

ATTACHMENT 15
Directions for Accessing OMNI (v4.00) via the Internet

OMNI is a collection of over 40 DOS based programs designed to process static, multi-baseline GPS data collected by carrier-phase receivers. OMNI was designed to provide an analyst with all the tools necessary to judge the quality of data, and to edit out bad data as necessary. It is an interactive software package, not an automatic, hands-off type of package like those sold by industry. OMNI (v4.00) is compatible with WindowsNT. The executable files, User's Guide, and sample data are available via the internet. They can be downloaded into a directory named "OMNI400" on your hard drive.

The NGS anonymous ftp server is: <ftp.ngs.noaa.gov>

Create a directory named OMNI400 on your hard drive. Log on to the above ftp server as "anonymous". For your password type your full internet address. Go to directory \PUB\OMNI\UPDATE\. Download all the files in the \EXE directory (using binary transfer mode) and in the \TXT directory (using ASCII transfer mode) into your OMNI400 directory.

To execute the programs, execute the OMNI.BAT file while in your OMNI400 directory.

If you have any problems or questions about accessing OMNI via the Internet, contact Steve Hilla at (301) 713-3202, ext. 162.

Attachment 16 World Wide Web

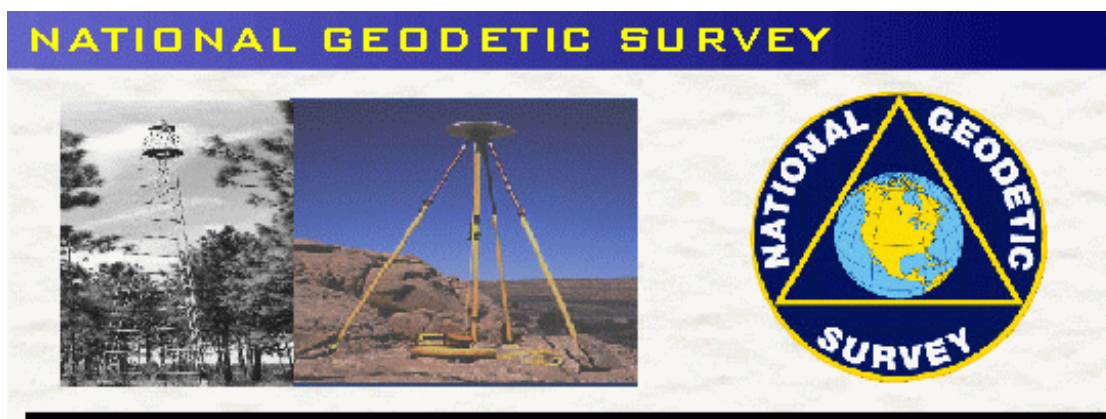
The NGS Aeronautical Survey Program Web Site can be accessed at <http://www.ngs.noaa.gov/AERO/aero.html> This web site provides access to documentation and other information for performing airport surveys. The site also provides survey tracking information and links to the NGS Home Page, CORS Data Page, and Survey Station Data Sheets Page.



Aeronautical Survey Program Home Page
<http://www.ngs.noaa.gov/AERO/aero.html>

NGS Home Page:

The address for NGS' World Wide Web site is: <http://www.ngs.noaa.gov> There NGS presents a wealth of information on its data products, software programs, and user services, as well as links to other helpful sites on the Web.



NGS Home Page
<http://www.ngs.noaa.gov>

CORS Data:

CORS data can be downloaded from <http://www.ngs.noaa.gov/CORS/cors-data.html>

This web page can be accessed from the Aeronautical Survey Program Home Page by clicking “CORS Data” under “NGS Hot Links.” From the CORS data page, click on the “User Friendly CORS” link to access the new utility that performs all the data file decimation and concatenation for you. All you need to enter is the CORS station name and the date and time period of the data you need.

Processing Programs:

Below is a select listing of the NGS PC software that is currently accessible through the Web. For the full and most recent list of NGS programs, visit the NGS PC Programs webpage at http://www.ngs.noaa.gov/PC_PROD/pc_prod.html

ADJUST (Version 4.11)

Performs a least squares adjustment on horizontal, vertical angle, and/or GPS observations. The program comprises six data checking programs in addition to the adjustment software. This software package has numerous options, such as choice of ellipsoid, and includes sample input data. Also available is the source code.

ADJUST UTILITIES

Suite of programs that are used in conjunction with PC program ADJUST. This group of programs includes:

BBACCUR which provides a formatted listing of the external and internal accuracies which have been computed by program ADJUST-- sorted in numerical ascending order of external accuracy. Output from program ADJUST, run with accuracies, is used as input.

CLUSTER used to identify geodetic stations which are common to two data sets with respect to name or a given position tolerance.

ELEVUP creates a bfile which combines the bfile output from the constrained horizontal adjustment with the bfile output from the constrained vertical adjustment. This new bfile contains *80* records with adjusted positions from the horizontal and *86* records with the ellipsoidal heights from the horizontal adjustment and the orthometric heights and geoid heights from the vertical adjustment.

ELLACC which computes ellipsoidal height order and class for a project. Output from program ADJUST, run with accuracies, is used as input.

MAKE86 which adds *86* records to the bfile. If the existing *80* records contain orthometric heights, these are added to the new *86* records.

MODGEE scales the standard errors assigned to the observations in the gfile. Input is a gfile and the scaling factor.

QORECORD adds qq records to the Afile (used by program ADJUST) to compute accuracies for all observed lines. Either the gfile (for GPS projects) or the bfile (for classical terrestrial projects) can be used as input.

COMPGB (Version 1.1)

Tests the consistency and compatibility of the Blue Book B file (GPS project and station occupation data) and G file (GPS vector data transfer file).

CR8BB (Version 4.0)

Reformats GPS project information to fit the requirements of the National Geodetic Survey data base. The file created, which is called the B-file, contains project information, station information, and survey measurements. The CR8BB software functions independently of the type of GPS receivers used in a project.

CR8SER (Version 1.1)

Extracts data from GPS Blue Book G file to create a station serial number file (serfil) for GPS observations.

DDPROC (Version 2.33)

This portion of program VFPROC organizes control point descriptions in accordance with the National Geodetic Survey's unified description format. This format eliminates the need for separate descriptions for horizontal, vertical, gravity, and satellite surveying points.

DSPLOT (Version 1.4)

Digital Data Sheet (DSDATA) plot program. Used to plot DSX created index files on the terminal screen. DSX is the DSDATA extraction program. Although DSPLOT was primarily developed to work with DSDATA and DSX, the program will plot any file which is in the same format as a DSX created index file. The documentation file DSPLOT.DOT contains a sample of this format. cost: Free with purchase of DSDATA.

DSSELECT (Version 3.4)

Digital Data Sheet (DSDATA) Data Item Selection program. Allows for extraction of various data items from a DSDATA file into a separate file. Output is one record per station with data items separated by a delimiter for easy database loading. cost: Free with purchase of DSDATA

DSWIN (Version 1.7)

DSWIN is windows based software for Data Sheet view and extraction. It displays a list of county names as found on your CD-ROM. Click on a county and a list of stations appears. Click on a station from the list and a data sheet appears. You may save the data sheet to a file or print it. The search feature allows for filtering the station list by: Point Radius, Min/Max Box, Station Name, or PID. You may also filter by type of control, such as 1st order bench marks only

DSX (Version 6.04)

Digital Data Sheet (DSDATA) extraction program. Extracts individual or groups of data from a DSDATA file. Includes options to extract by Station Identifier, Station Name, Area, and more. Also includes utilities for manipulating the data such as joining two or more DSDATA files or splitting a DSDATA file into smaller files. cost: Free with purchase of DSDATA.

GEOID96 (Version 3.10)

Computes geoid height values for the conterminous United States, Alaska, Puerto Rico, Virgin Islands, and Hawaii. Suitable for conversion of NAD83 GPS ellipsoidal heights into NAVD88 orthometric heights.

LOOP (Version 4.03)

Determines the loop misclosures of GPS base lines using the delta x, delta y, delta z vector components computed from a group of observing sessions.

OMNI Files and Printouts to be Submitted to NGS

Raw Data:

Place raw data in the following directory:

*ProjectName/DayofYear/RawData/

*ProjectName is two-letter state ID,
plus ANA

Formatted Data:

Place data formatted for OMNI processing and the precise orbit files in:

ProjectName/DayofYear/OMNIdata/

OMNI Results:

Place the following files into:

ProjectName/DayandSession/OMNIres/

FILE:

SAVIT

*.GF

INTGR

MERG.INP

MERG.TRP

GPS22.INP

*.EDT

####DT.DAT (1st and last ? only)

####HD.DAT

####OR.DAT

*.ANT

SAVE AS:

SAVI###s.Lna (save final and the copy created before running BIAS)

?###sGF.Lna (for the last database only)

INTGR.FIX (for fixed integer solutions, or .PAR for partially fixed,
.FLT for float solutions; save final and the file created
before running BIAS)

Note:

represents Day of Year

? represents the database ID

s represents the session letter

n represents solution type:

1 (L1)

2 (L2)

3 (L3)

a represents integer status:

L (float)

X (fixed integers), or

P (Partially fixed)

Paper Printouts:

Final SAVIT Files

Final Post-fit residual (PFR) plots

PXC plots

ELV plot for PACS

NGS Procedural Outline for Adjusting GPS Data (Establishment of ANA Geodetic Control Surveys)

1. Complete OMNI processing:

- Ensure all fixed coordinates used in processing were correct (review SAVIT files).
- Ensure all PFR plots are acceptable.
- Ensure RMS values in SAVIT files are acceptable.
- Ensure "up" offset values for each station are equal to the monument to L1 phase center difference.
Note, for the CORS stations this value should be 0.00m.

2. Create input files:

- Make a combined Gfile using program MAKEGF.
 - Check B record, column 52-53 for proper coordinate system code ("18" as of 03/01/98)
- Make an Afile using program CRAFILE or by editing a previous Afile.
- Make a Station Serial Number file (SERFILE) using program MAKESSN.
- Make a Bfile using program CR8BB.

3. Format and check Bfile:

- Add *86* records to Bfile using program MAKE86
- Manually edit Bfile into proper format:
 - Insert GPS Survey Method Code '4' into *12* record column 76
- Run checking program COMPGB; do not continue adjustment unless all errors are corrected

Substitute CTCORS for CORS below if applicable

4. Run a Free Adjustment (ADJUSTMENT 1):

- Afile- Constrain the NAD 83 position and ellipsoid height (EHT) of one CORS station.
 - Save copies of each Afile used- Name "AFILE.1" etc.
- Bfile- Use clean Bfile from step 3 as input.
- Output- Name output file ADJOUT.1
 - Rename output Bfile BBOUT.1
 - Analyze results, review residuals on vector components (all less than 5cm?)

5. Run a Horizontally Constrained Adjustment (ADJUSTMENT 2):

- Afile- Constrain the NAD 83 position and EHT of all CORS stations used
- Bfile- Use output Bfile from ADJUSTMENT 1 (BBOUT.1)
- Output- Name ADJOUT.2; review results
 - Compare coordinates with NGS published (match 5cm hor., 10 cm eht?)
 - Rename output Bfile BBOUT.2; (Basis for final Bfile)

6. Run an additional Constrained Adjustment (ADJUSTMENT 3):

- This adjustment is for comparison only, use results from ADJUSTMENT 2 for further adjustments and final results.
- Afile- Constrain NAD83 position and EHT of all HARN and CORS stations used
- Bfile- Use BBOUT.1 again as input
- Output- Name ADJOUT.3; rename output Bfile BBOUT.3; review results

7. Run a Free Adjustment with Accuracies (ADJUSTMENT 4):
 - Afile- Run program QQRECORD to add QQ records to AFILE.1 (output AFILE.4)
 - Bfile- Use BBOUT.2
 - Output- ADJOUT.4
 - Run program BBACCUR to obtain a listing of the length relative accuracies
 - Output- "BBACC.OUT"; review results
 - Run program ELLACC to obtain a listing of EHT accuracies
 - Output- "ELLACC.OUT"; review results
 - Manually edit the mode EHT order and class code into columns 54-55 of each *86* record of BBOUT.2

- **The following two adjustments are performed to obtain orthometric heights to be inserted into the output Bfile from ADJUSTMENT 2**

8. Run program GEOID (96) to insert geoid heights into the Bfile:
 - Input- BBOUT.2
 - Output- GEOID.OUT

9. Run a Free Vertical Adjustment (ADJUSTMENT 5):
 - Afile- Constrain the NAD83 horizontal position of one CORS station and the NAVD88 orthometric height of the "best" (center of project, high quality) benchmark
 - Bfile- Use GEOID.OUT for input
 - Output- Name ADJOUT.5; rename output Bfile BBOUT.5
 - Review orthometric heights with published NGS values (agree w/in 15cm?)

10. Run a Constrained Vertical Adjustment (ADJUSTMENT 6):
 - Afile- Same as ADJUSTMENT 5, constrain additional orthometric heights of benchmarks that worked well in the Free Vertical Adjustment
 - Bfile- Use GEOID.OUT for input
 - Output- Name ADJOUT.6; rename output Bfile BBOUT.6; review results and rerun using different constraints in the Afile if necessary.

11. Run program ELEVUP to transfer orthometric heights from ADJUSTMENT 6 to the final Bfile:
 - Input vertical Deck- BBOUT.6
 - Input horizontal Deck- BBOUT.2
 - Name the final Bfile %%%FNL.BBK (where %%% is a unique ID for the adjustment)
 - rerun checking programs on the final Bfile to check for format errors
 - double check values in *80* and *86* records against ADJOUT. 2 and ADJOUT.6
 - rename GFILE to %%%FNL.GFL

12. Run checking programs on the final Bfile and correct errors, explain any unresolved error messages in the project report:
 - COMPGB
 - NEWCHKOB
 - OBSCHK
 - OBSDES (matches Bfile with description file)
 - CHKDES (checks description file for format errors)

13. Submit the following digital files (and paper copy if indicated) in a ProjectName/Adjust/ directory (Create an %%%/Adjust/ subdirectory for each grouping of airports adjusted together, where %%% is a unique ID created for the adjustment group):

-ADJUST Files:

%%%%FNL.BBK (Include Paper Copy)
%%%%FNL.GFL
AFILE.*
ADJOUT.1 (Include Paper Copy)
ADJOUT.2 (Include Paper Copy)
ADJOUT.3 (Include Paper Copy)
ADJOUT.4
ADJOUT.5
ADJOUT.6 (Include Paper Copy)
BBACC.OUT (Include Paper Copy)
ELLACC.OUT
SERFILE

-Output Files From Checking Programs (Include Paper Copy), (Explain Error Messages in Report):

COMPGB.OUT
NEWCHKOB.OUT
OBSCHK.OUT
OBSDES.OUT (Checks description files)
CHKDES.OUT (Checks description files)

-Submit Final Description Files from DDPROC Software (Include Paper Copies).

-Submit paper copies of data used for fixed control (CORS log/coordinate sheets, NGS datasheet used for HARN, BM coordinates etc.)

-Final Processing Report:

-Include an OMNI processing scheme tabulated by session which lists: stations solved (and type of station PACS, BM, etc., and Airport ID(s) station was observed for); observation time for each station, vectors solved, solution type (L3 FIX, etc.), final RMS, and Gfile name for the session.

-Include a listing of instrumentation used during the project.

-Include a discussion of the field work, data processing, and adjustment performed. This discussion should include an analysis of results, problems encountered, and any deviations from the requirements in the Project Instructions or Supplemental Instructions.

-Include a list of all software used, including date and version.

-Include copies of all field logs (Observation logs, Visibility Diagrams, Rubbings).

-Submit a transmittal sheet listing all items submitted to NGS.

PROJECT SUBMISSION CHECKLIST

GPS PROJECTS

Project Title: _____

Accession Number: _____ Receiver Type: _____

Submitting Agency: _____

Observing Agency: _____

PACKAGE CONTENTS

Project Report and Attachments:

- () Project Report
- () Approved Reconnaissance and Project Sketch
- () Project Instructions or Contract Specifications
- () Final Station List
- () Station Visibility Diagrams
- () Final Observing Schedule
- () Observation Logs
- () Equipment Failure Logs
- () Loop Misclosures
- () Free Adjustment with Analysis
- () Free Adjustment with Accuracies
- () Constrained Horizontal Adjustment
- () Constrained Vertical Adjustment (NAVD Heights)
- () Meteorological Instrument Comparison Logs
- () Photographs of Views from Stations
- () Photographs or Rubbings of Station Marks
- () COMPGB Output (Validation program-B/G file)
- () OBSDES Output (Validation program-D-file)
- () OBSCHK Output (Validation program-D-file)
- () CHKDESC Output (Validation program-D-file)
- () ELLACC Output
- () BBACCUR Output

Required For:

- All Projects
- All Projects
- All Projects
- All Projects
- All Projects
- All Projects
- All Projects
- NGS Projects
- Optional
- All Projects
- All Projects
- All Projects
- All Projects
- If Specified
- If Specified
- All Projects
- All Projects
- All Projects
- All Projects
- All Projects
- All Projects

Digitized Data Files: () Diskettes () Zip Disk

- () Raw Phase Data (R-files)
- () Base Line Vectors (G-file)
- () Project and Station Occupation Data (Final B-file)
- () Descriptions or Recovery Notes (D-file)
- () Terrestrial Horizontal Observations (T-file)
- () Differential Leveling Observations (L-file)

() Other: _____

- All Projects
- All Projects
- All Projects
- All Projects
- If Applicable
- If Applicable

Comments - Enter on reverse side of this form.

<u>Org Code</u>	<u>Name</u>	<u>Date</u>
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Received By: _____

Reviewed By: _____

Reviewed By: _____