

JTLS-GO

Version Description Document

July 2023



DEPARTMENT OF DEFENSE
JOINT STAFF J7
116 LAKE VIEW PARKWAY
SUFFOLK, VA 23435-2697

**JOINT THEATER LEVEL SIMULATION - GLOBAL OPERATIONS
(JTLS-GO 6.1.11.0)**

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ABSTRACT

The Joint Theater Level Simulation - Global Operations (JTLS-GO[®]) is an interactive, computer-based, multi-sided wargaming system that models air, land, naval, and Non-Governmental Organization (NGO) functions within a combine joint and coalition environment.

This *JTLS-GO Version Description Document (VDD)* describes the new features of the Version 6.1.11.0 delivery of the configuration-managed JTLS-GO software suite.

JTLS-GO 6.1.11.0 is a Maintenance release of the JTLS-GO 6.1 series that includes an updated repository of standard data, a demonstration scenario based in the western Pacific, as well as a model functionality improvement implemented as Engineering Change Proposals (ECPs). This ECP is 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:

JTLS-GO Director of Development
ROLANDS & ASSOCIATES LLC
120 Del Rey Gardens Drive
Del Rey Oaks, California 93940 USA
jtlsgo@rolands.com

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TABLE of CONTENTS

ABSTRACTiii

1.0 INTRODUCTION 1-1

 1.1 SCOPE 1-1

 1.2 INVENTORY OF MATERIALS 1-1

 1.2.1 Obsolete/Outdated Documents..... 1-1

 1.2.2 Unchanged Documents 1-1

 1.2.3 Updated Documents..... 1-2

 1.2.4 New Documents..... 1-2

 1.2.5 Delivered Software Components 1-2

 1.2.6 Released Databases..... 1-4

 1.3 INTERFACE COMPATIBILITY 1-5

 1.3.1 Support Software 1-5

 1.3.2 JTLS-GO Cybersecurity Compliance 1-7

 1.3.3 JTLS-GO High Level Architecture Compliance 1-8

 1.4 DATABASE MODIFICATIONS 1-8

 1.4.1 JTLS-GO Using Legacy Default Symbol Set 1-9

 1.4.2 JTLS-GO Using New Default Symbol Set..... 1-9

 1.4.3 Standard Repository Changes 1-10

 1.5 INSTALLATION 1-10

2.0 ENGINEERING CHANGE PROPOSALS..... 2-1

 2.1 JTLS-2023-16269 NEW ORDER DELAY MESSAGE 2-1

3.0 SOFTWARE TROUBLE REPORTS 3-1

 3.1 JTLS-2023-16218 ERROR 424 INSERT RECORD WITH ALL ZEROS 3-1

 3.2 JTLS-2023-16220 ERROR 416 ADD SVPR OPTION TO SET SORTIE RATE 3-1

 3.3 JTLS-2023-16224 WARNING 1127 INSTANTANEOUS SENSORS 3-1

 3.4 JTLS-2023-16226 ERROR 240 CORRECTIONS NONFUNCTIONAL 3-1

 3.5 JTLS-2023-16230 WARNING 1238 NEEDS IMPROVEMENT 3-2

 3.6 JTLS-2023-16232 MULTIPLE AIRLIFTS FOR SAME UNIT PROBLEM 3-2

 3.7 JTLS-2023-16242 SQUADRON COMBAT SYSTEM IMT INACCURATE COUNT 3-2

 3.8 JTLS-2023-16245 CRASH REPAIRING RUNWAY TWICE 3-3

 3.9 JTLS-2023-16249 ATTACK PACKAGE MISSION MISSING TARGETING OPTION 3-3

 3.10 JTLS-2023-16251 NON-KILL CS WITH ACTIVE LANCHESTER DEBUG CRASH 3-3

 3.11 JTLS-2023-16253 CHANGE WARNING 1488 TO PROTOTYPE WARNING 3-3

 3.12 JTLS-2023-16255 UNDEFINED WHIP CRASH 3-4

 3.13 JTLS-2023-16259 UNIT MOVE MISSILE LAUNCH IMPROPERLY UPDATED 3-4

 3.14 JTLS-2023-16262 JXSR REPLY TO SOME FILL REQUESTS NOT RECEIVED 3-4

 3.15 JTLS-2023-16263 NAVAL FORMATION SIDE CHANGE ERROR 3-5

 3.16 JTLS-2023-16266 WARNING 1903 NEEDS NETWORK IDENTIFIER 3-5

 3.17 JTLS-2023-16273 WARNING 1901 FLIGHT PATH/SEA LANE NETWORK FIX 3-5

3.18 JTLS-2023-16277 LOGGING JODA STOPS WHEN PRIMARY JODA RESTARTED 3-5

3.19 JTLS-2023-16287 TERRAIN REPORT FAILS FOR EQUIPMENT SHELTERS 3-6

3.20 JTLS-2023-16291 PSQL STATEMENT FAILS FOR SVP WARNING CORRECTION 3-6

3.21 JTLS-2023-16295 GIS TOOL SEA LANE MAXIMUM ARC LENGTH 3-6

3.22 JTLS-2023-16300 UNNECESSARY FIRE ARTILLERY UNIT CHECK 3-6

3.23 JTLS-2023-16302 JSAT ROUTE POINT TIMES ROUND-OFF ERRORS 3-6

3.24 JTLS-2023-16304 ALTERNATE WHIP WORLD MAP 3-7

3.25 JTLS-2023-16307 MISSION LOAD MEMORY LEAK 3-7

3.26 JTLS-2023-16310 INCORRECT IDENTIFICATION CODES FOR SYMBOLS 3-7

4.0 REMAINING ERRORS..... 4-1

 4.1 DDSC – TMU LINE MODE CHANGES MULTIPLE GRIDS 4-1

 4.2 DDSC – MULTIPLE TYPES IN DDS HISTORY TABLE 4-1

 4.3 WHIP - PIPELINE NOT SHOWN ON IMT 4-1

 4.4 DDSC/WHIP/JOBE - CADRG MAP ZOOM 4-1

APPENDIX A. ABBREVIATIONS AND ACRONYMSA-1

APPENDIX B. VERSION 6.1.0.0 DATABASE CHANGES B-1

C.0 VERSION 6.1.0.0 REPOSITORY CHANGES C-1

 C.1 NEW GROUND UNITS C-1

 C.2 NEW TACTICAL UNIT PROTOTYPES C-3

 C.3 NEW AIRCRAFT TARGET CLASSES C-4

 C.4 NEW AIRCRAFT CLASSES C-4

 C.5 NEW AIRCRAFT LOADS C-4

 C.6 NEW TARGETABLE WEAPONS C-4

 C.7 UPDATED TARGETABLE WEAPONS C-5

 C.8 NEW SURFACE-TO-SURFACE MISSILES C-7

 C.9 NEW JAMMERS C-7

 C.10 NEW SENSORS C-7

 C.11 NEW SUPPLY CATEGORIES C-7

 C.12 UPDATED SUPPLY CATEGORIES C-8

 C.13 NEW UNITS OF MEASURE C-10

 C.14 UPDATED UNITS OF MEASURE C-11

 C.15 NEW ALTITUDE ZONES C-12

 C.16 NEW PH/PK/SKL LETHALITY DATA C-12

1.0 INTRODUCTION

1.1 SCOPE

This *JTLS-GO Version Description Document* (VDD) describes Version 6.1.11.0 of the configuration managed Joint Theater Level Simulation - Global Operations (JTLS-GO[®]) software suite. JTLS-GO 6.1.11.0 is a Maintenance delivery for the JTLS-GO 6.1 series of releases.

JTLS-GO 6.1.11.0 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 “wespac61”. There were no database format changes made to support this maintenance release. Database modifications that were accomplished to upgrade the previous JTLS-GO database format to the JTLS-GO 6.1 series format are summarized in the VDD for Version 6.1.0.0 delivered in the documents directory.

This release is being provided as part of the normal JTLS-GO maintenance program, in which new maintenance release versions are closely coordinated with Java security patch releases. One minor improvement to the model is summarized in [Chapter 2.0](#). [Chapter 3.0](#) describes the Software Trouble Reports (STRs) identified during testing and operational exercises.

JTLS-GO 6.1.11.0 executes on the Red Hat Linux Enterprise Server Version 8.4 64-bit operating systems. The Web-Hosted Interface Program (WHIP[®]) 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 PDF format within the 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 6.1.10.0)
- *JTLS-GO Executive Overview* (JTLS-GO Document 02, Version 6.1.7.0)
- *JTLS-GO Configuration Management Plan* (JTLS-GO Document 03, Version 6.1.0.0)
- *JTLS-GO Controller Guide* (JTLS-GO Document 04, Version 6.1.10.0)
- *JTLS-GO Data Requirements Manual* (JTLS-GO Document 05, Version 6.1.9.0)

- *JTLS-GO Director Guide* (JTLS-GO Document 07, Version 6.1.0.0)
- *JTLS-GO Installation Manual* (JTLS-GO Document 09, Version 6.1.9.0)
- *JTLS-GO WHIP Training Manual* (JTLS-GO Document 10, Version 6.1.9.0)
- *JTLS-GO Repository Description* (JTLS-GO Document 14, Version 6.1.9.0)
- *JTLS-GO Software Maintenance Manual* (JTLS-GO Document 15, Version 6.1.0.0)
- *JTLS-GO Entity Level Server User Guide* (JTLS-GO Document 19, Version 6.1.0.0)
- *JTLS-GO Federation User Guide* (JTLS-GO Document 20, Version 6.1.2.0)
- *JTLS-GO C4I Interface Manual* (JTLS-GO Document 21, Version 6.1.7.0)
- *JTLS-GO DoD Architecture Framework* (JTLS-GO Document 22, Version 6.1.0.0)
- *JTLS-GO DDS Training Manual* (JTLS-GO Document 23, Version 6.1.7.0)
- *JTLS-GO ATO Services User Guide* (JTLS-GO Document 24, Version 6.1.9.0)

1.2.3 Updated Documents

- *JTLS-GO DDS User Guide* (JTLS-GO Document 06, Version 6.1.11.0)
- *JTLS-GO Player Guide* (JTLS-GO Document 12, Version 6.1.11.0)
- *JTLS-GO Technical Coordinator Guide* (JTLS-GO Document 16, Version 6.1.11.0)
- *JTLS-GO Version Description Document* (JTLS-GO Document 17, Version 6.1.11.0)

Additionally, all documents have updated the Joint Chiefs of Staff crest, but have otherwise had no significant changes.

1.2.4 New Documents

No new documents were produced for this version of the software.

1.2.5 Delivered Software Components

JTLS-GO 6.1.11.0 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)
 - Glassfish Version 5.1.0
- 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)
 - The current JODA build number is 188.
- Web Services Manager (WSM)
- Web-Hosted Interface Program (WHIP) and its component programs:
 - Apache Server (APACHE) Version 2.4.54
 - 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)
- Database Development Server and its component programs
 - Glassfish 5.1.0
 - Database Development System Client (DDSC)
- Entity Level Server (ELS)
- JTLS Operational Interface (JOI) for both OTH-Gold and Link-16 generation
- Tactical Electronic Intelligence (TACELINT) Message Service
- Keyhole Markup Language (KML) Operational Interface (KOI)
- JTLS Transaction Interface Program (JTOI)
- JTLS Interface Network Navigator (JINN)
- JTLS Order of Battle Editor (JOBED)
- JTLS Geographic Information System (GIS) Terrain Building Program
- JTLS Master Integrated Database (MIDB) Tool
- JTLS Version Conversion Program (VCP)

VCP60 - Converts a JTLS-GO 5.1 database to a JTLS-GO 6.0 formatted database.

VCP61 - Converts a JTLS-GO 6.0 database to a JTLS-GO 6.1 formatted database.

Instructions for installing JTLS-GO 6.1.11.0 are provided in the *JTLS-GO Installation Manual*. Installing a previous version of JTLS prior to installing JTLS-GO 6.1.11.0 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 that serves as a repository of engineering level data called “repository61”. Although not useful as a scenario, it does follow all of the database requirements for a scenario, and should be loaded into your PostgreSQL scenario table-space.
- The scenario “wespac61”, which is suitable for training and demonstrations.

1.3 INTERFACE COMPATIBILITY

1.3.1 Support Software

JTLS-GO 6.1.11.0 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 Server (ES) Edition Version 8.4 or higher, 64-bit architecture.

JTLS-GO 6.1 has been tested with the following versions of Linux 8:

RedHat Linux 8.6 - this operating system license must be purchased.

Oracle Linux 8.4 and 8.6 - 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 8.4 - a free version of Linux 8 that has not been approved by DISA for use by U.S. Government agencies.

- There are no restrictions on the operating system for client workstations, except that the operating system must have a Java-enabled web browser. JTLS-GO 6.1.11.0 has been tested on the following operating systems:

Red Hat Linux Enterprise Server Edition Version 7.9, 8.4, and 8.6

Oracle Linux 8.4 and 8.6

CentOS Linux Version 7.9 and 8.4

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

- JTLS-GO 6.1.11.0 is delivered with the Adoptium™ project Temurin Java Development Kit (JDK) 1.8 Update 382 package, which is equivalent to the current version of OpenJDK.

Since the release of JTLS-GO 6.1.8.0, JTLS-GO has been using the Temurin JDK, which is optimized for speed, Prior to the release of JTLS-GO 6.1.8.0, JTLS-GO used AdoptOpenJDK, which was optimized for memory. All tests indicate that there is an increase in the amount of memory needed by our Java applications, but the increase is

not significant. Both the ICP and DCP have the option for an organization to increase the maximum memory heap for the WHIP and DDSC. For large scenarios and databases, an organization should consider increasing the maximum heap size.

- JTLS-GO uses IcedTea to provide the Java Web Start capability that implements the web-enabled JTLS-GO functionality. JTLS-GO supports IcedTea version 1.8.8.
- JTLS-GO database tools require a certified PostgreSQL 11.13 database server and the full PostgreSQL installation. A containerized solution, that fulfills this specification, is provided as part of the JTLS-GO download. It is not necessary to use the delivered containerized solution, but it is the easiest method to meet the requirements of JTLS-GO 6.1.11.0. There are several alternative methods available for obtaining the PostgreSQL 11.13 software. Refer to Chapter 6 of the *JTLS-GO Installation Manual* for additional installation details.
- 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 III (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 organization that can obtain source code and plan to re-compile JTLS-GO SIMSCRIPT code. The code was compiled using Simscript III Version 5.3.
- ANSI C Compiler: It is not necessary to use a C compiler to execute JTLS-GO. This compiler is used only by U.S. Government organizations that can obtain source code and intend 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 used only by U.S. Government organizations that can obtain source code and intend 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 application uses these open source libraries:

JFreeChart, licensed under a GNU Lesser General Public License (LGPL) 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 an operational Command, Control, Communication, Computer Information (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.

1.3.2 JTLS-GO Cybersecurity Compliance

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

One of the DoD requirements is that the software must implement a methodology that ensures that the end user keeps the software up-to-date and all security patches are properly installed. In order to fulfill this DoD Cybersecurity requirement, JTLS-GO has moved to Adoptium™ JDK, a full OpenJDK Java environment with a licensing paradigm allowing an application to deliver the software. The following procedure has been established and approved by the JS/J7 Cybersecurity branch:

- Within days of an Oracle Java security release, Adoptium produces an equivalent version using infrastructure, build and test scripts to produce pre-built binaries of the OpenJDK class libraries. All Adoptium binaries and scripts are open source licensed and available for free.
- Within two-weeks of the Adoptium JDK release, JTLS-GO provides a bug release version (JTLS-GO 6.1.n.0) including a full Version Description Document (VDD) for download to all authorized agencies. All DoD agencies using JTLS-GO will be in full compliance with this specific Cybersecurity mandate as long as they download and use the bug released versions when distributed.

The completed Cybersecurity paperwork and a current Gate completion certificate can be obtained by contacting Ms. Jessica Camacho, the U.S. Government Program Manager, at jessica.l.camacho.civ@mail.mil.

1.3.3 JTLS-GO High Level Architecture Compliance

The JTLS-GO 6.1.11.0 release is fully High Level Architecture (HLA) compliant, and includes all the programs required to run JTLS-GO in an HLA mode. JTLS-GO currently belongs to one federation known as 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. CAE's GESI constructive simulation system is designed to run complex and comprehensive exercises from the company level up to division level. The GESI system is used to represent a virtual battlefield, including weapons, vehicles, aircrafts, ground forces and more.

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.

From the JTLS-GO perspective, all software needed to run GlobalSim is included in this delivery. JTLS-GO uses the Federation Object Model (FOM) located in the \$JGAME/data/hla directory. Federation testing of JTLS-GO with CAE's GESI model have been accomplished. Future plans include expanding the capabilities of the GlobalSim federation.

The HLA RTI (Run Time Infrastructure) executive program (rtiexec) recommended for use with this release is Pitch pRTI Evolved 4.4.2.0. However, this program is not included in the JTLS-GO 6.1.11.0 delivery. Users may obtain a full installation package of the RTI software from Pitch Corporation (www.pitch.se). 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 6.1 series of the software and the previous JTLS-GO 6.0 series database structure. There are no database format changes between JTLS-GO 6.1.11.0 and the initial JTLS-GO 6.1.0.0 version of the software.

To upgrade your JTLS-GO 6.0 scenario to JTLS-GO 6.1 compatibility, see instructions listed in the *JTLS-GO DDS User Guide*, Chapter 3.1.

STR JTLS-2022-15607 Grid Lower-Left Location Not Exact On Restart was included in JTLS-GO 6.1.2.0, released in March 2022. This STR required a change to the ASCII checkpoint format. Any saved checkpoints from JTLS-GO 6.1.0.0 and JTLS-GO 6.1.1.0 will not work with JTLS-GO 6.1.3.0 and above.

STRs JTLS-2022-15810 and JTLS-2022-15839, delivered with JTLS-GO 6.1.7.0, required changes to the checkpoint format. Any saved checkpoints from any previous JTLS-GO 6.1.0.0 versions will not work with JTLS-GO 6.1.7.0 and above.

Users should download and re-load their scenarios, due to changes made in STR JTLS-2023-16291 PSQL Statement Fails For SVP Warning Correction, included in this JTLS-GO 6.1.11.0. This will recreate the related check constraints in the database schema.

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 6.1.0.0 formatted data from your PostgreSQL database server into the JTLS-GO 6.1.0.0 scenario American Standard Code for Information Interchange (ASCII) text files, you must execute the JSYMS program using the procedure outlined in the *JTLS-GO DDS User Guide*, Appendix B.11. This procedure will reorganize the structure of the <scenario_name>.gs and database symbol.scf file.

1.4.2 JTLS-GO Using New Default Symbol Set

The symbol 2525 ID Codes, which are used by C4I systems to identify the type of object, have been expanded and refined in this release as a result of STR JTLS-2023-16310 Incorrect Identification Codes For Symbols.

If you have scenarios based on the JTLS-GO repository, you are encouraged to update the symbol sets for those scenarios using the following steps.

1. Go to the \$JDATA/scenario/<scenario_name>/symbols directory. Enter the following command:
`cd $JDATA/scenario/<scenario_name>/symbols`
2. Compare your symbol.scf file to the JTLS 6.0 version under the repository61 scenario. Enter the following command:

```
diff symbol.scf $JDATA/scenario/repository61/symbols/symbol.scf_jtls60
```

3. If the files are identical, or if your symbols are a subset of the JTLS 6.0 version, you should update your symbol file (otherwise, perform Steps 4 through 6). Enter the following command:

```
cp $JDATA/scenario/repository61/symbols/symbol.scf ./symbol.scf
```

Your symbol set will now be updated.

4. If your symbol file has additional symbols not found in the JTLS 6.0 version, you can still update your symbol file, but will need to perform a manual integration of the symbol.scf file.

Bring up the jsyms program for your scenario, by selecting Option 1 "Prepare or Alter a Scenario Database", and then Option 5 "Configure Symbols", from the JTLS Menu.

5. Perform a save in the jsyms program. Selecting "Yes" will update the <scenario_name>.gs file, and update the graphic symbols in the DDS if the scenario is loaded; selecting "No" will only update the <scenario_name>.gs file.

If your scenario is not loaded into the DDS, the next time you perform a load the updated symbols will be loaded from the <scenario_name>.gs file.

6. Exit the jsyms program.

1.4.3 Standard Repository Changes

R&A is no longer improving and expanding the unclassified data repository "repository61." All repository work has been moved to the JTLS-GO 6.2 series.

1.5 INSTALLATION

The *JTLS-GO Installation Manual*, a Portable Document Format (pdf) file available for direct download, is part of this JTLS-GO delivery. It provides detailed instructions for installing the new version of JTLS-GO and the installation of PostgreSQL 11.13 required to operate JTLS-GO 6.1.11.0.

2.0 ENGINEERING CHANGE PROPOSALS

This section describes the new capabilities, known as an Engineering Change Proposal (ECP), that are delivered with this release.

2.1 JTLS-2023-16269 New Order Delay Message

Summary of Model Change Request

Players sometimes become impatient after submitting an order when no immediate response or resulting action is observed. This situation arises when communications jamming has delayed receipt of the order by the Unit involved. The Player, unaware of the jamming delay, may then resubmit the same order in a vain attempt to force the model to react. A new message is required to notify the Player when an order has been delayed.

Design Summary

In the CEP routine that first receives a submitted order, a delay time (if any) is calculated and applied to the scheduled receipt time (i.e. the time the order is actually received by the Unit to act upon). Logic was added to generate a Player message if the delay time is greater than two minutes. In future versions, the two minute limit will become a changeable database parameter.

3.0 SOFTWARE TROUBLE REPORTS

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

3.1 JTLS-2023-16218 Error 424 Insert Record With All Zeros

The correction for Error 424 creates a record with all zero values.

Error 424 is generated when a combat system has a supply category to fight specified, but does not have ANY of the required supplies. Under some circumstances the value need for the TUP or SUP was very small. The output was truncated for two decimal digits. This caused the values in the correction to be zero.

The output values were increased to four decimal digits. If a computed value was less than .0001 then it was set to .0001. This problem also existed when values needed to be increased. The same modification was made for this correction.

3.2 JTLS-2023-16220 Error 416 Add SVPR Option to Set Sortie Rate

Error 416 needs an option to automatically set a unit's MAX SORTIES PER DAY.

A unit owning combat system aircraft must have a MAX SORTIES PER DAY value specified in order to compute daily surge rates. At a minimum, the value should be set to a number greater than zero. A new correction was added to Error 416 to set the value to the TOE value aircraft in the unit.

3.3 JTLS-2023-16224 Warning 1127 Instantaneous Sensors

Warning 1127 compares the distance an aircraft moves with the maximum surface-based sensor range on board the mission. If the distance an aircraft moves each time is greater than half the distance of its maximum sensor, there will be a gap that is not covered between moves. This logic should only be applied to sensors whose SURFACE DETECTION METHOD is OBSERVED.

The code was modified to ignore those sensors with a SURFACE DETECTION METHOD set to INSTANTANEOUS.

3.4 JTLS-2023-16226 Error 240 Corrections Nonfunctional

The two corrections for Error 240 look identical, and one of them does not work.

Error 240 is reported when a TUP, HUP or SUP does not have a associated graphic symbol. It is also used when either the global GENERAL UNIT or SHIP graphic symbol is blank. Both correction options were worded identically, but the first was intended for TUPs, HUPs and SUPs, while the

second was intended for global symbols. So, no matter which error was being reported, both correction options appeared but only one would work.

To correct the issue, Error 240 was retained for reporting bad TUP, HUP and SUP graphic symbols, and new Error 243 was created for reporting missing UNIT or SHIP global graphic symbols. Both errors were reworded to provide a better explanation of the problem.

3.5 JTLS-2023-16230 Warning 1238 Needs Improvement

Warning 1238 is reported when an ELINT emitter has a output power value of zero, and needs to be improved to indicate whether an emitter is used or unused.

The correction message was modified to indicate whether the emitter is used or unused.

3.6 JTLS-2023-16232 Multiple Airlifts For Same Unit Problem

A Player submitted two different orders to airlift a single unit. The destination for each of the orders was slightly different. The unit was unexpectedly placed at the destination location specified in the second order.

When the first mobility mission was processed in the model, the destination was stored on the unit. However, when the second mission was ordered, that destination was overwritten with the new destination.

The code was meant to check if the locations were the same, but that check was not properly executed. This check was corrected and the model now verifies the destination before proceeding with any additional airlift orders. If the destinations do not agree, then the mission enters a wait state and a message informing the Player is generated.

3.7 JTLS-2023-16242 Squadron Combat System IMT Inaccurate Count

Three DCA air missions, each consisting of four aircraft, were launched from a single squadron. The "Unavailable" column in the squadron Combat System IMT showed 12 aircraft, as expected.

The first mission lost three aircraft in combat. The squadron "Unavailable" column decreased to 9, as expected. A Change Mission Parameter order was sent to the first mission to alter its return airbase. The "Unavailable" column decreased to 5 (instead of the expected 8).

The second mission then lost one aircraft and the "Unavailable" column decreased to 4.

The third mission, suffering no losses, was then ordered to return to a different airbase, and the "Unavailable" column decreased to 0.

The second mission was then ordered to return to a different airbase, and the "Unavailable" column decreased to -4.

By design, the "Unavailable" column in the squadron's Combat System IMT contains the total number of aircraft currently active in all missions (i.e. flying or on alert). When the Change Mission Parameter order was sent to a mission, the aircraft transfer logic incorrectly decreased the "Unavailable" column by the number of launched aircraft, which did not take into account that some aircraft may have been lost.

The code was corrected to use the current number of aircraft in the mission to reduce the "Unavailable" count at the parent squadron, and to increase the "Unavailable" count at the divert squadron.

3.8 JTLS-2023-16245 Crash Repairing Runway Twice

The CEP crashed when attempting to repair a runway that did not have any existing cuts. An analysis of the situation revealed that a single cut had been inflicted on the runway, but multiple repair events had been scheduled for the single cut. The first repair event repaired the runway and removed the cut. The second repair event attempted to access the cut, which no longer existed, and crashed.

The code was modified to avoid scheduling a repair event for a runway cut that already has a repair event.

3.9 JTLS-2023-16249 Attack Package Mission Missing Targeting Option

When creating an attack mission in an air mission package, the Player order did not include the option to specify a priority target type for a multi-object attack.

An order field was added to allow the Player to specify a target type for multi-object attack missions in packages. The associated code in the model was modified to incorporate the use of prioritized target types.

3.10 JTLS-2023-16251 Non-Kill CS With Active Lanchester Debug Crash

The model crashes when the Controller turned on the Ground Combat Lanchester flag if there was a non-killing Combat System in the battle.

An appropriate check was added for this circumstance.

3.11 JTLS-2023-16253 Change Warning 1488 To Prototype Warning

Warning 1488 is generated when there is a possible overlap of Air Search sensors in conjunction with a ADA site. Warning 1488 is specifically created only if all targets involved are Prototype Owned Targets, so it should be a Prototype Warning and not a Unit Warning.

The Warning was renumbered as 1214 and was moved into the Prototype Owned Target checks.

3.12 JTLS-2023-16255 Undefined WHIP Crash

The Shadow game crashed attempting to generate a Player message in response to a pushed order that was sent from a WHIP that did not exist.

The Interface Configuration Program (ICP) database configuration file, which establishes the Player WHIPs, had not been copied from the main game to the Shadow game before starting. The WHIPs were therefore not available in the Shadow game.

To avoid a crash, logic was added when the order is first received for processing in the CEP. If the WHIP is not defined, the Force Side of the originating order is determined from the specified Unit/HRU (if applicable), or from the order's Force Side attribute itself. If neither is valid, the Controller Side is selected. The Primary Player for the Side is then found and assigned to the WHIP.

3.13 JTLS-2023-16259 Unit Move Missile Launch Improperly Updated

If a unit that is scheduled to launch a missile in the future moves, and the launch time is based on a user-specified Impact Time, the model did not properly reschedule the missile launch.

The problem only existed if the missile was designated to attack a target with a specified impact time. A variable that indicates that a target was being attacked was not properly interpreted and so the perceived location of the target was not properly accessed. This has been corrected.

3.14 JTLS-2023-16262 JXSR Reply To Some FILL Requests Not Received

For some orders, the WHIP may send a lot of FILL requests in order to provide a set of values from which the user may select. This greatly reduces the number of values presented to the user, making the order more efficient. For the Manage TPFDD order, the WHIP sends ten FILL requests to the JXSR, but some are returned empty. The request and reply process is being interrupted. The user must manually refresh each field of the order where the FILL request failed.

The operating system used within the JTLS-GO development environment began more strictly enforcing Transmission Control Protocol (TCP) anti-flood policies. One of these policies prevents the rapid transmit of TCP request packets from the same client over a short period of time, with the idea that some of the request packets would be rejected and a legitimate requester would naturally resend the legitimate requests. This policy started to apply to the FILL request packets the WHIP needed to send for some of the JTLS-GO orders.

The solution was to have the TCP-requesting client simply detect the rejection and send the request a second time. This was implemented in the module used by the Apache process to send requests to the JXSR. The JXSR module was changed so a zero-length reply from an unexpectedly closed connection would wait half a second, and then try resending the request.

3.15 JTLS-2023-16263 Naval Formation Side Change Error

Naval units from different Force Sides belonged to the same formation. A Player from the Side owning the formation sent a Naval Move order to an own-Side vessel in the formation, and the model crashed.

The model logic allowed the vessel to leave the formation, leaving only the vessel from the other Side in the formation. The model correctly determined that the formation Side should change. The routine that changed the Side did not recognize a formation object type, due to a typographical error. As a result, the formation's old Side was not assigned to a local variable. The logic then tried to call an AAR routine to record the event and crashed attempting to access the variable, which had a zero value. The typographical error has been corrected.

3.16 JTLS-2023-16266 Warning 1903 Needs Network Identifier

The message for Warning 1903 does not specify what network type has the problem.

The message for Warning 1903 does not specify the problem is associated with a SEALANE. The word "SEALANE" was prefaced to the existing message.

3.17 JTLS-2023-16273 WARNING 1901 Flight Path/Sea Lane Network Fix

The JTLS-GO master data repository has Flight Path and Sea Lane Networks with overlapping arcs and no node present at the location, creating SVP warning messages and potential movement issues during a game.

All known Sea Lane and Flight Path network arc issues were repaired and saved to the master data repository. If a user organization has used the repository sea lane and/or flight path data in their own scenario, the JTLS-GO Development Team strongly suggests that the new data delivered with this version of JTLS-GO should be used be moved into each organization scenario.

3.18 JTLS-2023-16277 Logging JODA Stops When Primary JODA Restarted

The Logging JODA records data packets from the Primary JODA in a log file for later replay using the TRIPP. When the Primary JODA is restarted, the Logging JODA simply stops recording. It does not receive any further data even after the Primary JODA is restored and running following its restart.

The Logging JODA typically makes a connection to the Primary JODA and receives data packets continuously through this connection. When the Primary JODA is stopped, the connection is closed, but the Logging JODA was not being notified of this closed connection. The Logging JODA continues to wait for packets from the closed connection.

The Logging JODA was changed to register a function to be called when the connection to the JODA fails or is closed. This way, the Logging JODA will be notified when the connection is lost to

the Primary JODA and begin the reconnection process. Data will be received and processed once the Primary JODA is restarted.

3.19 JTLS-2023-16287 Terrain Report Fails For Equipment Shelters

If a grid contains an Equipment Shelter, the Terrain Report fails and cannot be viewed.

The code used to close the Equipment Shelter submessage was incorrectly formatted. This has been corrected. A similar error was discovered for grids containing chemical or nuclear contamination, which was also corrected.

3.20 JTLS-2023-16291 PSQL Statement Fails For SVP Warning Correction

When running the SVP, correcting the First Adjust Supply Time for units whose TPFDD Time was changed to a value greater than 365 days caused the PostgreSQL psql update statement to fail. This error was caused because of a 365 day upper limit for the First Adjust Supply Time.

All time database attributes had their time limits changed to unlimited to match the constraint of a unit's TPFDD time. Implemented this consistency eliminated the possibility of future errors.

3.21 JTLS-2023-16295 GIS Tool Sea Lane Maximum Arc Length

A user applied the Maximum Arc length criterion to the Sea Lane Network and observed that, while some arcs were sub-divided correctly, there were other arcs that were not divided at all.

The problem was that a set that was supposed to keep track of arcs that have been processed was not being filled properly. That problem has been fixed.

The Air Corridor and Sea Lane Networks in the GIS Tool's default database contained a number of overlapping arcs. If left alone, these arcs would have triggered SVP warnings. These networks were updated.

3.22 JTLS-2023-16300 Unnecessary Fire Artillery Unit Check

The Fire Artillery order has an option for selecting the Unit that should be attacked. This selection indicated that if a Controller submits the order, any unit in the game can be fired upon. It is impossible for the Controller to submit a Fire Artillery order, so the option made no sense.

Although wrong, the Controller option had no impact on the way the Fire Artillery Order operated. It was confusing to leave the option within the order definition, so it was removed.

3.23 JTLS-2023-16302 JSAT Route Point Times Round-Off Errors

When the JSAT was used to create satellites in the game, the times specified for the route points did not always correspond to the intended schedule of points. If the interval between points was

meant to be one minute, consecutive points would sometimes be assigned the same time, and sometimes be separated by two minutes.

The erroneous times for the route points were seen in the order which was submitted to the CEP to create the satellites. Code for the JSAT had round-off errors, which resulted in bad times in the output orders. The code was corrected and these errors were eliminated.

3.24 JTLS-2023-16304 Alternate WHIP World Map

The current world map displayed by the WHIP shows a border between Morocco and Western Sahara. Neither Morocco nor the United States recognize this border and it should be removed from the world map.

JTLS-GO will provide two world map files with each future release:

- The shape file `ne_10m_admin_0_sovereignty_ws.shp` contains the legacy Morocco-Western Sahara border. This is the previous world map shape file, which has been renamed to indicate that it contains the Morocco-Western Sahara border.
- The shape file `ne_10m_admin_0_sovereignty.shp` does not contain the Morocco-Western Sahara border. This is a new file, but has the same name as the older world map shape file. The WHIP will use this file by default.

If a user prefers to see the border, they can refer to Section 6.3.2 of the *JTLS-GO Technical Coordinator Guide* for instructions on how to switch to the alternate shape file.

3.25 JTLS-2023-16307 Mission Load Memory Leak

There was a memory leak in the routine that initializes mission loads when an air mission is first created or when its load is changed by the Change Mission Parameter order.

The logic first creates the new load as specified in the order (or determined by the database default). Before accepting the new load and assigning it to the mission, the logic checks the load's validity. If the load's assets (weapons, sensors, and jammers) are not appropriate for the mission type and target list (if any), the new load is rejected. However, the newly created load was not deleted from memory in this case. Code was added to do so.

3.26 JTLS-2023-16310 Incorrect Identification Codes For Symbols

Some of the JTLS-GO 2025 Symbols had incorrect or missing Identification Codes.

The symbols that had incorrect or missing Identification Codes were corrected. The related `scenario.gs` files were re-generated using the JSYMS application. Chapter 1 indicates how a user can use the newly delivered codes with their organization scenarios.

4.0 REMAINING ERRORS

Every effort has been made to correct known model errors. All reproducible errors that resulted in 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 6.1.0.0 represents a major release of new functionality, all outstanding errors have been reviewed. If the error could not be reproduced, it was considered obsolete and no longer relevant to JTLS-GO. These errors have been removed from consideration for correction at this time. This chapter contains the remaining errors that could be reproduced. As development team assets become available, these remaining known issues will be corrected.

In future maintenance releases, newly uncovered outstanding errors related to JTLS-GO will be listed in this chapter, along with information 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.

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
AADC	Area Air Defense Commander
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

BADGE	Bilateral Air Defense Ground Environment (used by Japan Defense Agency)
BAI	Battlefield Air Interdiction
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
DEMSDB	Demonstration Standard Database
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
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
HET	Heavy Equipment Transporter
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
IIP	Intelligence Information Prototype
IMT	Information Management Tool
INFO	Information
INTEL	Intelligence
JCATS	Joint Conflict And Tactical Simulation
JDA	Japan Defense Agency
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	Japanese Self-Defense Force
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
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
OPP	Order Preprocessing Program
OTH	Over The Horizon
OTH Gold	Over The Horizon message specification
OTH-T	Over The Horizon-Targeting
OVT	Order Verification Tool
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
SDB	Standard Database

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
SQL	Structured Query Language
SR	Short Range
SRP	Start/Restart Program (a JTLS 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
WW	Wild Weasel
XMS	XML Message Service

APPENDIX B. VERSION 6.1.0.0 DATABASE CHANGES

No changes were made to the JTLS-GO 6.1 database.

C.0 VERSION 6.1.0.0 REPOSITORY CHANGES

The following changes were made to the JTLS-GO 6.1 repository:

C.1 NEW GROUND UNITS

- 17.FIRES.BDE_US
- 1-94.FA.BN.MLRS_US
- A.BTRY.1-94.FA_US
- B.BTRY.1-94.FA_US
- C.BTRY.1-94.FA_US
- D.BTRY.1-94.FA_US
- 1MDTF_US
- 106BDE.SPT.BN.HHC_US
- A.CO.DISTR.106BSB_US
- B.CO.MAINT.106BSB_US
- C.CO.MED.106BSB_US
- 1MDEB.HQ_US
- 10MICO.CO.HQ_US
- 1CEMA.CO.HQ_US
- 1DEA.PLT_US
- 1DEA.SEC_US
- 2DEA.SEC_US
- 3DEA.SEC_US
- 4DEA.SEC_US
- 5DEA.SEC_US

- 6DEA.SEC_US
- DCO1.PLT_US
- DCO2.PLT_US
- DCO3.PLT_US
- 1ERSE.CO.HQ_US
- 1EW.PLT.HQ_US
- 1SEC(TLS_EAB).1EW_US
- 2SEC(TLS_EAB).1EW_US
- 3SEC(TLS_EAB).1EW_US
- 4SEC(TLS_EAB).1EW_US
- 5SEC(TLS_EAB).1EW_US
- 6SEC(TLS_EAB).1EW_US
- MFEW1-AIR.SEC.1EW_US
- MFEW2-AIR.SEC.1EW_US
- MFEW3-AIR.SEC.1EW_US
- 1HA.PLT.HQ_US
- 1HALB.SEC_US
- 1HASB.SEC_US
- 2HASB.SEC_US
- 1UAS.PLT(RQ7)_US
- 4SPACE.CO.HQ_US
- 82SIGNAL.CO.HQ_US
- 5-3.FA-LRPF.BN_US
- FSC.5-3FA_US

- HIMARS.BTRY_US
- LRHW.BTRY.5-3FA_US
- MRC.BTRY.5-3.FA_US
- 5-5.ADA.BN.HQ_US
- A.BTRY.5-5.ADA.BN_US
- B.BTRY.5-5.ADA.BN_US
- C.BTRY.5-5.ADA.BN_US
- D.BTRY.5-5.ADA.BN_US
- E.BTRY.5-5.ADA.BN_US
- 56.ARTILLERY.CMD_US
- 32.AAMDC_US
- 31.ADA.BDE_US

C.2 NEW TACTICAL UNIT PROTOTYPES

- SMRF.BTRY_US
- MC.NMESIS.BTRY_US
- HIMARS.PRSM.PLT.2L_US
- HIMARS.PRSM.BTRY.8L_US
- M-SHORAD.BTRY.HQ_US
- M-SHORAD.PLT_US
- M-SHORAD.BNHQ_US
- M-SHORAD(DE).BTRY_US
- ERSE.CO.HQ_US
- CEMA.CO_US
- DEA.PLT_US

- DEA.SEC_US
- DCO.PLT_US
- EW.PLT.HQ_US
- HAB.PLT.HQ_US
- HALB.SEC_US
- HASB.SEC_US
- SPACE.CONTROL.CO_US
- EW.MFEW.AIRPOD.SECTION_US
- EW.TLS-EAB.SECTION_US

C.3 NEW AIRCRAFT TARGET CLASSES

- SATELLITE

C.4 NEW AIRCRAFT CLASSES

- A60.BERIEV
- RAVEN-LIGHTNING.HAB(SM)
- RT200.HAB(MD)
- RT400.HAB(LG)

C.5 NEW AIRCRAFT LOADS

- RL100.HAB.DEF
- RT200.HAB.DEF
- RT400.HAB.DEF

C.6 NEW TARGETABLE WEAPONS

- M121A1_GB-155MM_CHEM
- M121A1_VX-155MM_CHEM
- M483A1-155MM_DPICM

- M549A1-155MM_RAP
- M731-155MM_MINE_AP
- BONUS-155MM_MINE_AT
- C-DAEM-155MM_MINE_AT
- M718A1-155MM_MINE_AT
- M741-155MM_MINE_AT
- M741A1-155MM_MINE_AT
- M898-155MM_SADARM
- M982_BLK2-155MM_EXCALIBUR
- M982_P4-155MM_EXCALIBUR
- M916-105MM_DPICM_US
- M927-105MM_RAP
- M913-105MM_RAP
- M1130A1-105MM_BB
- M1130-105MM_BB
- BGM174.SM6
- M57-ATACMS_UNITARY
- M26A2-MLRS_DPICMER_X1
- M31-GMLRS_DPICM
- BGM114L.HELLF2
- DE.M-SHORAD(50KW)LASER
- SOKOL-ESHELON(LASER)

C.7 UPDATED TARGETABLE WEAPONS

- Updated 155MM.1HE.OLD to M107-155MM_HE_OLD

- Updated 155MM.1CHEM to M687-155MM_CHEM
- Updated 155MM.1ICM to M449A1-155MM_ICM
- Updated 155MM.1DPICM to M483-155MM_DPICM
- Updated 155MM.1RAP to M549-155MM_RAP
- Updated 155MM.1MINE_AP to M692-155MM_MINE_AP
- Updated 155MM.1CLGP to M712-155MM_CLGP
- Updated 155MM.1MINE_AT to M718-155MM_MINE_AT
- Updated 155MM.1HE_NEW to M795-155MM_HE_NEW
- Updated 155MM.1BB to M864-155MM_BB
- Updated 155MM.1LEAFLET to M951-155MM_LEAFLET
- Updated 155MM.1EXCALIBUR to M982-155MM_EXCALIBUR
- Updated 105MM.1DPICM.US to M915-105MM_DPICM_US
- Updated 105MM.1RAP to M548-105MM_RAP
- Updated 105MM.1ICM to M444-105MM_ICM
- Updated 105MM.1HE.OLD to M1-105MM_HE_OLD
- Updated 105MM.1HE.NEW to M760-105MM_HE_NEW
- Updated 203MM.1CHEM to M426-203MM_CHEM
- Updated 203MM.1DPICM.US to M509-203MM_DPICM_US
- Updated 203MM.1HE.US to M106-203MM_HE_US
- Updated 203MM.1ICM.US to M404-203MM_ICM_US
- Updated 203MM.1RAP.US to M650-203MM_RAP_US
- Updated MLRS-DPICM.X1 to M26-MLRS_DPICM_X1
- Updated MLRS-DPICMER.X1 to M26A1-MLRS_DPICMER_X1
- Updated GMLRS-DPICM to M30-GMLRS_DPICM

- Updated GMLRS-UNITARY to M31-GMLRS_UNITARY
- Updated ATACMS-BLK1.DP to M39-ATACMS_BLK1_DP
- Updated ATACMS-BLK1A.DP to M39A1-ATACMS_BLK1A_DP
- Updated ATACMS-BLK4A.HE to M48-ATACMS_UNITARY

C.8 NEW SURFACE-TO-SURFACE MISSILES

- MLV-ROGUE.NSM(2)
- M-SHORAD.HELLFIRE(SP)POD

C.9 NEW JAMMERS

- TLS-EAB.COMM.JAM
- TLS-EAB.ARM.JAM
- TLS-EAB.EO.JAM
- TLS-EAB.IR.JAM
- TLS-EAB.LASER.JAM
- TLS-EAB.GPS.JAM
- TLS-EAB.RADAR.JAM
- MFEW-AIR.JAM

C.10 NEW SENSORS

- TRS-14C_SGN

C.11 NEW SUPPLY CATEGORIES

- CL.V.ARTY-155MM.M121A1.GB
- CL.V.ARTY-155MM.M121A1.VX
- CL.V.ARTY-155MM.M483A1
- CL.V.ARTY-155MM.M549A1
- CL.V.ARTY-155MM.M731

- CL.V.ARTY-155MM.BONUS.MN.AT
- CL.V.ARTY-155MM.C-DAEM.MN.AT
- CL.V.ARTY-155MM.MM718A1
- CL.V.ARTY-155MM.M741
- CL.V.ARTY-155MM.M741A1
- CL.V.ARTY-155MM.M898
- CL.V.ARTY-155MM.M982.BLK2
- CL.V.ARTY-155MM.M982.P4
- CL.V.ARTY-105MM.M916
- CL.V.ARTY-105MM.M927
- CL.V.ARTY-105MM.M913
- CL.V.ARTY-105MM.M1130A1
- CL.V.ARTY-105MM.M1130A1
- CL.V.SS-MR-BGM174.SM6
- CL.V.SS-M57.ATACM.UNI
- CL.V.M26A2-MLRS.DP-ER
- CL.V.M31-GMLRS.DPICM
- CL.V.SS-BGM114L.HELLF2
- CL.V.SS-SR-LASER.M-SHORAD

C.12 UPDATED SUPPLY CATEGORIES

- Updated CL.V.ARTY-155MM.HE.OLD to CL.V.ARTY-155MM.M107
- Updated 155MM.1CHEM to CL.V.ARTY-155MM.M687
- Updated 155MM.1ICM to CL.V.ARTY-155MM.M449A1
- Updated 155MM.1DPICM to CL.V.ARTY-155MM.M483

- Updated 155MM.1RAP to CL.V.ARTY-155MM.M549
- Updated 155MM.1MINE_AP to CL.V.ARTY-155MM.M692
- Updated 155MM.1MINE_AP to CL.V.ARTY-155MM.M712
- Updated 155MM.1MINE_AT to CL.V.ARTY-155MM.M718
- Updated 155MM.1HE_NEW to CL.V.ARTY-155MM.M795
- Updated 155MM.1BB to CL.V.ARTY-155MM.M864
- Updated 155MM.1LEAFLET to CL.V.ARTY-155MM.M951
- Updated 155MM.1EXCALIBUR to CL.V.ARTY-155MM.M982
- Updated CL.V.ARTY-105MM.1DPICM-US to CL.V.ARTY-105MM.M915
- Updated CL.V.ARTY-105MM.1RAP to CL.V.ARTY-105MM.M548
- Updated CL.V.ARTY-105MM.1ICM to CL.V.ARTY-105MM.M444
- Updated CL.V.ARTY-105MM.1HE-OLDto CL.V.ARTY-105MM.M1
- Updated CL.V.ARTY-105MM.1HE-NEWto CL.V.ARTY-105MM.M760
- Updated CL.V.ARTY-203MM_CHEM to CL.V.ARTY-203MM.M426
- Updated CL.V.ARTY-203MM_DPICMM_US to CL.V.ARTY-203MM.M509
- Updated CL.V.ARTY-203MM_HE_US to CL.V.ARTY-203MM.M106
- Updated CL.V.ARTY-203MM_ICM_US to CL.V.ARTY-203MM.M404
- Updated CL.V.ARTY-203MM_RAP_US to CL.V.ARTY-203MM.M650
- Updated CL.V.MLRS.DPICMto CL.V.M26-MLRS.DPICM
- Updated CL.V.MLRS.DP-ERto CL.V.M26A1-MLRS.DP-ER
- Updated CL.V.GMLRS.DPICM to CL.V.M30-GMLRS.DPICM
- Updated CL.V.GMLRS.UNIT to CL.V.M31-GMLRS.UNIT
- Updated CL.V.SS.ATACMS_BLK1_DP to M39-ATACMS_BLK1_DP
- Updated CL.V.SS.ATACM1Ato CL.V.SS-M39A1-ATACM1A

- Updated CL.V.SS.ATACM.UNI to CL.V.SS-M48.ATACM.UNI

C.13 NEW UNITS OF MEASURE

- 155MM.M121A1-GB.CHEM
- 155MM.M121A1-VX.CHEM
- 155MM.M483A1.DPICM
- 155MM.M549A1.RAP
- 155MM.M731.MINE.AP
- 155MM.BONUS.MINE.AT
- 155MM.C-DAEM.MINE.AT
- 155MM.M718A1.MINE.AT
- 155MM.M741.MINE.AT
- 155MM.M741A1.MINE.AT
- 155MM.M898.SADARM
- 155MM.M982.BLK2
- 155MM.M982.P4
- 105MM.M916.DPICM.US
- 105MM.M927.RAP
- 105MM.M913.RAP
- 105MM.M1130A1.BB
- 105MM.M1130.BB
- BGM174.SM6
- M57.ATACMS-BLK4A.UN
- M26A2.MLRS-DPICMER.X1
- M31.GMLRS-DPICM

- BGM114L.HELLF2
- DE.M-SHORAD.LASER

C.14 UPDATED UNITS OF MEASURE

- Updated 155MM.HE.OLD to 155MM.M107.HE.OLD
- Updated 155MM.1CHEM to 155MM.M687.CHEM
- Updated 155MM.1ICM to 155MM.M449A1.ICM
- Updated 155MM.1DPICM to 155MM.M483.DPICM
- Updated 155MM.1RAP to 155MM.M549.RAP
- Updated 155MM.1MINE.AP to 155MM.M692.MINE.AP
- Updated 155MM.1CLGP to 155MM.M712.CLGP
- Updated 155MM.1MINE.AT to 155MM.M718.MINE.AT
- Updated 155MM.1HE.NEW to 155MM.M795.HE.NEW
- Updated 155MM.1BB to 155MM.M864.BB
- Updated 155MM.1LEAFLET to 155MM.M951.LEAFLET
- Updated 155MM.EXCALIBUR to 155MM.M982.EXCALIBUR
- Updated 105MM.1DPICM.US to 105MM.M915.DPICM.US
- Updated 105MM.1RAP to 105MM.M548.RAP
- Updated 105MM.1ICM to 105MM.M444.ICM
- Updated 105MM.1HE.OLD to 105MM.M1.HE.OLD
- Updated 105MM.1HE.NEW to 105MM.M760.HE.NEW
- Updated 203MM.1CHEM.US to 203MM.M426.CHEM.US
- Updated 203MM.1DPICM.US to 203MM.M509.CHEM.US
- Updated 203MM.1HE.US to 203MM.M106.CHEM.US
- Updated 203MM.1ICM.US to 203MM.M404.CHEM.US

- Updated 203MM.1RAP.US to 203MM.M650.CHEM.US
- Updated MLRS-DPICM.X1 to M26.MLRS-DPICM.X1
- Updated MLRS-DPICMER.X1to M26A1.MLRS-DPICMER.X1
- Updated GMLRS-DPICM to M30.GMLRS-DPICM
- Updated GMLRS-UNITARY to M31.GMLRS-UNITARY
- Updated ATACMS-BLK1.DP to M39.ATACMS-BLK1.DP
- Updated ATACMS-BLK1A.DPto M39A1.ATACMS-BLK1A.DP
- Updated ATACMS-BLK4A.HEto M48.ATACMS-BLK4A.UN

C.15 NEW ALTITUDE ZONES

- HEO-HIGH.EARTH.ORBIT
- GSO-GEOSYNCHRONOUS.ORBIT
- MEO-MIDDLE.EARTH.ORBIT
- LEO-LOW.EARTH.ORBIT
- VLEO-VERY.LOW.EARTH.ORBIT

C.16 NEW PH/PK/SKL LETHALITY DATA

- M48.ATACMS_PH
- M48.ATACMS_PK
- M57.ATACMS_PH
- M57.ATACMS_PK
- M48.ATACMS_SKL