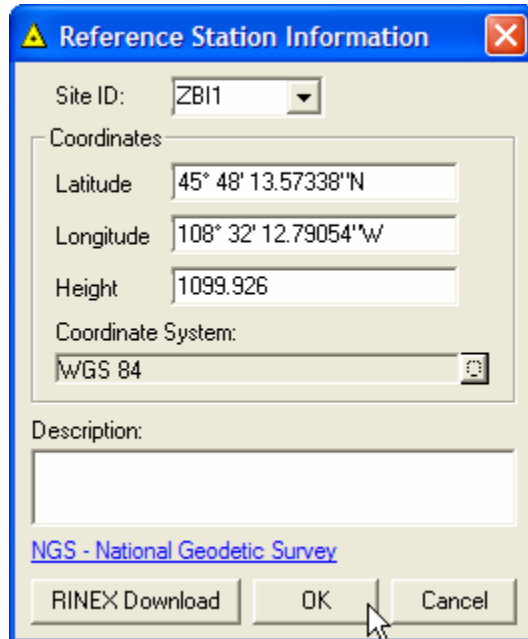


ITRF00 vs NAD83 Reference Station Information

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Using the correct reference frame will greatly improve the apparent accuracy of your Mobile Mapper Observations.

When post processing Mobile Mapper data files with NGS CORS data, Mobile Mapper Office automatically displays the coordinates of the reference station:



A screenshot of a software dialog box titled "Reference Station Information". The dialog has a yellow warning icon in the top-left corner and a red close button in the top-right corner. It contains several input fields: "Site ID" with a dropdown menu showing "ZBI1"; "Coordinates" section with "Latitude" (45° 48' 13.57338"N), "Longitude" (108° 32' 12.79054"W), and "Height" (1099.926); and "Coordinate System" with a dropdown menu showing "WGS 84". Below these is a "Description" text area. At the bottom, there is a blue hyperlink "NGS - National Geodetic Survey" and three buttons: "RINEX Download", "OK", and "Cancel". A mouse cursor is pointing at the "OK" button.

These default coordinates are **ITRF00** (not NAD83!) coordinates for the reference station.

User data processed against these base coordinates will yield coordinates offset to ITRF00.

Typical users in the United States may want to adjust the Reference Station coordinates to the NAD83 coordinates from the datasheet.

For example: here is the datasheet for XBI1, the Billings Montana Airport WAAS / CORS operated by the FAA:

```
***ITRF 00***
BILLINGS WAAS 1 (ZBI1), MONTANA
Retrieved from NGS DataBase on 11/24/03 at 16:39:07.
```

```
|
|      Antenna Reference Point(ARP): BILLINGS WAAS 1 CORS ARP
|      -----
|      PID = DF8970
|
| ITRF00 POSITION (EPOCH 1997.0)
| Computed in November, 2003 using 51 days of data.
|   X = -1416232.335 m      latitude   = 45 48 13.57346 N
|   Y = -4223633.939 m      longitude  = 108 32 12.79055 W
|   Z = 4550857.965 m      ellipsoid height = 1099.533 m
|
| ITRF00 VELOCITY
| Predicted with HTDP_2.7 March 2003.
|   VX = -0.0187 m/yr      northward = -0.0094 m/yr
|   VY = -0.0012 m/yr      eastward  = -0.0173 m/yr
|   VZ = -0.0062 m/yr      upward    = 0.0005 m/yr
|
| NAD_83 POSITION (EPOCH 2002.0)
```

```

| Transformed from ITRF00 (epoch 1997.0) position in Nov. 2003.
|   X = -1416231.786 m    latitude   = 45 48 13.54875 N
|   Y = -4223635.191 m    longitude  = 108 32 12.74800 W
|   Z = 4550857.912 m    ellipsoid height = 1100.202 m
|
| NAD_83 VELOCITY
| Transformed from ITRF00 velocity in Nov. 2003.
|   VX = 0.0000 m/yr    northward = 0.0000 m/yr
|   VY = -0.0000 m/yr    eastward  = 0.0000 m/yr
|   VZ = -0.0000 m/yr    upward    = 0.0000 m/yr
|
|-----|
| L1 Phase Center of the current GPS antenna: BILLINGS WAAS 1 CORS L1 PC C
|-----|
| The WAAS Antenna with Novatel Element antenna
| (Antenna Code = NOV_WAAS_600) was installed on 04/29/03.
|   The L2 phase center is 0.005 m above the L1 phase center.
|   PID = DF8971
|
| ITRF00 POSITION (EPOCH 1997.0)
| Computed in November, 2003 using 51 days of data.
|   X = -1416232.422 m    latitude   = 45 48 13.57338 N
|   Y = -4223634.200 m    longitude  = 108 32 12.79054 W
|   Z = 4550858.245 m    ellipsoid height = 1099.926 m
|
| The ITRF00 VELOCITY of the L1 PC is the same as that for the ARP.
|
| NAD_83 POSITION (EPOCH 2002.0)
| Transformed from ITRF00 (epoch 1997.0) position in Nov. 2003.
|   X = -1416231.873 m    latitude   = 45 48 13.54868 N
|   Y = -4223635.452 m    longitude  = 108 32 12.74799 W
|   Z = 4550858.192 m    ellipsoid height = 1100.595 m
|
| The NAD_83 VELOCITY of the L1 PC is the same as that for the ARP.

```

We are most interested in the L1 Phase Center of the reference antenna (outlined in red). In the example above two coordinates are listed, the ITRF00 and NAD83 coordinates. If we treat the ITRF00 coordinate as a NAD83 value and Inverse to the NAD83 value we find:

45 48 13.57338 N 108 32 12.79054 W NAD83; ITRF00

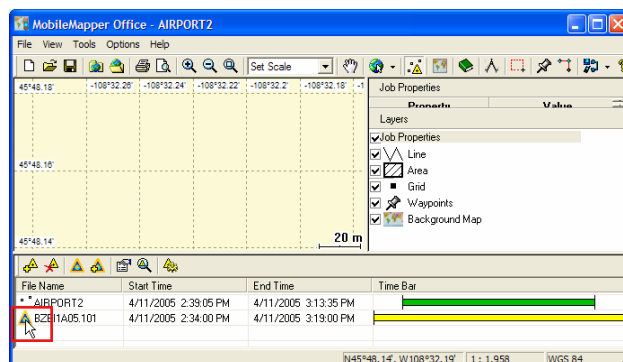
45 48 13.54868 N 108 32 12.74799 W NAD83; NAD83

= **1.194 M N50.1828W or 3.918 feet horizontal offset!**

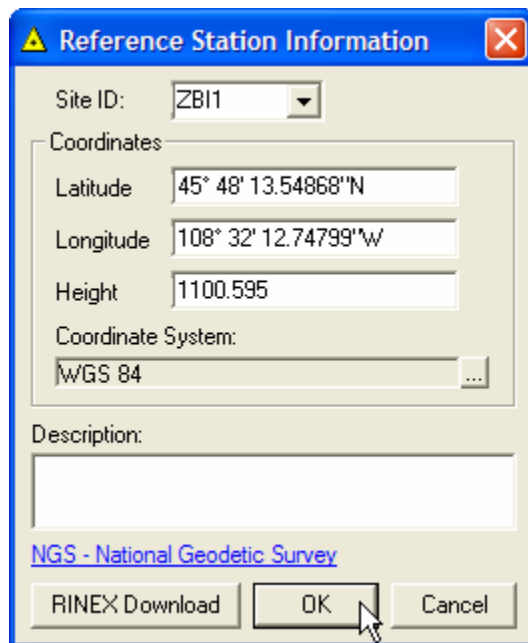
In other words: if you occupy a NGS Control point (Current Survey Control listed in NAD83) and use the default ITRF00 reference station coordinate then every Mobile Mapper recorded coordinate will appear to have more than 3.9 feet of error (in the Billings Montana.)

Most users in the United States will want to change the Mobile Mapper defaults to reflect the published NAD83 position.

To change the coordinates, click on the reference station icon to the left of the filename.



Then enter the NAD83 coordinate data:



The image shows a 'Reference Station Information' dialog box with a blue title bar and a yellow warning icon. It contains the following fields: 'Site ID' with a dropdown menu showing 'ZBI1'; 'Coordinates' section with 'Latitude' (45° 48' 13.54868"N), 'Longitude' (108° 32' 12.74799"W), and 'Height' (1100.595); 'Coordinate System' with a dropdown menu showing 'WGS 84' and an ellipsis button; and a 'Description' text area. At the bottom, there is a link 'NGS - National Geodetic Survey' and three buttons: 'RINEX Download', 'OK' (with a mouse cursor), and 'Cancel'.

and finally press OK.

Now press the process data button:



to recompute the differential corrections.

Once the coordinates for a reference station have been changed, Mobile Mapper will continue to use the manually entered values. (You won't need to reenter the NAD83 coordinate each time you post process a new job with this same reference station.)