

JTLS-GO

Version Description Document

May 2022



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JOINT THEATER LEVEL SIMULATION - GLOBAL OPERATIONS
(JTLS-GO 6.1.5.0)

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

JTLS-GO 6.1.5.0 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 minor model functionality improvements implemented as an Engineering Change Proposal (ECP). 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:

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1.0 INTRODUCTION

1.1 SCOPE

This *JTLS-GO Version Description Document (VDD)* describes Version 6.1.5.0 of the configuration managed Joint Theater Level Simulation - Global Operations (JTLS-GO[®]) software suite. JTLS-GO 6.1.5.0 is a Maintenance delivery for the JTLS-GO 6.1 series of releases.

JTLS-GO 6.1.5.0 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 were summarized in the VDD for Version 6.1.0.0 delivered in the documents directory.

A detailed description of the Engineering Change Proposal (ECP) implemented for this release is provided in [Chapter 2.0](#), and a summary of all Software Trouble Reports (STRs) corrected in this Maintenance delivery are summarized in [Chapter 3.0](#).

JTLS-GO 6.1.5.0 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 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 6.1.2.0)
- *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 Director Guide* (JTLS-GO Document 07, Version 6.1.0.0)
- *JTLS-GO WHIP Training Manual* (JTLS-GO Document 10, Version 6.1.4.0)
- *JTLS-GO Player Guide* (JTLS-GO Document 12, Version 6.1.2.0)

- *JTLS-GO Repository 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 6.1.2.0)
- *JTLS-GO C4I Interface Manual* (JTLS-GO Document 21, Version 6.1.2.0)
- *JTLS-GO DoD Architecture Framework* (JTLS-GO Document 22, Version 6.1.0.0)

1.2.3 Updated Documents

- *JTLS-GO Executive Overview* (JTLS-GO Document 02, Version 6.1.5.0)
- *JTLS-GO Data Requirements Manual* (JTLS-GO Document 05, Version 6.1.5.0)
- *JTLS-GO DDS User Guide* (JTLS-GO Document 06, Version 6.1.5.0)
- *JTLS-GO Installation Manual* (JTLS-GO Document 09, Version 6.1.5.0)
- *JTLS-GO Version Description Document* (JTLS-GO Document 17, Version 6.1.5.0)
- *JTLS-GO DDS Training Manual* (JTLS-GO Document 23, Version 6.1.5.0)
- *JTLS-GO ATO Services User Guide* (JTLS-GO Document 24, Version 6.1.5.0)

1.2.4 New Documents

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

1.2.5 Delivered Software Components

JTLS-GO 6.1.5.0 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 6.1.5.0 are provided in the *JTLS-GO Installation Manual*. Installing a previous version of JTLS prior to installing JTLS-GO 6.1.5.0 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 6.1.5.0 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 6.1.5.0 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 6.1.5.0 is delivered with the AdoptOpenJDK 1.8 Update 322 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 6.1.5.0. 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.

Joint Staff J7 has tested JTLS-GO using PostgreSQL 11.15. However, no containerized solution exists for use of 11.15 with Red Hat 8. Users may use PostgreSQL 11.15 themselves, but the JTLS-GO 6.1 series will continue to be delivered with the containerized solution for PostgreSQL 11.13.

- 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 6.1.5.0 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 6.1.5.0 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 6.1.5.0 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 6.1.5.0 release.

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 6.1.5.0, 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 6.1.5.0.

2.0 ENGINEERING CHANGE PROPOSALS

The following new model capabilities were added to JTLS-GO 6.1.5.0 as a result of implementing authorized Engineering Change Proposals (ECPs).

2.1 JTLS-2022-15657 Added Required RPMs Checker

Summary of Model Change Request

During recent installation support, the JTLS-GO Installation Team noted that it was difficult to check that each documented RedHat Package Manager (RPM) was properly installed. The JTLS-GO Installation Team suggested that a script to automatically check the fulfillment of the RPM requirements be created.

Design Summary

A script, "checkJtIsRequiredRPMs", was created and placed in the \$JHOME/script directory. Executing the script checks that all required RPMs are installed and displays the results.

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-2022-15655 ELS Updates Missing Side Attribute

Some update packets in the EODA did not include the attribute for the Side of the objects.

The Side attribute was not included on the packets because it was assumed to be unchanged. This caused some issues for a direct connection with an external model. Changes were made to always publish the side information for all updates to object data on the EODA.

3.2 JTLS-2022-15658 Convoy Did Not Load All Specified Supplies

A Directed Resupply order was submitted for a Rail convoy. After the Load task was complete, some of the supply categories specified in the order were not loaded on the convoy, even though enough rail cars with sufficient capacity were part of the convoy (as confirmed in the Supply Run Status Report). As a result, the convoy delivered only what it carried at destination.

The model correctly selected the rail cars necessary to transport all the supply categories specified in the order. However, the process that actually loaded the supplies failed to differentiate between “wet” and “dry” supply categories, which caused some categories to be omitted when a transportation class could carry both. The logic treated both types identically and wrongly mixed quantity measures (i.e. gallons vs tons) when assigning supplies based on transportation class capacities. The logic was modified to load wet and dry supplies separately to correct the problem.

The Offload task sometimes failed to unload all the supplies carried by the convoy at the delivery location. The problem arose when a transportation class had the capacity to carry both wet and dry supplies (e.g. 64-ton flat car) and a particular sequence of transportation classes and supplies were processed during the Offload task. The Elementary Loading Facility (ELF) was mis-allocated to unload wet supplies instead of unloading dry supplies from the dual-capable transportation class. This logic error caused all the wet supplies to be unloaded and none of the dry supplies. The error was corrected by forcing all the dry supplies to be unloaded before the wet supplies so that the ELF didn't take wet supplies from a transportation class that had both a wet and dry capacity.

During the convoy offload process, the amount left on the convoy for a particular supply category could be extremely small (after repeated subtractions). The supply category remained in the requested offload set, when ordinarily it would have been deleted when approaching zero. As a result, the logic failed to terminate the Offload Task, leaving the convoy in limbo until the Manage Convoy Tasks order was sent to cancel the Offload Task. This rare occurrence was corrected by changing the conditional test to use almost zero (0.0000001) instead of exactly zero.

Similarly, a convoy might not have carried enough to fulfill the expected amount to be offloaded which triggered a player message. The logic was modified to use the almost zero value instead of exactly zero so that the message is not generated when the convoy is short a very small amount.

Note that these load/unload problems were intermittent and independent of the convoy type (truck, rail, or barge). The problems depended on the supply types requested, the transportation classes used, and the sequence of processing.

Code was added to display the name of the transported unit in the Supply Run IMT.

3.3 JTLS-2022-15661 POT Bridge Target Number Of Elements

The SVP should not limit POT Bridge Targets to one.

The SVP currently limits the number of elements for a Bridge POT Target to one. There should be no limit. A Unit may have more than one Pontoon Road Bridges that is carried around, emplaced, and picked up as needed.

The check in the SVP code limiting Bridge POT Targets to one element has been removed.

During testing, a problem where a Unit was unable to retrieve an emplaced Unit-owned Bridge POT Target was identified. Such a Bridge Target can now be recovered by any Unit on any Side, provided the Unit TUP indicates it is Bridge Ops capable.

3.4 JTLS-2022-15663 Sensor Pulse Code SVP Checks

SVP Error 131 should not be checking the PULSE CODE and PREFIRE PULSE CODE fields.

There are eight fields for sensors. If one is filled, they all should be filled. The PULSE CODE and PREFIRE PULSE CODE were not needed as part of the data supplied the external software program they were being passed to, and the fields should not be a part of this check.

Those two fields were removed from the SVP check for Error 130.

3.5 JTLS-2022-15665 ELS Crash Reading Terrain Data During Restart

The ELS crashed while reading the terrain data. The ELS was expecting a different format to the data than was saved by the aggregate model (CEP).

When the CEP saved a checkpoint, the format of the terrain data was recently changed. This change was documented in STR JTLS-2022-15637. The remaining issue was that the ELS could not be restarted from a checkpoint which was saved in the improved data format.

The ELS required code changes similar to those in the CEP to read the same data files. However, the ELS was not updated at the time when the CEP was modified. This STR reflected changes to

the ELS which were made after a release of JTLS-GO which has incompatible terrain data between the CEP and the ELS.

3.6 JTLS-2022-15666 OPM Initial Supply Values Incorrect

The OPM was displaying "-1.0" for Unit Initial Supply Values.

The problem was caused by a previous change to correct the way initial supplies are handled by the SIP program. Unit Initial supplies should only appear in the OPM if the unit has an prototype overriding Initial Supply Value for a supply category. The problem was corrected.

3.7 JTLS-2022-15667 JSAT Route Points Sent To CEP Dropped

Satellites receiving MANAGE.SATELLITE orders from the JSAT would lose their calculated route points after a period of time. This prevented the satellites from completing their orbit routes.

The JSAT executable limits the number of route points on a MANAGE.SATELLITE order to no more than 500 points, because the buffer in the CEP used to process all orders is limited to 31999 characters. This allows 500 route points to be included in the MANAGE.SATELLITE order.

When the JSAT executable determines that the satellite's orbit needs more than 500 route points, the route points are gathered into groups of no more than 500. A MANAGE.SATELLITE order is created and sent to the CEP for each group. The order for the first group may specify that the route points in the order should be added to, or replace, any existing route points as specified by the JSAT GUI. The order for each subsequent group always specifies that the route points in the order should be added to the route points already specified by the previous group.

Testing showed that all satellites followed the 500 route points given in the first MANAGE.SATELLITE order sent by the JSAT. However, when the orbit route required the JSAT to send more orders for the additional route points, the satellite never proceeded to those points. The satellite always stopped after reaching the last point in the first order.

Each route point consists of a location and a time to reach that location. Both the location and time are calculated by the JSAT. The time was calculated correctly for all the route points in the first order, but it was calculated incorrectly for the route points in the follow-up orders. All of these times were calculated to be less than the current game and thus were automatically deleted by the model. The time calculations have been fixed and the points on follow-on orders now end up in the satellite's route.

3.8 JTLS-2022-15668 Warning 1450 Additional Corrective Actions

Warning 1450 has only one SVPR corrective action, and requires more options.

The corrective actions for SVP Warning 1450 were updated to be consistent with the corrective actions of other warnings for similar problems, such as Warning 1449.

The options to display target table data for updating a targets owning and/or associated unit to correct the problems were not usable, because the displayed tables are for display only. These were also modified for Warning 1450 and other like warnings, to use either the SAM/AAA target table or the TUP/SUP Prototype Owned Target table. This included Warnings 1449 and Errors 456 and 457.

3.9 JTLS-2022-15669 AAR Air Missions With Unknown Home Squadron

One of the data items that is inserted into the AAR database when an Air Mission is created is its home squadron. For some Air Missions, this is being inserted into the database as an unknown reference. This appears to be linked to either a checkpoint restart or a restart of the AARC.

The AARC keeps a full list of all objects that it knows about, and ensures those objects that pass its filter settings are inserted into the database. For each of these objects, the AARC tracks whether it is in the database and whether it has passed filter checking. The filter tracking is used to maintain a consistent and closed database with references to objects that will not be in the database being zeroed out. For example, if a target passes filters and will be inserted into the database, but its associated unit does not, the reference to the associated unit will be zeroed out.

In order to accomplish this, when the AARC received a new JODA download it dumps all known objects and starts to rebuild this list by retrieving everything from the database. During this retrieval objects were being marked as in the database, but were not being marked as having passed filters leading subsequent references to them to be zeroed out. The problem was fixed by marking objects retrieved from the database as having passed filters, which they would have done at the time of insertion.

3.10 JTLS-2022-15671 GIS Tool - New Terrain Layers Not Listed

The user created terrain layers and then started the Calculate Grid Parameters option. The Calculate Grid Parameters dialog appeared, and the new layers were listed and correctly color-coded red. The user selected all of the new layers and had the grid parameters calculated. The user proceeded to create additional terrain layers and then attempted to Calculate Grid Parameters again. The new layers were not listed by the Calculate Grid Parameters dialog.

The GIS Tool was correctly updating its internal table of terrain layers as the new layers were created. However, the Calculate Grid Parameters dialog was not properly updating its list of terrain layers displayed to the user. The dialog was supposed to update its list by reading the layers stored in the Tool's internal table every time the user selected the Calculate Grid Parameters option, but the dialog was not doing so. The dialog now correctly updates its list so that the user can see the new layers.

3.11 JTLS-2022-15673 Crash Sending HRU ROE Order For "No Side"

The model crashed when a user entered an HRU Task Order and specified an ROE change for a side called "No Side". This does not exist in JTLS-GO.

The problem was that the order panel provided an incorrect drop-down list. The list should have included all sides other than the HRU's side and the Unknown Side. The order panel was corrected to list other sides and the Unknown side. This is the drop-down list referred to as ROE_Force_Side versus the Other_No_Side drop-down list.

3.12 JTLS-2022-15675 Syntax Error When Loading Scenario

The scenario loading into the 11.15 version of the PostgreSQL database failed with "Syntax error on the word SECURITY" messages for seven of the stored procedures in the jtls_create_schema.sql SQL script. This was not an issue when the same scenario was loaded into the 11.13 version of the PostgreSQL server.

The related seven stored procedures were modified to include the "SECURITY INVOKER" specification from the end of the stored procedures to the line where the stored procedures were defined by the "CREATE OR REPLACE PROCEDURE" statement. With this fix, the scenario loading into the 11.15 version of the PostgreSQL database was successful. With the same fix, the scenario loading into the 11.13 version of the PostgreSQL database server was also successful.

3.13 JTLS-2022-15676 Infinite Loop Gathering Grid

A naval ship was located exactly at the lower left corner of a grid. When computing whether there was any terrain masking from a sensor to the ship, the model went into an infinite loop attempting to gather the grids between the sensor and the ship.

The logic did not properly handle this situation. Code was added to check for the situation and to stop as soon as the grid location of the ship was entered. The same logic improvement was placed in the Scenario Initialization Program (SIP). The gather routine is needed for several of the SVP checks.

3.14 JTLS-2022-15679 Missile Hits Dead Ship

Some databases are built so there is no time required to sink the ship. As soon as the model computes that a ship should sink, it sinks and is removed from the game. If, for this type of database, the user submits two or more fire missile orders, it is very possible that a follow-on missile will arrive after a ship is removed from the game. The model does not crash, but some confusing messages are generated.

The damage assessment logic checks to determine if the missile is about to hit a ship that is no longer in the game. Depending on the type of missile and the objects in the vicinity, the missile may end up hitting a different ship, which is as intended and designed.

3.15 JTLS-2022-15680 Stop Runway Warnings For Future Arriving Airbases

A user was receiving numerous warnings indicating that an airbase was not assigned a runway. Some of these errors were accurate, but some were not because the unit was not planned on arriving in the game for several days, if at all. A warning should not be generated if an airbase that arrives after game start has no database-assigned runway.

The user request was implemented.

3.16 JTLS-2022-15682 Incorrect Warning HUP Crew Needed Warning

The SIP was incorrectly reporting a warning, indicating that there were not enough personnel in the HUP to support the Combat System crew requirements.

There was a logic error in the check. If a HUP has three Armored Personnel Carriers (APCs), it was computing the crew requirements for four APCs. For every crewed combat system that the HUP owned, the check was adding in an extra combat system.

3.17 JTLS-2022-15684 PKs Not Always Desired When PH Exists

A user did not want Probability of Kill (PK) data for some weapons but did want Probability of Hit (PH) data. Reporting this undesired situation causes them to miss real problems. Leaflets should have PH but no PK data. Chemical weapons should be able to hit something, but once the chemical agent is released, the chemical immediate and longer term damage data takes over.

Both situations were reasonable. The code was changed to not report the lack of PK data for leaflet weapons and chemical weapons when PH exists. Note a user may still build databases in which leaflets and chemical weapons cause direct damage, lacking kill probabilities is simply no longer reported as a warning.

3.18 JTLS-2022-15687 Incorrect Air Drop Task End Time

The model was incorrectly computing the time it takes for an Air Drop of supplies or a unit. Airdrops are instantaneous, and attempting to compute an end task time was unnecessary and caused a logic error.

Airdrop task completion is now reported as occurring immediately. The logic error is no longer being produced.

3.19 JTLS-2022-15688 JOI Module Connectivity And GUI Improvements

The OTHGMS and Link16 modules shared several issues:

1. The GUI of the window could be shrunk, but the tables contained in the windows would not collapse. A scrollbar would spawn instead, and users could not see the entire table.

2. An object class entry in the Object Summary table reads as "CRUISE_MISSILE", despite the object class referring to both Cruise and Theater Ballistic missiles.

3. The JOI services did not attempt to reconnect automatically to a C4I system if the connection is lost. Additionally, the only way to view the connection status was by monitoring the error/message log of the service.

1. The module GUIs have been modified so that shrinking the window causes the contained tables to shrink with the window.

2. The "CRUISE_MISSILE" entry in the Object Summary table now reads as "MISSILE".

3. The JOI services will now attempt to reconnect automatically to C4I systems. Their "Status" tab in the Web Services Manager has been updated to provide an easy to read and color-coded tabular layout, including the current connection status to the C4I system. The JOI modules also now include the same C4I connection status information at the top of the module.

3.20 JTLS-2022-15689 Warning 1223 Improvement

Warning 1223 needs an option to display the entire TUP/SUP supply table.

An option to display the entire TUP/SUP supply table was added. This will allow the user to review all supplies before making corrections to the supply category in question.

3.21 JTLS-2022-15692 Warning 1254 Improvement

Warning 1254 needs an option to display the entire SUP supply table.

An option to display the entire SUP supply table was added. This will allow the user to review all supplies before making corrections to the supply category in question.

Corrections were also made to the values used to update the TUP or SUP.

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

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

APPENDIX C. VERSION 6.1.0.0 REPOSITORY CHANGES

No significant changes were made to the JTLS-GO 6.1 repository.