

This demonstration mutes the need for this comparison by manually entering base station coordinates directly from NGS datasheets.

## A. Settings

- New project folders 3-7 were created with the same .ssf file as N1/N2
- .cor files exported with NAD83(Conus) null transformation
- .shp files assigned ITRF00 or UTM NAD83 projection files (.prj) as appropriate

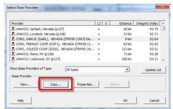
* Choose Ref Position Source	Distance from base	Resulting proj file	Choose Ref System and Transformation	Assign proj file & Projection file
N1 1 <sup>st</sup> Option Base Files RINEX header 42 24 58.47910, 119 21 19.59185	0.0	ITRF00	Lat/Long ITRF00 NAD83 (Conus)	ITRF00.prj
<i>*In Demo # 2, we learned this was really NAD83(2011) just for the sake of consistency, we choose ITRF00 for now</i>				
N2 2 <sup>nd</sup> Option Base Provider CBS-populated 58 48626, 19 43775	1.23 m	ITRF00*	Lat/Long ITRF00 NAD83 (Conus)	ITRF00.prj
<i>*See Demo # 1 for an explanation of the term "ITRF00"</i>				
N3 Seed NGS "New" L1 58 48645, 19 44385	1.34 m	IGS08	Lat/Long ITRF00 NAD83 (Conus)	ITRF00.prj
N4 Seed NGS "New" L1 58 48626, 19 43775	0.05 m	NAD83 (2011)	UTM NAD83 NAD83 (Conus)	UTM 11N NAD83.prj
N5 Seed NGS "Old" L1 58 48626, 19 43775	1.23 m	ITRF00	Lat/Long ITRF00 NAD83 (Conus)	ITRF00.prj
N6 Seed NGS "Old" L1 58 43262, 19 38154	0.0 m	NAD83 (CORSS98)	UTM NAD83 NAD83 (Conus)	UTM 11 N NAD83.prj
N7 Seed NGS "Old" ARP 58 47318, 19 43158	0.0 m	ITRF00	Lat/Long ITRF00 NAD83 (Conus)	ITRF00.prj

## Choose Reference Position Source

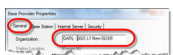
Base provider (2<sup>nd</sup> option) offers the opportunity to manually enter coordinates

1. Select the same CORS station

2. Click **Copy**



3. On the General tab, for **Organization** enter a name that describes the CORS site, source and reference system



4. On the **Base Station** tab, edit to match NGS

New L1 **IGS08 IGS08** coordinates and altitude



## B. View results in ArcMap

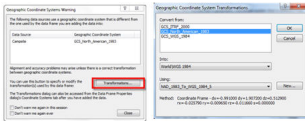
1. Start a new ArcMap document containing **no projection information**
2. Since a NAD83 data frame is desired, add the expected NAD83 locations **N4** and

□□□ **N6** first

3. Verify the map projection is UTM NAD83
4. Verify the spatial reference for N4 and N6 is **UTM NAD83**
5. Add the expected ITRF00 locations: **N1, N2, N3, N5 and N7.**

Since these ITRF00 locations do not match the NAD83 map, a transformation to align these layers in ArcMap can be specified.

6. Click the **Transformations** button



7. Choose to convert from NAD83 to WGS 84 using the **\_5 transform**

□□□ *Note: Same results in ArcGIS 10 as shown or in ArcGIS 10.1 with either [ITRF2000 to WGS84] +*

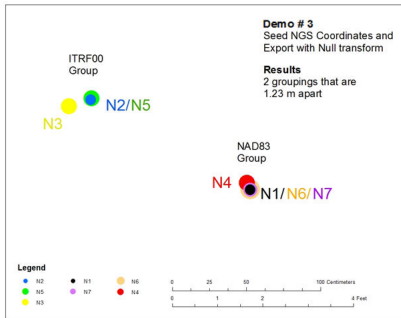
□□ *[WGS84(ITRF00) to NAD83 transform or [ITRF2000 to WGS84] + [NAD83 to WGS84\_5] transform*

8. Verify spatial reference for N1, N2, N3, N5, N7 is **ITRF00**

9. Verify the map projection is still **UTM NAD83**

For **N1, N2, N3, N5 N7** the data remains stored in ITRF00 but has been projected

“on the fly” in ArcMap to match the current NAD83 data frame.



### C. Analysis

Demo # 2 showed the 1.23 m difference between the “ITRF” and “NAD83” locations reflects the “meters from base distance”. This corresponds to the difference between NAD83 and ITRF00 in this area. Below 2 groupings are one might have predicted from the “meters from base” distances.

#### N2/N3/N5

- N2 and N5 are within 10 mm of each other

The difference between locations of the N5 (NGS ITRF00) and N2 (“HTDP ITRF00”) reflects location-specific IGS08 adjustments that were lost when the NGS IGS08 positions were HTDP-transformed to ITRF00.

- N3 is 15 cm from N5/N2

This is the difference is the datum shift between IGS08 (N3) and ITRF00 (N5/N2).

#### N1/N7

- N1 and N7 locations are one and the same. This is not surprising as N1 coordinates were supplied by Trimble and the same coordinates were seeded for N7.

- The N6 location within a mm of N1/N7
- The N4 location is slightly shifted from N6 reflects the new absolute antenna position compared to the older antenna position and the datum shift between and NAD83(2011) and NAD83(CORS96)

## D. Conclusions

Unacceptable -

- N2(HTDP-ITRF00)/N3(IGS08)/N5(ITRF00)/ can be dismissed since these do not meet the original goal of a NAD83 export.
- N6 is not good since it relies on "Old" coordinates which are based on the previous relative antenna standard that NGS no longer supports. The same could be said of N5.
- N7 is not good since these same coordinates are already the base file. Re-entering them introduces the element of human error. Re-read the results of demo # 1 before you insist on using the N1 workflow.

Best option in light of changes

In light of these Sept 2011 release of NA2011 and recent changes in PFO, N4 is the one of the best workflows above all others tested because the base coordinates were –

- manually entered from well-documented source, the NGS datasheet

- reflect the new absolute antenna position,
- are in the latest epoch of NAD83, NAD83(2011)
- meet our goals for export to GIS in a NAD83 shapefile

As Joel Cusick, NPS points out, “this is still not recommended as the ‘right way’, since this is really a ‘temporary’ work-around until a true solution can be found.”