JTLS-GO

Version Description Document

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DEPARTMENT OF DEFENSE
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JOINT THEATER LEVEL SIMULATION - GLOBAL OPERATIONS
(JTLS-GO 5.0.2.0)

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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 combined joint and coalition resource air, land, naval, and Non-Governmental Organization (NGO) environments.

This *JTLS-GO Version Description Document (VDD)* describes the new features of the Version 5.0.2.0 delivery of the configuration-managed JTLS-GO software suite.

JTLS-GO 5.0.2.0 is a Maintenance release of the JTLS-GO 5.0 series that includes an updated SBDKOR50 Standard Database, as well as major model functionality changes implemented as Engineering Change Proposals (ECPs), which are summarized in Chapter 2. Code modifications that represent corrections to known Software Trouble Reports (STRs) are described in Chapter 3. Remaining and outstanding STRs are described in Chapter 4.

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

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1.0 INTRODUCTION

1.1 SCOPE

This *JTLS-GO Version Description Document* (VDD) describes Version 5.0.2.0 of the configuration managed Joint Theater Level Simulation - Global Operations (JTLS-GO®) software suite. JTLS-GO 5.0.2.0 is a Maintenance delivery for the JTLS-GO 5.0 series of releases.

JTLS-GO 5.0.2.0 includes the entire JTLS-GO suite of software and the SDBKOR50 Standard Database that supports a realistic scenario based on the current Korean Peninsula theater of operations. Database modifications that were accomplished to upgrade the previous JTLS-GO Standard Database to this current version are summarized in this chapter, as well as APPENDIX B. Detailed descriptions of Engineering Change Proposals (ECPs) implemented for this release are provided in Chapter 2.0.

JTLS-GO 5.0.2.0 executes on the Red Hat Enterprise Linux Version 6 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 Unchanged Documents

JTLS-GO 5.0.2.0 is a bug release of the JTLS-GO system. Other than date changes, the following documents have had no significant changes since the last release of JTLS-GO.

- *JTLS-GO Director Guide* (JTLS-GO Document 07, Version 5.0.2.0)
- *JTLS-GO Executive Overview* (JTLS-GO Document 08, Version 5.0.2.0)
- *JTLS-GO Entity Level Server User Guide* (JTLS-GO Document 19, Version 5.0.2.0)
- *JTLS-GO Federation User Guide* (JTLS-GO Document 20, Version 5.0.2.0)
- *JTLS-GO C4I Interface Manual* (JTLS-GO Document 21, Version 5.0.2.0)

1.2.2 Updated Documents

- *JTLS-GO Analyst Guide* (JTLS-GO Document 01, Version 5.0.2.0)
- *JTLS-GO Air Services User Guide (*JTLS-GO Document 03, Version 5.0.2.0)

- *JTLS-GO Controller Guide* (JTLS-GO Document 04, Version 5.0.2.0)
- *JTLS-GO Data Requirements Manual* (JTLS-GO Document 05, Version 5.0.2.0)
- *JTLS-GO DDS User Guide* (JTLS-GO Document 06, Version 5.0.2.0)
- *JTLS-GO Installation Manual* (JTLS-GO Document 09, Version 5.0.2.0)
- *JTLS-GO WHIP Training Manual* (JTLS-GO Document 10, Version 5.0.2.0)
- *JTLS-GO Player Guide* (JTLS-GO Document 12, Version 5.0.2.0)
- *JTLS-GO Standard Database Description* (JTLS-GO Document 14, Version 5.0.2.0)
- *JTLS-GO Software Maintenance Manual* (JTLS-GO Document 15, Version 5.0.2.0)
- *JTLS-GO Technical Coordinator Guide* (JTLS-GO Document 16, Version 5.0.2.0)
- *JTLS-GO Version Description Document* (JTLS-GO Document 17, Version 5.0.2.0)

1.2.3 Delivered Software Components

JTLS-GO 5.0.2.0 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)
- Database Development System (DDS)
- JTLS Symbols Application (JSYMS)
- ATO Translator Service (ATOT)
- ATO Generator Service (ATOG)
- ATO Retrieval Program (ATORET)
- JTLS Convert Location Program (JCONVERT)
- Count Critical Order Program (CCO)

- JTLS HLA Interface Program (JHIP)
- After Action Review Client (AARC)
- Scenario Data Client (SDC)
- Order Entry Client (OEC)
- Order Verification Tool (OVT)
- JTLS Object Distribution Authority (JODA)
- Web Services Manager (WSM)
- Web Services

    Apache Server (APACHE)

    JTLS XML Serial Repository (JXSR)

    Order Management Authority (OMA)

    Synchronized Authentication and Preferences Service (SYNAPSE)

    XML Message Service (XMS)
- Web-Hosted Interface Program (WHIP)
- Total Recall Interactive Playback Program (TRIPP)
- Entity Level Server (ELS)
- JTLS Operational Interface (JOI) OTH-Gold, Link-16, and TACELINT
- KML Operational Interface (KOI)
- JTLS Transaction Interface Program (JTOI) supporting

    ICC 2.8.2 and 3.0.2

    NEC-CCIS

    TBMCS
- JTLS Interface Network Navigator (JINN)
- JTLS Order of Battle Editor (JOBE)
- Database Configuration Program (DCP)

- DDS User Interface (DDS)
- JTLS Terrain Building Program

Instructions for installing JTLS-GO 5.0.2.0 are provided in the *JTLS-GO Installation Manual*. Installing a previous version of JTLS prior to installing JTLS-GO 5.0.2.0 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.

1.2.4 Released Databases

This release includes the following sample unclassified databases:

- The scenario developed as the Korea Standard Database and named SDBKOR50 is a large-scale, seven-sided scenario database reflecting the approximate starting positions of units involved in the Korea Peninsula theater of operations. This example scenario was developed using unclassified data sources and is consequently not completely accurate. Discrepancies among actual units and their locations are not detrimental to the intended purpose of this database, which is to provide a recognizable and realistic scenario that demonstrates the simulation capabilities and supports JTLS training.
- The scenario DEMSDBKOR50, which is a reduced version of SDBKOR50, has also been updated.
- The scenario blank50 is the SDBKOR50 database with all force structure data removed, which can be used as a framework for building your customized database.

1.3 INTERFACE COMPATIBILITY

1.3.1 Support Software

JTLS-GO 5.0.2.0 requires the following versions of support software, including operating systems, compilers, scripting utilities, database tools, transfer protocols, and display managers.

- Operating system for the model: Red Hat Linux Enterprise Edition Version 6.8 (ES), 64-bit architecture.

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

A RedHat Linux documented loop-back interface problem continues to cause degraded performance issues on Red Hat/CentOS 6 systems. This issue negatively impacts JTLS services when executed on the same server as Apache.

While we expect Red Hat to eventually correct this issue, significant effort has been place on JTLS-GO optimization to minimize impact of the problem. Still we recommend users with more than 25 concurrent WHIP/TRIPP users to avoid this Red Hat/CentOS loopback issue by running Apache and the SYNAPSE on different physical or virtual servers. For users with significantly more than 25 concurrent WHIP/TRIPP users, consider not running other JTLS services, such as the JXSR and XMS, on the same server used by Apache.

See the *JTLS-GO Installation Manual*, Appendix D for some recommended system tuning changes that can mitigate these performance issues.

JTLS-GO 5.0 has been tested with the following versions of Linux 6:

RedHat Linux 6 - this operating system license must be purchased.

Oracle Linux 6 - this is a free and distributable version of Linux which has been approved for use by U.S. Government agencies by the Defense Information Systems Agency (DISA).

CentOS 6 - a free version of Linux 6 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 5.0.2.0 has been tested on the following operating systems:

  Red Hat Linux Enterprise Edition Version 5 and 6.

  CentOS Linux Version 5 and 6.

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

- Java 8 Update 121 is required for all platforms and must be used to support all workstations.

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

One of the DoD IA requirements is that the software must implement a methodology that ensures that the end user keep the software up-to-date and all security patches are properly installed. Java 8 has fulfilled this mandate by implementing an expiration date for its software. After a certain date, all Java related programs will stop working, whether you are connected to an open network or not.

JTLS-GO software releases are linked to the Java 8 security updates to meet this requirement. This version of JTLS-GO is released using Java 8 Update 121, which expires on 18 April 2017. A new version of JTLS-GO will be released prior to that expiration date.

- JTLS-GO database tools require use of a certified Oracle database server and the full Oracle Client installation for runtime requirements. Refer to Section 1.5.2 of this chapter 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 II.5 (SIMSCRIPT to C) translator/compiler: SIMSCRIPT is required for recompiling JTLS-GO code. It is not necessary to have a SIMSCRIPT compiler to execute JTLS-GO, because all JTLS-GO software executables are statically linked with the SIMSCRIPT libraries. The compiler is needed only if you are a U.S. Government 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 (Database Development System) application uses these open source libraries:

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

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

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

- KML Operational Interface (KOI)

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

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

1.3.2 JTLS-GO High Level Architecture Compliance

The JTLS-GO 5.0.2.0 release is fully High Level Architecture (HLA) compliant, and includes all the programs required to run JTLS-GO in an HLA mode. JTLS-GO has moved to a new Federation Object Model (FOM) located in the $JGAME/data/hla directory. Federation testing of JTLS-GO is not complete, but initial tests with CAE's Gefechts Simulation (GESI) have been accomplished. Future plans include expanding the capabilities of the JTLS-GO-GESI federation, called GlobalSim continue.

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

The HLA RTI (Run Time Infrastructure) executive program (rtiexec) recommended for use with this release is RTI-NG-Pro-v7.0 or Pitch pRTI Evolved 4.4.2.0. However, these programs are not

included in the JTLS-GO 5.0.2.0 delivery. Users may obtain a full installation package of the RTI software from either vendor: Raytheon Company (http://www.raytheon.com) or 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

No database structure differences exist between JTLS-GO 5.0.2.0 and JTLS-GO 5.0.0.0.

Significant database structure differences exist between JTLS-GO 5.0.2.0 and any previous 4.1 series database. For this reason, after installing JTLS-GO 5.0.2.0, you **must** unload and reload any JTLS 4.1 series scenarios that you may have.

Prior to unloading any newly upgraded JTLS 5.0 series scenarios you may have, you **must** execute the JSYMS program to update the symbol set used in the scenario, whether you wish to retain the legacy Default Symbol Set or upgrade to the new Default Symbol Set. Instructions for updating the symbol set are listed below - perform one of these procedures **before unloading** your newyly upgraded JTLS 5.0 series scenario.

1.4.1 JTLS-GO Using Legacy Default Symbol Set

Prior to unloading your newly upgraded JTLS-GO 5.0.0.0 formatted data from your Oracle database server into a JTLS-GO 5.0.0.0 scenario ASCII file, you must execute the JSYMS program using the procedure listed below, which will reorganize the structure of the .gs and .scf symbols-related files.

Use this procedure to start the JSYMS program before unloading your newly JTLS-GO 5.0.0.0 formatted scenario.

1. Enter the command "jsyms" from a command prompt window. Do not use the JTLS-GO Menu > Database Menu for this purpose.
2. Select your scenario name from the available list and select OK.
3. Select "File" from the menu bar, and select "Save" to update your scenario symbol set.
4. Select "File" from the menu bar and select "Exit.".
5. Unload and reload your scenario.

1.4.2 JTLS-GO Using New Default Symbol Set

The JTLS-GO Default Symbol Set delivered with this release has been modified to use the US 2525C symbology standard and well as the NATO Joint Military Symbology [APP-6(c)] standard. If

you choose to propagate this new Default Symbol Set to any of your scenarios that use the 4.1 Default Symbol Set, use the procedure that follows. You should not make any modifications to the Default Symbol Set, but you are free to copy the Default Symbol Set and create your own set to meet your needs..

Use this procedure to update your JTLS-GO 5.0.0.0 formatted scenario to use the new JTLS-GO Default Symbol Set.

1. Enter the command "jsyms --upgrade" from a command prompt window. Do not use the JTLS-GO Menu > Database Menu for this purpose.
2. The JSYMS program will open. Select "File" from the menu bar, and select "Save As" to update your scenario symbol set.
3. Select your scenario name from the available list.
4. Follow the instructions in the following popup windows.
5. Select "File" from the menu bar and select "Exit.".

1.4.3 Standard Database Changes

Additional Standard Database changes that are applicable to JTLS-GO 5.0.2.0 are described in APPENDIX B.

1.5 INSTALLATION

1.5.1 Installation Instructions

The *JTLS-GO Installation Manual,* included in the compressed TAR file that is part of this JTLS-GO delivery, provides detailed instructions for installing a new version of JTLS-GO. The *Installation Manual* can be found in the /documents subdirectory of the JTLS-GO TAR file.

With the JTLS-GO 5.0 series, there have been significant changes to the directory structure which holds the files for the Online Player Manual (OPM). Users must remove all existing files from their JTLS 4.1 or earlier version $JGAME/{scenario} directory before setting up their scenario for execution with the JTLS 5.0 series. Prior to running Option 3 - "Setup System for a Specific Scenario" of the JTLS-GO menu, all users must remove the existing files in their scenario game directory. Failure to clean-up the $JGAME/scenario directory will result in a program crash while generating the OPM (Option 4).

1.5.2 Oracle Compatibility and Installation

A full Oracle Client installation (not Instant Client) that matches your database server version is currently a requirement for running some JTLS-GO applications. The Oracle Instant Client is not

sufficient for JTLS-GO applications because Oracle utilities, such as sqlldr, imp, exp, tnsping, etc., are missing. If you have applied a patchset to your database server, the same patchset should be applied to the Oracle Client installation. A 64-bit Oracle Client installation must be used. The JTLS-GO scenario/database modification process also expects Oracle 11.2.0.1 or higher full Oracle Client installation. Some sites NFS mount their database server as Oracle Client; other sites prefer a full install of the Oracle Client to a different directory that mounts (simple NFS will suffice) to JTLS-GO. Your system administrator can choose the appropriate installation. Assigning the full Oracle Client installation location (or mount point) as the ORACLE_HOME in the JTLS .cshrc file allows connecting to an Oracle database server (11.2.0.1 or higher - including 11gR2 XE) running on any Oracle-certified database server platform.

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

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

1.5.3 Disabling Certificate Authority

Industry standard programming practices strongly recommended that Web Start technologies be signed by a Certificate Authority (CA) to validate that an application being run comes from a trusted and registered source under the PKI. Keeping with high security standards, R&A has opted to sign its web enabled applications with a certificate from the COMODO, which uses the Public Key Infrastructure (PKI) to validate the digital signature. Local area networks, intranets and standalone systems that have no outside connection to the Internet must configure their installation to disable certificate revocation checks. If this step is not taken under a closed environment, the JTLS-GO web-enabled applications will experience a significant delay in start up while the PKI attempts to validate the certification on COMODO's servers via the Internet.

The following outlines the method that should be used to turn off certificate revocation checks. Again, this step should only be taken if the WHIP, TRIPP and/or DDS are going to be run in a closed environment.

Bring up the Control Panel. On Linux, typing 'jcontrol' in a terminal window will bring up the configuration panel. On Windows, go to the Windows 'Control Panel', select 'Programs' then click on 'Java'. Both Linux and Windows will display the same configuration panel.

Navigate to the 'Advanced' tab and in the list of configuration options, select the 'Do not check' radio button and click 'OK'. The image below illustrates the corresponding selection in the Control Panel.

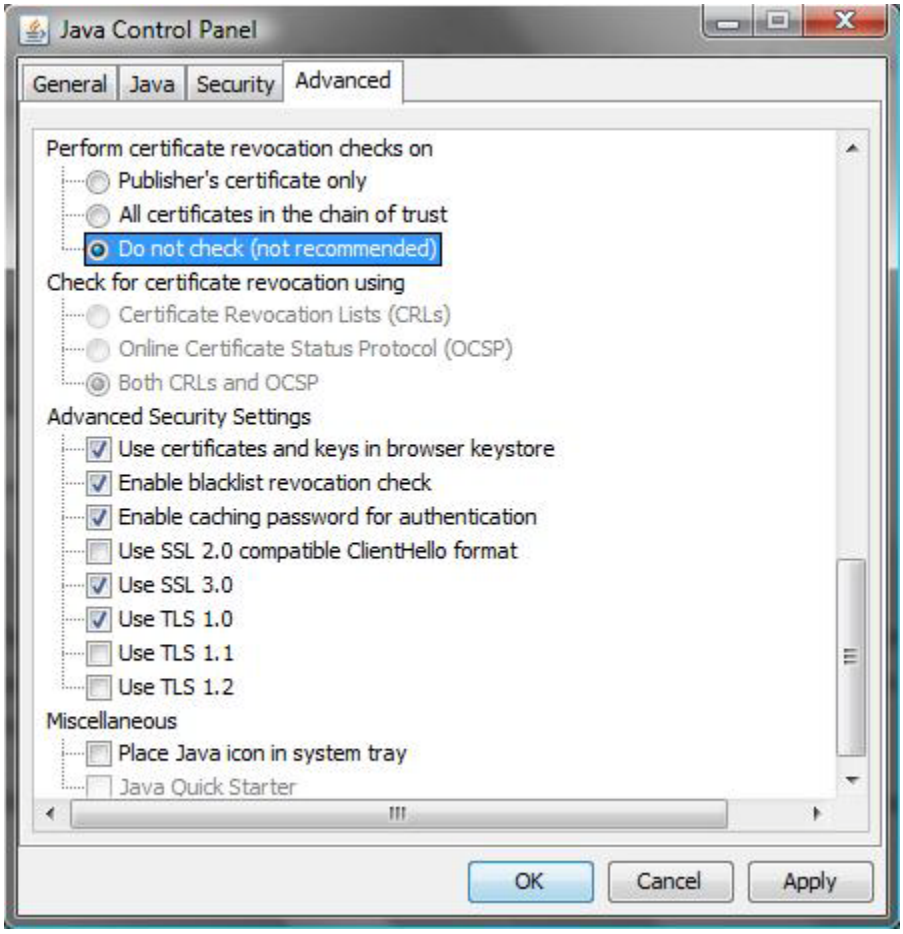

Figure 1.1 Control Panel

Completing this step will allow you to run the JTLS-GO web enabled applications without any external checks and launch the application without the validation delay.

1.5.4 Map Vector File Format Update

The format of the files used to display outline maps on the WHIP and DDSC has changed. Files in the new format are delivered with JTLS-GO. The files are located in $JTLSHOME/data/maps/vector and are in XML format.

For users who desire to use any custom files that are in the JTLS 4.1 format, a conversion script called "outlineConverter" is provided. The script can either convert individual files or a directory of files. The user can also choose to convert all types of outlines or only the shoreline outline (coded 9999 in the 4.1 format).

The script has 2 usages:

- To convert a single file:

```
outlineConverter -a <map_file> [-c shoreline]
```

- To convert all files in a directory. The file extension is assumed to be .map.

```
outlineConverter -d <directory> [-c shoreline]
```

The optional "-c shoreline" argument causes only the shoreline vectors to be converted. Rivers and national boundaries no longer follow hex-edges in JTLS-GO 5.0.2.0, but are represented as distinct lines with latitudes and longitudes. These terrain features can be individually turned on and off using the WHIP filter capability. Thus, the need to represent rivers and national boundaries in the vector maps is eliminated. The ability to represent these features, as part of the vector map, has not been removed from the WHIP, but the user should consider whether these old vector features should or should not be displayed by the vector maps.

The output files are placed in the same directory as the input files.

2.0 ENGINEERING CHANGE PROPOSALS

This chapter summarizes model capabilities added to JTLS-GO 5.0.2.0 as a result of implementing authorized Engineering Change Proposals (ECPs).

2.1 JTLS-2016-12816 GIS Tool: Reduce Nodes For Entire Network

Summary of Model Change Request

The GIS Tool provides the user the capability to reduce nodes along an individual polyline, given minimum arc length and maximum acceptable deviation constraints. This can become burdensome if the user is working with a large network. It would be desirable to continue giving the user the capability to reduce the nodes of an individual polyline, and add the capability to reduce the nodes over the entire network at once.

Design Summary

The user will be able to click on an arc/node to allow a menu to pop up. The menu will give the user the ability to choose trimming the nodes of the polyline that goes through the selected arc/node, or trimming the nodes of the entire network that the arc/node belongs to. The user will next enter the minimum arc length and maximum acceptable deviation constraints. The node trimming begins at this point. Since the trimming, itself, can potentially be a time consuming process, it will be run in the background from a worker thread so that the GUI doesn't lose its responsiveness.

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.

Chapter 4.0 describes STRs that remain outstanding from previous versions; however, because of the model enhancements included with JTLS-GO 5.0.2.0, no previously-identified STRs are considered valid. Errors identified for JTLS-GO 5.0.2.0 and corrected for future Maintenance releases in the JTLS-GO 5.0 series will be documented in this chapter.

3.1 JTLS-2017-12817 CEP Crash During Convoy Creation

The CEP crashed when a convoy was being built.

The source code incorrectly referenced the wrong entity type for a supply run entity. The code was corrected to reference the correct entity type.

3.2 JTLS-2017-12818 Disabled Apache Trace Method

A software scan showed that the Apache trace method was enabled. This can lead to a cross-site scripting vulnerability.

The trace method was disabled in the Apache configuration.

3.3 JTLS-2017-12819 GIS Tool: Missing Road Node

After opening a project, reading the shapefiles for roads, and rendering the road networks on the screen, it was observed that a road node was missing between two arcs.

Two problems were discovered. First, the missing node had a negative ID number. Within a network, each node is given a unique ID number that starts from 0. If the value is -1, it means that the node has not been assigned an ID number. The second problem, was that the node was not properly assigned to the arcs it was meant to connect. Both problems have been corrected.

Since the code to handle air corridor, rail, river and sea lane shapefiles is similar to the code handling road shapefiles, the corresponding code was also corrected.

3.4 JTLS-2017-12820 Airdrop Instruction Ignored After First Trip

A mobility mission was ordered to airdrop a unit. On the first trip to the delivery location, the mission unloaded a partial unit without landing as expected. However, on the second and succeeding trips to deliver remaining portions of the unit, the mission landed to unload, which greatly extended the overall mission duration.

The problem was found in the logic that generated the mission tasks for the return trips. The logic created a new unload task, but failed to copy the insert/airdrop flag from the original unload task. This omission caused the mission to treat each subsequent delivery as a landing requirement to unload the unit. The missing code was added to correct the problem.

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

4.1 DDSC – TMU Line Mode Changes Multiple Grids

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

4.2 DDSC – Multiple Types In DDS History Table

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

4.3 WHIP - Pipeline Not Shown On IMT

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

4.4 DDSC/WHIP/JOBE - CADRG Map Zoom

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

4.5 WSM - Many Messages Cause Lockup

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

APPENDIX A. ABBREVIATIONS AND ACRONYMS

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

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

BADGE	Bilateral Air Defense Ground Environment (used by Japan Defense Agency)
BAI	Battlefield Air Interdiction
BDA	Battle Damage Assessment
BDE	Brigade
BN	Battalion
C3	Command, Control, and Communications
C3I	Command, Control, Communications, and Intelligence
C4I	Command, Control, Communications, Computers, and Intelligence
CA	Civil Affairs
CADRG	Compressed ARC Digitized Raster Graphics
CAP	Combat Air Patrol
CAS	Close Air Support
CAT	Category
CCF	Central Control Facility
CCP	Command Control Prototype
CCU	Controller Change Unit
CEP	Combat Events Program
CMDR	Commander
COP	Common Operational Picture
CP	Combat Power
CS	Combat System
CSP	Combat System Prototype
CTAPS	Contingency Tactical Air Planning System
CTG	Commander Task Group
CTRL	Control keyboard command
DCA	Defense Counter Air
DCL	Digital Command Language
DDS	Database Development System
DEMSDB	Demonstration Standard Database
DISA	Defense Information Systems Agency
DIV	Division
DMA	Defense Mapping Agency
DoD	Department of Defense
DOS	Days of Supply

DPICM	Dual Purpose Improved Conventional Munitions
DS	Direct Support
DSA	Directed Search Area
DTG	Date Time Group
EC	Electronic Combat
ECM	Electronic Counter Measure
ECP	Engineering Change Proposal
EEI	Essential Elements of Information
ELINT	Electronic Intelligence
ELS	Entity Level Server
EODA	Entity Level JTLS Object Data Authority
ETA	Estimated Time of Arrival
FARP	Forward Arming and Refueling Point
FLP	Fire Lethality Prototype
FLOT	Forward Location of Troops
FOL	Forward Operating Location
FWL	Frederick W. Lanchester (originated a differential equation model of attrition)
GAL	Gallon
GCCS	Global Command and Control System
GRTE	Ground Route
GS	General Support
GSR	General Support Reinforcing
GUI	Graphical User Interface
HARM	High-speed Anti-radiation Missile
HE	High Explosive
HELO	Helicopter
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 5.0.2.0 STANDARD DATABASE CHANGES

B.1 Tactical Unit Prototypes (TUPs)

The following Tactical Unit Prototypes were added to the database:

- SOF.BN_KP

The following Tactical Unit Prototypes were removed from the database:

- FROG5.SSM.BN_KP
- FROG5.SSMBTY_KP
- FROG5.SSMBNHQ_KP

B.2 Ground Units

The following Ground Units were added to the database:

- 1SPF.BN_KP
- 2SPF.BN_KP

B.3 High Resolution Units (HRUs)

The following High Resolution Units were added to the database:

- 1SPF.TM1
- 1SPF.TM2
- 1SPF.TM3
- 2SPF.TM4
- 2SPF.TM5
- 2SPF.TM6

B.4 Ship Unit Prototypes (SUPs)

The following Ship Unit Prototypes were added to the database:

- ORION_SE
- SPIGGEN_SE

- BELOS.ASR_SE
- DSRV_SE
- ASD2810.TUG_SE
- ASD3010.TUG_SE
- ODEN_SE
- URHO_SE
- ALE_SE
- BALTICA_SE
- TYPE.A17_SE
- STYRSO_SE
- CHEON.W.BONG_KR
- LEGEND_US
- LSF-II_KR
- MK.IV.LCU_IN
- NAMPO.MM_KR
- SOYANG_KR
- TONGYEONG_KR
- TSAPLYA_KR
- VISAKHAPATNA_IN

B.5 The following Sensors were added to the database:

- KRTP91.AEE
- TRS-22XX_LAA
- MESA_AGR
- SPS-100K_SGN

- SPS-540K_SGN
- SPS-540K_SAA
- SPS-550K_SGN
- SPS-550K_SAA

B.6 Aircraft Loads

The following aircraft loads were added to the database:

- Default Load MC12/LIBERTY
- Default Load HERMES.450.DEF
- Default Load HERMES.900.DEF
- Default Load SAAB2000.ISTAR.DEF
- Default Load YAK130.DEF
- Default Load KA50.ALLIGATOR.DEF
- 2AR1
- 2AR1X2FT5
- 2BA7X2FT5
- 4AR1
- 4AR1X4FT5
- 6AR1
- CH3A.UAV.DEF
- CH4B.UAV.DEF
- CH5.UAV.DEF
- E7AWEDGETAIL.DEF

B.7 Aircraft Class

The following aircraft classes were added to the database:

- MC12W.LIBERTY
- C5M.GALAXY
- C146A.WOLFHOUND
- UH60M.BLACKHAWK
- HH60M.BLACKHAWK
- HERMES.450.UAV
- HERMES.900.UAV
- SAAB2000.ISTAR
- SAAB2000
- AN72.COALER
- KA226.HOODLUM
- YAK130.MITTEN
- KA50.ALLIGATOR
- CH3A.UAV
- CH4B.UAV
- CH5.UAV
- E7A.WEDGETAIL

B.8 Targetable Weapons

The following Targetable Weapons were added to the database:

- AR1.CH.UAV.AT
- BLUE.ARROW7
- FEI.TENG-5.SGB
- HJ10
- TG100.LGB

B.9 Aircraft Kill Lethalities (AKL)

The following AKLs were added to the database:

- AR1_AKL
- BLUE.ARROW7_AKL
- FT5.100KG.BF_AKL
- HJ10_AKL
- TG100.LGB_AKL

B.10 Surface Kill Lethalities (AKL)

The following SKLs were added to the database:

- AR1_SKL
- BLUE.ARROW7_SKL
- FT5.100KG.BF_SKL
- HJ10_SKL
- TG100.LGB_SKL

B.11 Probability of Hit (pH)

The following pHs were added to the database:

- AR1_PH
- BLUE.ARROW7_PH
- FT-5.100KG_PH
- HJ10_PH
- TG100.LGB_PH

B.12 Probability of Kill (pK)

The following pKs were added to the database:

- AR1_PK

- BLUE.ARROW7_PK
- FT-5.100KG_PK
- HJ10_PK
- TG100.LGB_PK

B.13 Supply Categories

The following Supply Categories were removed from the database:

- CL.V.AS-LG2000P
- CL.V.AS-LG-OTH
- CL.V.AS-SAL-LR
- CL.V.AS-SR
- CL.V.AS-WIRE

B.14 Aircraft Class Probability of Detection

The following Aircraft Class Probabilities of Detection were modified in the database:

- F22.RAPTOR was changed to .0001
- B2A.SPIRIT was changed to .02
- F35A.JSF_USAF was changed to .001
- F35B.JSF_USAF was changed to .001
- F35C.JSF_USAF was changed to .001

B.15 Airbases

The following airbases were added to the database:

- FIERY.CROSS.REEF_CN
- ITU.ABA.ISLAND.AF_US
- MISCHIEF.REEF.AF_CN
- PRATAS.ISLAND.AF_US

- SPRATLY.ISLAND.AF_US
- SWALLOW.REEF.AF_US
- THITU.ISLAND.AF_US
- WOODY.ISLAND_CN

B.16 Runways

The following runways were added to the database:

- FIERY.CROSS.RWY05-23
- ITU.ABA.IS.RWY07-25
- MISCHIEF.RWY03-21
- PRATAS.IS.RWY10-28
- SPRATLY.IS.RWY04-22
- SWALLOW.R.RWY06-24
- THITU.IS.RWY14-32
- WOODY.IS.RWY05-23

B.17 Miscellaneous Changes

- Changed BEST.CAPAB_SLP Distance to 5 km and REPLENISHMENT TIME to 3H
- Changed CSP_CS MLRS-LR-VEH - COMBAT SYSTEM EFFECTIVE Range from 0 to 10 km
- Changed JDPIs Runway Targets Damage percents
- Changed LEAST.CAPAB_SLP Distance to 1.5km and REPLENISHMENT TIME to 5H
- Changed LESS.CAPAB_SLP Distance to 3km and REPLENISHMENT TIME to 4H
- Changed TW GBU58.MK81 Supply Category to CL.V.AS-GBU58
- Checked all JDPIs Collateral Damge Boxes which were blank as required
- Updated all JDPIs Item Numbers by assigning a value which were blank
- Updated all Equipment Shelter Combat System Priority Number

- Updated BE Target ONCHON.AFB_KP by removing all Owned Targets

APPENDIX C. Version 5.0.2.0 DATABASE CHANGES

No changes were made to the JTLS-GO 5.0.1.0 database.