



Mensuration Services Program (MSP) Release Notes / Version Description Document for MSP Geographic Translator (GEOTRANS) Version 3.7

Program Title: Mensuration Services Program
Date: 18 February 2016
Contract No: HM047615D0002
CDRL: C018 MSP-GeoTrans
DID: Contractor Format

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18 February 2016

Revision Record

Version	Date	Description
-	18 February 2016	Original issue.

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1. SCOPE

1.1 IDENTIFICATION

This document is the Release Notes for Version 3.7 of the MSP Geographic Translator (GEOTRANS).

1.2 SYSTEM OVERVIEW

GEOTRANS is an application that allows you to convert geographic coordinates among a wide variety of coordinate systems, map projections, grids, and datums. GEOTRANS runs in Microsoft Windows and LINUX environments.

The user interface of GEOTRANS consists primarily of a single window. To convert coordinates, select the coordinate reference frame and datum in which your coordinates are defined, enter any associated parameters, and enter the coordinates in the upper half of the window. Then select the coordinate reference frame and datum to which you want the coordinates to be converted, and enter any associated parameters, in the lower half of the window. Click on the Convert Upper-to-Lower button, and the resulting coordinates will be displayed in the lower half of the window. You can convert additional coordinate sets from the same source by just entering the new coordinates and clicking on the Convert Upper-to-Lower button. You can change any of the coordinate reference frame, datum, or parameter selections at any time. Also, you can reverse the roles of input and output by using the Convert Lower-to-Upper button. Currently, thirty-five different types of coordinate systems, map projections, grids, and coding schemes are supported, as well as more than two hundred different horizontal datums.

GEOTRANS can also be used to efficiently convert large numbers of coordinates contained in text files. The file format is very simple. A multi-line file header defines the coordinate reference frame and datum of the coordinates contained in the file, including any associated parameter values. Following the header, each line contains a single set of coordinates, separated by commas followed by at least one space. Using the GEOTRANS file processing interface, you can select an existing file of coordinates to be converted. You can then define the coordinate reference frame and datum to which you want to convert the coordinates, along with any associated parameter values. Finally, you can specify the name and location of the output file that is to be created. GEOTRANS then converts all of the coordinates in the input file and creates the output file as a single operation.

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1.3 DOCUMENT OVERVIEW

The MSP GEOTRANS 3.7 Release Notes describes what has changed between the MSP GEOTRANS 3.6 release and the 3.7 release. It also describes the installation process.

GEOTRANS software is provided via the WWW, SIPRNet, and JWICS networks. It can also be requested via CD-ROM or DVD media. Users can download the executable software only or the executable software with the source code. The software provided is built for four platforms: Windows 7 32-bit, Windows 7 64-bit, Red Hat Enterprise Linux (RHEL) v6 32-bit and 64-bit. It should also work on all later versions of these operating systems.

The GEOTRANS software consists of the Coordinate Conversion Service (CCS) libraries and the GEOTRANS application. The GEOTRANS CCS libraries are written in C++. The Windows version was built using MS Visual Studio 2010 (32-bit) and MS Visual Studio 2013 (64-bit). The Linux version was built using GCC v4.4.7. The GEOTRANS application Graphical User Interface (GUI) is written in Java and requires the Java Runtime Environment (JRE) version 1.8 or later to execute. We recommend using JRE version 1.8 update 72 or later that addresses all known vulnerability issues in the earlier versions of JRE.

Software Integrators should refer to the Programmer's Guide for information regarding the GEOTRANS software structure, the programming environment in which it was developed, the Application Programming Interface (API) and the process for building and modifying the GEOTRANS software.

Users should refer to the User's Guide for information regarding the capabilities and use of the GEOTRANS GUI for interactive coordinate conversion.

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2. REFERENCES

For the list of referenced documents, see the MSP GEOTRANS Programmer's Guide or the User's Guide.

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3. RELEASE NOTES DESCRIPTION**3.1 INVENTORY OF MATERIAL**

The unclassified MSP GEOTRANS 3.7 release provides executables and libraries built for four operating systems and compiler combinations: Windows 7 32-bit, Windows 7 64-bit, Red Hat Enterprise Linux (RHEL) v6 32-bit and 64-bit. The MSP GEOTRANS software is also available in the classified MSP releases.

The GEOTRANS software was designed to reduce as much as possible any operating system dependencies and therefore should work on all later versions of these operating systems (e.g., Windows 8, RHEL v6). If not, the source code is provided for rebuilding on the user's platform of choice. For information regarding the GEOTRANS software structure and building the software from the source code, refer to the Programmer's Guide.

3.2 SYSTEM REQUIREMENTS

The hardware requirements of the GEOTRANS software are minimal. It is designed to run on any 32-bit or 64-bit processor with 512MB or more of memory and 300MB or more of available disk space.

GEOTRANS software operates on Windows, and Red Hat Linux operating systems.

Platform	OS and Version	Compiler and Version
PC	Red Hat Enterprise Linux 6 32-bit multi-thread	GCC 4.4.7
PC	Red Hat Enterprise Linux 6 64-bit multi-thread	GCC 4.4.7
PC	Windows 7 32-bit multi-thread	Visual Studio 2010
PC	Windows 7 64-bit multi-thread	Visual Studio 2013

Supported Operating Systems and Compilers

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3.3 ADDITIONAL SOFTWARE REQUIRED

3.3.1 JAVA RUNTIME ENVIRONMENT

The GEOTRANS application GUI is written in Java and requires the JRE to execute. JRE version 1.8.0.72 resolves all known vulnerabilities and was used for testing MSP GEOTRANS 3.6. It is recommended that the GEOTRANS users also use 1.8.0.72 or later. JRE 1.8.0.72 or the latest JRE can be downloaded from the Oracle website:

<http://www.oracle.com/technetwork/indexes/downloads/index.html>.

3.3.2 VISUAL STUDIO REDISTRIBUTABLE PACKAGE

The GEOTRANS Windows libraries are compiled using Microsoft Visual Studio C++ compilers and they required the runtime components of Visual C++ libraries to run. If the system does not have the required runtime components of Visual C++ libraries, GEOTRANS users will need to install the Microsoft Visual C++ Redistributable Package.

Microsoft Visual C++ Redistributable Package can be downloaded from the following websites:

For Windows 7 32-bit GEOTRANS download the Microsoft Visual C++ 2010 Service Pack 1 Redistributable Package:

<https://www.microsoft.com/en-us/download/details.aspx?id=8328>

For Windows 7 64-bit GEOTRANS download the Microsoft Visual C++ 2013 Redistributable Package:

<https://www.microsoft.com/en-us/download/details.aspx?id=40784>

GEOTRANS 3.7 includes the Visual Studio redistributable DLLs with the installation package so that users do not have to download the Redistributable Package from the web site.

3.4 SUMMARY OF SOFTWARE CHANGES

MSP GEOTRANS 3.7 is the eighth release of the re-architected GEOTRANS application under the MSP program and repairs several issues discovered in operations. The code modifications made in GEOTRANS 3.7 necessitated changes to the GEOTRANS API so integrators will need to recompile their software against the GEOTRANS 3.7 libraries when transitioning from GEOTRANS 3.6 to 3.7. This is the first release of GEOTRANS compiled with JDK 1.8.

GEOTRANS 3.7 adds support for the U.S Survey Foot unit of measure for height values when performing Geodetic coordinate conversions. This modification provides the addition of a Height / Elevation tab under the Format window to allow the selection of the unit of measure for

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height values. After changing the unit of measure for Geodetic coordinate conversions the Geodetic Coordinate must be reselected in the coordinate conversion GUI to allow the correct display of either Height (m) or Height (*ft*).

In previous versions of GEOTRANS Transverse Mercator translations used an algorithm to compute expansion coefficients from the input eccentricity values regardless of the selected ellipsoid. GEOTRANS 3.7 modified the Transverse Mercator translation to use the specific coefficient values supplied for each ellipsoid as provided in NGA SIG-12. This change required minor internal interface changes to provide the ellipsoid code when an object calls the Transverse Mercator or the Universal Transverse Mercator translation. If the ellipsoid code is a user defined code GEOTRANS still provides for the computation of the coefficients from the input eccentricity values.

GEOTRANS 3.7 modified the computation of the ratio $R4/a$ to use the computation provided by Bessel (1825) for Transverse Mercator translations. This provides a better converging series for $R4$ though it does not effect the final value of $R4/a$.

NOTE: GEOTRANS 3.2 and later versions use an iterative algorithm in the Geocentric to Geodetic conversion to achieve better accuracy. If the legacy non-iterative GEOTRANS algorithm needs to be used the MSPCCS_USE_LEGACY_GEOTRANS environment variable needs to be defined before starting GEOTRANS.

The following tables describe the resolved Discrepancy Reports (DRs) and Enhancement Requests (ERs) included in the MSP GEOTRANS 3.7 release (Table 1), the Open Discrepancy Reports remaining in the MSP GEOTRANS 3.7 release (Table 2) for implementation in a future release and the Open Enhancement Requests (Table 3) for consideration in a future release.

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Table 1. MSP GEOTRANS 3.7 Resolved DRs and ERs

ID	Title	Pri	Impact	Workaround
30125	Transverse Mercator converter deviates slightly from book	4	NGA SIG-19 describes the Transverse Mercator conversion to/from geodetic coordinates using specific values for the series expansion coefficients for each ellipsoid in GeoTrans.	None.
30211	Two problems with MGRS/UTM in GeoTrans	4	<p>The first problem is with the setting of the latitude band in MGRS. The border used is $PI_OVER_180/divisor$. The divisor should be set as $divisor = 1.0e5/computeScale(precision)$. However, it is currently set as $divisor = computeScale(precision)$.</p> <p>The second problem is for negative longitude in UTM. The longitude is moved to a positive value by adding $2*PI + 1.0e-10$.</p>	None
30349	Problem with MGRS border for low precision MGRS coordinates	4	There was a bug in how MGRS zones had small borders added to them to avoid rounding issues.	None
30518	Conversion of MSL elevations in units of feet	2	GEOTRANS is required to support Geodetic coordinate conversions when height values are specified in units of either the meter or the U.S. Survey Foot.	None

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Table 2. MSP GEOTRANS 3.7 Open DRs

ID	Title	Pri	Impact	Resolution/Workaround
25204	GEOTRANS vs MSP – Quit vs Exit on closing windows	4	None. A different convention is used on the GEOTRANS GUI and MSP GUI to close the application (“Quit” vs “Exit”). Consistency would be nice.	The resolution is to change GEOTRANS to use “Quit” on the File dropdown menu.
27158	GEOTRANS in the Java, Look and Feel mode, Enter does not remove the “Help, About” GUI	4	Minor. User cannot close the “Help About” GUI using the Enter key from the keyboard when Java Look and Feel mode selected.	The workaround is to select the OK button to remove the window. The resolution is to allow Enter to close the window when in the Java Look and Feel mode, as is the case for the Solaris and Windows Look and Feel modes.
29600	GEOTRANS does not accept latitude of origin at 90 degrees	4	The Belgium Lambert 1972 projection specifies a latitude of origin of 90 degrees. MSP does not allow latitudes of origin above 89:59:59.	None.
29645	Update GEOTRANS Lat/Lon Error Message	4	None. When user enters an improperly formatted latitude or longitude, an “out of range” message is displayed, which does not indicate improper format.	None
29966	GeoTrans Error Message Should be Enhanced	4	When the New Zealand Map Grid is either the “To” or the “From” coordinate system and the datum is NOT set to “GEO: Geodetic Datum 1949, NZ”, the buttons turn red. If the user attempts to make a conversion the error message states “Ellipsoid must be International” (something similar to those words). However there are many datums that use the International Ellipsoid including all EUR datums, so this error message should be enhanced.	Geotrans should either set the datum automatically to GEO or the error message should state “Datum must be GEO”.

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ID	Title	Pri	Impact	Resolution/Workaround
29974	GeoTrans Setting of Data Directory has Problems	4	GeoTrans relies on the setting of an environmental variable to set the data directory. A user reports a problem and a related desired enhancement. The problem is with copying to memory that has not been allocated when the MSPCCS_DATA environmental variable is not present. The related enhancement is to centralize and simplify the setting of the data directory and to offer an alternative to setting an environmental variable.	The work around is to make sure environment variable MSPCCS_DATA is set properly

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Table 3. MSP GEOTRANS 3.7 Open ERs

ID	Title	Pri	Impact	Resolution/Workaround
23926	Gauss-Kruger projection	9	Many users do not realize that the Gauss-Kruger projection is a member of the transverse Mercator family. Listing the Gauss-Kruger as a projection type would streamline the workflow of users.	The resolution is to list the Gauss-Kruger as a projection type.
25411	GEOTRANS GUI File -> Load Setting returns an error	9	Users of GEOTRANS installed as a shared application on a network cannot Save and Load personal settings.	The resolution is to provide the capability to save and restore settings to/from a User's Home directory, instead of to/from the installed directory.
26200	MSP should allow for third party coordinate conversions	9	Users are limited to the coordinate conversions provided by GEOTRANS.	The resolution is to design the capability for a "plug-in" coordinate conversion.
26551	Add UTM units option of US Survey Feet	9	Surveyors in the US who use units of US Survey Feet with UTM coordinates cannot use GEOTRANS to/from UTM coordinates.	The resolution is to add the US Survey Feet as a selectable unit for UTM Easting and Northing values.
26987	MSP GEOTRANS should add new transformation model	9	GEOTRANS users cannot use the seven parameter model described in NATO STANAG 2211.	The resolution is to add the transformation to the CCS and to the GEOTRANS GUI as described in NATO STANAG 2211.
27339	Add an "administrative rules" button to the UTM coordinate option	9	Users cannot convert to True UTM coordinates in the special regions over Southern Norway and Svalgard, without specifying a zone override.	The resolution is to add an "Administrative Rules" button to the GEOTRANS GUI to control whether True UTM coordinates are returned or the special rules for UTM zones are returned.
27813	GeoTrans User Defined Spherical Radius	9	Modify GeoTrans to allow a user entered radius for all spherical models of the earth.	The resolution is to modify GeoTrans to allow a user entered radius for all spherical models of the earth.
27814	Coordinate Conversion Service report Point Scale factor and Convergence of Meridian	9	Coordinate Conversion Service to report Point Scale and Convergence of Meridians for conformal mappings.	Modify Coordinate Conversion Service to report Point Scale and Convergence of Meridians for conformal mappings. This is a change to the CCS API. It is not needed for the GeoTrans GUI.

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ID	Title	Pri	Impact	Resolution/Workaround
28084	Z Pass Through option for batch coordinate conversions	9	A user in the bathy group at NGA uses GeoTrans to convert between Degrees Minutes Seconds and Decimal Degrees and would like the Z value to be a pass through. In addition, UTM's to geographics (DD or DMS) with a "z pass through" is needed for for hydrographic work. Hydrographic survey work, commercial or DOD (Naval Oceanographic Office and Army Corps of Engineers) is routinely in UTM's, normally WGS84, but frequently in State Plane; in the case of data received from other international partner, it may be in a local, national datum as well.	No workaround.
29536	Allow users to save their own settings	9	Configuration settings are saved in setting.xml in the MSPCCS_DATA directory and the changes are common for all users. This forces users to copy the data files into their home directory structure to save settings. It would be nice to have a separate environment variable for the settings directory in order to give users the option to save the settings as well as custom datums in their own directory.	The workaround is to have different installation for each user.
29573	Add setting methods to class UPSCoordinates class	9	A user reports that currently UPSCoordinates class only provides a single method to set hemisphere, easting and nothing all at the same time. It is an inconvenience not to be able to set the values individually. Recommend adding the following methods: setHemisphere, setEasting, setNorthing to UPSCoordinates class.	The resolution is to add setting methods as recommended.
29739	Enhance Constant definitions for GeoTrans	9	Constants such as PI and PI/2 are defined multiple times in the GeoTrans code. Sometimes they are defined using #define and other times they are global C++ constant double.	The resolution is to define global constants in one place.

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ID	Title	Pri	Impact	Resolution/Workaround
30083	Enhance GeoTrans to support third party geoids	9	Some geotrans users have geoids that define mean sea level for their area of interest and they would like to be able to use these geoids with geotrans without have to do external calculations.	This enhancement is to allow a user to drop a geoid into geotrans and have it available for use on the ellipsoid drop-down menu.
30139	Enhance GeoTrans to support RAE coordinates	9	Enhance GeoTrans to support Range/Azimuth/Elevation (RAE) coordinates.	This enhancement is to provide support to convert from Range/Azimuth/Elevation coordinates to other coordinates and vice versa.

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3.5. INSTALLATION INSTRUCTIONS

The unclassified MSP GEOTRANS 3.7 release can be downloaded from the WWW, SIPRNet or JWICS networks—or can be delivered via CD-ROM or DVD media by request. The unclassified MSP GEOTRANS 3.7 release is provided in exe format for Windows platforms and tgz format for Linux platforms and does not require a registration key or a license key to install and run. The MSP GEOTRANS web page addresses are as follows:

WWW – <http://earth-info.nga.mil/GandG/geotrans/>

SIPRNet – <http://www.geoint.nga.smil.mil/products/gandg/geotrans>

JWICS – <http://www.geoint.nga.ic.gov/products/gandg/geotrans/>

The GEOTRANS 3.7 application requires the JRE to operate. JRE version 1.8.0 update 72 or later is recommended. The startup script may need to be modified to set the correct version of the JRE.

The startup script for Linux systems is found in:

```
<install dir>/geotrans3.7/GEOTRANS3/linux/runGeotrans.csh
```

For Windows systems, it is found in:

```
<install dir>\geotrans3.7\GEOTRANS3\win\runGeotrans.bat.
```

For Linux systems, using an editor of your choice, open the runGeotrans.csh start up script and modify the following line so that the parameter JAVA_HOME is set to Java's home directory.

For example :

```
setenv JAVA_HOME /usr/jdk1.8.0_72
```

For Windows systems, using an editor of your choice, open the runGeotrans.bat startup script and modify the following line so that the path to the JRE is set correctly. For example change:

```
@java -Xss1024k -jar MSPCCS.jar
```

to

```
@"C:\Program Files\java\jre1.8.0_72\bin\java.exe" -Xss1024k -jar MSPCCS.jar
```

GEOTRANS 3.7 for Windows users is also available in self installation InstallAnywhere package. After downloading the installation file from the web-site, double click on install.exe and follow on screen instructions to complete the installation.

GEOTRANS 3.7 InstallAnywhere package supports silent installation. To perform silent installation:

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1. Create the properties file installer.properties in C:\Temp directory

```
C:\> install.exe -r c:\Temp
```

2. Specify the installation directory by modifying C:\Temp\installer.properties.

3. Perform silent installation

```
C:\> install.exe -i silent -f C:\Temp\installer.properties
```

3.6 MSP HELP DESK SUPPORT

For help with the installation, to request a delivery on CD-ROM or DVD media, to report an issue, or for general help of any kind, contact the NGA Enterprise Service Center (ESC) at 800-455-0899 or email MSP_Help@nga.mil.

GEOTRANS Enhancement Requests can also be reported to the MSP Help Line or to the National Geospatial-Intelligence Agency (NGA) Coordinate Systems Analysis Team (CSAT) at (314) 676-9124, DSN 846-9124 or coordsys@nga.mil.

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APPENDIX A – ACRONYMS

API	Application Programming Interface
CCS	Coordinate Conversion Service
CD-ROM	Compact Disk – Read Only Memory
CSAT	Coordinate Systems Analysis Team
DR	Discrepancy Report
DVD	Digital Versatile/Video Disk
EGM	Earth Gravity Model
ER	Enhancement Request
GCC	Gnu Compiler Collection
GEOTRANS	Geographic Translator
GUI	Graphical User Interface
JRE	Java Runtime Environment
MB	MegaByte
MS	Microsoft
MSL	Mean Sea Level
MSP	Mensuration Services Program
NGA	National Geospatial-Intelligence Agency
RHEL	Red Hat Enterprise Linux
WWW	World Wide Web