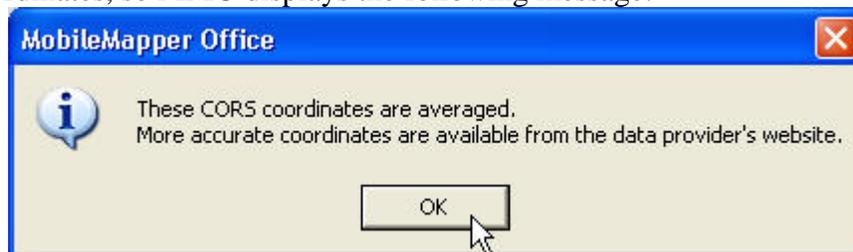


## Checking the accuracy of CORS sites prior to post-processing

23 January 2007

MobileMapper Office includes a **RINEX Download** utility for automating the download of reference station data used in post-processing. The *first* time you download data from a CORS station, **RINEX Download** averages the RINEX data to calculate coordinates for the reference station, which are a requirement for post-processed differential correction. A CORS station's coordinates are typically contained in the RINEX file's header but they usually lack the precision for submeter accuracy. Any error in the reference station's coordinates will be passed on to each rover position you post-process, so MMO ignores the coordinates in the RINEX header and instead averages the RINEX data to obtain more accurate coordinates. However, it is possible to obtain even more accurate reference station coordinates, so MMO displays the following message:



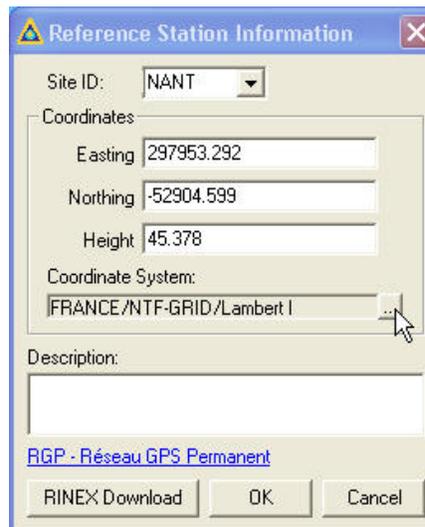
This tech note tells you how to obtain the correct coordinates from the RINEX provider's FTP or web site and enter them into MMO's **Reference Station Information** window. When you type in the correct coordinates, MMO writes them to a file (c:/Program Files/MobileMapper Office/refsites.ini) so it can automatically use the same coordinates the next time you download data from the same CORS site. So you need to follow the procedure below *only the first time* you download RINEX data from a CORS site. To locate and copy the correct reference station coordinates, follow these steps:

1. Visit the ftp site of the RINEX provider from whom you just downloaded CORS data:  
ASI: <ftp://geodaf.mt.asi.it/GEOD/GPSD/INFO/> and [ftp://geodaf.mt.asi.it/GEOD/GPSD/INFO/old\\_site\\_logs/](ftp://geodaf.mt.asi.it/GEOD/GPSD/INFO/old_site_logs/)  
IGS: <ftp://igsceb.jpl.nasa.gov/pub/station/log/>  
NGS: [ftp://www.ngs.noaa.gov/cors/station\\_log](ftp://www.ngs.noaa.gov/cors/station_log) (If you are downloading RINEX data from the US NGS, you may wish to refer to the tech note "Post-Processing with MMOOffice and NGS CORS data" for an easier way to input the correct coordinates of NGS sites.)  
RGP: <ftp://lareg.ensg.ign.fr/pub/rgp/stations/logsheets>  
SOPAC: [ftp://garner.ucsd.edu/pub/docs/site\\_logs/](ftp://garner.ucsd.edu/pub/docs/site_logs/)  
UNAVCO: <ftp://data-out.unavco.org/pub/logs>

- If you do not know which RINEX provider was used, click on the on the reference station's file name in MMO's Differential Correction window. Then click the **Reference Station properties** icon.

| File Name    | Start Time            | End Time              | Time Bar  |
|--------------|-----------------------|-----------------------|---|
| 06111300     | 11/6/2006 10:55:34 AM | 11/6/2006 11:25:11 AM |  |
| BNANTA06.310 | 11/6/2006 10:54:30 AM | 11/6/2006 11:30:30 AM |  |

A link to the provider is displayed at the bottom of the Reference Station Information window. In the example, below the data was downloaded from France's RGP (Réseau GPS Permanent).



Reference Station Information

Site ID: NANT

Coordinates:

Easting: 297953.292

Northing: -52904.599

Height: 45.378

Coordinate System: FRANCE/NTF-GRID/Lambert I

Description:

[RGP - Réseau GPS Permanent](#)

RINEX Download OK Cancel

- Double-click on the log sheet of the appropriate CORS site. These are listed alphabetically according to the four-character ID of the CORS site.
- Scroll down the log sheet until you find the section with "Site Location Information" as seen below:

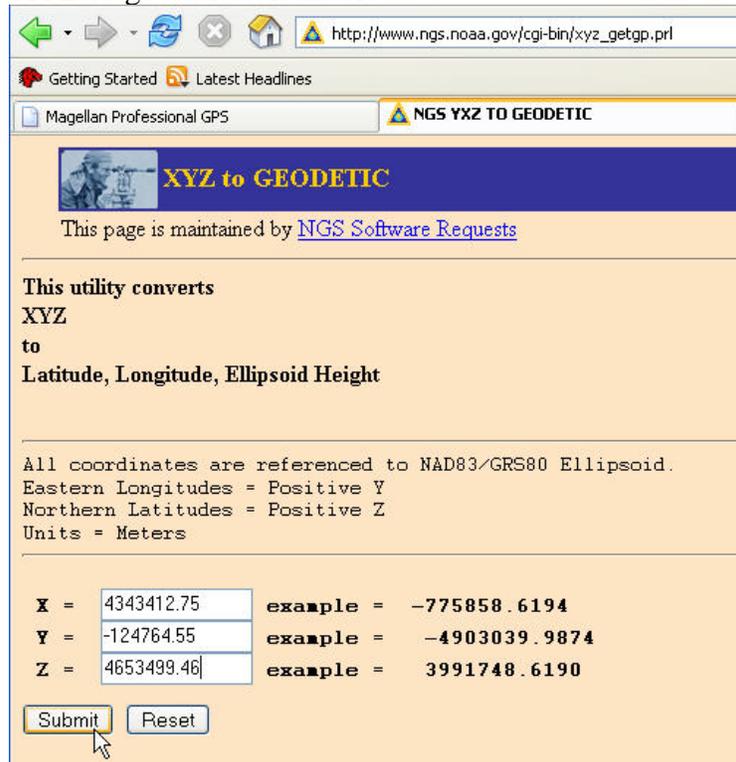
```

2. Site Location Information

City or Town           : BOUGUENAIS
State or Province     : Loire Atlantique (44)
Country               : France
Tectonic Plate        : Eurasia
Approximate Position (ITRF)
X coordinate (m)      : 4343412.75
Y coordinate (m)      : -124764.55
Z coordinate (m)      : 4653499.46
Latitude (N is +)    : +470914.79
Longitude (E is +)   : -0013843.33
Elevation (m,ellips.) : 00091.58
Additional Information : (multiple lines)
  
```

The latitude and longitude are not listed with enough precision to allow the greatest possible accuracy, so you will need to convert the XYZ coordinates into latitude/longitude/elevation.

- Highlight the X coordinate and copy it (press Ctrl/C on your keyboard).
- Go to [http://www.ngs.noaa.gov/cgi-bin/xyz\\_getgp.prl](http://www.ngs.noaa.gov/cgi-bin/xyz_getgp.prl) and paste the X coordinate (and then the Y and Z coordinates) from the CORS station's site log into the appropriate fields of the XYZ-to-geodetic calculator:



**XYZ to GEODETIC**

This page is maintained by [NGS Software Requests](#)

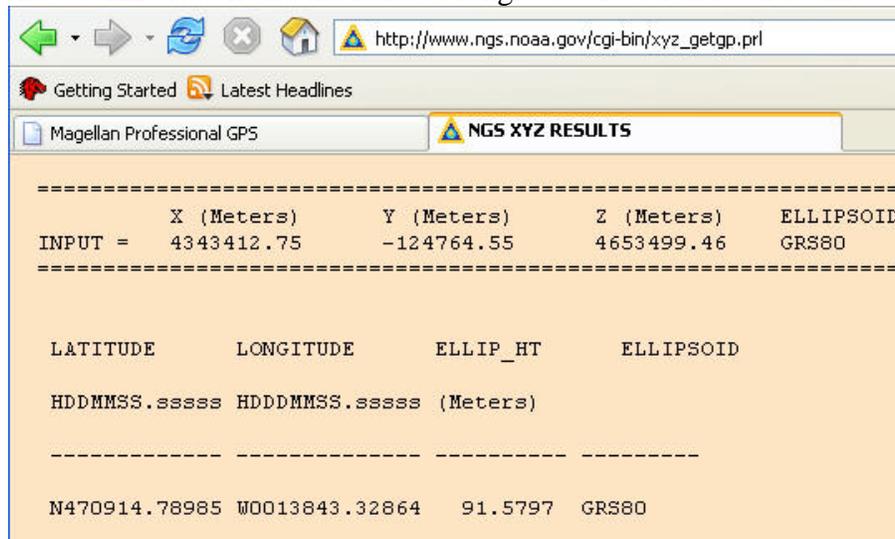
**This utility converts  
XYZ  
to  
Latitude, Longitude, Ellipsoid Height**

All coordinates are referenced to NAD83/GRS80 Ellipsoid.  
Eastern Longitudes = Positive Y  
Northern Latitudes = Positive Z  
Units = Meters

X =     **example** = -775858.6194  
Y =     **example** = -4903039.9874  
Z =     **example** = 3991748.6190

- Click the **Submit** button and the latitude/longitude/elevation results will be displayed:



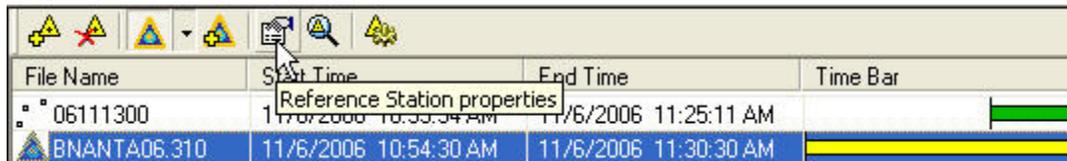
=====

|         | X (Meters) | Y (Meters) | Z (Meters) | ELLIPSOID |
|---------|------------|------------|------------|-----------|
| INPUT = | 4343412.75 | -124764.55 | 4653499.46 | GRS80     |

=====

| LATITUDE                             | LONGITUDE      | ELLIP_HT | ELLIPSOID |
|--------------------------------------|----------------|----------|-----------|
| HDDMMSS.sssss HDDMMSS.sssss (Meters) |                |          |           |
| -----                                |                |          |           |
| N470914.78985                        | W0013843.32864 | 91.5797  | GRS80     |

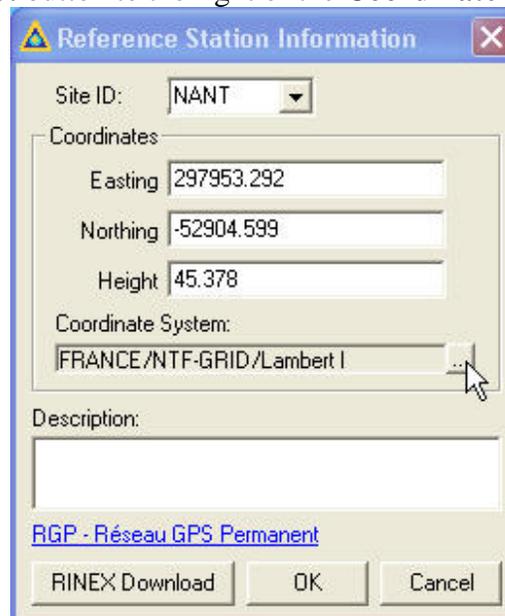
- If you just clicked **OK** on the MMO message saying the CORS station's coordinates are averaged, the **Reference Station Information** window is still displayed. If you have already closed the **Reference Station Information** window you may display it again by clicking on the reference station's file name in the MMO Differential Correction window. Then click the **Reference Station properties** icon as shown below:



| File Name    | Start Time            | End Time              | Time Bar |
|--------------|-----------------------|-----------------------|----------|
| 06111300     | 11/6/2006 10:55:34 AM | 11/6/2006 11:25:11 AM |          |
| BNANTA06.310 | 11/6/2006 10:54:30 AM | 11/6/2006 11:30:30 AM |          |

Note that the (averaged) coordinates are displayed by the **Reference Station Information** window are in the coordinate system you selected for your job. If this coordinate system is WGS84, you may proceed to **Step 11**. But if you are using a different coordinate system, proceed to **Step 8**.

- If you are using a coordinate system other than WGS84, as in the example below, click on the **three dot** button to the right of the **Coordinate System** field.



Reference Station Information

Site ID: NANT

Coordinates

Easting: 297953.292

Northing: -52904.599

Height: 45.378

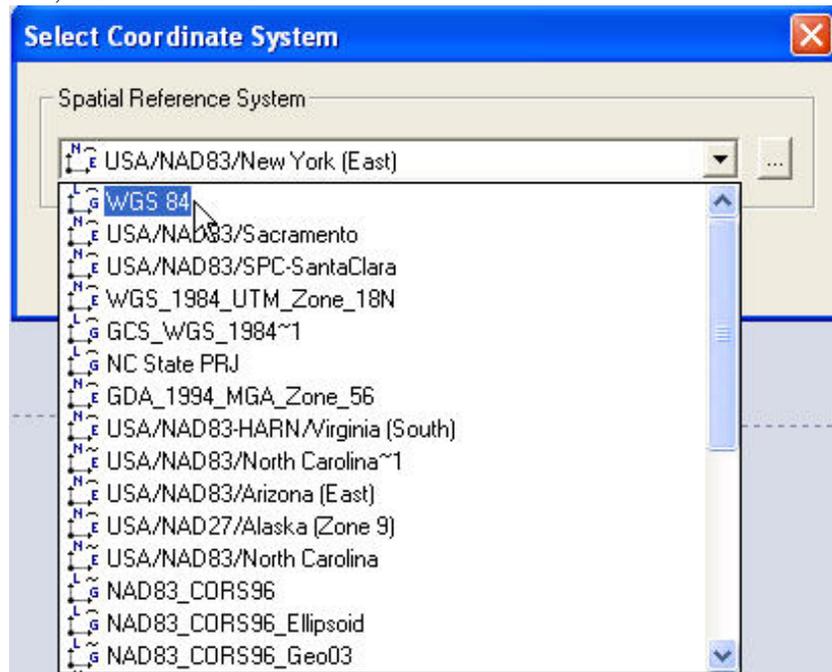
Coordinate System: FRANCE/NTF-GRID/Lambert I

Description:

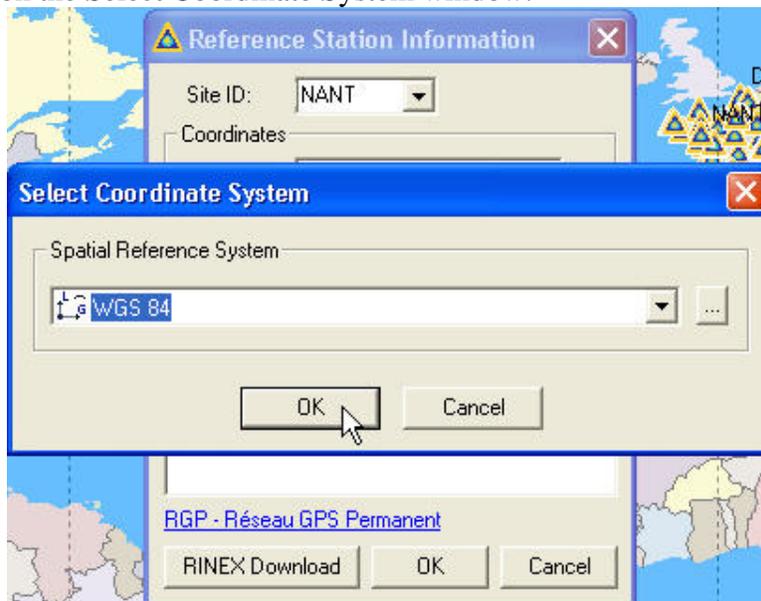
RGP - Réseau GPS Permanent

RINEX Download OK Cancel

10. This action displays MMO's **Select Coordinate System** screen (see below). Click the down arrow, select **WGS84**.

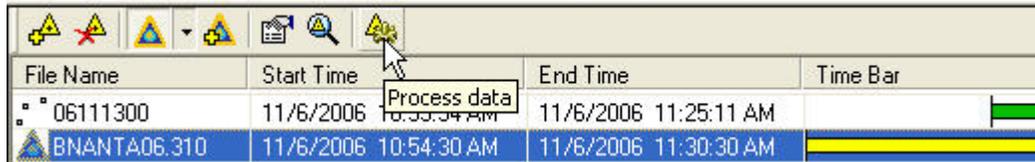


11. Click **OK** on the Select Coordinate System window.



12. MMO's **Reference Station Information** window will still be displayed. Copy the CORS log sheet's latitude and longitude and ellipsoid height (in meters) from the "NGS XYZ Results" web page into the **Reference Station Information** window and click **OK** at the bottom of the window. MMO will automatically switch back to your original coordinate system. MMO will also reset the units of height to what you were using.

13. You may now click the Process Data icon to post-process your data:



| File Name    | Start Time            | End Time              | Time Bar  |
|--------------|-----------------------|-----------------------|---|
| 06111300     | 11/6/2006 10:54:30 AM | 11/6/2006 11:25:11 AM |  |
| BNANTA06.310 | 11/6/2006 10:54:30 AM | 11/6/2006 11:30:30 AM |  |

Note: MMO saves all CORS site coordinates in a file (c:/Program Files/MobileMapper Office/refsites.ini) that may be deleted when you upgrade to a new version of MMO (depending on which version of MMO you are upgrading from). To prevent the loss of this file, please copy this file to a temporary folder and copy it back after the upgrade is complete. The instructions for upgrading to a new version of MMO include a reminder to do this. You may find the latest version of MMO at <ftp:magellangps.com> in the /Mobile Mapping/MM Office/Software/ folder.