red Hat Linux Enterprise Edition Version 7.6 (ES), 64-bit architecture.

Security Enabled (SE) Linux must not be enabled on systems used to execute JTLS-GO or its components. Tests reveal that SE Linux-enabled systems cause frequent and random JXSR crashes and errors. Use of SE Linux to support JTLS-GO is currently not authorized.

- JTLS-GO 5.1 has been tested with the following versions of Linux 7:

Red Hat Linux 7.6 - This operating system license must be purchased, but it has been approved by the Defense Information Systems Agency (DISA) for use by U.S. Government Agencies.

Oracle Linux 7.6 - This operating system is free to download, use, and distribute, and is provided in a variety of installation and deployment methods. It has been approved by DISA for use by U.S. Government Agencies.

CentOS Linux 7.6 - A free version of Linux 7 that has **not** been approved by DISA for use by U.S. Government Agencies.

- There are no restrictions on the operating system used for client workstations, except that the operating system must have a Java-enabled web browser. JTLS-GO 5.1.4.0 has been tested on the following operating systems:

Red Hat Linux Enterprise Edition Version 7.6.

CentOS Linux Version 7.6.

Windows 7 and Windows 10, which can be used only if the workstation is an external HTTP client of the simulation network.

- The JTLS-GO 5.1 series no longer uses Oracle Java, and has moved to the latest version of OpenJDK 8, which is OpenJDK 8 Version 222. We no longer deliver the Java Runtime Environment (JRE) within the JTLS-GO delivered software TAR files. Each user organization must obtain the latest version of the OpenJDK Red Hat Package Manager (RPM) and install the RPM on the servers used by JTLS-GO.

- JTLS-GO uses IcedTea to provide the OpenJDK web start capability that implements the web-enabled JTLS-GO functionality. The current version of JTLS-GO supports IcedTea version 1.8.3.

IcedTea version 1.7.1 does not support use of unsecured HTTP to access web-enabled JTLS-GO components for the DDS Client application. Users must configure their Glassfish instance, using the DCP program, to use HTTPS, by enabling the "Use SSL" column (this is enabled by default) when running with IcedTea version 1.7.1.

Red Hat Linux version 7.7 continues to distribute with IcedTea version 1.7.1. There are available RPM packages for a later version of IcedTea, so users who wish to install a later version of IcedTea must explicitly install IcedTea, including on their client workstations. IcedTea version 1.8.3 is required to use unsecure HTTP with JTLS-GO.

- JTLS-GO database tools require use of a certified Oracle database server and the full Oracle Client installation for runtime requirements. Additional installation details can be found in [Section 1.5.2](#) of this chapter.
- Windows software, X11R5 server, Motif 1.2 Library, Motif Window Manager: These items are included as part of the supported versions of Red Hat Linux ES.
- TCP/IP is required for inter-process communication between the JODA data server and all user interface programs. The version of TCP/IP included with the supported versions of Red Hat Linux ES is sufficient.
- The Perl script language is used by the JTLS-GO system and game setup scripts. The version of Perl included with the supported versions of Red Hat Linux ES is sufficient. The Perl program is typically located in the /usr/bin directory. If Perl is installed in a another location, a link should be created from the /usr/bin directory to this program.
- SIMSCRIPT II.5 (SIMSCRIPT to C) translator/compiler: SIMSCRIPT is required for recompiling JTLS-GO code. It is not necessary to have a SIMSCRIPT compiler to execute JTLS-GO, because all JTLS-GO software executables are statically linked with the SIMSCRIPT libraries. The compiler is needed only if you are a U.S. Government Agency that can obtain source code and plans to re-compile JTLS-GO SIMSCRIPT code. To obtain a SIMSCRIPT compiler, contact CACI Inc.
- ANSI C Compiler: It is not necessary to use a C compiler to execute JTLS-GO. This compiler is needed only if you are a U.S. Government Agency that can obtain source code and plans to re-compile any of the JTLS-GO component programs. The C Compiler version delivered with the supported versions of Red Hat Linux ES is sufficient.

- C++ Compiler: It is not necessary to use a C++ compiler to execute JTLS-GO. This compiler is needed only if you are a U.S. Government Agency that can obtain source code and plans to re-compile any of the JTLS-GO HLA component programs. The C++ Compiler version delivered with the supported versions of Red Hat Linux ES is sufficient.
- The JTLS-GO DDS (Database Development System) application uses these open source libraries:

JFreeChart, licensed under LGPL (GNU LESSER GENERAL PUBLIC LICENSE) by Object Refinery Limited, <http://www.object-refinery.com>.

JCommon, licensed under LGPL2.1 (GNU LESSER GENERAL PUBLIC LICENSE version 2.1 or later) by Object Refinery Limited, <http://www.object-refinery.com>

Commons-math3-3.0.jar, licensed under Apache Software Foundation (Apache License, Version 2.0), <http://www.apache.org/licenses/LICENSE-2.0>HLA Compliance.

- KML Operational Interface (KOI)

The Keyhole Markup Language (KML) Operational Interface (KOI) server utility enables the model to feed operational simulation data to any version of Google Earth™. The display capabilities and data transfer features of this terrain viewer are sufficiently robust to be used as a base-level operational interface. Operational Players who may be restricted from using the COP, C2PC, or other C4I systems may be able to install and use Google Earth and configure the KOI to provide a capability that resembles C4I for observing perception Force Side data.

Chapter 3 of the *JTLS-GO C4I Interface Manual* describes requirements and procedures for using the KOI capabilities.

- JTLS-GO 5.1 implements SSH Tunneling between Apache and the services, and among the services. Rigorous testing should be done prior to use in any exercise, and particular attention should be paid to network performance under load.

### 1.3.2 JTLS-GO Information Assurance Compliance

Because of recent incidents of intrusions into software systems, the United States Department of Defense (DoD) has implemented a strong and strictly enforced Information Assurance (IA) program. JTLS-GO, as software that executes on DoD systems, must comply to the mandates of the IA program, as well as requirements of all of the third party software used by JTLS-GO, such as Oracle and Java.

One of the DoD IA requirements is that the software must implement a methodology that ensures that the end user keeps the software up-to-date and properly installs all security patches. In previous versions of JTLS-GO, Java 8, as delivered by Oracle, fulfilled this mandate by implementing an expiration date for its software. After a certain date, all Java-related programs

stopped working, whether connected to an open network or not. All JTLS-GO releases were closely linked to the Java expiration date.

Information available at the time of this release indicates that OpenJDK will not implement an expiration date. In order to fulfill the DoD IA requirement, Maintenance releases of JTLS-GO will be released as new versions of OpenJDK are released. In a future version of JTLS-GO, all delivered Java programs will check that the latest version of Java is being used. Each local installation will be able to override the warning generated when the program detects that the latest version is not properly installed.

JTLS-GO has completed the IA program mandates and the JTLS-GO 5.1 series of releases has been granted an Authority To Operate (ATO) on DoD systems. Contact the U.S. Government Program Manager, Mr. Don Weter ([donald.e.weter.civ@mail.mil](mailto:donald.e.weter.civ@mail.mil)), for additional information.

### 1.3.3 JTLS-GO High Level Architecture Compliance

The JTLS-GO 5.1.4.0 release is fully High Level Architecture (HLA) compliant, and includes all the programs required to run JTLS-GO in an HLA mode. JTLS-GO uses the Federation Object Model (FOM), located in the \$JGAME/data/hla directory. Federation testing of JTLS-GO is not complete, but initial tests with CAE's GESI wargaming system have been accomplished. Future plans include expanding the capabilities of the JTLS-GO-GESI federation, called "GlobalSim".

GlobalSim is a comprehensive constructive simulation solution for joint training and wargaming, that helps commanders and all levels of staff prepare for a range of operational scenarios. The solution combines JTLS-GO with CAE's GESI constructive tactical entity-level simulation system as a federation. CAE's GESI constructive simulation system is designed to run complex and comprehensive exercises from the company level up to division level. The CAE GESI system is used to represent a virtual battlefield, including weapons, vehicles, aircraft, and ground forces.

Combining JTLS-GO and GESI brings together operational and tactical level constructive simulations to prepare commanders and staff to make timely, informed and intelligent decisions across the full spectrum of operations, including conventional combat, disaster relief, and operations other than war.

All JTLS-GO software needed to run GlobalSim is included in this delivery.

The HLA RTI (Run Time Infrastructure) executive program recommended for use with this release is Pitch pRTI Evolved 4.4.2.0. However, this program is not included in the JTLS-GO 5.1.4.0 delivery. Users may obtain a full installation package of the RTI executive program from Pitch Corporation ([www.pitchtechnologies.com](http://www.pitchtechnologies.com)). For information about executing the HLA RTI Executive and other HLA-related software, refer to the appropriate HLA documentation and user guides.

## 1.4 DATABASE MODIFICATIONS

Significant database structure differences exist between the JTLS-GO 5.1 series and the previous JTLS-GO 5.0 series database structure.

To upgrade your JTLS-GO 5.0 scenario to JTLS-GO 5.1 compatibility, see instructions listed in Chapter 3.1 of the *JTLS-GO DDS User Guide*.

### 1.4.1 JTLS-GO Using Legacy Default Symbol Set

If a user organization is still using the pre-JTLS-GO 5.0.0.0 legacy default symbol set, prior to unloading your JTLS-GO 5.1.0.0 formatted data from your Oracle database server into the JTLS-GO 5.1.0.0 scenario American Standard Code for Information Interchange (ASCII) text files, you must execute the JSYMS program using the procedure outlined in Appendix B.11 of the *JTLS-GO DDS User Guide*. This procedure will reorganize the structure of the .gs and .scf symbols-related files.

### 1.4.2 JTLS-GO Using New Default Symbol Set

You should not make any modifications to the Default Symbol Set delivered with JTLS-GO 5.1.4.0, but end user organizations are free to use the Default Symbol Set in their scenarios and alter the scenario symbol set to meet specific organizational needs.

### 1.4.3 Standard Repository Changes

The JTLS-GO 5.1 series of JTLS-GO is the first series in which R&A is delivering an unclassified data repository called “repository51”. In future Major releases of JTLS-GO, [APPENDIX B](#) will provide a summary of the data structure changes made to the data repository. No data structure changes have been made in this Maintenance release; therefore, [APPENDIX B](#) is empty. Refer to Appendix B in the *JTLS-GO 5.1.0.0 Version Description Document*, included with this release, for data structure changes made for the JTLS-GO 5.1 series.

## 1.5 INSTALLATION

### 1.5.1 Installation Instructions

The *JTLS-GO Installation Manual*, a PDF file available for direct download, is part of this JTLS-GO delivery. It provides detailed instructions for installing a new version of JTLS-GO.

### 1.5.2 Oracle Compatibility and Installation

A full Oracle Client (not Instant Client) installation that matches your database server version is currently a requirement for running some JTLS-GO applications. The Oracle Instant Client is not sufficient for JTLS-GO applications because certain Oracle utilities, such as sqlldr, imp, exp, and tnsping, are missing. If you have applied a patchset to your database server, the same patchset



should be applied to the Oracle Client installation. A 64-bit Oracle Client installation must be used.

The JTLS-GO scenario/database modification process also expects Oracle 11.2.0.1 or higher full Oracle Client installation. Some sites NFS mount their database server as Oracle Client; other sites prefer a full installation of the Oracle Client to a different directory that mounts to JTLS-GO (a simple NFS mount will suffice). Your system administrator can choose the appropriate installation.

Assigning the full Oracle Client installation location (or mount point) as the ORACLE\_HOME in the JTLS-GO .cshrc file allows connecting to an Oracle database server (11.2.0.1 or higher - including 11gR2 XE) running on any Oracle-certified database server platform.

Between the free Express Editions (XE) of Oracle, the 18c XE has a large footprint and much more complex database architecture compared to the 11gR2 XE version. For test environments and scenario building purposes, or for collecting AAR data for a short period of time, installation and setup of the 11gR2 XE version would be much simpler.

The DDS application utilizes the Oracle GlassFish J2EE server, which, like the JTLS-GO WHIP Apache server, is delivered with JTLS-GO and requires no separate installation.

Refer to Chapter 6 of the *JTLS-GO Installation Manual* for additional details pertaining to the Oracle installation.

### 1.5.3 Special Installation Instructions

This section describes special instructions that should be followed because of errors corrected in this version and previous bug releases for the JTLS-GO 5.1 series.

#### 1.5.3.1 OTH-Gold Ship Types

JTLS-GO 5.1.0.0 was delivered with an old list of OTH-Gold ship types. This problem was corrected in JTLS-GO 5.1.1.0. To properly implement this solution, users must execute the following additional procedures for each of their JTLS-GO Version 5.1.0.0 scenarios loaded in Oracle.

Users who have already executed this procedure for their scenarios (including during installation of JTLS-GO Version 5.1.1.0, 5.1.2.0, or 5.1.3.0) do not need to execute the provided procedure again.

New OTH-Gold ship types were added to JTLS-GO, due to STR JTLS-2019-14238.

1. Execute the following command:

```
cd $JTLSHOME/script/dds/version5.1/scripts/
```

2. Execute the following command:

```
sqlplus yourScenario/OraclePassword @update_oth_gold_types.sql
```

3. Verify the related execution listing file under the \$JDATA/scenario/ directory for errors.
4. Unload your scenario using the JTLS-GO Menu, Options 1 -> 1 -> 4
5. Verify the .srw ascii file for your scenario.

To fix the problem renaming Force Sides, due to STR JTLS-2019-14267:

6. Reload the database.

### 1.5.3.2 Generation Of Combat System Summary Files

STR JTLS-2019-14518 Move Combat System Summary Files, delivered as part of JTLS-GO 5.1.4.0, solved a problem overwriting the summary Combat System Character Separated Value (.csv) files during Batch Runs. This STR was solved by moving the location of the .csv files from the game/<scenario\_name>/location directory to a sub-directory under each checkpoint. After loading JTLS-O 5.1.4.0, the user must accomplish one of the following steps to all active game scenarios:

- Option 1: Rerun the Setup Procedure for each active scenario.
- Option 2: Hand-create a cbtsys\_summary sub-directory in the game/<scenario\_name> directory. This can be accomplished using the following steps from a command terminal for each existing game that has already been set up and prepared for execution:
  - a. Enter the command: **game** - this puts the terminal in the \$JTLSHOME/game directory.
  - b. Enter the command: **cd <scenario\_name>** (for example, **cd wespac51**) - this puts the terminal in the game/<scenario\_name> directory.
  - c. Enter the command: **mkdir cbtsys\_summary**. This creates the necessary new directory.



## 2.0 ENGINEERING CHANGE PROPOSALS

This chapter summarizes model capabilities added to JTLS-GO 5.1.4.0 as a result of implementing authorized Engineering Change Proposals (ECPs).

### 2.1 JTLS-2019-14481 Representing Air-Launched Ballistic Missiles

#### Summary of Model Change Request

JTLS-GO does not represent Air Launched Ballistic Missiles (ALBM).

#### Design Summary

A missile fired from an aircraft was assumed to be a Cruise Missile. This assumption was removed. If the fired missile is a Ballistic Missile, indicated by the weapon parameter TW BOOST PHASE TIME being not set to zero, the missile now follows Ballistic Missile flight path rules.



## 3.0 SOFTWARE TROUBLE REPORTS

This chapter summarizes Software Trouble Reports (STRs), which describe software code errors that have been discovered by JTLS-GO users or developers and have been corrected.

[Chapter 4.0](#) describes STRs that remain outstanding from previous versions; however, because of the model enhancements included with JTLS-GO 5.1.0.0, no STRs identified in prior JTLS-GO series are considered valid. Uncorrected errors identified for JTLS-GO 5.1.4.0 are documented in this chapter and should be corrected in future maintenance releases.

### 3.1 JTLS-2019-14469 Ship Basic Type List Deprecated

*In previous versions of JTLS-GO, the Ship Basic Type list of values was used to map to a list of OTH Gold values. JTLS-GO now has the list of OTH Gold values immediately available. Ship Basic Type is now obsolete and should be replaced.*

*During the process of removing usage of Ship Basic Type, an error was found where the number of basic ship types was used incorrectly when generating an IIR message. The English format of message 5503 and the Message Text Format (MTF) format of messages 5502 and 5503 were found to be using Ship\_C3I\_Types, which has been replaced by OTH\_GOLD\_Type.*

All references and use of Ship Basic Types have been removed from the CEP. In the JTLS Data System Protocol, the NAVAL attribute of basic\_ship\_type still exists but should not be used. The Ship Real World Data belonging to that NAVAL unit's Ship Unit Prototype will store this data.

Message 1050 has been changed to use Operating\_Medium instead of Ship\_Basic\_Types when reporting SUP types as Surface or Subsurface. The IIR message generation code has been fixed to use the number of generic ship types instead of the number of ship basic types. The English format of message 5503 and the MTF format of messages 5502 and 5503 were updated to use OTH\_GOLD\_Type instead of Ship\_C3I\_Types.

### 3.2 JTLS-2019-14470 Zero Range Accepted For Jammer Targets

*The Controller Set Target Parameter order permits a Target Distance of zero to be entered for an individual Jammer Target. This is supposed to mean that the Target's range is equal to the maximum range of the Jammer Type (JT RANGE). The code was actually setting the range of the Jammer Target to zero.*

The model code was changed to treat a request to change the Target Distance to zero for Jammer Targets as a request to assign the maximum range for the Target class, JT RANGE. This is equivalent to the logic used for Sensor Targets.

Additionally, when the zero range option was applied to SAM and SENSOR Targets, the range rings were not being updated. This problem was also corrected in the same routine.

### 3.3 JTLS-2019-14471 SVPR Improvements

*New SVPR correction options should be added to various Errors and Warnings to enhance the database builders capability to quickly fix problems.*

New SVPR correction options were added to Error 501 and Warnings 1224, 1225, 1448, 1449, 1457, 1459, 1605, and 1620.

### 3.4 JTLS-2019-14472 DCP Saving Configuration

*STR JTLS-2019-14387, delivered with JTL:S 5.1.3.0, introduced a problem that prevented the DCP from starting Glassfish using the "Start Glassfish" button. The DCP used a global variable that was reset only if the "Save and start Glassfish" button was pushed. Therefore, bringing up the DCP for the first time did not start Glassfish when the "Start Glassfish" button is pushed, even though the domain existed.*

The DCP code no longer uses the global variable and instead uses an internal flag for save status. An ICP error message title was also corrected to no longer display "Dcp".

### 3.5 JTLS-2019-14473 SIP Country Code Overrides Listed

*When the site specific Country Code file (\$JGAME/data\_site/Country\_Codes.xml) is loaded, every new Country Code being added to the configuration managed list of Country Code is printed to the screen. This message was originally inserted as a debugging statement during the development of the Country Code module, but was never removed. Its addition causes confusion for the database developers.*

The print statement was removed from the code.

### 3.6 JTLS-2019-14474 JINN/JOBE Packager Script Include File

*The JINN runs the packager script to make a package for the JOBE program. The package did not include the newly needed glazedlists.jar file. This would cause the JOBE would crash.*

The glazedlists.jar file was added to the packager script.

### 3.7 JTLS-2019-14475 HUP Firing Targets Short On Supplies

*Database developers needed to be able to identify HUPs that do not have enough supplies to support their assigned SAM and SSM targets.*

Only HUP prototype SSMs were considered by the supply verification procedure. SAM targets are now also considered. The following paragraphs describe the new verification checks.

- HUP SSM Targets:
  - a. If the HUP SSM has enough supplies to fire one of any of the targetable weapons (TWs) that can be fired by the SSM, no Warning is produced.
  - b. If the SSM does not have enough supplies to fire at least one of the allowable TWs, Error 236 is written. Because there is no available information concerning which of the legal TWs should be given to the HUP, only two options are available to correct the problem: open the HUP supply table to add or increase a supply, or open the HUP target table to change the SSM subcategory.
- HUP SAM Targets:
  - a. If the HUP SAM target cannot fire at least one round of either its primary or advanced weapon, Error 236 is generated.
  - b. If it has enough to fire one of either weapon, a further check is done to see if it is carrying a full load of either weapon. If the HUP is short of a full load of both weapons, Warning 1220 is written. Warning 1220 can be turned on or off.
- Unit SSM Targets: If the SSM does not have enough supplies to fire at least one of its TWs, Error 449 is written **and** Warning 1446 is written for every TW it could possibly fire. There are six possible ways to correct unit SSM shortage problems.

Refer to Chapter 9 of the *JTLS-GO DDS User Guide* for a complete description of the SVPR automatic corrective actions for the problems described above.

### 3.8 JTLS-2019-14478 BE Facility Owned Target Side Not Correct

*At the beginning of the game, if a side has established a BE Facility with an opposing side's units and/or targets, the model provides the side with a full intelligence update for the objects within the BE Facility. In the case of owned but stationary targets in the BE facility, intelligence information on the side of the owned target was not being provided.*

The logic was expanded to provide full intelligence information to a BE Facility-owning side for all targets owned by a unit that is in the BE facility.

### 3.9 JTLS-2019-14479 Fortify Corrections

*The JTLS-GO source code must comply with the security issues identified by the Fortify software as part of Information Assurance requirements. A significant number of issues were identified in the source code for JTLS-GO 5.1.3.0.*

All identified issues from Fortify were corrected to fix security issues, and no changes in functionality were made.



### 3.10 JTLS-2019-14482 Crash While Managing Air Mission Tasks

*A user attempted to add an Insert-Extract task to an existing air mission. The model crashed while processing this order to manage the mission tasks.*

This crash occurred while the CEP was adding a transit point to the mission. As part of this process, the model checked to see if any refueling or rearming was needed at a landing point. The routine attempted to access the home squadron for the mission to determine the type of aircraft.

The code utilized a temporary mission while attempting to create the tasks required for the insert-extract. This allowed the model to temporarily try to create the needed tasks without actually adding them to the real mission until all of the steps are verified. This temporary mission did not have an assigned home squadron, so the CEP crashed. A change was made to add the home squadron to the temporary mission, thus preventing the crash.

### 3.11 JTLS-2019-14483 Changing Sensor On Satellite Error

*A user attempted to change the sensor on a satellite. The order to manage National Asset Pass (NAP) allowed the user to specify a new sensor on the satellite. The order appeared to execute correctly, but no change was evident.*

When the order was submitted to change the sensor on a satellite, the model correctly processed the change. This change was not subsequently passed to the JODA so no change was apparent on the WHIP. Code changes were made to publish the new sensor on the satellite and to update the range ring on the JODA. These changes were updated properly when a sensor was changed using the NAP order.

### 3.12 JTLS-2019-14484 JSAT GUI Corrections

*A number of problems and improvements for the JTLS-GO Satellite Service (JSAT) Graphical User Interface (GUI) were identified and fixed.*

When the JSAT GUI is launched, the user will be presented with a list of all the .tle files located in the directory \$JDATA/scenario/<scenario\_name>/jsat. The user can select one or more of the listed .tle files and load the satellite data from those files to the GUI.

Each satellite name in the .tle file is scanned for blank characters and duplicates. An underscore ("\_") is substituted for each blank character, and duplicate names are skipped and a warning is written. The name check is not case sensitive.

When the .xml document that stores the satellite parameters is loaded, the parameters for all of the satellites listed in the .xml were being loaded. This was changed so that the satellite's parametric data in the .xml is loaded only if its name is also in the table.

In the table, the time interval is initially blank. The user has the option to enter a time interval not to exceed ten minutes, or to leave it blank. If left blank, the JSAT program will calculate a time interval for the satellite. The user does not type the time but enters the time in minutes and seconds using a set of combo-boxes and spinners; it is converted to decimal minutes when it is written to the database file or sent directly to the CEP.

### 3.13 JTLS-2019-14485 Warning 1200 Correction Not Working

*The correction for Warning 1200 to set the Ship Dry Carry Capacity greater than the SUP Basic Load does not work.*

The correction action was using parameter 6, which did not exist. It was corrected to use parameter 4.

### 3.14 JTLS-2019-14488 ICP Color File From User Home

*The Interface Configuration Program (ICP) was retrieving the colors file from the user's home directory, instead of the path set in the \$JTLSHOME environment variable.*

The colors file path was changed to use the path set in the \$JTLSHOME environment variable.

### 3.15 JTLS-2019-14489 SVP Redundant Conversion Error

*The SVP generated Warning 1322, indicating that the wet supply capacity for an aircraft class was less than the fuel amount specified for the aircraft. However, the fuel amount displayed in the message was suspiciously much larger than the wet supply capacity.*

The warning message was valid in this case because the aircraft's fuel amount was truly greater than the aircraft's wet capacity. But the aircraft's fuel amount, which had previously been converted to its equivalent weight in tons in the routine, was incorrectly converted again just before passing to the SVP template for display. The extra conversion was removed to correct the problem.

### 3.16 JTLS-2019-14490 JSAT GUI And Program On Different Hosts

*The JSAT GUI runs on the same host machine running the JSAT program. However, when an attempt was made to run the GUI and the JSAT program on different host machines, a null pointer exception was thrown when the GUI was launched, and the GUI failed to run.*

Whenever the GUI and the JSAT program are to be run from different machines, the GUI must start an ssh tunnel. The null pointer exception was thrown during this process when an attempt was made to access an object before it had been instantiated. This problem was resolved by moving the code that instantiates the object before the code that starts the ssh tunnel.

### 3.17 JTLS-2019-14491 MDP Emails With Long Domain Names

*While configuring the MDP to deliver CEP messages via email, the MDP GUI does allow the MDP service to be configured with email addresses having long domain names. However, the MDP service rejects any email address having more than 2 domain groups (e.g., user@my.domain.com). This is a problem for users having long domains as part of their normal office mail server configuration.*

In order to improve the security of the email feature of the MDP service, an email address validating routine was added to the MDP service in a previous version. This routine limited the number of domain groups in the address to just two.

Any address used for forwarding email must be sufficiently formatted to be accepted and used by a mail server. The current check for just two domain groups was too restrictive, so this routine was improved to allow at most five domain groups. This checking routine was also moved to a common JDSP library archive so it may be accessed by other email forwarding services and programs.

### 3.18 JTLS-2019-14492 HRUs Attacking To Wrong Location

*An HRU was told to attack a unit, but the HRU did not go to the unit's location.*

The routine that assigns a task location assigned a Latitude value instead of a Longitude value. This caused the HRU to go to the wrong location. This error was corrected.

A thorough search of the code was accomplished to ensure there were no other errors of this type. Several other issues were found and fixed.

### 3.19 JTLS-2019-14493 Tactical Ground Formation Attack Disabled

*The Tactical Ground Formation Attack order does not work. The capability should be disabled until a proper fix can be implemented.*

The Attack order panel was modified. If the user attempts to submit a TGF Attack, the OMA will refuse the order, indicating that the capability has been disabled.

### 3.20 JTLS-2019-14494 JHIP Incorrect Order Format

*When the JTLS-GO High Level Architecture (HLA) Interface Program (JHIP) is federated with GESI, the JHIP receives Operation Areas (OA) from GESI that are used to create equivalent OAs in JTLS-GO. Whenever the areas are deleted, the JHIP has an error sending the required deletion order to the CEP.*

The format of the MANAGE.OPERATIONS.AREA order was changed to support some new model requirements. These changes were not reflected in the JHIP code. The fix was fairly straight forward, but it did uncover an issue that needs to be addressed in future JTLS-GO releases.

The JHIP is not the only program that internally “hard-codes” the format for orders being sent to the CEP. Code improvements are needed to automatically catch issues when order formats are changed to support other requirements. An ECP for an automatic order error detection capability has been added to the JTLS-GO 6.0 planned improvement list.

### 3.21 JTLS-2019-14495 Reserve Zero Length Array Attempt

*A user sent an order to schedule an air mission for a future time, which set the mission's posture as "SCHEDULED." Later, the user attempted to send a "set sensor order" to modify an ELINT parameter on a sensor. Since the mission was in a scheduled posture, no assets had yet been assigned to the mission. When the next routine was called and attempted to reserve an array by the number of items in the (empty) air mission asset set, the model crashed.*

The situation is now properly detected and the mission is skipped if there are no assigned assets.

### 3.22 JTLS-2019-14496 TACELINT Email Header/Footer Configuration

*The TACELINT Message Service (TEMS) was modified to support sending emails via sendmail. The service was failing to send emails because it was still looking for a direct connection to a receiving host. The TEMS was also failing to use the full header and footer formatting functionality and would crash when trying to use number streams in messages.*

The TEMS was modified to not require a connection to another host when in email mode. The message header and footer formatting was resolved by fully initializing the JTLS-GO message library within the TEMS.

### 3.23 JTLS-2019-14497 WHIP Launched With Incomplete Resource URL

*The WHIP is launched with a URL that points to the directory in which its primary resources reside. When launched from the "whip" script command line, a user can enter a URL without a file path separator, "/", at the end. This was causing issues with the WHIP interacting with the ATOT and ATOG services because of a malformed URL.*

The WHIP has been modified to ensure that its primary resource URL ends in a file path separator, "/".

### 3.24 JTLS-2019-14498 Country Code Standard Not In OPM

*The database parameter for the default COUNTRY CODE STANDARD is not listed in the Online Player Manual (OPM).*

The COUNTRY CODE STANDARD was added to the Miscellaneous Modeling Parameter OPM page under General Modeling Parameters.

### 3.25 JTLS-2019-14499 Transport Unit Convoy Canceled In Error

*A Transport Unit order was sent with a Transport Method of "Truck" selected. The model computed the number of trucks required to transport the Unit and created the convoy. The convoy moved to the location of the Unit to be loaded. Before loading the Unit, the convoy was canceled by the model and returned home empty. The Player message stated there was an insufficient number of trucks to transport the entire Unit.*

The logic that computed the type and quantity of trucks necessary to lift a transported unit was using an old algorithm that had not been updated to accommodate multiple combat systems (trucks) of the same transportation class. The logic incorrectly underestimated the trucks required. The subroutine was modified to correct this error.

Additionally, when the convoy arrived at the loading location, the logic failed to reduce its on-hand supply category equivalent to its basic load amounts before attempting to load the trucks. Generally, the on-hand amounts were greater than the basic load, so the convoy could not accommodate everything. A subroutine call was added to reduce the on-hand supply categories before loading.

### 3.26 JTLS-2019-14500 JHIP Crash During Run CEP Paused

*The JHIP crashed when game speed was paused while the JHIP was in startup mode.*

The JHIP processes objects it receives from the JODA. It accesses memory for each field of a container that represents the data for an object. If the field is empty, the JHIP should not access the memory associated with the field. There is a flag in the container to indicate this. However, the JHIP was not always checking the flag to see if the field was empty before accessing the field.

This bug only caused a problem when the game was paused. A check was added to the JHIP code to keep the JHIP from accessing empty fields.

### 3.27 JTLS-2019-14501 OTHGold Send Email Reports

*The OTHGold Message Service had a configuration setting that allowed it to send reports via email. However, due to the implementation of this setting, it was unreliable because it was difficult to configure and test.*

The OTHGold message service has been modified to send email reports using the sendmail library built into JTLS. This library is used by multiple services across the JTLS suite and makes testing and configuration management more stable.

As a result of this change, all of the JOI services that send emails now use the sendmail library. Because this library provides a "sent from" email address, the ICP no longer requires a column for this data in the JOI panel.

### 3.28 JTLS-2019-14502 Link 16 Data Not In OPM

*The Link 16 network structure information was not in the Online Player Manual (OPM).*

A new Link 16 page has been added under the General Modeling Parameters menu of the OPM.

### 3.29 JTLS-2019-14503 SVP Crash Verifying Unit Small Boat Availability

*The SVP crashed when verifying that a unit had sufficient small boats to support the creation of its database HRUs. This error would only appear if a ground unit was verified after a naval unit.*

Small boats are tracked differently by ground units and naval units. Naval units have a small boat array, which contains many different types of small boats and remains with the naval unit. Ground units track their small boats in their combat system array, and all the small boats are of a single type.

When gathering the unit's assets by small boat types, the ground units were reserving and loading an array, whereas the naval units just accessed their existing array. When done with the unit, the ground units released the temporary array and zeroed the pointer so it could be used again. For naval units the array pointer was not being zeroed, but should have been. As a result, if a ground unit followed a naval unit in the verification process, it would attempt to reserve a temporary array using a variable that already contained an array pointer, causing a crash. The issue was solved by always zeroing the pointer for both naval and ground units.

### 3.30 JTLS-2019-14504 Link 16 Detected Missions Appearing At ON OE

*Air tracks detected by a Link 16 detector were being displayed at ON OE instead of their real location. This was a result of the Link 16 detection updating all the Link 16 specific attributes of the air mission, but not updating the basic attributes of location, speed, and so on.*

After updating Link 16 specific attributes, a call is made to also update the basic detection attributes.

### 3.31 JTLS-2019-14505 HRU Search Any Force Side Picking Side 12

*An HRU sent on a Patrol mission, with an Essential Elements of Information list requesting that it report on objects on any other Force Side, only reports on objects for side number 12.*

The dynamic XML files that are created, and which associate the vocabulary word ANY\_OTHER\_SIDE with an integer, were explicitly assigning the number 12. This was appropriate when the database was limited to 10 sides, but with 20 sides permitted the number should be 22. This name to index relationship was updated in both the CEP and the SIP for Controller and Player dynamic vocabulary files.

Once this issue was fixed it was discovered that all Force Sides were not being reported. This was tracked down to a code error that was not checking if the Essential Element of Information was Any Side when determining if an object should be considered essential.

### 3.32 JTLS-2019-14506 Alter Database Tool Chosen Task

*A user chose an option from the Alter Database Tool and was not able to view that the chosen task was taking place. For example, the user chose option 6: Assign Bridges/Tunnels to Arcs. The SIP displayed to the user the reading and initialization processes taking place. When the task finished, the final output the user saw was "SIP Complete." However, there was no output displaying to the user that the SIP had actually begun assigning the bridges/tunnels.*

The SIP now displays output when it has begun the chosen task from the Alter Database Tool. For this example, the SIP now displays "SIP assigning Bridges/Tunnels to Arcs."

### 3.33 JTLS-2019-14509 Oracle Create Database Link Privilege Check

*The DDS Migration repair process requires an Oracle Database Link created at runtime for batch processing to improve performance. Although the "CREATE DATABASE LINK" privilege requirement is documented, users often forget to create the link, especially when the database was upgraded from an older version, which can cause a lengthy migration repair process.*

Two changes were added to improve performance:

- At Glassfish server buildtime, the existing DCP dropdown menu "Test Connection" is enhanced to also verify whether the "create database link" privilege has been granted to the source database user.
- During the data migration repair process, if the process cannot dynamically create the database link, the repair process will stop and send a warning to the DDS.

### 3.34 JTLS-2019-14510 DDS ORBAT Migration

*If the user attempts to migrate a unit that has the same name as its Force Side, migration does not work.*

The code erroneously believed the selected Unit was the Force Side node instead of the top Unit node. The code was modified to correctly distinguish the selected object(s).

### 3.35 JTLS-2019-14511 Parametric Data Repair Incorrect Message

*While performing DDS Migration parametric data repair, "Data Repair Finished" message pops up without further information, but the repair process still runs on the server.*

Additional exception handling was added in order to display more meaningful error messages. Queries were optimized to avoid examining null values for data that are mostly not null. Logic to

automatically split large data into multiple chunks was implemented. A special handle to properly intercept carriage returns in the xml stream was added.

### 3.36 JTLS-2019-14512 Fortify Fixes

*Fortify scans identified several errors in Java code.*

The identified errors were corrected.

### 3.37 JTLS-2019-14513 ATO Mission Remove Delay OPM Label

*There was an error under the FS.ATO.MISSION.REMOVE.DELAY attribute in the OPM. This attribute states that air mission removal from the ATO Viewer occurs "02H After End of ATO Period." However, this statement was only partially true as this remove delay does not have to take place after the end of the ATO Period, and thus the Air Mission will not always be removed two hours after the ATO period.*

The comment "02H After End of ATO Period" was removed from the OPM page. New documentation was written explaining when an ATO Air Mission is removed from the game. The attribute FS.ATO.MISSION.REMOVE.DELAY is a minimum time for removal, with the other considerations being the end of the ATO Period and the delivery time of the final mission report for the Air Mission. If either of these events occur at a later time than the attribute delay time, then the mission is destroyed at whichever time occurs last.

### 3.38 JTLS-2019-14514 JOBE Map Not Opening On Windows

*When launching the JOBE on the Windows system, the Map component was unable to open.*

Earlier changes to the JOBE's preferences tool failed to include all of the new Java packages needed to allow Windows to start the Map. This has been corrected.

### 3.39 JTLS-2019-14516 Various IIR Format Issues

*Several formatting problems were discovered when the JTLS-generated IIR message was passed through a USMTF message checker:*

Each of the formatting problems was corrected.

### 3.40 JTLS-2019-14517 Synapse Unknown Side Error

*When generating orders from an IMT screen's multiple line selection, the SYNAPSE service did not recognize the Super WHIP's IMT order spreadsheet file path to perform a save. This caused an error to be logged and the save of the order spreadsheet to be dismissed. The problem occurred because the SYNAPSE did not know the side permissions a Super WHIP has to perform the write in the proper location.*



This problem was corrected by registering the sides of a Super WHIP with the SYNAPSE service to allow the save of the order spreadsheets on the given file path.

### 3.41 JTLS-2019-14518 Move Combat System Summary Files

*The combat system summary files should be moved out of the location data directory to allow easier access during batch runs.*

The combat system summary .csv-formatted files were all written to the scenario location directory. This cluttered the directory and made the files hard to find.

The combat system summary files are now be written into a cbtsys\_summary directory as they are produced. When checkpoints are generated, the file is moved out of the cbtsys\_summary directory into a cbtsys\_summary directory inside the checkpoint directory.

This change will require all users to run Option 3 from the JTLS Menu to ensure the new directory is created, or they may create the directory \$JGAME/(scenario\_name)/cbtsys\_summary.

### 3.42 JTLS-2019-14519 Inconsistent Movement OF ELS Entities

*When aggregate objects move in the CEP, the corresponding entities must move in the ELS. This fine-scale movement did not appear to be consistent with their movement parameters (course and speed). The entities showed some unexpected back and forth movement, called "rubber-banding".*

The movement code in the ELS was worked and re-worked for this problem several times, and was completely re-written in order to address this problem. A new approach was used to perform the dead-reckoning of the entities. The new method used a fixed starting point, and computed each new position based on the distance the object traveled from the starting point. Each time the aggregate model changed the location of an object, then the starting point was reset. This technique resulted in very consistent movement, as predicted by the parameters of the move.

### 3.43 JTLS-2019-14520 Non-Standard Code

*The routine responsible for printing out the Targetable Weapons that can be fired by a Combat System was not following coding standards. Although no problem could be found with the logic, having an inner loop using the same variable name as an outer loop is not good practice.*

The code was corrected to use a structure that follows our coding practices.

### 3.44 JTLS-2019-14521 Pacer Start With RTI Host And Port

*When starting the Pacer Program from the JTLS Menu, the Pacer starts and attempts to locate and connect to a running RTI on the local network. The Pacer fails to connect with the RTI and eventually times out and quits.*

The options to start the Pacer Program from the JTLS Menu and Javamenu have been updated to allow the user to specify the host and port number of the RTI the Pacer is to connect to. The Pacer's startup options now match the startup options for the JHIP.

### 3.45 JTLS-2019-14522 HRU Raid Order Failed To Attack Ship

*An HRU representing a naval unmanned underwater vehicle (UUV) was ordered to attack/raid an enemy vessel. The UUV moved to the location of the vessel and attempted to execute the attack task. However, the attack failed with a player message indicating "No remaining weapons are available to expend", even though the HRU possessed a single torpedo.*

In order for an HRU to execute an Attack/Raid, the HRU's direct fire combat systems are fired at the specified unit. In this example, the HRU was based on a HUP that did not have any direct fire combat systems. As a result, the HRU could not fire at the ship. This rule also applies to Ambush, Patrol, and Overwatch tasks.

To prevent this situation from occurring, new logic was added that will immediately reject the player's Raid, Ambush, Patrol (if seeking combat), or Overwatch order if the HRU does not have any direct fire combat systems available with at least one targetable weapon to fire. Similar checking is already present when the attack is about to be executed. The rejection message logic was improved to state either "No direct fire combat systems are available to fire" or "No ammunition is available to support the task" depending on the situation that caused the cancellation.

Note: In this example, the HRU was created from a HUP that consisted of a robot pilot combat system, an amphib small boat combat system, two sensors, an SSM target, and a single torpedo. Only the explicit Fire Missile order could be used to fire the torpedo. The HRU cannot automatically engage with the torpedo in a Raid, Ambush, Patrol, or Overwatch task, because the SSM target (launcher) is not a combat system.

### 3.46 JTLS-2019-14523 GIS Tool Adding Terrain Layer Freeze

*While editing a terrain layer, the user tried to add a terrain layer to the WORLD\_LEVEL terrain layer. After selecting the grid of WORLD\_LEVEL that defined the lower left corner of the new layer, the user was not prompted to select the grid that would have defined the upper right corner of the new layer. At this point the tool would not allow the user to select the second grid.*

The GIS tool uses a QuadTree object provided by the OpenMap API to rapidly search for objects in two-dimensional space. The search for a terrain grid in a terrain layer, given a latitude and longitude, is a two step process. First, the search coordinates are passed to the QuadTree, and the QuadTree always returns a grid. The second step executes a point in polygon test to ensure that the search coordinates are indeed in the returned grid.

The following four conditions caused the QuadTree to return the wrong grid:

- The parent terrain layer contained 10 degree grids.
- The latitude of the northern boundary of the grid was 50 N (or 50 S).
- The search coordinates were inside the grid.
- The search coordinates were "near" the grid's northern boundary (the search latitude was within approximately 2 degrees of the northern boundary).

When those four conditions were met, the QuadTree actually returned the grid that was to the immediate north of the desired grid. The point in polygon test failed as a result of this erroneous grid. When the point in polygon test failed, the tool did not provide the user with any useful feedback.

Note: If Conditions 1 through 3 were met, and the search coordinates were near the grid's southern boundary, the QuadTree returned the proper grid. Proximity to the grid's east or west boundaries also did not negatively affect the QuadTree search unless the search latitude satisfied Condition 4. This problem did not occur when the parent terrain layer contained 5 degree or smaller grids.

The GIS Tool will continue using the QuadTree search, but an optional third step was added: If the point in polygon test fails, a call is now made to the parent terrain layer's method `com.rolands.gis.terrain.GridLevel.searchGrid()`. This is an existing method. The required arguments for this method are a search latitude and longitude. Given the search coordinates, the method calculates the x- and y- indices of the grid belonging to the parent layer and then returns that grid.

Although the method is accurate and not computationally intensive, it is mainly called during a process that does not require the user to receive immediate feedback through the GUI. When a grid is selected it needs to be highlighted quickly. In this case, the QuadTree is used to find the grid quickly based on a mouse click. The QuadTree is now supplemented with `GridLevel.searchGrid()` if the QuadTree search fails. As a last resort, if `GridLevel.searchGrid()` fails to find the grid, a message dialog appears instructing the user to click on another portion of the grid.

#### 3.47 JTLS-2019-14524 Loitering Munition Print Error

*The Controller Set Aircraft Parameter order was submitted to review characteristics of the HARPY.UAV. The Loitering Munition (Expendable) Flag displayed "1 KM" instead of "YES". For other aircraft types, if the aircraft was not expendable, the message displayed "0 KM" instead of "NO".*

The problem was in the message template file. The field was defined to display as a Distance value instead of an Answer value. The error was corrected.

### 3.48 JTLS-2019-14525 External Models Pass Intelligence Errors

*Following a rewrite of the movement code in the ELS, a number of tests were performed to demonstrate that the intelligence components were working properly. This testing revealed some small errors. When working properly, this process allowed external models such as MUSE and NWARS to share their gathered intelligence with the JTLS-GO users through area reports and IIR messages.*

A large number of routines were recently modified as part of an overhaul of the code which handled entity movement in the ELS. These changes also cause some unwanted differences in how the ELS processed orders and published entities. Any errors found during subsequent testing were found and fixed. The passing of intelligence from the ELS to the CEP was repaired and now functions as designed.

### 3.49 JTLS-2019-14526 Air Mission Tracks Losing Name

*When an enemy air mission left radar coverage, the associated track was turning black and no longer had a name associated with it. This track would then remain on the WHIP at the last detected location until a new detection was made or the air mission finished and was destroyed.*

This was tracked down to a lost JODA packet that was started, but before it was sent a new JODA packet was started, overwriting all the previous settings. The original packet was responsible for removing the track from the WHIP, whereas the new packet switched the icon to black and removed the name. The solution was to ensure the original packet was sent before the second packet overwrote its contents.

### 3.50 JTLS-2019-14527 Checkpoint Not Writing Supply Category Name

*During a checkpoint the High Resolution Unit Prototype (HUP) supply category data was only writing out the first 15 characters for the supply category name, even though the database permits a supply category name of 25 characters. This caused the checkpoint to fail during a restart.*

The write statement for the HUP Supply Category was switched to permit 25 characters for the Supply Category name. In addition other instances of writing a name as 15 characters when it should be 25 were looked for, and a few were found and also fixed.

### 3.51 JTLS-2019-14530 SYNAPSE Memory Leak

*The SYNAPSE creates a data structure to hold information for a file named in a request to WRITE, PUT or CHMOD. This structure is only used if the named path associated with the file is valid. If it is invalid, the memory of the data structure is lost.*

The SYNAPSE code was changed. It now creates the data structure for the file information but only if the associated path is valid.

### 3.52 JTLS-2019-14531 SYNAPSE Memory Leak Loading File

*The SYNAPSE attempts to register any file that is named in a request from the Apache interface. When a request involved a file in a directory that was not previously loaded, the metadata structure used to hold information about the file would be lost.*

This problem has been corrected. The metadata structure is properly deleted when it is no longer needed or used.

### 3.53 JTLS-2019-14532 TGF Follower In Direct Fire Range Crash

*The user gave a Tactical Ground Formation (TGF) Move order, and one of the followers was in Direct Fire Range of an enemy and was trying to set the reason why the TGF would not occur. The code was trying to access the follower's PET (which it does not have) – not the leader's PET.*

The proper PET was accessed to set the task cancellation message.

### 3.54 JTLS-2019-14533 TGF Follower Executing Task Crash

*A user told a unit and one follower to do a group move, immediately followed by a TGF Move. The leader finished the Group move, but the follower had not complete the Group Move. The TGF move started and the follower ended up with two move events, and the model eventually crashed.*

If any follower is currently executing as task, the TGF move is canceled. The user is informed to wait for the follower tasks to finish.

### 3.55 JTLS-2019-14534 OTHGold Classification Fails With Spaces

*The OTHGold module allows users to specify a string of text for the classification of messages to be reported via OTHGold. When a user enters a space in this text string, an error occurred.*

The OTHGold module now encodes spaces in the classification string so that the command is processed properly through the web services.

### 3.56 JTLS-2019-14535 Obsolete Directories Created

*Directories were being created by the JINN and Javamenu under \$JTLSHOME/game/<game>/ato for the previous implementation of the ATO Translator. These directories are no longer used and should not be created.*

The JINN and Javamenu will no longer create these obsolete directories when setting up the game directory.

### 3.57 JTLS-2019-14536 Armed Recce Firing On Special Systems Crash

*If an Armed Recce mission is sent with a Target preference list that contained only special system capabilities, such as vehicles, aircraft, and amphibious systems, the model crashes attempting to fire on a unit.*

The logic that asks whether this unit has the desired special systems properly came to the conclusion that the unit did have the desired special systems. The logic which attempted to determine the best weapon to fire incorrectly came to the conclusion that the unit did not have any of the desired special systems. This caused the crash. This problem was corrected.



## 4.0 REMAINING ERRORS

Every effort has been made to correct known model errors. All reproducible errors that resulted in Combat Events Program (CEP) catastrophic software failures (crashes) have been corrected. Other corrections were prioritized and completed according to their resource cost-to-benefit relationship.

As JTLS-GO 5.1.0.0 represents a major release of new functionality, remaining outstanding errors from the JTLS-GO 4.1 series and earlier have been considered to be obsolete and no longer relevant to JTLS-GO and have been removed from consideration for correction at this time. In future Maintenance releases, outstanding errors related to JTLS-GO will be listed in this chapter, with information provided regarding the extent of the error, as well as suggestions to avoid or minimize the effects of the problem.

### 4.1 DDSC – TMU Line Mode Changes Multiple Grids

When using the line mode in the TMU, more grids than the ones the line passes through are changed. This can also cause a warning about trying to change multiple layers to appear.

### 4.2 DDSC – Multiple Types In DDS History Table

If records for more than one table type are selected in the DDS History table, "History Details" will display details for only one type.

### 4.3 WHIP - Pipeline Not Shown On IMT

A pipeline being operated by a non-detected unit is not shown in the pipeline IMT.

### 4.4 DDSC/WHIP/JOBE - CADRG Map Zoom

When using the CADRG map projection, if the width of the map is less than the height the zoom tool does not work correctly.

### 4.5 WSM - Many Messages Cause Lockup

If a service produces a large number of log or error messages in a short period of time, it can cause the WSM to lockup.





## APPENDIX A ABBREVIATIONS AND ACRONYMS

Terms are included in this Appendix to define their usage in JTLS-GO design, functionality, and documentation.

AAA	Anti-Aircraft Artillery
AAL	Air-to-Air Lethality
A/C	Aircraft
ACP	Air Control Prototype
ADA	Air Defense Artillery
AEW	Airborne Early Warning
AFB	Air Force Base
AG	Air-Ground (Air-to-Ground)
AI	Air Interdiction
AIM	Air Intercept Missile
AIREF	Air Refueling
AKL	Area Kill Lethality
AMMO	Ammunition
AO	Area of Operations
AOC	Air Operations Center
APC	Armored Personnel Carrier
ARECCE	Armed Reconnaissance
ARTE	Air Route
ARTY	Artillery
ASC	Automatic Supply Calculation
ASCII	American Standard Code for Information Interchange
ASW	Anti-Submarine Warfare
ATC	Aircraft Target Category
ATGM	Anti-Tank Guided Missile
ATK	Attack
ATO	Air Tasking Order
ATORET	Air Tasking Order Retrieve Program
ATOT	Air Tasking Order Translator
AWACS	Airborne Warning And Control System
AZ	Altitude Zone
BAI	Battlefield Air Interdiction

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BDA	Battle Damage Assessment
BDE	Brigade
BN	Battalion
C3	Command, Control, and Communications
C3I	Command, Control, Communications, and Intelligence
C4I	Command, Control, Communications, Computers, and Intelligence
CA	Civil Affairs
CADRG	Compressed ARC Digitized Raster Graphics
CAP	Combat Air Patrol
CAS	Close Air Support
CAT	Category
CCF	Central Control Facility
CCP	Command Control Prototype
CCU	Controller Change Unit
CEP	Combat Events Program
CMDR	Commander
COP	Common Operational Picture
CP	Combat Power
CS	Combat System
CSP	Combat System Prototype
CTAPS	Contingency Tactical Air Planning System
CTG	Commander Task Group
CTRL	Control keyboard command
DCA	Defense Counter Air
DCL	Digital Command Language
DDS	Database Development System
DISA	Defense Information Systems Agency
DIV	Division
DMA	Defense Mapping Agency
DoD	Department of Defense
DOS	Days of Supply
DPICM	Dual Purpose Improved Conventional Munitions
DS	Direct Support
DSA	Directed Search Area

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DTG	Date Time Group
EC	Electronic Combat
ECM	Electronic Counter Measure
ECP	Engineering Change Proposal
EEI	Essential Elements of Information
ELINT	Electronic Intelligence
ELS	Entity Level Server
EODA	Entity Level JTLS Object Data Authority
ETA	Estimated Time of Arrival
FARP	Forward Arming and Refueling Point
FLP	Fire Lethality Prototype
FLOT	Forward Location of Troops
FOL	Forward Operating Location
FWL	Frederick W. Lanchester (originated a differential equation model of attrition)
GAL	Gallon
GCCS	Global Command and Control System
GRTE	Ground Route
GS	General Support
GSR	General Support Reinforcing
GUI	Graphical User Interface
HARM	High-speed Anti-radiation Missile
HE	High Explosive
HELO	Helicopter
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HQ	Headquarters
HRU	High Resolution Unit
HTML	Hypertext Markup Language
HTT	High Resolution Unit Target Type
HUP	High Resolution Unit Prototype
ICM	Improved Conventional Munitions
ICP	Interface Configuration Program
ICPLogin	Interface Login Program
ID	Identifier
IFF	Identification Friend or Foe

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IIP	Intelligence Information Prototype
IMT	Information Management Tool
INFO	Information
INTEL	Intelligence
JCATS	Joint Conflict And Tactical Simulation
JDPI	Joint Desired Point of Impact (formerly DMPI: Desired Mean Point of Impact)
JDS	JTLS Data System
JDSP	JTLS Data System Protocol
JEDI	JODA Entity Data Identifier
JMCIS	Joint Maritime Combat Information System
JMEM	Joint Munitions Effectiveness Manuals
JODA	JTLS Object Distribution Authority
JOI	JTLS Operational Interface
JPL	Jet Propulsion Laboratory
JRSG	Joint Rapid Scenario Generation (formerly JIDPS: Joint Integrated Database Preparation System)
JSDF	Japan Self-Defense Forces
JTLS	Joint Theater Level Simulation
JTLS-GO	Joint Theater Level Simulation - Global Operations
JTOI	JTLS Transaction Operational Interface
JXSR	JTLS XML Serial Repository
KIA	Killed In Action
KM	Kilometer
KNOTS	Nautical miles per hour
LA	Lethal Area
LAN	Local Area Network
LAT	Latitude
LB	Login Build (JTLS order type)
LDAP	Lightweight Directory Access Protocol
LDT	Lanchester Coefficient Development Tool
LOG	Logistics
LOGIN	Logistics Input
LOGREP	Logistics Report
LONG	Longitude
LOTS	Logistics Over The Shore

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LR	Long Range
M&S	Modeling and Simulation
MAPP	Modern Aids to Planning Program
MB	Megabyte
MCP	Mobility Counter-mobility Prototype
MCR	Model Change Request
MG	Machine Gun
MHE	Material Handling Equipment
MIP	Model Interface Program
MOGAS	Motor Gasoline
MOPP	Mission-Oriented Protective Posture
MOSAIC	NCSA user interface software
MOTIF	X Window System graphical interface
MP	Maneuver Prototype
MPP	Message Processor Program
MSC	Major Subordinate Command
MSG	Message
MTF	Message Text Formats
MUREP	Munitions Report
MUSE	Multiple Unified Simulation Environment
NCSA	National Center for Supercomputing Applications (University of Illinois)
NEO	Noncombatant Evacuation Operations
NFS	Network File Server
NGO	Non-Governmental Organization
NIS	Network Information Service or Network Information System
NM	Nautical Mile
NTSC	Naval Telecommunications System Center
OAS	Offensive Air Support
OBS	Order of Battle Service (formerly UGU: Unit Generation Utility)
OCA	Offensive Counter-Air
OJCS	Organization of the Joint Chiefs of Staff
OMA	Order Management Authority
ONC	Operational Navigation Chart
OPM	Online Player Manual

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OPP	Order Preprocessing Program
OTH	Over The Horizon
OTH Gold	Over The Horizon message specification
OTH-T	Over The Horizon-Targeting
pD	Probability of Detection
pE	Probability of Engage
pH	Probability of Hit
pK	Probability of Kill
PKL	Point Kill Lethality
POL	Petroleum, Oil, and Lubricants
POSIX	International operating system standard based on System V and BSD
PPS	Postprocessor System
PSYOPS	Psychological Operations
RAM	Random Access Memory
RDMS	Relational Database Management System
RECCE	Reconnaissance (air missions)
RECON	Reconnaissance (ground missions)
REGT	Regiment
RNS	Random Number Seed
ROE	Rules Of Engagement
RPT	Report
RSP	Reformat Spreadsheet Program
SAL	Surface-to-Air Lethality
SAM	Surface-to-Air Missile
SAM/AAA	Surface-to-Air Missile/Anti-Aircraft Artillery
SC	Supply Category
SCP	Simulation Control Plan
SEAD	Suppression of Enemy Air Defense
SIMSCRIPT	Simulation programming language (product of CACI, Inc.)
SIP	Scenario Initialization Program
SITREP	Situation Report
SLP	Sustainment Log Prototype
SOF	Special Operations Forces
SP	Survivability Prototype

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SQL	Structured Query Language
SR	Short Range
SRP	Start/Restart Program (a JTLS-GO component)
SRTE	Sea Route
SSM	Surface-to-Surface Missile
STR	Software Trouble Report
SUP	Ship Unit Prototype
SVP	Scenario Verification Program
SYNAPSE	Synchronized Authentication and Preferences Service
TADIL	Tactical Digital Interface Link
TCP/IP	Transmission Control Protocol/Internet Protocol
TEL	Transporter Erector Launcher
TG	Target entity attribute prefix
TGS	Terrain Generation Service (formerly TPS:Terrain Preparation System)
TGT	Target
TMU	Terrain Modification Utility
TOE	Table of Organization and Equipment
TOT	Time Over Target
TOW	Tube-launched Optically-tracked Wire-guided missile
TPFDD	Time-Phased Force Deployment Data
TTG	Target Type Group
TTL	Target Types List
TUP	Tactical Unit Prototype
TW	Targetable Weapon
UBL	Unit Basic Load
UIM/X	GUI builder tool
UNIX	POSIX-compliant operating system
UNK	Unknown
UOM	Unit Of Measure
USA	United States Army (U.S. and U.S.A. refer to United States and United States of America)
USAF	United States Air Force
USCG	United States Coast Guard
USMC	United States Marine Corps
USMTF	United States Message Text Format



USN	United States Navy
UT	Unit entity attribute prefix
UTM	Universal Transverse Mercator
VIFRED	Visual Forms Editor
VMS	Virtual Memory System
VTOL	Vertical Take-Off and Landing aircraft
WAN	Wide Area Network
WDRAW	Withdraw
WEJ	Web Enabled JTLS
WHIP	Web Hosted Interface Program
WIA	Wounded In Action
WPC	Warrior Preparation Center
WPN	Weapon
WT	Weight
XML	Extensible Markup Language
XMS	XML Message Service

## **APPENDIX B Version 5.1.4.0 DATABASE CHANGES**

No database structure changes were made for JTLS-GO 5.1.4.0.



## APPENDIX C Version 5.1.4.0 REPOSITORY CHANGES

The following changes were made to the JTLS-GO 5.1 repository.

C.1 Added All Brigade Units (BN and CO) for:

- 1 AD - 1ABCT Units to Ft Bliss, TX
- 1 AD - 2ABCT Units to Ft Bliss, TX
- 1 AD - 3ABCT Units to Ft Bliss, TX
- 1 CAV - 1ABCT Units to Ft Hood, TX
- 1 CAV - 2ABCT Units to Ft Hood, TX
- 1 CAV - 3ABCT Units to Ft Hood, TX
- 101AA - 1IBCT Units to Fort Campbell, KY
- 101AA - 2IBCT Units to Fort Campbell, KY
- 101AA - 3IBCT Units to Fort Campbell, KY
- 10MTN - 1IBCT Units to Fort Drum, NY
- 10MTN - 2IBCT Units to Fort Drum, NY
- 10MTN - 86IBCT Units to Fort Drum, NY
- 11ACR - Units to Fort Irwin, CA
- 173 Airborne Bde Units to Italy
- 1AD - 1ABCT Units to Ft Bliss, TX
- 1AD - 2ABCT Units to Ft Bliss, TX
- 1AD - 3ABCT Units to Ft Bliss, TX
- 1ID - 1ABCT Units to Fort Riley, KS
- 1ID - 2ABCT Units to Fort Riley, KS
- 2ACR - Units to Rose Barracks, Vilseck, GE
- 3ACR - Units to Fort Hood, TX

- 3ID - 1ABCT Units to Fort Stewart, GA
- 3ID - 2ABCT Units to Fort Stewart, GA
- 3ID - 48IBCT Units to Fort Stewart, GA
- 4ID - 3ABCT Units to Ft Carson, CO
- 82ABN - 1IBCT Units to Fort Bragg, NC
- 82ABN - 2IBCT Units to Fort Bragg, NC
- 82ABN - 3IBCT Units to Fort Bragg, NC

C.2 Verified All Brigade Units (BN and CO) for:

- 25ID - 1SBCT Units are in Korea
- 25ID - 2IBCT Units are in Korea
- 25ID - 3IBCT Units are in Korea
- 25ID - 4IBCT Units are in Korea
- 25ID - CAB (Combat Avn Bde) Units are in Korea
- 2ID - 1SBCT Units are in Korea
- 2ID - 2SBCT Units are in Korea
- 2ID - 81SBCT Units are at FT Lewis
- 2ID - CAB (Combat Avn Bde) Units are in Korea
- 4ID - 1SBCT Units are in Korea
- 4ID - 2IBCT Units are in Korea

C.3 Added SUP:

- ASAHI.DDG\_JP

C.4 Added Naval Units:

- ASAHI\_JP (ASAHI Class)
- CHARLESTON\_US (INDEPENDENCE Class)

- CINCINNATI\_US (INDEPENDENCE Class)
- INDIANAPOLIS\_US (FREEDOM Class)
- MINNEAPOLIS\_US (FREEDOM Class)
- SHIRANUI\_JP (ASAHI Class)
- ST.LOUIS\_US (FREEDOM Class)
- TULSA\_US (INDEPENDENCE Class)

#### C.5 Added Combat Systems:

- GBL130.MINE.LAYER-ENG1 (China)
- GCZ110.CEV-ENG1 (China)
- GCZ111.CEV-ENG1 (China)
- GDG130.EXCAVATOR-ENG2 (China)
- GZM003.BRIDGE.VEH-ENG1 (China)
- HZ.PPB.BRIDGE-ENG1 (China)
- KM720.LWB\_TRK.CGO (SK)
- KOHKIDOHSHA.HMV-VEH-NA (Japan)
- M860.SEMI.TRLR-EQUIP-TO (US)
- MRZR4-VEH-NA
- MSLP.STLR.VAN-EQUIP-TO
- NORINCO.DITCH.DIGGER-ENG1 (China)
- NTK62.GPMG.7.62M-CREW.WPN (Japan)
- OPFOR.CRANE-EQUIP.SP
- PRC.DEMO.TROOP (China)
- RNGR.SNIPER.M110
- ROK.DEMO.TROOP

- ROK.SOF.DEMO
- ROK.SOF.RIFLEMAN.K2
- ROK.SOF.SPT.TROOP.K2
- SKW464MR.WRECKER\_EQUIP.SP (Japan)
- SX2190.DUMP-ENG2 (China)
- TYPE60-1.TRACTOR\_EQUIP.SP (China)
- TYPE654.ARV\_EQUIP.SP (China)
- TYPE73.6X6\_TRK.CGO (Japan)
- TYPE75.DOZER-ENG1 (Japan)
- TYPE89.AMBULANCE-VEH-LA (China)
- VN1.12.7MM\_APC.LA.OW (China)
- VN1.30MM\_APC.LA.OW (China)
- VS21.ARV\_EQUIP.SP (China)
- VS31.ARV\_EQUIP.SP (China)
- WZ501.NBC.RECON-CHEM (China)
- WZ8581.MAINT.VEH-EQUIP.SP (China)
- ZBD09.HJ73C-IFV-ATSHHATC (China)
- ZJX93.MAINT.VEH-EQUIP.SP (China)

#### C.6 Added TUPs

- CIV.AFF.BN\_US
- CIV.AFF.CO\_US
- CIV.AFF.TM\_US
- HHB.FA.BDE\_US
- LMADIS.JAM\_US

- PAT.BN.MNTCO\_US
- PAT.PLT\_US
- PATRIOT.BN\_US
- RGR.STB.BN\_US
- SIG.CO.FABDE\_US
- SPT.CO.FABDE\_US

#### C.7 Updated Combat Systems in TUPs:

- MLRS.BN.16L\_US
- MLRS.BTRY.8L\_US
- MLRS.PLT.4LH\_US

#### C.8 Renamed TUP:

- PATRIOTBDEHQ\_US to ADA.BDE.HHB\_US
- RANGERRGTHQ\_US to RANGERRGTHHC\_US

#### C.9 Deleted TUP:

- RGR.RIFLECO+\_US
- RGR.RECONPLT\_US
- RGRRGTHQC2TM\_US

#### C.10 Created New Jammer:

- LMADIS.COM.JAM

#### C.11 Created New Sensor:

- MPQ65\_LAM
- OPS48\_SGN

#### C.12 Created New TW:

- AGM88E.HARM



## C.13 Created New UOM:

- AGM88E.HARM

## C.14 Created New Supply Category:

- AGM88E.HARM

## C.15 Added Sensor to A/C Load:

- APG77\_AGK to FA22.DEF Load

## C.16 Added Russia Side to Scenario:

- Migrated RUSSIA Force Side from scenario

## C.17 UOM Verification

- Verified the Storage Floor Area is in Square Kilometers for all Personnel CS