

JTLS-GO

Version Description Document

October 2021



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

JOINT THEATER LEVEL SIMULATION - GLOBAL OPERATIONS
(JTLS-GO 6.1.0.0)

[Blank Page]

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 6.1.0.0 delivery of the configuration-managed JTLS-GO software suite.

JTLS-GO 6.1.0.0 is a Major 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 major model functionality improvements implemented as Engineering Change Proposals (ECPs). These ECPs 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:

JTLS-GO Development Team Leader
ROLANDS & ASSOCIATES Corporation
120 Del Rey Gardens Drive
Del Rey Oaks, California 93940 USA
jtlsgo@rolands.com

Copyright 2021 - ROLANDS & ASSOCIATES Corporation - All Rights Reserved

[Blank Page]

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 1.2.1 Obsolete/Outdated Documents..... 1-1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

 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 1-4

 1.3.1 Support Software 1-4

 1.3.2 JTLS-GO Cybersecurity Compliance 1-7

 1.3.3 JTLS-GO High Level Architecture Compliance 1-7

 1.4 DATABASE MODIFICATIONS 1-8

 1.4.1 JTLS-GO Using Legacy Default Symbol Set 1-8

 1.4.2 JTLS-GO Using New Default Symbol Set..... 1-8

 1.4.3 Standard Repository Changes 1-9

 1.5 INSTALLATION 1-9

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

 2.1 JTLS-2006-1946 STOPPED NAVAL UNIT DETECTIONS 2-1

 2.2 JTLS-2011-10943 IMPROVE FIELD RESTRICTION DEFINITION 2-1

 2.3 JTLS-2016-12599 MOVE TASK END TIME 2-3

 2.4 JTLS-2016-12650 LIMIT WHIP CONTROL OF HRUS 2-3

 2.5 JTLS-2016-12707 FORCE CONTROL ARROW IN WHIP/TRIPP SLIDES 2-4

 2.6 JTLS-2019-14353 CONVOY DATA IN AAR 2-5

 2.7 JTLS-2020-14790 SPLIT FORMATIONS WITH EMBARKED UNITS 2-5

 2.8 JTLS-2020-14910 MOVING SHIP P(HIT) MODIFIER 2-6

 2.9 JTLS-2020-14948 IMPROVE MAX RANGE RING LABELS 2-6

 2.10 JTLS-2020-14949 IMPROVE MANAGE TPFDD ORDER 2-7

 2.11 JTLS-2020-14950 EXPAND OBJECT EVENT QUERIES 2-7

 2.12 JTLS-2020-14951 DDS EASY TABLE SEARCH CAPABILITY 2-8

 2.13 JTLS-2020-14953 ADD AAR REPORTS TO WHIP 2-8

 2.14 JTLS-2020-14973 MULTIPLE SENSORS ON SATELLITE 2-9

 2.15 JTLS-2020-15019 CONVERT CS AND SC TO TEMPORARY ENTITIES 2-10

 2.16 JTLS-2020-15044 TRACK WEAPONS BY COUNT NOT SUPPLIES 2-11

 2.17 JTLS-2020-15094 DEVELOP CONSISTENT NAMING RULES 2-12

 2.18 JTLS-2020-15106 ADD DATABASE COMMENT FIELDS 2-13

 2.19 JTLS-2021-15152 REPRESENT VARIOUS TYPES OF FUEL 2-14

- 2.20 JTLS-2021-15225 AAR REPORT VISUALIZATION 2-15
- 3.0 SOFTWARE TROUBLE REPORTS 3-1
- 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
 - B.1 ADDED DATA FIELDS B-1
 - B.2 MODIFIED DATA FIELDS B-2
 - B.3 REMOVED DATA TABLES B-3
- APPENDIX C. VERSION 6.1.0.0 REPOSITORY CHANGES C-1

1.0 INTRODUCTION

1.1 SCOPE

This *JTLS-GO Version Description Document (VDD)* describes Version 6.1.0.0 of the configuration managed Joint Theater Level Simulation - Global Operations (JTLS-GO[®]) software suite. JTLS-GO 6.1.0.0 is a Major delivery for the JTLS-GO 6.1 series of releases.

JTLS-GO 6.1.0.0 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”. Database modifications that were accomplished to upgrade the previous JTLS-GO database format to this current version are summarized in this chapter, as well as [APPENDIX B](#). Detailed descriptions of the Engineering Change Proposals (ECPs) implemented for this release are provided in [Chapter 2.0](#).

JTLS-GO 6.1.0.0 executes on the Red Hat Enterprise Linux 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 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 6.1.0.0 does not include a major redesign of the JTLS-GO system, but does include several extensive engineering change proposals. All of the documentation has been updated to reflect these functional capability changes.

1.2.3 Updated Documents

- *JTLS-GO Analyst Guide* (JTLS-GO Document 01, Version 6.1.0.0)
- *JTLS-GO Air Services User Guide* (JTLS-GO Document 03, Version 6.1.0.0)
- *JTLS-GO Configuration Management Plan* (JTLS-GO Document 03, Version 6.1.0.0)
- *JTLS-GO Controller Guide* (JTLS-GO Document 04, Version 6.1.0.0)
- *JTLS-GO Data Requirements Manual* (JTLS-GO Document 05, Version 6.1.0.0)

- *JTLS-GO DDS User Guide* (JTLS-GO Document 06, Version 6.1.0.0)
- *JTLS-GO Director Guide* (JTLS-GO Document 07, Version 6.1.0.0)
- *JTLS-GO Executive Overview* (JTLS-GO Document 08, Version 6.1.0.0)
- *JTLS-GO Installation Manual* (JTLS-GO Document 09, Version 6.1.0.0)
- *JTLS-GO WHIP Training Manual* (JTLS-GO Document 10, Version 6.1.0.0)
- *JTLS-GO Player Guide* (JTLS-GO Document 12, Version 6.1.0.0)
- *JTLS-GO Standard Database Description* (JTLS-GO Document 14, Version 6.1.0.0)
- *JTLS-GO Software Maintenance Manual* (JTLS-GO Document 15, Version 6.1.0.0)
- *JTLS-GO Technical Coordinator Guide* (JTLS-GO Document 16, 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 6.1.0.0)
- *JTLS-GO C4I Interface Manual* (JTLS-GO Document 21, Version 6.1.0.0)
- *JTLS-GO Version Description Document* (JTLS-GO Document 17, Version 6.1.0.0)
- *JTLS-GO DoD Architecture Framework* (JTLS-GO Document 22, Version 6.1.0.0)

1.2.4 New Documents

No new documents are required for this version of the software.

1.2.5 Delivered Software Components

JTLS-GO 6.1.0.0 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)
 - The current JODA build number is 172.
- 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)
- 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 6.1.0.0 are provided in the *JTLS-GO Installation Manual*. Installing a previous version of JTLS prior to installing JTLS-GO 6.1.0.0 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 6.1.0.0 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, 64-bit architecture.

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

RedHat Linux 8.4 - this operating system license must be purchased.

Oracle Linux 8.4 - 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 6.1.0.0 has been tested on the following operating systems:

Red Hat Linux Enterprise Edition Version 7.9 and 8.4

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 6.1.0.0 is delivered with the AdoptOpenJDK 1.8 Update 302 package, which is equivalent to the current version of OpenJDK. Using AdoptOpenJDK provides two benefits:
 - a. Only the JTLS-GO account on the system servers access this version of Java. An installation site can use the JTLS-GO servers for programs other than JTLS-GO without impacting the version of Java used by other programs.
 - b. Security releases of AdoptOpenJDK software are produced on the same schedule as the Oracle OpenJDK security release procedure. An organization can expect to receive a bug release version of JTLS-GO within two-weeks of a new Java 1.8 security release. As long as a user organization installs all of the JTLS-GO bug releases, JTLS-GO can guarantee that the latest Java security release is being used on the servers. JTLS-GO no longer depends on system administration for implementing proper Java security update procedures.
- JTLS-GO uses IcedTea to provide the Java Web Start capability that implements the web-enabled JTLS-GO functionality. JTLS-GO supports IcedTea version 1.8.4.
- 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 6.1.0.0. 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. 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 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 keep the software up-to-date and all security patches are properly installed. 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.

OpenJDK™ has not implement an expiration date. In order to fulfill this DoD Cybersecurity requirement, JTLS-GO has moved to AdoptOpenJDK, a full OpenJDK Java environment with licensing alternations 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, AdoptOpenJDK produces an equivalent version using infrastructure, build and test scripts to produce pre-built binaries of the OpenJDK class libraries. All AdoptOpenJDK binaries and scripts are open source licensed and available for free.
- Within two-weeks of the AdoptOpenJDK 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.

Contact the U.S. Government Program Manager, Mr. James Blank (james.e.blank.civ@mail.mil) to obtain the completed Cybersecurity paperwork and a current Gate completion certificate.

1.3.3 JTLS-GO High Level Architecture Compliance

The JTLS-GO 6.1.0.0 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 6.1.0.0 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 JTLS-GO 6.1.0.0 and the previous JTLS-GO 5.1 series database structure.

To upgrade your JTLS 5.1 scenario to JTLS-GO 6.1 compatibility, see instructions listed in the *JTLS-GO DDS User Guide*, Chapter 3.1.

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 databases symbol.scf file.

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 6.1.0.0, 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. Some new symbols have been

created to meet end-user requirements. No previously existing symbols were deleted nor were any of the preexisting symbol names changed.

This means that the user can easily move in this new symbol set. Please follow the steps outlined in the *JTLS-GO DDS Users Guide*, Section B.13, Updating Scenario Symbol Set.

1.4.3 Standard Repository Changes

R&A has continued to improve and expand the unclassified data repository, which has been renamed to “repository61.” The DDS comparison and synchronization function can be used to determine if any of the changes delivered are of use to a JTLS-GO user organization.

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 11.11 required to operate JTLS-GO 6.1.0.0.

2.0 ENGINEERING CHANGE PROPOSALS

This chapter summarizes model capabilities added to JTLS-GO 6.1.0.0 as a result of implementing authorized Engineering Change Proposals (ECPs).

2.1 JTLS-2006-1946 Stopped Naval Unit Detections

Summary of Model Change Request

Each time a Naval Unit moves, the model determines what the Naval Unit can see and what assets can see the Naval Unit. If a Naval Unit is stopped, it will not detect anything. This means that if two Naval Units from opposing Sides are both stationary in the middle of the ocean, neither unit will be detected and the time of last detection will not update.

This problem was temporarily solved by checking for the situation every hour as part of the HOURLY UNIT PROCESSING event. The primary issue with this solution is that this happens only once an hour and Command, Control, Communication, and Computer Information (C4I) systems will continue to drop tracks if detection are not updated more often.

Design Summary

A new event was created in the model called C4I UPDATE PROCESSING. Unlike the HOURLY UNIT PROCESSING event, which happens every hour by definition, this event happen periodically based on a database parameter. If C4I systems require that this update happen every 12 minutes, then:

- The event will execute every 12 minutes.
- All necessary C4I updates will be processed.
- When the OTH-Gold Message Service obtains the last detection time update, a message is sent to the C4I system resulting in the track not being deleted.

Naval Units in port use a different method for reporting their status to C4I systems. This ECP accounts for this difference. There is a separate database parameter accessed for determining the C4I reporting requirements when a ship is in port.

2.2 JTLS-2011-10943 Improve Field Restriction Definition

Summary of Model Change Request

This ECP expands field restriction capabilities in two ways:

- **Linking multiple field restrictions.** A linked field restriction allows an order panel to be developed in such a way that the value of one fields serves as a restriction for another field. This means that once a unit is selected on the Fire Artillery order, the values held in the selectable Targetable Weapon drop-down list field are changed to contain only the weapons that the unit owns.
- **Implement auto-select group capability.** An auto-select group capability allows an order panel to be developed in such a way that the value of one field results in the order panel automatically selecting a group that needs to be filled. For example, the Change Air Mission parameter order has been changed to utilize this new capability. When an Air Mission is selected, the WHIP knows the mission type of the mission and automatically selects the available parameter change group based on the mission's type.

There are five other ECPs that are related to field restrictions and each are solved by implementing these two new capabilities. The following five ECPs were also addressed and are closed with the implementation of this design.

- JTLS-2018-13574 - Order Fields Should Only List Weapons that the Object Can Fire
- JTLS-2011-10929 - Minelaying Order Context-Sensitive Fields
- JTLS-2010-10628 - Limit SSM Fire Order Field
- JTLS-2009-10162 - Reduce Fire Missile Order Weapon List Size
- JTLS-2006-1761 - Fire Missile Order Capable Units List

Design Summary

Implementing the described improvements required changing the capability of the Web Hosted Interface Program (WHIP), the JTLS XML Server (JXSR), the Order Management Authority (OMA), and the Combat Events Program (CEP). The following changes were required:

- The WHIP implemented the ability to auto-select a group options, not driven directly by the user but by the entry of other fields.
- The WHIP, JXSR and OMA capabilities were expanded to allow a specific field to exist in multiple field restrictions.
- The CEP was changed to output information needed to tie weapons and units together in a single field restriction.

2.3 JTLS-2016-12599 Move Task End Time

Summary of Model Change Request

In JTLS-GO 5.0, the concept of object tasks were added to the model. All scheduled object tasks can be viewed on the JTLS-GO WHIP Information Management Tool (IMT). Each task has a column on the display panel that indicates the task's start time and end time. For the majority of tasks, the user can specify the task start time but only some tasks have the concept of a task duration or task end time.

When a task starts to execute, the model should automatically alter the Start Time for the order to the actual start time of the task, and compute the expected end time for the order. The JODA should get these updated values so the user can view them on the IMT.

Design Summary

When a task starts to execute, the model call a centralized routine that properly set the start time attribute and expected stop time attribute for the task. Depending on the type of task, the model updates the task End Time periodically as the task executes.

2.4 JTLS-2016-12650 Limit WHIP Control Of HRUs

Summary of Model Change Request

Controlling one or more specific units may be restricted to a group of one or more specific WHIPs. This configuration capability enhances the management of the unit tasking for a side. Although this capability is already available for Aggregate Resolution Units (ARUs), it is not available for High Resolution Units (HRUs). Currently there is no method for delegating to specific WHIPs the exclusive control of an HRU. Any WHIP, on the same side as an HRU, is able to task the HRU using any of the HRU orders.

Design Summary

Currently, any side WHIP has the ability to task any HRU on its side. This can cause confusion and errors. Like the division of the command authority for ARUs, the ability for the WHIP to limit the HRUs over which it has command, result in better exercise management.

HRU's are given Command Authority Tags in a manner similar to the control method already used for ARUs, Since HRUs are transient game objects, some extra measures were needed in the Combat Events Program (CEP) to ensure the management and tracking of Command Authority Tags when an HRU is created or deleted from the game. A given side WHIP is always able to send an order requesting general reports from any HRU on its side, but may not send tasking orders without having Primary or Shared Authority.

2.5 JTLS-2016-12707 Force Control Arrow In WHIP/TRIPP Slides

Summary of Model Change Request

The WHIP provides users the ability to create slides on the map from a set of graphics using the map’s drawing tool. This design improves the drawing capabilities by expanding the set of graphic types available to the user for slides. The additional graphic types include:

- The ability to draw straight and curved force control arrows,
- Place object icons on the map from a library of JTLS-GO unit and target symbol icons, and
- Place images from a user-specified image file.

Design Summary

Table 2.1 lists the new object options added to the WHIP’s Drawing Tool object list.

Table 2.1 Proposed New WHIP Drawing Tool Objects

NEW OBJECT TYPE	EXPLANATION
Straight Line Arrow	<p>This button allows the user to directly draw a line with an arrowhead automatically at the line’s second point. This gives the user the option to draw line arrows from the beginning of the drawing task instead of having to adjust the line’s attributes.</p> <p>The ability to make simple lines into arrows did not change and the option continues to be available from the format options window.</p>
Straight Force Control Arrow	<p>This button draws a straight force control arrow. When selecting the button, the user is required to draw a straight conceptual line. Once drawn, the code automatically creates the object points needed to form the block arrow with the conceptual line at the geometric center of the final force control arrow shape.</p>
Curved Force Control Arrow	<p>This button draws a curved force control arrows. It operates in the same manner as the Straight Force Control Arrow, but instead of drawing a conceptual straight line, the user draws a conceptual spline curve. Once the conceptual curve is drawn, the code automatically creates the object points to form the block arrow with the conceptual spline at the geometric center of the final shape.</p>
JTLS-GO Symbol Icon	<p>This button brings up a table with all available JTLS-GO scenario unit and target symbol icons. The user can then <i>drag-and-drop</i> a desired icon onto the active map slide.</p>
User Selected Image	<p>This button brings up a separate file selection box from which an image file can be selected. The user can then <i>drag-and-drop</i> the desired image onto the active map slide.</p>

2.6 JTLS-2019-14353 Convoy Data In AAR

Summary of Model Change Request

All data available for convoys should be saved in the AAR, just like we currently have for air missions. This should include Supplies carried and all event timing.

Design Summary

The following convoy-related events are captured and saved in the AAR:

- The number and types of the vehicles assigned to the convoy.
- Supply types and quantities transferred to or from the convoy.
- Posture changes to capture loading, unloading, and movement activity.
- Arrival of the convoy at a unit for loading or unloading supplies.
- Route issues, such as blocked routes, route re-calculation due to destination unit movement or infrastructure degradation, and delay issues due to air or artillery attacks.
- Detection events.
- Asset losses, including both transportation and supplies carried assets.

2.7 JTLS-2020-14790 Split Formations With Embarked Units

Summary of Model Change Request

In JTLS-GO, ground units can be embarked one or more ships within a naval formation. A formation can be directed to merge with another formation, thereby forming a single formation carrying the embarked units. However, the single formation with embarked units cannot be subsequently split into its original parts. A new capability is required to split a formation that includes ships with embarked units in their original state.

Design Summary

This ECP is not limited to splitting off a previously joined Formation. The ECP allows any split to occur as long as the ships that are to be moved into a new Formation include all of the pieces and parts of embarked units.

The model logic was modified to accept Split Formation orders for any combination of ships as long as an embarked units does end up in two different formations. Thus, this change allows the original formation to be recreated from the merged formation, or a completely new Formation can be created.

2.8 JTLS-2020-14910 Moving Ship P(Hit) Modifier

Summary of Model Change Request

In JTLS-GO, there are numerous missiles that have a Probability Of Hit against ships of zero, because they do not have the ability to hit a moving ship. In the real world, these missiles could be used against ships in port, but they cannot be used for this purpose in JTLS-GO because their P(Hit) is zero. Some weapons can be used against ships in port and while moving, but not with the same P(Hit). This problem is also true for moving trucks or other moving objects.

Design Summary

The use of a single P(Hit) value for weapon types does not allow differentiation between weapons that can or cannot hit moving objects with different probabilities. In particular, some surface-to-surface missiles (SSMs) lack the capability to attack a moving object, but can attack a stationary object. The Tomahawk Land Attack Missile (TLAM) is an example of a missile with this limitation.

A new attribute for Targetable Weapons (TWs) was implemented. This attribute, known as the TW MOVNG OBJECT PHIT MODIFIER, is applied only to SSMs and air-to-surface missiles that are attacking moving objects in the model. The attribute is multiplied against the weapon's existing P(Hit) to determine if the weapon hits the moving object. The attribute is ignored when a non-moving object is attacked. Non-missile weapons ignore the modifier as well, and use only their P(Hit) values as implemented in previous versions of JTLS-GO.

The TW MOVNG OBJECT PHIT MODIFIER has been added to the Controller SET TW PARAMETER order to permit changes to the database parameter during model execution.

2.9 JTLS-2020-14948 Improve Max Range Ring Labels

Summary of Model Change Request

The labeling of range rings in the context sensitive menu for objects on the WHIP should be improved, to allow the user to identify the specific item which has the maximum range. Individual items are listed for several types of objects, including:

- Unit Combat Systems
- Air Mission Targetable Weapons and Sensors
- Surface to Surface Missile targets
- Air Defense targets

Design Summary

In JTLS-GO, range rings for an object may be displayed on the WHIP. If a single object has multiple Combat Systems (CS), Sensors (ST), Targetable Weapons (TW), or ranges by Altitude Zones (AZ), then the WHIP shows a context sensitive menu which lists the individual items. For some types of objects, the maximum ranges are also listed in the menu.

This design addressed a shortfall in the context sensitive menu for range rings. The menu does not specify which individual items have the maximum range. The range ring labeling was improved to clearly identify which items correspond to the maximum range. The improved labels include a small icon at the beginning of the label for those items which exhibit the maximum range.

By marking the maximum on the individual items, the method also reduces the overall number of items in the menus. The extra menu items for the maximum values are no longer needed. Also, if an item has range of zero, it is omitted from the context sensitive menu.

2.10 JTLS-2020-14949 Improve Manage TPFDD Order

Summary of Model Change Request

An option to include subordinates on the Time Phased Force Deployment Data (TPFDD) report should be added.

Design Summary

The Controller Manage TPFDD order now indicates whether the model should include or exclude subordinates when processing the order. The Player is also asked the same question in the Show TPFDD order.

2.11 JTLS-2020-14950 Expand Object Event Queries

Summary of Model Change Request

The user should be able to trace what has happened to a selected unit(s) during a given time period in the TRIPP. Examples of the events to be included are attacks, detections, losses, and received orders.

Design Summary

A new AAR report was developed called the Object Event Report which allows the user to specify the type of object of interest and a time period of interest. The time period is specified by designating a mandatory starting time and an optional ending time. In the case that the ending time is omitted, all data from the starting time to the current game time is gathered.

The resulting report appears in the Report Browser and, as with all reports, multiple presentation layers can be created. The basic presentation merely list the various events in sequential order. The more robust presentation collates and collect like pieces of information and groups them together. This collated presentation include sections on detections made by the object, detections of the object, damage inflicted by the object, damage inflicted on the object, and orders received.

The new AAR Report is available for all major object types, including Units, HRUs, Targets, Convoys, Air Missions, and Missiles. This does not apply to Mission Packages, Naval Formations, Tactical Ground Formations, or Joint Desired Points of Impact (JDPIs), because these are collections of other basic objects and the specified events of interest are events that happen to basic objects.

Satellite Assets were not considered under this ECP, because the only event they participate in is as the detector in a detection event. Detection event information can already be requested from the AAR database with a Collection Report, negating the need to include Satellite Assets in this ECP.

2.12 JTLS-2020-14951 DDS Easy Table Search Capability

Summary of Model Change Request

The user should be able to easily search for a record in a table in the Database Development System (DDS) based on the user-specified value of a designated column. The graphical user interface of this functionality should be similar to that of the IMT table's search capability.

Design Summary

DDS tables have a filter field that allows the user to specify constraints to retrieve record(s) that fit the criteria. While this offers users the flexibility to express a wide range of constraints, it requires a user to have some knowledge of both the database and SQL statements. Additionally, the DDS Client (DDSC) filter option requires that the DDSC send a new download request to the DDS Server. This is usually unnecessary and time consuming.

This design implemented an additional, but simpler, user interface to locate a record when the criterion is merely matching its specific column's value to the user specified text. It borrows the GUI of the IMT table's search interface.

2.13 JTLS-2020-14953 Add AAR Reports To WHIP

Summary of Model Change Request

Add the AAR reporting functionality that is currently available in the Total Recall Interactive Post-Process (TRIPP) to the Web Hosted Interface Program (WHIP).

Design Summary

The TRIPP currently has two unique AAR capabilities:

- **Replay Capability** - The ability to connect to a Replay XML Server (JXSR) and load the saved status of simulated objects at any point in time. Once the status is loaded, the TRIPP looks similar to a WHIP and an AAR team can view all available data. In addition the AAR team can move forwards or backwards in time and watch the saved situation evolve. The Replay Capability provides the perceived status information for the TRIPP's assigned Force Side.
- **AAR Query Capability** - The TRIPP also has the ability for the user to fill out AAR Report Requests using Report Panels very similar to the Order Panels used by WHIP operators to provide operations guidance to simulated objects during game play. The Report Requests are not sent to the model; instead, they are sent to an AAR Glassfish Java applet which interprets the report requests, conducts an appropriate retrieval from the AAR Glassfish database and produces an XML report with the request data.

The resulting XML report can be viewed in a unique TRIPP component called the Report Browser which operates in a manner similar to the Message Browser component that exists within the WHIP.

The AAR Query Capability does not distinguish between perceived and actual information. No matter the TRIPP Force Side, the user can request information based on any object withing the AAR historical database. The concept being that the TRIPP as an AAR tool is being used by a trusted agent.

The Report Request menu structure, Report Request panels, and Report Browser components were all added to the WHIP. The user is allowed to fill out a Report Request from a WHIP, and the request are passed to the AAR Glassfish for processing. The resulting XML report is viewable in the WHIP's Report Browser.

2.14 JTLS-2020-14973 Multiple Sensors On Satellite

Summary of Model Change Request

Allow multiple sensors on a satellite. Currently, each satellite can have only one sensor. This is not realistic and JTLS-GO needs the capability to place several sensors on each satellite.

Design Summary

The current capabilities of satellites in JTLS-GO were expanded to support multiple sensors on satellites, as well as prepare for planned additional future capabilities, such as satellite kinetic warfare.

Satellites were given an "Aircraft Load", which can contain:

- One or more Sensors - Each sensor specified in the Aircraft Load is able to collect intelligence information.
- One or more Jammers - Jammers will be available for future use as satellite representation is expanded within JTLS-GO. The implementation of active jamming from satellites is not part of this ECP.
- Weapons - Weapons will be available for future use as satellite representation is expanded within JTLS-GO. Weapons on board the satellite cannot currently be fired on land-based targets or other satellites.
- Supplies - Supplies are simply a construct that exists on all Aircraft Loads. As of this writing, the Design Team sees little satellite use for this capability, but there is nothing stopping a database from including supplies on a satellite assigned Aircraft Load.

2.15 JTLS-2020-15019 Convert CS And SC To Temporary Entities

Summary of Model Change Request

Many objects within JTLS-GO are represented as permanent entities (objects that can neither be created or destroyed during game play), such as Combat Systems, Supply Categories, Ship Unit Prototypes, and Sensor Types. These objects must be present in the scenario database at the start of game execution to be used in the simulation.

In order to understand the level of effort required to remove permanent entities from the code-base, JTLS-GO 6.0.0.0 changed the representation of the permanent Targetable Weapon entity. It is now represented as the preferred temporary entity. The impact on the model is that a new Targetable Weapon can be created during game play, by copying an existing Targetable Weapon and altering some of its characteristics. This capability is quite useful when a specific weapon has been inadvertently omitted in the scenario database.

The next step in this conversion process was to change Combat Systems and Supply Categories to temporary entities so that they may also be created on-the-fly during game play.

Design Summary

Combat Systems and Supply Categories are used throughout the CEP. These permanent entities are embedded in many places in the Simscript III code, player orders, and player messages. All of these components were reviewed and then modified to represent Combat Systems and Supply Categories as temporary entities.

In addition, the following JTLS-GO programs were modified due to this change:

- JTLS Object Distribution Authority (JODA),

- WHIP including each of its components, Orders, IMT, Logistics Hierarchy, and Message Browser.
- Scenario Initialization Program (SIP) for each of its assigned function, Scenario Verification Program (SVP), Scenario Setup, Online Player Manual (OPM) generation, and the Alter database functions.
- Entity Level Server (ELS), the Entity Object Data Authority (EODA), and the High Level Architecture (HLA) Interface Program (HIP).
- AAR database structure along with the AAR Client (AARC) that takes AAR event records from the CEP and places them in the AAR database.

Numerous other support programs such as Interface Control Program, TechTool, Message Delivery Program (MDP), and the MDP Graphical User Interface (MDP-GUI) had minor changes to support the internal data structure change for Combat Systems and Supply Categories.

2.16 JTLS-2020-15044 Track Weapons By Count Not Supplies

Summary of Model Change Request

There are three issues with the representation of weapon availability within JTLS-GO. These issues are:

- **Assigning weapons to a unit based on a prototype is not working as needed.** For example, if accurate weapon availability is to be represented for a given scenario, each airbase will most likely have a different mix of weapons. To represent this, each airbase would need its own Tactical Unit Prototype (TUP) with the desired number of weapons, or Controller Orders must be entered at game start to set the desired weapons at each airbase.

Additionally, if real-world starting fuel amounts are to be represented, each airbase would have different values and the standard TUP representation could not be used.

- **Difficult to maintain accurate weapon counts for units.** Even though individual weapon Units of Measure (UOMs) are normally built within the database, the use of the UOM still results in reports showing fractional weapons
- **Difficult to obtain accurate weapon counts for units.** There are two major causes for this. First, when an air mission is loaded, the weapons are taken from the “Draw From Unit” and placed on the Air Mission. The weapons have not been used, but they are also not current available at the “Draw From Unit”. The second problem is that owned Air Defense Sites hold weapons. Again, these weapons have not been used, but they do not show up on the available supply table for the Air Defense Site’s owning unit.

Naval units and some ground units have similar problems as airbases. Weapons should not be placed in a prototype’s supply table; instead, either the prototype or a unit should have a new

table that lists the exact weapon counts that should be available at the unit. Weapon supplies should still be tracked for resupply purposes, but the model and all user interface interaction should be presented as weapon counts.

Design Summary

Weapons are represented by Supply Categories within JTLS-GO. This cannot nor should be changed. The representation of resupply, carry capacity, storage capacity, and lift requirements all depend on the weight of the supplies owned by a unit. Weapons are supplies and play an important part in each of these operations. The implementation results in the model holding weapon information for those weapons that have a one-to-one relationship with a specific Supply Category as both supplies and as weapon counts.

IMT tables were created to display weapon count information. Using a “Quick Retrieval” button, a user is able to ask to see Weapon Counts for the following objects:

- Unit - Including all of the Aggregate Resolution Units (ARUs) and High Resolution Units (HRUs).
- Air Defense Targets
- Air Missions - carried as weapons

If a weapon is drawn from a Supply Category that is used by multiple weapons, such as the generic CLASS V AMMUNITION Supply Category, the weapon is not part of the individual weapon tallies and is not be included on the IMT display for a unit’s specific weapon counts. The supplies still show in the IMT supply data for the unit.

In addition, ammunition supplies that cannot be used as weapons by an object are always visible on the IMT and the supply UOM concept can be used to look at weapon counts. Formations are an example of this supply visibility expansion. In previous versions, supplies being sea-lifted by a Formation could not be viewed on the IMT.

2.17 JTLS-2020-15094 Develop Consistent Naming Rules

Summary of Model Change Request

There is not a consistent naming rule followed within JTLS-GO. All of the naming conventions and rules currently used within JTLS-GO must be reviewed and new guidelines established that can easily be understood by all users.

Design Summary

There are two basic types of objects:

- Order of Battle (OB) entities. These include Aggregate Resolution Units (ARUs), such as Airbases and Ground Combat unit, and Targets, which are militarily significant objects that are not represented as units. Each of these objects have two names - a long name and a short name. The short name is used as the relational database key when other entities refer to these objects.

These objects appear to have a consistent rule. The object short name is 20 characters long and the object long name is 40 characters long. This rule will not be changed as part of this design,

- Engineering attribute objects. These include unit prototypes, such as a Tactical Unit Prototype (TUP); and target prototypes, such as the Air Defense Class object. The most common name length for these objects is 25 characters. As much as possible, all engineering attribute object names, that are less than this character count, will be increased to 25 characters.

After a thorough review of all represented JTLS-GO objects, the design team concluded that the majority of objects followed these rules, but the documentation of longer engineering attribute names was never updated. This ECP simply resulted in reviewing, throughout the JTLS-GO system, the use of all names to ensure the database, OPM, model, and documentation accurately implemented the naming convention rules.

2.18 JTLS-2020-15106 Add Database Comment Fields

Summary of Model Change Request

JTLS-GO 6.0 added comments fields to some important database tables, such as the unit tables and the Targetable Weapon table. These comment fields have proven to be extremely useful and the user community has asked that similar comment fields be added to these tables:

- Air Defense Class table
- Aircraft Class table
- Aircraft Target Class table
- Combat Arms Type table
- Jammer Type table
- Minefield Type table
- Sensor Type table
- Small Boat table

- Surface-to-Surface Missile table
- Aircraft Load table

Design Summary

A new comment attribute was added to each of the specified tables. The database builder can view, change, and clear the comment as desired. The new field is sortable, searchable, and filterable.

The new data field is in the initialization database, read into the model, assigned to the model's data structure for the object, and saved as part of the checkpoint procedure. The data held in the new field is not accessed or used in any way by the model. There is no ability for the Controller or the Player to change the contents of the comment attribute during game play.

2.19 JTLS-2021-15152 Represent Various Types Of Fuel

Summary of Model Change Request

JTLS-GO only represents one type of aviation fuel, one type of ground fuel, and one type of naval fuel. For the proper representation of an Operational Plan's fuel requirements, various types of fuel and fuel interchangeability needs to be represented.

A planned US INDOPACOM ECP links JTLS-GO to the new US INDOPACOM logistics-centric Command, Control, Communications, and Computer Information (C4I) system called the Logistics Common Operation Picture (LOGCOP). A more detailed representation of fuel is required to provide a realistic data feed to LOGCOP.

Design Summary

Fuel usage is represented in the following ways within JTLS-GO:

- Aircraft Fuel Usage
- Combat System Fuel Usage in Non-Combat and Combat Situations
- Ground Unit Movement Fuel Usage
- Naval Unit Fuel Usage
- Aircraft Load Fuel Requirements

Each of these fuel usage capabilities are now represented in more detail and require new data to indicate the type of fuel that should be used under different conditions. If an end user does not want to represent more than the current three fuel types or even represent a single fuel type, the implementation supports the reduced level of detail.

The basic premise of this design is not to require extra effort on the JTLS-GO Player during game play, but if more detailed fuel representation is selected, there may be increased effort in scenario database development.

2.20 JTLS-2021-15225 AAR Report Visualization

Summary of Model Change Request

Expand the format of AAR Reports beyond plain text and tables. This will bring data visualization to AAR Reports through a web browser using JavaScript and HTML5 technologies. Visualization of report data should improve processing speed of reports and the ease of identifying trends.

Design Summary

AAR Reports are currently requested by users through the TRIPP. In JTLS-GO 6.1, this capability is expanded to allow users to submit the same requests through the WHIP. Visualized report requests are initiated in the same way.

A new field has been added to existing requests informing the server if the old style report or new style visualized report should be used. Old style reports are still viewable in the Report Browser. New visualized reports are viewable in the web browser through an index page handled by the AAR Report server.

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. Since this is the first release of JTLS-GO Version 6.1.0.0, no STRs have been reported.

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
EI	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
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
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

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

B.1 ADDED DATA FIELDS

- Added AC.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added AC.FL.FUEL.PRIORITY to the database. [JTLS-2021-15152 Represent Various Types Of Fuel, Section 2.19](#)
- Added AD.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added AL.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added ATC.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added CAT.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added CP.C4I UPDATE TIME.AT.SEA to the database. [JTLS-2006-1946 Stopped Naval Unit Detections, Section 2.1](#)
- Added CP.C4I UPDATE TIME.IN.PORT to the database. [JTLS-2006-1946 Stopped Naval Unit Detections, Section 2.1](#)
- Added CP.SUBMARINE.REPORT.INTERVAL to the database. [JTLS-2006-1946 Stopped Naval Unit Detections, Section 2.1](#)
- Added CS.FL.FUEL.PRIORITY to the database. [JTLS-2021-15152 Represent Various Types Of Fuel, Section 2.19](#)
- Added HRU.SC.STARTING.ON.HAND to the database. [JTLS-2020-15044 Track Weapons By Count Not Supplies, Section 2.16](#)
- Added JT.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added MFT.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)

- Added SB.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added SSM.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added ST.COMMENT to the database. [JTLS-2020-15106 Add Database Comment Fields, Section 2.18](#)
- Added STA.AIRCRAFT.LOAD to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added STA.FACTION to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added STA.NAME to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added STA.RTE.LOCATION to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added STA.RTE.MOVE.TIME to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added STA.RTE.SATELLITE.NAME to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added STA.START.TIME to the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)
- Added SUP.FL.FUEL.PRIORITY to the database. [JTLS-2021-15152 Represent Various Types Of Fuel, Section 2.19](#)
- Added SUP.FUEL.PER.KM to the database. [JTLS-2021-15152 Represent Various Types Of Fuel, Section 2.19](#)
- Added TW.MOVING.OBJECT.PHIT.MODIFIER to the database. [JTLS-2020-14910 Moving Ship P\(Hit\) Modifier, Section 2.8](#)
- Added UT.SC.STARTING.ON.HAND to the database. [JTLS-2020-15044 Track Weapons By Count Not Supplies, Section 2.16](#)

B.2 MODIFIED DATA FIELDS

- ARW.NAME was modified to decrease the maximum length from 30 to 25. [JTLS-2020-15094 Develop Consistent Naming Rules, Section 2.17](#)

- SC.SPECIAL.CAPABILITY was modified to change its legal values. [JTLS-2021-15152 Represent Various Types Of Fuel, Section 2.19](#)

B.3 REMOVED DATA TABLES

- Removed the National Asset Pass table from the database. [JTLS-2020-14973 Multiple Sensors On Satellite, Section 2.14](#)

APPENDIX C. VERSION 6.1.0.0 REPOSITORY CHANGES

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

Table C.1 Data Repository Expansion

NEW AIR DEFENSE ARTILLERY (ADA) CLASSES
GBI.FACILITY
MADIS.MK1.STINGER(SP)VEH
NEW AIRCRAFT CLASS
S70.OKHTONIK.SUKHOI.UAV
NEW AIRCRAFT LOADS
S70.OKHTONIK.DEF
NEW AIRCRAFT TARGET CLASS
6GEN.FIGHTERS
NEW AREA KILL LETHALITY (AKL) DATA SETS
KH101.HE_AKL
NEW COMBAT SYSTEMS
BMK130_AMPHIB
MADIS.MK2.M134-APC.LA.TW
OVERLORD.LUSV_AMPHIB
SEA.HAWK.MSUV_AMPHIB
T72B.125MM-TANK_IT
VITYAZ-DT10P_VEH-LA
VITYAZ-DT30_VEH-LA
NEW GROUND UNITS
FT.GREELY.GBI_US
USMC.NMESIS.BTRY_US
NEW HIGH RESOLUTION UNITS (HRUs)
OVERLORD.LUSV
OVERLORD_LUSV
SEA.HAWK_MSUV
SEA.HAWK_MSUV

Table C.1 Data Repository Expansion

NEW JAMMERS
1L267.MOSKVA.RDR.JAM
1L269.KRASUKHA-2.RDR.JAM
AVIACONVERS.GPS.JAM
EW1600.GPS.JAM
KRASUKHA-4.COM.JAM
MODI.II.COM.JAMMER
R330ZH.ZHITEL.COM.JAM
RB109A.BYLINA.COM.JAM
RB341V.LEER-3.COM.JAM
RB531B.INFAUNA.COM.JAM
RB636AM2.SVET-KU.COM.JAM
REPELLENT.UAV.COM.JAM
TORN.COM.JAM
TORN-MDM.COM.JAM
VLQ12.CREW.DUKE.COM.JAM
UPDATED PROBABILITY OF HIT (PH) DATA SETS
TLAM-C
TLAM-D
TLAM-E
NEW PH DATA SETS
KH101_PH
PRESEVET_PH
UPDATED PROBABILITY OF KILL (PK) DATA SETS
TLAM-C
TLAM-D
TLAM-E
NEW PK DATA SETS
KH101_PK
PRESEVET_PK

Table C.1 Data Repository Expansion

NEW SURFACE AIR LETHALITY (SAL) DATA SETS
GBI_SAL
PRESEVET_SAL
NEW SENSORS
GLOBUS.III.(IR)_LAA
GLOBUS.III_LAA
LEONARDO.AESA_SAA
LEONARDO.AESA_SGN
LEONARDO_VGN
RPS42_LAA
SPS-732_SAA
SPS-732_SGN
NEW SENSOR TARGETS
GLOBUS.III
GLOBUS.III.(IR)
NEW SURFACE KILL LETHALITY (SKL) DATA SETS
KH101_SKL
PRESEVET_SKL
NEW SMALL BOATS
BMK130
OVERLORD_LUSV
SEA.HAWK_MSUV
NEW SURFACE-TO-SURFACE MISSILES (SSMs)
ROGUE.NSM(2).LNCHR.VEH
Added SCALP.EG to A70.VLS(8)
NEW SHIP UNIT PROTOTYPES (SUPs)
AQUITAINE.AA_FR
BURKE.III_US
COLUMBIA_US
CONSTELLATION_US

Table C.1 Data Repository Expansion

HUNTER_AS
JAN.MAYEN_NO
LAW_US
PPA.FULL_IT
PPA.LIGHT_IT
PPA.LIGHT+_IT
NEW SUPPLY CATEGORIES
CL.V.AS-TV-LR-KH101
CL.V.SS-SR.LASER-PRESEVET
CL.V.AS-AGM88G
CL.V.AA-AIM260
CL.V.SS-ATACM1A.UN
CL.V.SA-LR-GBI
RENAMED SUPPLY CATEGORIES
CL.V.SS-SR.LASER-XN-1
UPDATED SUPPLY CATEGORIES VALUES
SUP SAN.ANTONIOI_US For CL.V.SS-SR.LASER-XN-1
NEW TACTICAL UNIT PROTOTYPES (TUPs)
GBI.FACILITY_US
MC.LAAD.(MADIS).BN.HQ_US
MC.LAAD.(MADIS).BTRY_US
MC.ROGUE.BTRY_US
NEW TARGETABLE WEAPONS (TWS)
AGM88G.HARM
AIM260
ATACMS-BLK1A.UN
GBI
KH101
PRESEVET(LASER)
STINGER-(SP).MADIS.MK1

Table C.1 Data Repository Expansion

NEW UNITS OF MEASURE (UOMs)
AGM88G.HARM
AIM260
ATACMS-BLK1A.UN
GBI
KH101
PRESEVET
XN-1LAWS