

# OP2IDB Future Plans

CGSIC, Portland, OR

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OP2IDB – acronym for OPUS Projects loaded into the NGS Integrated Database

<https://www.ngs.noaa.gov/datums/newdatums/NSRSModernizationNewsIssue5.pdf>

National Geodetic Survey Positioning America for the Future [geodesy.noaa.gov](http://geodesy.noaa.gov)



Issue 5, October 2016

# NSRS Modernization News

For all issues of **NSRS Modernization News**, visit:  
[geodesy.noaa.gov/datums/newdatums/TrackOurProgress.shtml](http://geodesy.noaa.gov/datums/newdatums/TrackOurProgress.shtml)

## Legislation

The National Society of Professional Surveyors (NSPS), the American Association for Geodetic Surveying (AAGS), and the NGS Advisory Committee on National Spatial Reference System Legislation recently briefed the NSPS Executive Committee (ExComm). Following the meeting, the NSPS took possession of the template legislation for 2022, and the committee was then disbanded.

## Major Projects

**A variety of NGS projects now underway are contributing to the modernization of the NSRS. Significant milestones are highlighted below.**

### Geometric Transformation Consistency

**Lead: Dr. Dru Smith:** The final builds of all grids are nearly complete, and NADCON5 functionality is being coded into NGS' internal test website (DEV) in October. If all goes well, a new toolkit containing NADCON5 will be released on the beta website for public testing by December.

### Geoid Slope Validation Survey 2017

**Lead: Dr. Derek Van Westrum:** NGS surveyors have completed the setting of 220 bench marks in southern Colorado. Data acquisition (leveling, GPS, gravity, and deflection of vertical) will begin as soon as weather permits in the spring of 2017 and is expected to continue through the summer.

### GPS Campaign for Transformations

**Lead: Galen Scott:** Data density requirements for the horizontal component of the transformation tool are being investigated using CORS data. Preliminary results indicate the datum shift pattern is regular enough that little supplementary data will be needed

for the horizontal transformation. Requirements for vertical data density are also being investigated. Analysis of existing GPS on Bench Mark data is also being evaluated, and a gap analysis will be performed to determine where new data is needed. Rates of vertical land motion will also be considered to help determine the timing of future data collections.

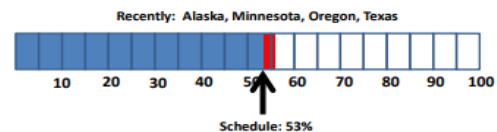
### OPUS-Projects into the IDB

**Lead: Dr. Mark Schenewerk:** The report documenting the analysis of OPUS Projects is going through internal review and should be available later this year. Development of the next generation of OPUS Projects has begun. NGS continues to expect its first "bluebooked through OPUS Projects" submission to enter the NGS IDB by the end of the calendar year. As the development nears completion, several public webinars will be held describing this work and the changes to OPUS Projects, but no dates have yet been set. Check the NGS webpage for announcements.

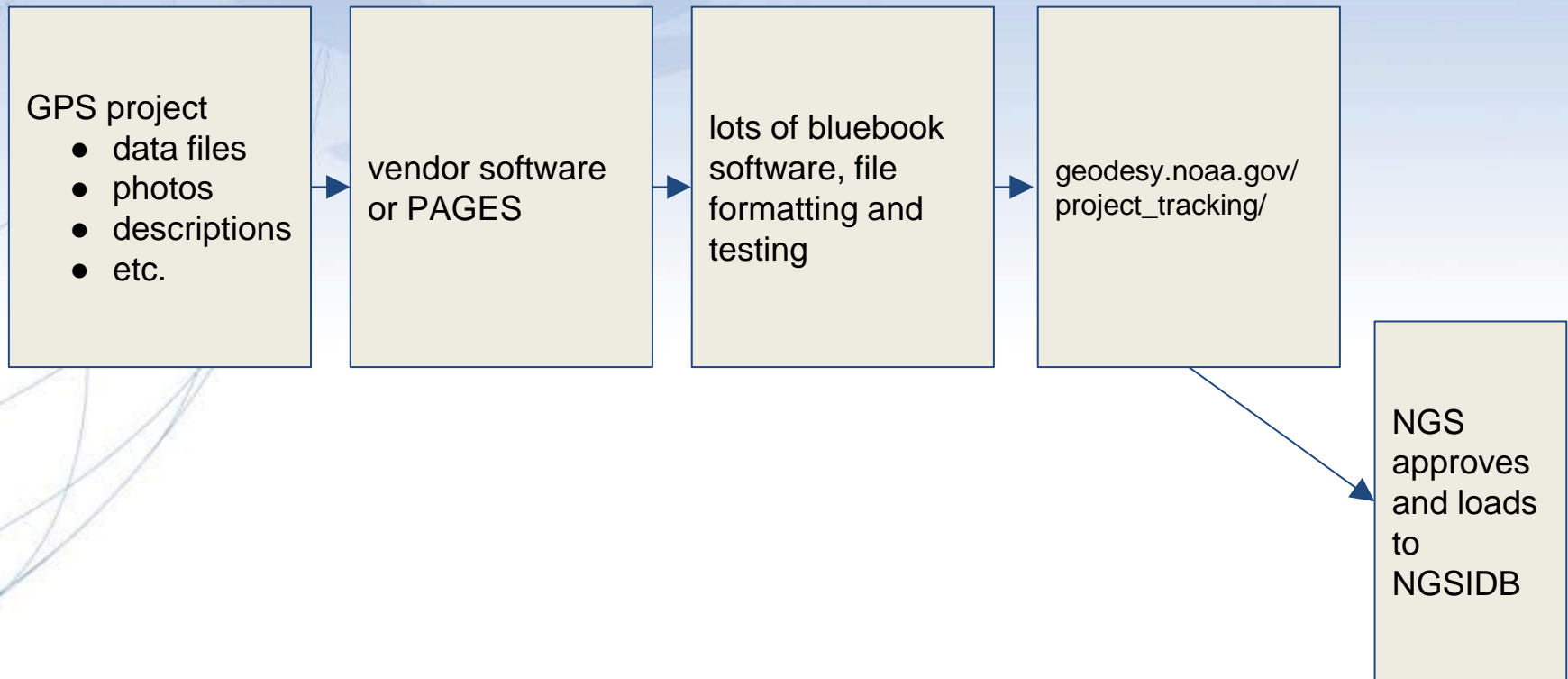
### xGEOIDs

**Lead: Dr. Yan Wang:** This year's annual experimental gravimetric geoid model, incorporating all available GRAV-D data, has been released for beta testing. Known as xGEOID16B, the model can be found here: <http://beta.ngs.noaa.gov/GEOID/xGEOID16/>

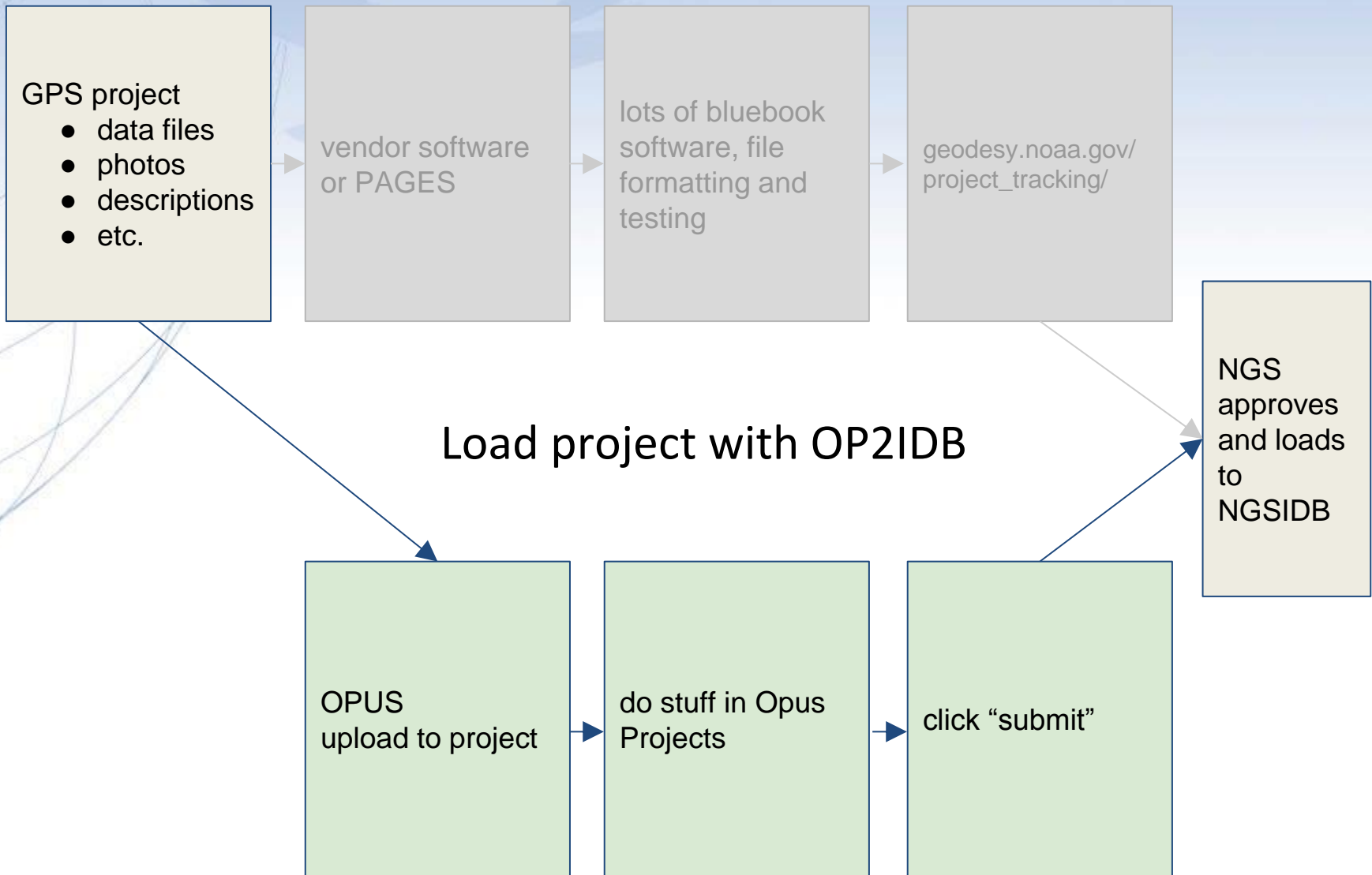
**GRAV-D progress last quarter: up 2.4% to 55.4% Ahead of Schedule!**



← OP2IDB is part of modernizing the NSRS



How GPS surveys historically get loaded into the NGS Integrated Database (NGSIDB)



# NGS IDB & OPUS Projects References

- Constrained Adjustment Guidelines  
[https://geodesy.noaa.gov/PC\\_PROD/ADJUST/adjustment\\_guidelines.pdf](https://geodesy.noaa.gov/PC_PROD/ADJUST/adjustment_guidelines.pdf)
- NGS Survey Marks and Datasheets  
<https://geodesy.noaa.gov/datasheets/index.shtml>  
<https://geodesy.noaa.gov/DATASHEET/dsdata.pdf>
- OPUS-Projects training and reference documents.  
<ftp://geodesy.noaa.gov/pub/opus-projects/>

# What is in a submission to the IDB?

- Station Photographs (Digital)
- Observation (Field) Logs (scanned)
- Station Mark Rubbings
- Raw Data Files in both RINEX and proprietary receiver formats.

# What is the purpose of OP2IDB?

- In 2015, NGS began working on an upgrade to OPUS-Projects, where GPS projects can be loaded to the NGS IDB. We call it OP2IDB for short.
- The driving factors:
  - Bluebooking is tedious and time-consuming.
  - Provide that, with minimal changes to its web-based Graphical User Interface (GUI), OPUS-Projects can be extended to prepare in toto submissions to the IDB.
- In short: create a version of OPUS-Projects that can “feed” the IDB.



# What OP2IDB does

- Backward compatible to OPUS-Projects.
- Suggest defaults settings for processing GPS data.
- Orchestrates and performs adjustments using ADJUST.
- Automatically creates all bluebook processing submission files.
- Automatically performs basic, required quality control.
- Provides a “convenient” place to keep, organize and quality control electronic copies of files required for a submission to the IDB.



# Differences to OPUS-Projects (in general)

- Online help
- Fewer email messages
  - Users control project deletion
  - “Better” locking
- All marks have velocities
- Add/del CORS
- More CORS selection information
- Better CORS-CORS integer fixing
- “Better” baseline selection within session
- Uncertainties from short-term time series (CORS from OPUS-Net) for CORS without measured coordinate uncertainties

# Status of OP2IDB

- July 26 – October 25: Development release for NGS-internal testing.
- October 25 - indefinite : BETA release for public testing.
  - This will be treated like a production release.
- After approximately six months without issue: we'll propose to move BETA OP2IDB to PROD OPUS-Projects

# CORS map as of September 2017 (only Contiguous US shown)

**CORS Map**

https://www.ngs.noaa.gov/CORS\_Map/

National Geodetic Survey

NGS Home About NGS Data & Imagery Tools Surveys Science & Education Search

**CHOOSE MAP**  
Sampling Rate Map [v]  
Show/Hide Help Legend

**Zoom to CORS:**  
Site ID: [ ] Go

Cursor Lat/Lon :  
45.64477 , -123.31055  
Three Nearest Sites :  
JIME 28.39 km  
NWBG 46.45 km  
CHZZ 54.93 km

Enter a location [ ] Go  
Place X

**Map** Satellite **JIME** X

Status : Operational  
Sampling Rate : 5 sec(s)  
Availability : Hourly  
GNSS : GPS+GLO  
Agency : Washington County Surveyor's Office

**Get Site Info**

250 km radius X

\*\* To filter sites click on icons \*\*

GPS	GNSS	All
[GPS icon]	[GNSS icon]	[All icon] <a href="#">1 sec rate</a>
[GPS icon]	[GNSS icon]	[All icon] <a href="#">5 sec rate</a>
[GPS icon]	[GNSS icon]	[All icon] <a href="#">15 sec rate</a>
[GPS icon]	[GNSS icon]	[All icon] <a href="#">30 sec rate</a>
[GPS icon]	[GNSS icon]	[All icon] <a href="#">All Active</a>
[GPS icon]	[GNSS icon]	[All icon] <a href="#">All Non-Operational</a>
[GPS icon]	[GNSS icon]	[All icon] Decommissioned

[Download CORS KMZ](#)

Map data ©2017 Google, INEGI Terms of Use  
Website Owner: National Geodetic Survey / Last modified by ngs.infocenter Tuesday, 12-Sep-2017 13:12:18 EST

# Sample OPUS report

NGS OPUS SOLUTION REPORT

All computed coordinate accuracies are listed as peak-to-peak values.  
 For additional information: <http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>

USER: sample\_dataset@noaa.gov DATE: September 23, 2014  
 RINEX FILE: s487333r.12c TIME: 15:52:24 UTC

SOFTWARE: page5 1209.04 master53.pl 022814 START: 2012/11/28 17:40:00  
 EPHEMERIS: igs17163.eph [precise] STOP: 2012/11/28 23:19:00  
 NAV FILE: brdc3330.12n OBS USED: 13936 / 14614 : 95%  
 ANT NAME: TRMR8\_GNSS3 NONE # FIXED AMB: 71 / 72 : 99%  
 ARP HEIGHT: 2.000 OVERALL RMS: 0.012 (m)

REF FRAME: NAD 83 (2011) (EPOCH:2010.0000) IGS08 (EPOCH:2012.9095)

X:	-1344688.261 (m)	0.003 (m)	-1344689.094 (m)	0.003 (m)
Y:	-4254022.426 (m)	0.011 (m)	-4254021.176 (m)	0.011 (m)
Z:	4543984.565 (m)	0.006 (m)	4543984.537 (m)	0.006 (m)

LAT:	45 43 1.90250	0.003 (m)	45 43 1.92368	0.003 (m)
E LON:	252 27 30.07922	0.002 (m)	252 27 30.02508	0.002 (m)
W LON:	107 32 29.92078	0.002 (m)	107 32 29.97492	0.002 (m)
EL HGT:	877.465 (m)	0.012 (m)	876.788 (m)	0.012 (m)
ORTHO HGT:	892.034 (m)	0.023 (m)	[NAVD88 (Computed using GEOID12A)]	

Peak to Peak, or largest minus smallest position values as obtained from 3 CORS

	UTM COORDINATES	STATE PLANE COORDINATES
	UTM (Zone 13)	SPC (2500 MT )
Northing (Y) [meters]	5065768.616	164962.754
Easting (X) [meters]	302195.871	752401.705
Convergence [degrees]	-1.82015695	1.43254516
Point Scale	1.00008105	0.99964529
Combined Factor	0.99994349	0.99950779

US NATIONAL GRID DESIGNATOR: 13TCL0219565768 (NAD 83)

BASE STATIONS USED

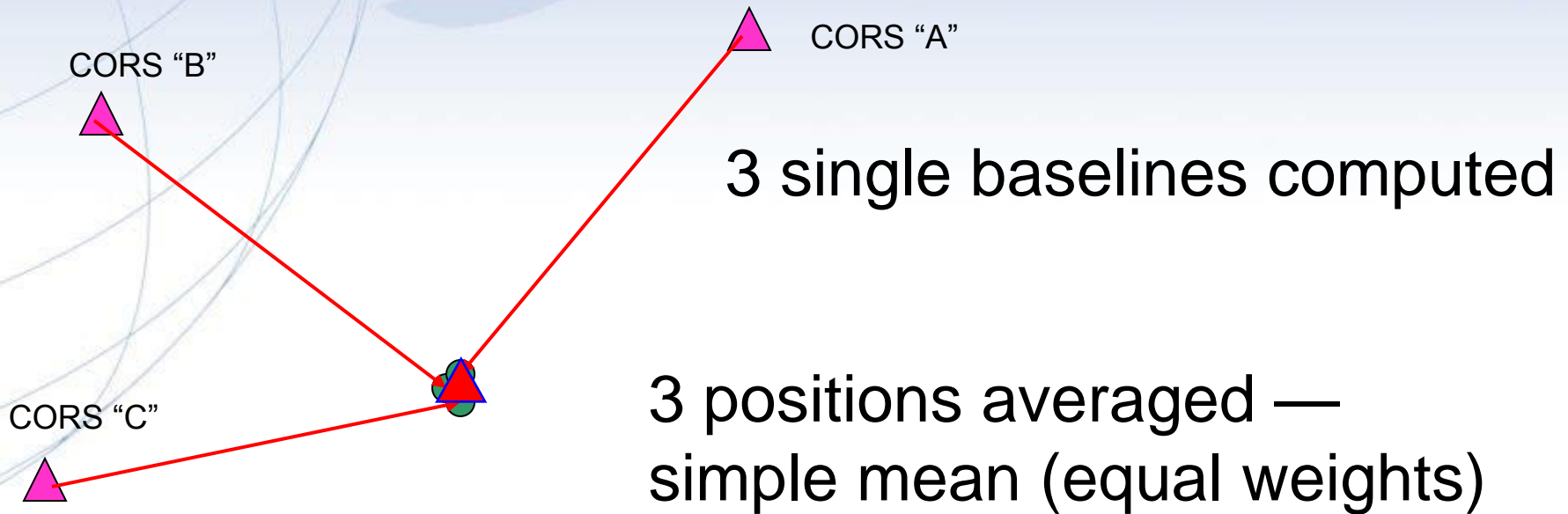
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE (m)
DI3062	BIL5 BILLINGS 5 CORS ARP	N455816.237	W1075947.298	45229.9
DI3425	P052 LRRNCHJRDNMT2006 CORS ARP	N472229.026	W1070107.185	188587.9
DM7161	WYSH SHERIDAN CORS ARP	N444801.769	W1070035.715	110113.3

NEAREST NGS PUBLISHED CONTROL POINT

QV0271	S 487	N454301.902	W1073229.920	0.0
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# How Does OPUS Compute Position?



Differences between positions include any errors in CORS coordinates

# IDB datasheet for OPUS mark (PID:QV0271)

The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.12.3

1 National Geodetic Survey, Retrieval Date = SEPTEMBER 15, 2017

QV0271 \*\*\*\*\*

QV0271 DESIGNATION - S 487  
 QV0271 PID - QV0271  
 QV0271 STATE/COUNTY- MT/BIG HORN  
 QV0271 COUNTRY - US  
 QV0271 USGS QUAD - HARDIN (1980)

OPUS results agree with the NGS IDB to within 6mm in Latitude and 9mm in Ellipsoid height

QV0271 \*CURRENT SURVEY CONTROL

QV0271\* NAD 83(2011) POSITION- 45 43 01.90270(N) 107 32 29.92081(W) ADJUSTED  
 QV0271\* NAD 83(2011) ELLIP HT- 877.456 (meters) (04/30/13) ADJUSTED  
 QV0271\* NAD 83(2011) EPOCH - 2010.00  
 QV0271\* NAVD 88 ORTHO HEIGHT - 892.066 (meters) 2926.72 (feet) ADJUSTED

QV0271 GEOID HEIGHT - -14.569 (meters) GEOID12B  
 QV0271 NAD 83(2011) X - -1,344,688.258 (meters) COMP  
 QV0271 NAD 83(2011) Y - -4,254,022.415 (meters) COMP  
 QV0271 NAD 83(2011) Z - 4,543,984.563 (meters) COMP  
 QV0271 LAPLACE CORR - -0.42 (seconds) DEFLEC12B  
 QV0271 DYNAMIC HEIGHT - 891.891 (meters) 2926.15 (feet) COMP  
 QV0271 MODELED GRAVITY - 980,389.6 (mgal) NAVD 88

QV0271 VERT ORDER - FIRST CLASS II

QV0271 Network accuracy estimates per FGDC Geospatial Positioning Accuracy Standards:

QV0271	FGDC (95% conf, cm)		Standard deviation (cm)			CorrNE (unitless)
	Horiz	Ellip	SD_N	SD_E	SD_h	
QV0271	0.76	2.39	0.35	0.26	1.22	0.01415943

QV0271 Click here for local accuracies and other accuracy information.

QV0271

# OP2IDB Sample Project



## OPUS Projects - Manage "HARDIN AIRPORT"

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- Tools
- Surveys
- Science & Education

 Search

Results From ALL ADJUSTMENTS

**Controls**

LEGEND

MARKS: ● meet preferences ● do not meet preferences ● are not included ● have error

CORS: ▲ meet preferences ▲ do not meet preferences ▲ are not included

Baselines: —

Map Satellite  Marks  Marks&CORS

Preferences

Project List

Solutions

Add Project Tracking ID

Show File

Send Email

Upload Serfil

Upload Description

Upload Field Logs

Set up Adjustment

Upload Project Report

Review and Submit to IDB

Delete Project

**LEGEND**

**MARKS**

- 00ua
- 00ub
- 00uc
- n487
- s487**
- y538

**LEGEND**

**CORS**

- bil5
- p051
- p052
- p722
- pie1
- wysh

Add MARKS

Add/Del CORS


Occupation From ALL ADJUSTMENTS

MARKS	Adjustments					MARKS
	network final-vertical-constrained	network final-vertical-free	network final-horizontal-constrained	network final-horizontal-free	network final	
00ua	●	●	●	●	●	00ua
00ub	●	●	●	●	●	00ub
00uc	●	●	●	●	●	00uc
n487	●	●	●	●	●	n487
s487	●	●	●	●	●	s487
y538	●	●	●	●	●	y538



# NGS Corbin, VA Training Center

<https://www.ngs.noaa.gov/corbin/calendar.shtml>



## National Geodetic Survey

Positioning America for the Future

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Fax: (540) 373-4327

Email Us

**Calendar of Upcoming Classes**

To Register for a Webinar:  
Follow the 'Register' link on the webpage describing the class content. Click here for webinar **Frequently Asked Questions**.

To Register for a Classroom-based Session:  
Click on the appropriate link in the table below, which will take you to a short registration form.

- For classroom-based sessions, we request at least a **3-week notice** if you cannot make a class for which you registered. While we understand that schedules and circumstances change, there are minimum class sizes, and last-minute cancellations can negatively affect other attendees and NGS staff.
- NGS will make every effort to conduct all classes as shown below; however, changes to the schedule may arise due to budget constraints or other considerations. In the event of any changes, those registered for the class will be notified as soon as possible, with at least a 2-week notice.

All classes are free of charge unless otherwise noted.

For a list of workshops and conferences sponsored or attended by NGS, visit [this page](#).




Date	Name of Class	Registration Status	Trainer(s)	Audience	Classroom / Webinar
9/27/17 - 9/28/17	<b>OPUS Projects Manager's Training</b> , webinar	Class is full contact Erika Little for wait list	Dave Zenk, Northern Plains Regional Advisor	Open to all federal, state, local and private organizations	webinar
10/25/17	<b>Beta OPUS Projects Quick Start Training</b> , webinar	<a href="#">Register</a>	Mark Schenewerk, OPUS Technical Advisor	Open to all federal, state, local and private organizations	webinar
10/31/17 - 11/1/17	<b>OPUS Projects Manager's Training</b> , Casper, WY	Registration details coming soon	Bill Stone, Southwest Regional Geodetic Advisor and Pamela Fromhertz, Rocky Mountains Regional Geodetic Advisor		classroom
10/31/17- 11/3/17	<b>Geodetic Digital Levelling class, with an optional day on River/Valley Crossings</b> , Corbin, VA	<a href="#">Register</a>	Charlie Geoghegan and Malcolm Arher-Shee	Open to all federal, state, local and private organizations	classroom
11/8/17 - 11/7/17	<b>OPUS Projects Manager's Training</b> , Tulsa, OK	<a href="#">Register</a>	Bill Stone, Southwest Regional Geodetic Advisor and Dan Prouty, Southern Plains Regional Geodetic Advisor	Open to all federal, state, local and private organizations	classroom
11/8/17	<b>Beta OPUS Projects Quick Start Training</b> , webinar	<a href="#">Register</a>	Mark Schenewerk, OPUS Technical Advisor	Open to all federal, state, local and private organizations	webinar
12/5/17 - 12/6/17	<b>OPUS Projects Manager's Training</b> , Corbin, VA	<a href="#">Register</a>	Charles Geoghegan, NGS Trainer	Open to all federal, state, local and private organizations	classroom




Note the frequency Of OPUS Projects Training classes

# New features for OP2IDB

Current OPUS Projects tabs

Future OP2IDB tabs

Controls
  
Preferences
Project List
Design
Serfil
Solutions
Show File
Send Email
Set up Adjustment
Review and Share
Delete Project

Controls
  
Preferences
Project List
Solutions
Add Project Tracking ID
Show File
Send Email
Upload Serfil
Upload Description
Upload Field Logs
Set up Adjustment
Upload Project Report
Review and Submit to IDB
Delete Project

# Ready to try OP2IDB?

You will first have to take a OPUS Projects training class (see the Corbin training calendar for course locations and times) at <https://www.ngs.noaa.gov/corbin/calendar.shtml>

For individuals who have had OPUS Projects training, see the notice on or after October 25, 2017 at <https://www.ngs.noaa.gov/OPUS-Projects/OpusProjects.shtml> , where the Beta link will be provided, or

Email [Rick.Foote@noaa.gov](mailto:Rick.Foote@noaa.gov) or [Mark.Schenewerk@noaa.gov](mailto:Mark.Schenewerk@noaa.gov) for the Beta link after October 25, 2017