

## GET STARTED

These steps apply for Network Surveys intended for inclusion in the NGSIDB.

### Field Requirements:

- 2-2 hours sessions for all stations (minimum)
- Ht Mod specs - must follow the NGS-58 & NGS 59 guidelines
- FAA specs - must follow the AC-16

### Things to think about before proceeding with OP

For now, OP is still creating a bluebook project. Though this was not the original intent it now is necessary to do some common house cleaning so to speak. If your intent is to have your project loaded into the NGS database the project is checked for format, quality and consistency. If you name your RINEX files in the manner of aaaaxxb.yyo, where aaaa is the 4-character ID, OPUS Projects will use the first 4 characters. They must be unique. OP uses 4 character IDs exclusively. A bfile and the description file uses a combination of SSNs, 4 character IDs, and designations. A gfile uses SSNs and 4 char IDs. Create 4 char IDs that make sense. Do not rely on OP to create the IDs. You want to use these same 4 char IDs for your logs, data files and photos. This makes it easy to find the correct metadata for a particular observation.

#### 1) Create

Provide NGS-supplied Project Tracking ID and hit return-fields will be filled in.  
You will be able to edit some of the fields and not others. Add in missing fields  
Check to ensure project type is correct.

#### 2) Preferences

Change Project ID and Manager Keywords if desired (they can be the same)  
Settings should be  
Piece-wise Linear  
7200 sec sampling interval  
USER network design setting  
Normal Constraints

#### 3) Upload (3 and 4 can be done in either order)

Set profile to use Project ID (caution:reset your profile for each new project)  
Upload all data files

NOTE: Please please please ensure your data files are named with the 1<sup>st</sup> 4 characters being the 4-character ID of the station. This will save much confusion during analysis.

#### 4) Upload Description

Run Windesc ChkdDesc outside of OP 4.0 BEFORE uploading the .dsc file. No errors are allowed other than the missing GPS number. When the description file is final, upload the .dsc file to OP 5.0. Currently, OP 5.0 is coded to require all 5 description files (\*.dsc, \*.des, \*.err, \*.dis, \*.nbr) uploaded in order to proceed. **It is important to upload descriptions at this point. This creates your SSNs.**

#### 5) Add long distance CORS

Choose a long distance CORS between 375 and 800 km from the center of your project that has data for every session.

#### 6) Remove superfluous CORS

A good rule of thumb is to have about 5 or 6 CORS that surround the project, plus the centrally located hub and a long distance CORS.

Ensure the remaining CORS have data for all sessions and that the short term plots indicate stability. NGS cannot stress enough the importance of choosing CORS wisely. (Include the short term plots in the project report.)

#### 7) Begin session processing

##### a) Single hub

One hub will be suggested if OP can do so with confidence. Otherwise, you will need to choose one that can be used in all sessions ,if possible. Try to keep the hub within 100 km of the observed "user" marks in the session. This distance can be extended if occupation times are substantial but should not exceed 200 km.

##### b) Multiple hubs

For larger projects where distances exceed 100-200 km mentioned above.

Ensure all session's Hub connect to all other Hubs.

**Fix all hubs in 3D.**

#### Tools for analysis:

Use the Solution Statistics from the pull down menu on the Managers Page to help with analysis.

Look at the session summary email. The 3<sup>rd</sup> section provides the MARK ESTIMATED – A PRIORI COORDINATE SHIFT(s) . Large shifts on the CORS should not to be ignored. If a particular CORS has large shifts consistently throughout the session it should be removed from the project. If a CORS shows large shifts in a particular session only, remove it from that session.

Note poor results, but at this stage you may want to see how it displays in the preliminary network adjustment. But on the other hand if you have overly large P2P anything approaching or over 3N,3E,6U, you may want to remove the offending station from the session.

#### 8) Preliminary Network Adjustment (GPSCOM)

If any significant time has elapsed since the beginning of session processing, hitting the REFRESH PID button will ensure control stations are updated in the project in the event there were updates to the NGSIDB.

Fix one hub (3D), float all other stations

If poor results are still indicated, you may need to go back to session processing to 'reject' observations. Be careful to ensure 2 occupations remain (do not reject to no-check (see ADJUST guidelines)).

#### 9) Free Adjustment

Fix one hub (3D), float all other stations

If large differences (residuals) exist it may be necessary to remove (reject) observations. This requires returning to session processing.

#### 10) Constrained Adjustment

Fix all published NAD 83(2011) positions in 3D with the exception of the long distance CORS and review results. If large shifts and/or large residuals exist it could be helpful to remove all passive control and only hold the CORS to see how things look.

Fix all CORS except the Long Distance CORS in 3D.

You may want to start with only the CORS. IF there are issues then you may, want to remove some of the CORS that are giving poor results from the project.

Fix published passive control (3D)

If the adjustment looks good with only the CORS control then proceed with fixing all passive control.

Note F-test result (if it does not pass, this is an indication of poor control or bad sigmas)  
If large differences (residuals) exist it may be necessary to free (redetermine) control.

11) Free Vertical Adjustment

Fix the hub (2D), float all other stations  
Fix one published orthometric height

12) Constrained Vertical Adjustment

Fix the hub (2D), float all other stations  
Fix all published orthometric heights  
Note F-test result

If large differences (residuals) exist it may be necessary to free (redetermine) control.

13) Upload field logs for **every** occupation

One file of scanned logs

or

Logs individually named consistent with RINEX naming convention, zipped

14) Upload photos (see [photo guidelines](#) for naming conventions)

15) Upload project report (see [Introduction](#) Section 6)

16) Review and Submit to IDB

NGS will receive the project for review and inclusion into the NGSIDB.