

Basic Geodesy

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MSP GeoTrans Batch File Conversions/Transformations

Roger Foster, Dan Mullaney, Christopher Stanton (SNAC)

Coordinate System Analysis Branch (CSAT)

In the early to mid 20th Century, Mikhail Molodensky developed mathematical equations that enabled transformation of coordinates between datums. These equations, which can be found in TR8350.2, were tedious to compute by hand for an individual point. The use of calculators and slide rules by rooms full of workers shortened the time from months and years to hours. MSP GeoTrans allows millions of points to be transformed (datum to datum) or converted (reprojected) in seconds and minutes rather than hours. This process is done using batch files. (Figure 1 is an image of the MSP GeoTrans interface.)

Format for Batch Files

Running a batch file through MSP GeoTrans requires specific formatting. The batch file must consist of input criteria, a body, optional comments/blank lines, and output criteria. (Figure 2 on Page 2 provides two examples of batch files. Note that output criteria are not specified until after the file is opened in MSP GeoTrans.)

Input Criteria

The first line of the file describes the reference frame/type of the coordinates in the batch file. This line is defined as either PROJECTION or COORDINATES, followed by a colon, a space, and an identifier. Line one of Figure 2; example one is **COORDINATES: Geodetic** while line one of example two is **COORDINATES: Universal Transverse Mercator (UTM)**. The second line identifies the datum for the coordinates in the batch file. The line is defined as DATUM, followed by a

colon, a space, and an identifier. The identifier is a three to five letter codes as defined by MSP GeoTrans. (These codes can be found in the datum drop-down menu as shown in Figure 1.) Our two examples are **DATUM: CAI** and **DATUM: NAS-A** (CAI is Campo Inchauspe datum in Venezuela. NAS-A is North American Datum 1927 for the Eastern US.)

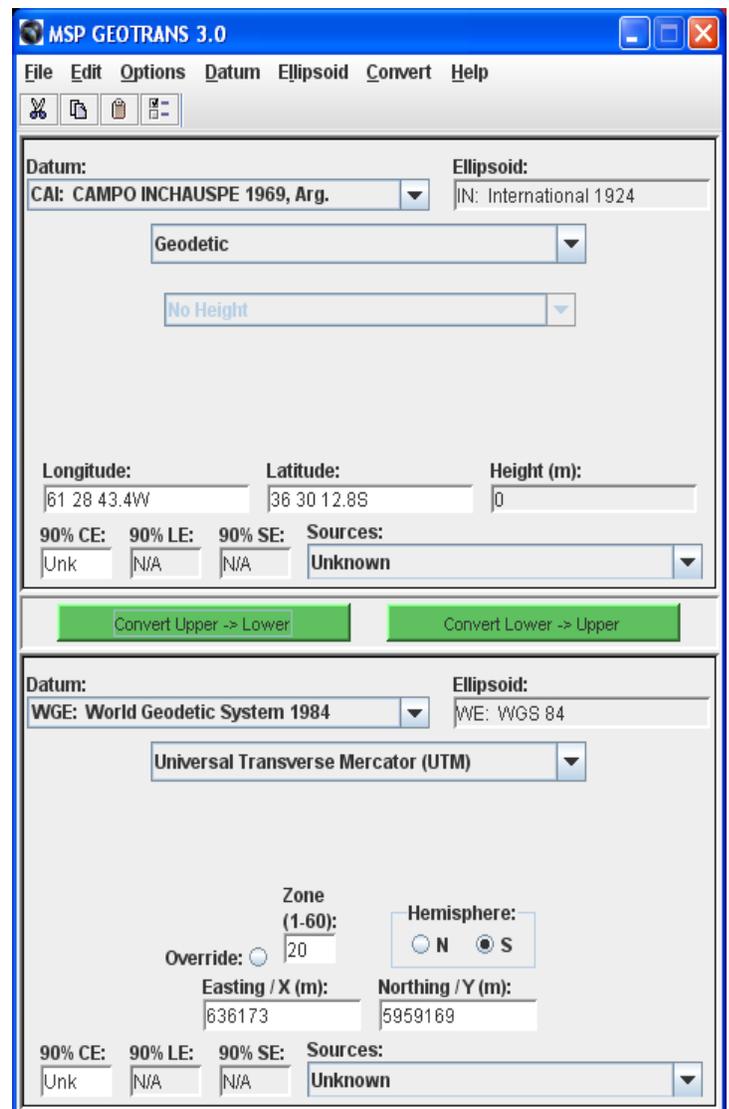


Figure 1

Figure 2

<p>Example 1: COORDINATES: Geodetic DATUM: CAI #ELLIPSOID: IN NO HEIGHT END OF HEADER</p>	<p>Example 2: COORDINATES: Universal Transverse Mercator (UTM) DATUM: NAS-A #ELLIPSOID: CC END OF HEADER</p>	<p>Input Criteria</p>
<p># ARGENTINA # CAI_GEO TO WGS84_UTM</p>	<p># WASHINGTON, DC AREA # NAD27_UTM TO WGS84_MGRS</p>	
<p>27 00 00.0S, 65 00 00.0W 34 00 00.0S, 64 00 00.0W 40 30 00.0S, 69 00 00.0W 44 00 00.0S, 70 00 00.0W 51 30 00.0S, 71 00 00.0W</p>	<p>18, N, 371489, 4400877 18, N, 325592, 4262982 17, N, 675608, 4207497</p>	<p>Body</p>

The third line is optional and is used as a comment to define the ellipsoid used with the DATUM. This line has a # symbol, ELLIPSOID, followed by a colon, a space and a two letter code. (These codes can be found in the Ellipsoid drop-down menu as shown in Figure 1.) The two examples are **#ELLIPSOID: IN** and **#ELLIPSOID: CC**. (IN is the code for International 1924 ellipsoid and CC is the code for Clarke 1866 ellipsoid.) The fourth line is optional and is not needed if geodetic coordinates are not being converted. It details the order of the GEODETIC COORDINATES. The default setup is LATITUDE, LONGITUDE unless defined otherwise. This line is not shown in the two examples since one of the examples uses the default and the other example is using UTM grid coordinates. The fifth line defines any height values associated with the coordinates as relative to the ellipsoid surface. This line only applies only to geodetic coordinates. If not present, it will set the default to ELLIPSOID HEIGHT or NO HEIGHT if values are not included with the geodetic coordinates. For our examples, **NO HEIGHT** was input for the one example and was not required for the other example since it is not inputting geodetic coordinates.

Body

The body of the batch file consists of one or more lines of information (coordinates). Each line may contain only one set of values separated by a comma and a space. In Example 1, the first set of geodetic coordinates are **27 00 00.0S, 65 00 00.0W** followed by four more sets of coordinates. (Note: The coordinates could be formatted in various ways. For more information, use the Help function for formatting.) Example 2 has a first set of UTM grid coordinates as **18, N, 371489, 4400877** followed by two more sets of coordinates. (Note: There are many variations to the form used for input of the coordinates which will depend on the nature of the system or projection.) At this point, the user would save the file as either a text (*.txt) or a data (*.dat) file name of their choice.

Output File

In order to specify the output coordinates, the user would open the MSP GeoTrans program and click on the File->Open menu buttons as shown on Page 3, Figure 3A. The user would then choose the text or data file that was created earlier and then the File Processing dialogue box would open. This allows the user to specify the output criteria. In example one, the user is choosing to output the coordinates as WGS 84, UTM grid coordinates. In example two, the user is choosing to output the coordinates as WGS 84, MGRS grid coordinates. After clicking on the OK box, the File Save As dialogue box opens which allows the user to specify the name and location where the output file is sent. Once the user clicks on the Save button, the file begins to be processed and will lists the number of points converted, number of errors, and number of warnings. In our first example, five points were converted with zero warnings or errors. The second example had three points successfully converted with zero warnings or errors. The output files can be seen in Figure 3D.

MSP GeoTrans download links:

<http://www.geoint.nga.ic.gov/products/gandg/geotrans/index.html> (NGANet link)

<http://earth-info.nga.mil/GandG/geotrans/index.html> (SBU link) **(NOTE: Hold down the CTRL key when clicking on the link.)**

Figure 3A - File Open dialogue box



Figure 3B - File Processing dialogue boxes

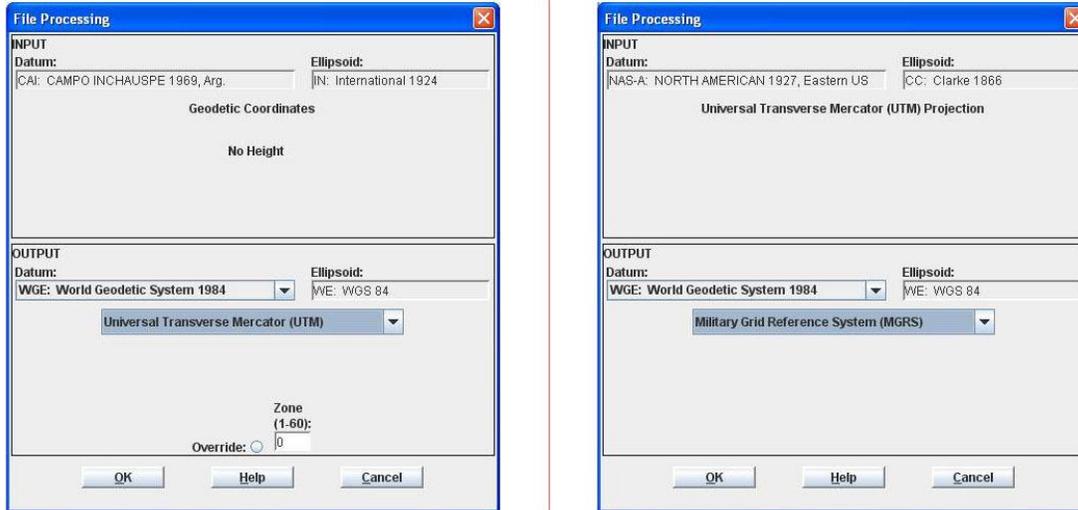


Figure 3C - Save As dialogue boxes

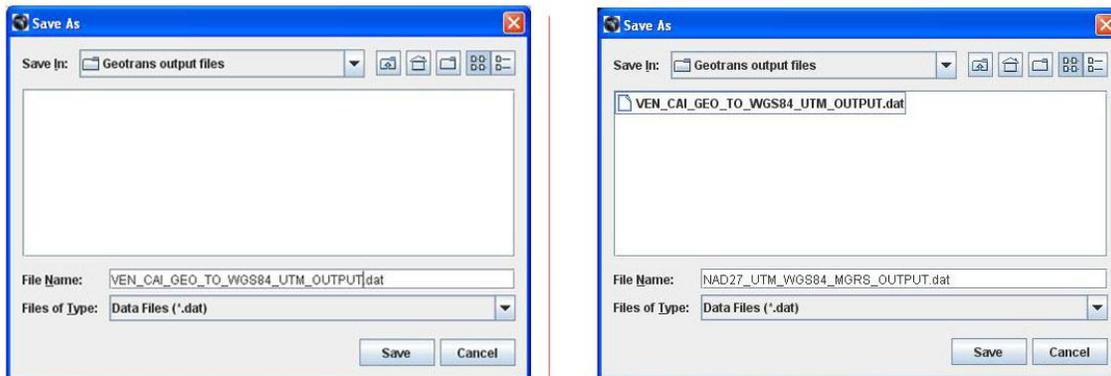


Figure 3D - Output file examples

COORDINATES: Universal Transverse Mercator (UTM)
 DATUM; WGE
 # ELLIPSOID: WE
 END OF HEADER

ARGENTINA
 # CAI_GEO TO WGS84_UTM

20, S, 301468, 7012060
 20, S, 407576, 6237447
 19, S, 499911, 5516787
 19, S, 419733, 5127672
 19, S, 361085, 4292679

COORDINATES: Military Grid Reference System (MGRS)
 DATUM; WGE
 # ELLIPSOID: WE
 END OF HEADER

WASHINGTON, DC AREA
 # NAD27_UTM TO WGS84_MGRS

18SUK7152101091
 18SUH2562463196
 17SPC7562507712

Next Article

The next article will demonstrate the use of the Create File Header Window, available in MSP GeoTrans version 3.0 or later, to assist in creating batch files.

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