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Subject: Update for GNSS Observations on passive Wisconsin Height Modernization (Wi-HMP) Stations May 2023
Date: Monday, May 1, 2023 4:15:33 PM

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Please share as appropriate
Date: 5/1/2023

I want to acknowledge that Mark Kamin and the students at Northeast Wisconsin Technical College (NWTC) have submitted multiple observations on some new stations near the NWTC campus for publication in the NGS database when the 2022 datum is rolled out. Thank you all for adding to this effort!

The National Geodetic Survey (NGS) has announced the current deadline to include GPS on BM observations as part of the release of the 2022 datum is September 30, 2023. More information is available at <https://www.ngs.noaa.gov/GPSonBM/>

A link to the WisDOT GPS on BM status Map:
<https://wisdot.maps.arcgis.com/apps/webappviewer/index.html?id=9f00da9c32da4e519bd035591abc09c9>

In the Wisconsin Height Modernization (WI-HMP) Program, there are approximately 5,288 Vertical only stations and 3,553 stations with a Horizontal component for a total of 8841 stations

Many observations have been done that do not yet appear on the NGS OPUS share map nor GPS on BM PRIORITY MARK LIST below

OPUS Share Solutions per NGS OPUS share Dashboard (Based on Observation Date)

Shared Observations prior to January, 2021	474
Shared Observations 2021	3445
Shared Observations 2022	1000
Shared Observations 2023 as of 5/1/23	35

Total 4954

OPUS Share Solutions per NGS OPUS share Dashboard (Based on Date observation was accepted by NGS)

Shared Observations prior to January, 2021	345
Shared Observations 2021	3294
Shared Observations 2022	1216
Shared Observations 2023 as of 5/1/23	99

Total

4954

Notes

- All shared observations by WisDOT and Partners
- Includes non-WI-HMP stations

Date	Total Shared Observations Based on NGS accepted date
September 8, 2020	66
December 3, 2020	157
January 4, 2021	345
February 1, 2021	430
March 1, 2021	606
April 1, 2021	755
May 1, 2021	971
June 1, 2021	1143
July 6, 2021	1443
August 4, 2021	1752
September 1, 2021	2299
October 1, 2021	2708
November 1, 2021	3000
December 1, 2021	3370
January 1, 2022	3643
February 4, 2022	3845
March 2, 2022	3970
August 8, 2022	4139
September 1, 2022	4208
October 3, 2022	4292
November 7, 2022	4414
December 1, 2022	4613
January 6, 2023	4883
February 2, 2023	4920
March 2, 2023	4922
April 4, 2023	4923
May 1, 2023	4954

10 Km NGS GPSONBM Hexagons Completed

NGS has divided the entire nation into a series of 10 Km hexagons. One goal of the WisDOT's GNSS Observation on passive stations project is to get one observation in every Wisconsin 10 KM hexagon. There are 1843 hexagons in Wisconsin. Hexagons that are DONE are a result of either an OPUS share station observation or a station submitted to NGS via Bluebooking within a hexagon.

Date	10 KM Hexagons Completed	% Completed	10 Km Hexagons Remaining
September 8, 2020	447	24.3%	
November 30, 2020	571	31.0%	
January 4, 2021	584	31.7%	
February 1, 2021	609	33.1%	
March 1, 2021	718	39.0%	
April 1, 2021	760	41.3%	
May 3, 2021	897	48.7%	
June 3, 2021	978	53.1%	
July 2, 2021	1083	58.8%	
August 3, 2021	1300	70.6%	
September 2, 2021	1510	82.0%	
October 4, 2021	1618	87.8%	
November 1, 2021	1688	91.6%	
December 1, 2021	1737	94.3%	
January 4, 2022	1757	95.3%	86
February 3, 2022	1768	95.9%	75
March 2, 2022	1775	96.3%	68
August 8, 2022	1777	96.4%	66
September 7, 2022	1777	96.4%	66
October 17, 2022	1777	96.4%	66
October 31, 2022	1778	96.5%	65
November 28, 2022	1779	96.5%	64
January 3, 2023	1779	96.5%	64
January 31, 2023	1779	96.5%	64
February 21, 2023	1779	96.5%	64
March 20, 2023	1779	96.5%	64
May 1, 2023	1779	96.5%	64

Note: All remaining hexagons contain non-Wisconsin Height Modernization NGS stations, vertical only benchmarks or are have stations that are not GPSable.

GPS on BM PRIORITY MARK LIST (NGS)

NGS has produced a prioritized list of bench marks where additional GPS data would be helpful to help define the new 2022 Geoid model. Providing GPS on stations with leveled elevations will help to relate the GPS derived ellipsoid height with the leveled elevation of these marks. The stations on the Priority List are chosen by computer generated algorithms based on station location and metadata without regard to its status as a WI-HMP station. Currently, there are about 15,000 NGS benchmarks (both WI-HMP stations and non WI-HMP) in Wisconsin. Most non WI-HMP stations have relatively little current survey value, but may have important older surveys tied to them.

Date	Number of stations on list	Number of stations Completed	Percent of NGS Priority Marks Completed	Approximate % of 3553 Horizontal WI-HMP Stations
9/8/2020	2968	674	22.7%	19.0%
11/30/2020	3162	806	25.5%	22.7%
1/11/2021	3284	891	27.1%	25.1%
2/11/21	3395	949	28.0%	26.7%
3/1/21	3622	1054	29.1%	30.0%
4/1/21	3718	1107	29.8%	31.2%
4/28/21	4033	1272	31.5%	35.8%
5/24/21	4205	1397	33.2%	39.3%
6/29/21	4455	1565	35.1%	44.0%
7/30/21	4582	1646	35.9%	46.3%
8/23/21	5281	2134	40.4%	60.1%
9/20/21	5545	2448	44.1%	68.9%
11/1/21	5720	2689	47.0%	75.7%
11/29/21	5774	2846	49.3%	80.1%
12/7/21	5780	2861	49.5%	80.5%
1/4/22	5790	2931	50.6%	82.5%
1/18/22	5802	2982	51.4%	83.9%
2/8/22	5802	2998	51.7%	84.4%
3/1/22	5808	3041	52.4%	85.6%
8/1/22	5807	3080	53.3%	86.7%
8/23/22	5807	3126	53.8%	88.0%
10/11/22	5807	3164	54.5%	89.1%
11/28/22	5811	3346	57.6%	94.2%
1/31/23	5812	3509	60.4%	98.8%

Not updated since 1/31/22

Notes

- In an effort to make sure GPS on BM observations are spread out throughout a region, NGS designates only one 'completed' station in every NGS 2 Km hexagon, not matter how many station are in the hexagon
- Not all Wi-HMP stations are currently on the BM PRIORITY MARK LIST
- The vast majority of observations are on WI-HMP horizontal stations, but not all.
- NGS adds additional stations to the BM PRIORITY MARK LIST after certain stations are observed
- BM PRIORITY MARK LIST Spreadsheet typically updated once a month

ORIGINAL HARN STATIONS (OR REPLACEMENTS) DONE One

goal of the WisDOT's GNSS Observation on passive stations project is to get two observations on all original HARN stations or their replacements in Wisconsin. There are 80 Stations in total. The original HARN stations are a higher accuracy station and provided the initial control from which all other horizontal stations in Wisconsin were surveyed from.

Date	HARN Stations Completed	% Completed
March 1, 2021	49	61.3%
April 1, 2021	53	66.3%
May 3, 2021	59	73.8%
June 3, 2021	60	75.0%
July 6, 2021	69	86.3%
August 2, 2021	71	88.8%
September, 2, 2021	74	92.5%
October 1, 2012	76	95.0%
November 1, 2021	76	95.0%
December 1, 2021	78	97.5%
January 1, 2022	78	97.5%
February 3, 2022	78	97.5%
March 1, 2022	79	98.8%

Remaining (0): MILWAUKEE GPS has been destroyed.

List of Non-WisDOT Partners (that I am aware of) that have or are planning to submit OPUS Share observations

J.W. Austin Associates of Minocqua, Vernon County, LaCrosse County, Dodge County, Dunn County, Brown County, Sheboygan County, Washington County, Burnett County, Manitowoc County, Jackson County, Clark County, Sawyer County, Fond du Lac County, Oneida County, Washburn County, Lincoln County, Rock County City of Madison, Landtech Surveying of Oconomowoc, Seiler Instruments, Leica Geosystems, Milwaukee Metropolitan Sewerage District, DJ Henkel and Associates, LLC, Northeast Wisconsin Technical College (NWTC), Ayres and Associates, Christopher J. Gregory, PLS

THANK YOU ALL,
Mick

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