



## Oregon Real-time GNSS Network (ORGN) Past, Present & Future



CSRC 2025

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# ORGN Station Installation: The Pieces of the Puzzle





# SCIGN GPS Antenna Mount



# Site Criteria Standards

- +/- 60 Km Station Spacing
- Satellite visibility: clear view of sky
- No electromagnetic interference
- Pre-installation data quality sets: 3 days of GPS data
- Continuous power w/ backup (Home Made UPS device)
- Internet connectivity
- Vandal resistant locations
- Year-round ease of access





# Completed Installation



Lightning Protector

Battery Charger

GPS Sensor



Internet Cable

Battery

GPS Antenna Cable



Eric

## ORGN: Quick Overview



- ▶ History & Makeup:
  - ▶ Begun in 2006 with 4 S. Oregon stations
  - ▶ Current NSRS NAD83 2011 epoch 2010.00
  - ▶ 140+ Reference Stations, 51 belong to ODOT, 90+ to partners
  - ▶ Multi constellation GPS, GLONASS & Galileo
  - ▶ MAX Network
  - ▶ Multiple partners: WSRN, TURN, Earthscope (aka UNAVCO), CWU, Counties, Cities.
  - ▶ Customers include: Construction, AG, UAV's, OSP+
  - ▶ Over 2700+ rover accounts (Survey, Construction, Inspection, Agriculture, UAV, Remote Sensing)
  - ▶ RINEX for Post Processing
  - ▶ Managed by ODOT (Randy Oberg and Eric Zimmerman)



## *ORGN Station Facts*

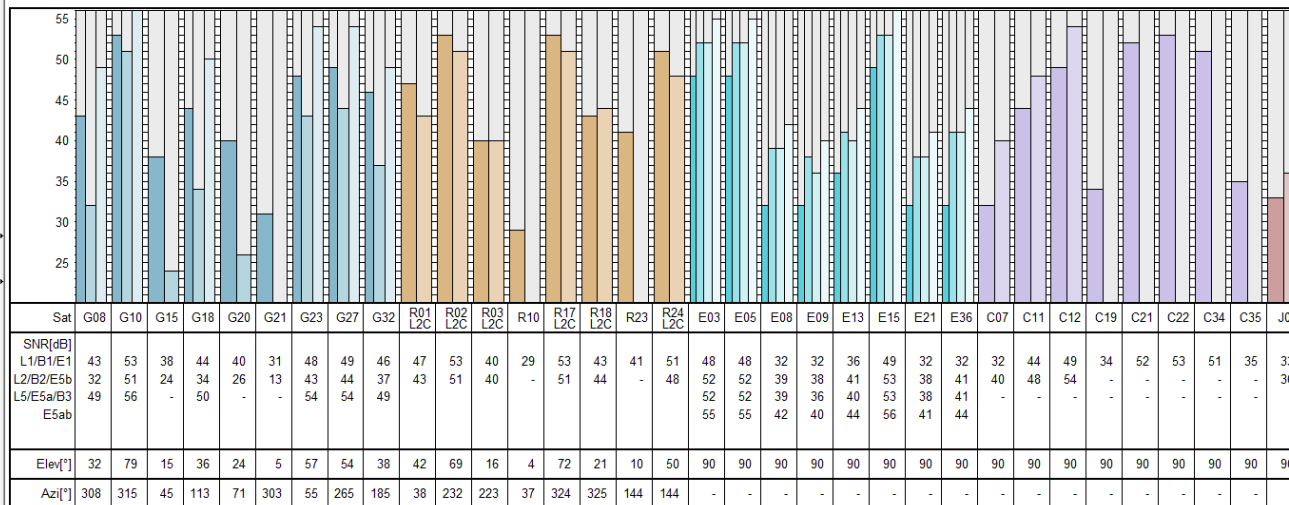
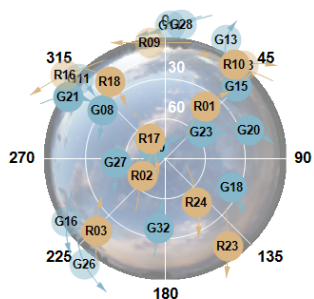
### Total Stations

- 140 Stations (48 ODOT Owned)
- Many are NGS CORS Stations
- Adopted County Stations
  - 10 Stations from 6 different counties
- 105 in the Network
- 35 Redundant
- **5 Planned**

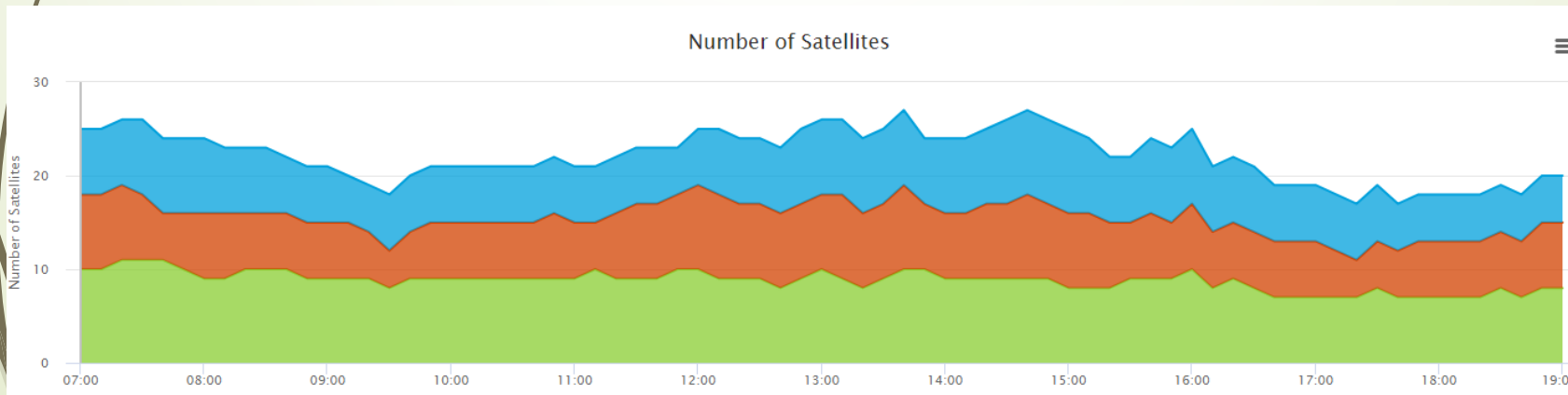


## Multi Constellation: GPS, GLONASS, GNSS (added Galileo)

Elevation mask -

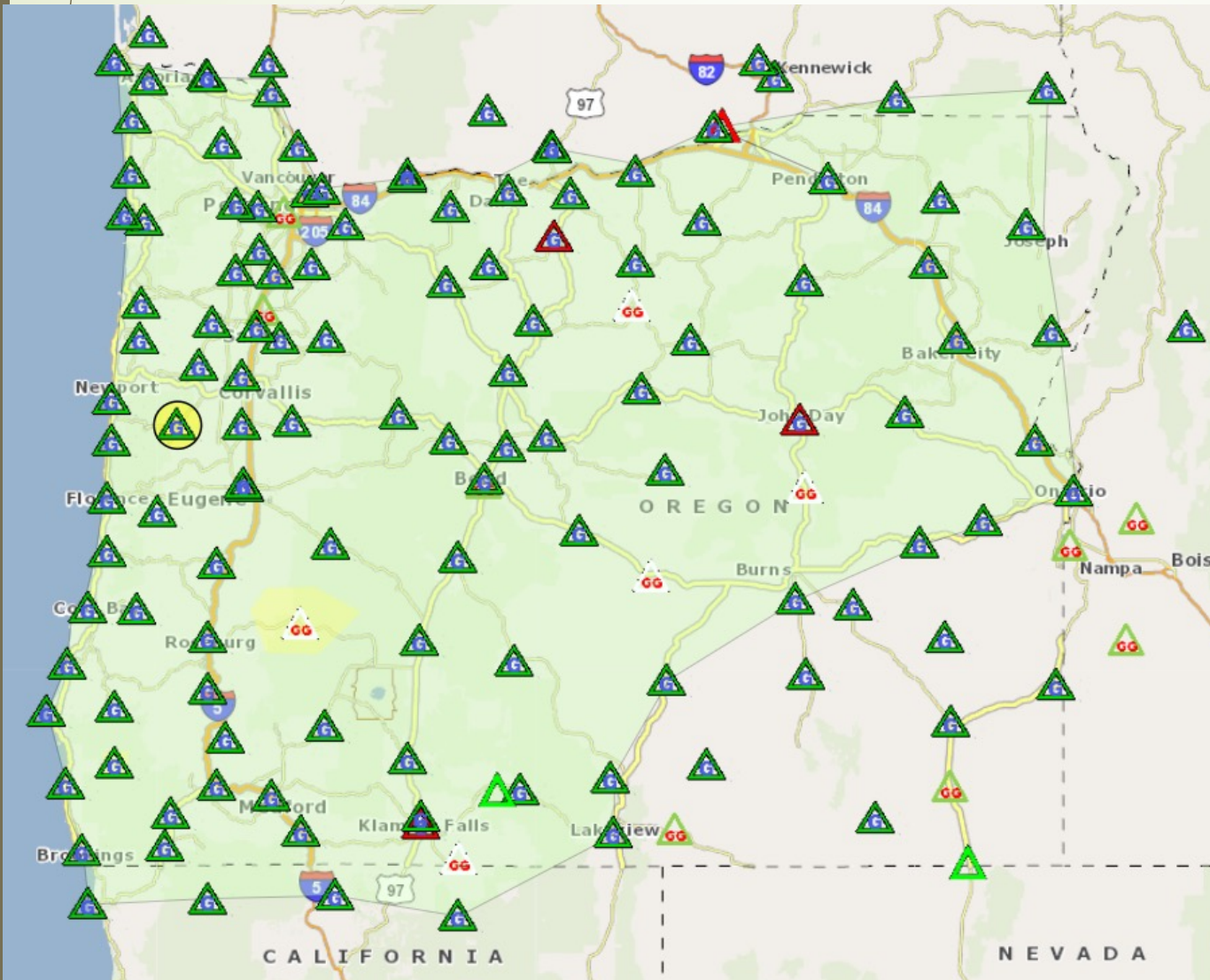


Last change 23:04:41 / Receive data / Orbits updt:





## Geometronics Online Toolkit



### ORGN Stations Legend

#### Ground Station Status

- GNSS Active
- GNSS Alert
- GNSS Inactive
- GLONASS Active
- GLONASS Alert
- GLONASS Inactive
- GLONASS Planned
- GPS Active
- GPS Alert
- GPS Inactive
- GPS Planned

#### Coverage Area

- No Coverage
- Coverage



## "All Stations List"

- ◆ Site Page link
- ◆ Reference ID
- ◆ Coordinates
- ◆ Site log
- ◆ Constellations tracked

All Stations List							
August 19, 2024							
GNSS Legend GPS=GPSonly, GG= GPS+GLONASS, GNSS=GPS+GLONASS+Galileo							
Station ID	Ref ID	Location	Latitude	Longitude	Ellipsoid Height (meters) @ ARP	Site Logs	GNSS
<a href="#">ADEL</a>	206	Adel	42 10 35.41966	-119 53 45.06314	1386.0970	<a href="#">ADEL</a>	GG
<a href="#">AGNS</a>	292	Agness	42 33 09.94155	-124 03 32.74455	51.763	<a href="#">AGNS</a>	GNSS
<a href="#">ANAT</a>	201	Anatone, WA	46 07 58.29503	-117 08 07.48104	1087.765	<a href="#">ANAT</a>	GNSS
<a href="#">ARLN</a>	202	Arlington	45 42 29.52532	-120 10 59.71154	120.812	<a href="#">ARLN</a>	GNSS
<a href="#">ASHL</a>	203	Ashland	42 10 50.47299	-122 40 12.55241	609.147	<a href="#">ASHL</a>	GNSS
<a href="#">BASQ</a>	270	Basque Maintenance Yard	42 24 41.78354	-117 51 46.84978	1349.14	<a href="#">BASQ</a>	GG
<a href="#">BEND</a>	205	Bend, City of	44 03 25.75727	-121 18 54.61222	1096.257	<a href="#">BEND</a>	GG
<a href="#">BLY1</a>	204	Bly	42 24 24.62755	-121 02 56.57650	1313.889	<a href="#">BLY1</a>	GNSS
<a href="#">BNDM</a>	278	Bend (ODOT Maintenance)	44 05 21.80729	-121 18 27.07883	1070.737	<a href="#">BNDM</a>	GNSS
<a href="#">BRNT</a>	222	Burnt River School (Unity)	44 26 24.77044	-118 11 28.69155	1213.201	<a href="#">BRNT</a>	GNSS
		New Receiver 08/20/2024 Trimble NetR9					
<a href="#">BURN</a>	271	Burns Jct	42 46 46.18843	-117 50 36.65278	1181.437	<a href="#">BURN</a>	GNSS
<a href="#">CABL</a>	243	Cape Blanco	42 50 09.94322	-124 33 47.98644	38.291	<a href="#">CABL</a>	GNSS
<a href="#">CATH</a>	207	Cathlamet, WA	46 11 50.27547	-123 22 02.11302	56.670	<a href="#">CATH</a>	GNSS
<a href="#">CHEM</a>	208	Chemult	43 13 27.68494	-121 47 08.94043	1440.413	<a href="#">CHEM</a>	GNSS
<a href="#">CHZZ</a>	256	Tillamook	45 29 11.44035	-123 58 41.18384	51.145	<a href="#">CHZZ</a>	GNSS
<a href="#">CORO</a>	209	Beaverton, City of	45 29 08.88914	-122 47 50.56291	47.207	<a href="#">CORO</a>	GG
<a href="#">COND</a>	210	Condon	45 14 16.44868	-120 10 52.90279	865.844	<a href="#">COND</a>	GNSS
<a href="#">CRAN</a>	213	CRAN-Crane	43 24 56.80137	-118 34 29.70705	1248.746	<a href="#">CRAN</a>	GNSS
		New Antenna and Receiver 08/20/2024 Trimble TRM115000.00 NONE, NetR9					
<a href="#">CRLA</a>	253	Crater Lake	42 53 44.91712	-122 08 10.07939	1952.636	<a href="#">CRLA</a>	GNSS
<a href="#">CROK</a>	211	Castle Rock, WA	46 16 28.54446	-122 54 45.09357	1.470	<a href="#">CROK</a>	GNSS
<a href="#">CTPT</a>	212	Central Point	42 22 36.08473	-122 53 38.19500	370.975	<a href="#">CTPT</a>	GNSS
<a href="#">DANP</a>	247	Richland WA	46 16 48.13634	-119 16 34.52974	104.176	<a href="#">DANP</a>	GNSS
<a href="#">DOWL</a>	237	Eugene	44 03 57.45920	-123 05 53.27962	112.197	<a href="#">DOWL</a>	GNSS
<a href="#">ELG2</a>	341	Elgin	45 33 53.49145	-117 55 42.27526	816.489	<a href="#">ELG2</a>	GNSS
<a href="#">ENTR</a>	214	Enterprise	45 25 52.50655	-117 17 17.03741	1127.055	<a href="#">ENTR</a>	GNSS
<a href="#">EUCH</a>	250	Euchre Mtn	44 50 05.05549	-123 52 14.85766	722.265	<a href="#">EUCH</a>	GNSS
<a href="#">FWBD</a>	215	Farewell Bend POE	44 17 30.78145	-117 13 17.85372	631.934	<a href="#">FWBD</a>	GNSS
<a href="#">GLWD</a>	217	Glenwood, WA	46 01 11.36775	-121 17 18.92579	561.420	<a href="#">GLWD</a>	GNSS
<a href="#">GOBS</a>	200	Goldendale, WA	45 50 19.73131	-120 48 52.77605	621.955	<a href="#">GOBS</a>	GNSS
<a href="#">GOLY</a>	218	Goldendale, WA	45 49 43.29747	-120 48 08.78726	500.605	<a href="#">GOLY</a>	GNSS
<a href="#">GRAS</a>	219	Grass Valley (BLM)	45 21 51.87542	-120 47 14.62113	677.871	<a href="#">GRAS</a>	GNSS
<a href="#">GTPS</a>	220	Grants Pass	42 26 04.16523	-123 17 50.51054	279.017	<a href="#">GTPS</a>	GNSS
<a href="#">HALF</a>	221	Halfway	44 52 20.58922	-117 05 59.32893	783.937	<a href="#">HALF</a>	GNSS
		New Antenna and Receiver 08/19/2024 Trimble TRM115000.00 NONE, NetR9					
<a href="#">HRPR</a>	242	Harper School	43 51 57.12128	-117 36 28.54808	761.430	<a href="#">HRPR</a>	GNSS
		New Receiver 08/20/2024 Trimble NetR9					
<a href="#">IDEM</a>	249	Emmett, ID	43 51 53.55931	-116 28 31.62571	717.973	<a href="#">IDEM</a>	GG
<a href="#">IDMU</a>	243	Murphy, ID	43 13 00.30277	-116 33 03.77402	849.414	<a href="#">IDMU</a>	GG
<a href="#">IDRO</a>	248	Roswell, ID	43 43 22.35074	-116 57 44.84958	708.306	<a href="#">IDRO</a>	GG
<a href="#">JIME</a>	223	Hillsboro (Washington County)	45 31 23.21435	-122 59 25.84156	53.044	<a href="#">JIME</a>	GNSS
<a href="#">JUNT</a>	226	Juntura	43 44 37.73932	-118 04 42.47825	891.128	<a href="#">JUNT</a>	GNSS
<a href="#">KENI</a>	224	Kennewick, WA	46 11 52.36515	-119 09 31.01667	146.534	<a href="#">KENI</a>	GNSS
<a href="#">KFRC</a>	225	Klamath Falls/ Rhine Cross	42 13 27.00263	-121 47 01.91272	1240.594	<a href="#">KFRC</a>	GNSS
<a href="#">LAPN</a>	230	La Pine (Deschutes County)	43 39 52.55204	-121 30 21.55207	1279.374	<a href="#">LAPN</a>	GNSS
<a href="#">LCS1</a>	244	Albany (Linn County)	44 38 03.65081	-123 06 23.93574	59.437	<a href="#">LCS1</a>	GNSS
<a href="#">LCS2</a>	245	Sweet Home (Linn County)	44 23 46.23808	-122 44 03.16230	145.121	<a href="#">LCS2</a>	GNSS
<a href="#">LCS3</a>	246	Halsey (Linn County)	44 22 39.21880	-123 06 32.76660	72.279	<a href="#">LCS3</a>	GNSS
<a href="#">LFLQ</a>	227	Florence (Lane County)	43 59 00.96717	-124 06 27.69123	-6.045	<a href="#">LFLQ</a>	GNSS
<a href="#">LKVW</a>	340	Lakeview	42 10 19.53310	-120 20 47.99347	1433.513	<a href="#">LKVW</a>	GNSS
<a href="#">LPSB</a>	228	Eugene (Lane County)	44 03 04.40923	-123 05 24.24852	118.092	<a href="#">LPSB</a>	GNSS



# Station Pages (website)

Go To

## Station - GTPS



Looking North



Looking South



Looking West



Looking East

### Station Information

Site ID: GTPS  
Location: GTPS - Grants Pass  
PID: 220

### Position at Antenna Reference Point

Antenna Ref Point:  
NAD83 (2011) epoch 2010.00  
Latitude: 42° 26' 04.16523"N  
Longitude: 123° 17' 50.51054"W  
Ellip. Hgt.: 279.017m

### Tracking GPS and GLONASS

Location Address: 345 NE Agness Ave,  
Grants Pass, OR 97526  
Organization: Oregon Department of  
Transportation

### Equipment Specifications

Manufacturer: Trimble  
Receiver Model: NetR9  
Antenna: Zephyr 3 Geodetic (TRM 115000.00 NONE)  
Elevation Mask: 0 Degrees

### File Logging

File Type: RINEX  
Logging Interval: 5 Seconds  
Operation Time: 24x7 log files  
Rollover: Hourly

### Important Links

- Site Log:
- RINEX Data:
- Alerts/Advisories:
- Superseded coordinates NAD83 (CORS96) epoch 2002:



## All RTK Products

### NTRIP Single Base RTK Product List

May 29, 2024  
Port 9879

NTRIP Mount Point	Location	Data format	Constellations
ADEL_GG3x	Adel	RTCM 3.x (Extended)	G/R/-/-/-
AGNS_GG3x	Agnes	RTCM 3.x (Extended)	G/R/-/-/-
AGNS_GNSS	Agnes	RTCM 3.x (MSM4)	G/R/E/C/J
ANAT_GG3x	Anatone, WA	RTCM 3.x (Extended)	G/R/-/-/-
ANAT_GNSS	Anatone, WA	RTCM 3.x (MSM4)	G/R/E/C/J
ARLN_GG3x	Arlington	RTCM 3.x (Extended)	G/R/-/-/-
ARLN_GNSS	Arlington	RTCM 3.x (MSM4)	G/R/E/C/J
ASHL_GG3x	Ashland	RTCM 3.x (Extended)	G/R/-/-/-
ASHL_GNSS	Ashland	RTCM 3.x (MSM4)	G/R/E/C/J
BASQ_GG3x	Basque	RTCM 3.x (Extended)	G/R/-/-/-
BEND_GG3x	Bend	RTCM 3.x (Extended)	G/R/-/-/-
BLY1_GG3x	Bly	RTCM 3.x (Extended)	G/R/-/-/-
BLY1_GNSS	Bly	RTCM 3.x (MSM4)	G/R/E/C/J
BNDM_GG3x	Bend Maintenance	RTCM 3.x (Extended)	G/R/-/-/-
BNDM_GNSS	Bend Maintenance	RTCM 3.x (MSM4)	G/R/E/-/-
BRNT_GG3x	Unity	RTCM 3.x (Extended)	G/R/-/-/-
BURN_GG3x	Burns Jct	RTCM 3.x (Extended)	G/R/-/-/-
BURN_GNSS	Burns Jct	RTCM 3.x (MSM4)	G/R/E/C/J
CABL_GG3x	Cape Blanco	RTCM 3.x (Extended)	G/R/-/-/-
CABL_GNSS	Cape Blanco	RTCM 3.x (MSM4)	G/R/E/C/J
CATH_GG3x	Cathlamet	RTCM 3.x (Extended)	G/R/-/-/-
CATH_GNSS	Cathlamet	RTCM 3.x (MSM4)	G/R/E/C/J
CHEM_GG3x	CHEMULT	RTCM 3.x (Extended)	G/R/-/-/-
CHEM_GNSS	CHEMULT	RTCM 3.x (MSM4)	G/R/E/C/J
CHZZ_GG3x	Tillamook	RTCM 3.x (Extended)	G/R/-/-/-
CHZZ_GNSS	Tillamook	RTCM 3.x (MSM4)	G/R/E/C/J
COBO_GG3x	Beaverton	RTCM 3.x (Extended)	G/R/-/-/-
COND_GG3x	Condon	RTCM 3.x (Extended)	G/R/-/-/-
COND_GNSS	Condon	RTCM 3.x (MSM4)	G/R/E/C/J
CRAN_GG3x	Crane	RTCM 3.x (Extended)	G/R/-/-/-
CRLA_GG3x	Castle Rock	RTCM 3.x (Extended)	G/R/-/-/-
CRLA_GNSS	Castle Rock	RTCM 3.x (MSM4)	G/R/E/C/J
CROK_GG3x	Castle Rock	RTCM 3.x (Extended)	G/R/-/-/-
CROK_GNSS	Castle Rock	RTCM 3.x (MSM4)	G/R/E/C/J
CTPT_GG3x	Central Point	RTCM 3.x (Extended)	G/R/-/-/-
CTPT_GNSS	Central Point	RTCM 3.x (MSM4)	G/R/E/C/J
DANP_GG3x	Richland, WA	RTCM 3.x (Extended)	G/R/-/-/-
DANP_GNSS	Richland, WA	RTCM 3.x (MSM4)	G/R/E/C/J
DOWL_GG3x	Eugene	RTCM 3.x (Extended)	G/R/-/-/-
DOWL_GNSS	Eugene	RTCM 3.x (MSM4)	G/R/E/C/J
ELG2_GG3x	Elgin	RTCM 3.x (Extended)	G/R/-/-/-
ELG2_GNSS	Elgin	RTCM 3.x (MSM4)	G/R/E/C/J

- ◆ By Port 9879, 9881, 9882
- ◆ Data Format
- ◆ Constellations tracked

### NTRIP Network RTK Product List

May 29, 2024  
Port 9881

NTRIP Mount Point	Data format	Constellations
Nearest_Single_RTCM23	RTCM 2.x (Type 1,2,18,19)	G/-/-/-/-
Nearest_Single_RTCM3	RTCM 3.x (Extended)	G/-/-/-/-
MAX_RTCM3	MAX RTCM 3.x (Extended,1015,1016)	G/-/-/-/-
IMAX_CM_R_AG	i-MAX CMR+	G/-/-/-/-
IMAX_RTCM23	i-MAX RTCM 2.x (Type 18,19)	G/-/-/-/-
IMAX_CM_R+	i-MAX CMR+	G/R/-/-/-
IMAX_RTCM3	i-MAX RTCM 3.x (Extended)	G/-/-/-/-
IMAX_RTCM3_AG	i-MAX RTCM 3.x (Extended)	G/-/-/-/-
<b>Port 9882</b>		
NTRIP Mount Point	Data format	Constellations
GIS_Nearest	RTCM 3.x (Extended)	G/R/-/-/-
IMAX_GG_CM_R_AG	i-MAX CMR+	G/R/-/-/-
Nearest_Single_GG_RTCM3	RTCM 3.x (Extended)	G/R/-/-/-
MAX_GG_RTCM3	MAX RTCM 3.x (Extended,1015,1016)	G/R/-/-/-
IMAX_GG_RTCM3	i-MAX RTCM 3.x (Extended)	G/R/-/-/-
IMAX_GG_CM_R	i-MAX CMR+	G/R/-/-/-
MAX_GG_RTCM3_AG	MAX RTCM 3.x (Extended,1015,1016)	G/R/-/-/-
IMAX_GG_RTCM3_AG	i-MAX RTCM 3.x (Extended)	G/R/-/-/-
IMAX_GNSS	i-MAX RTCM 3.x (MSM4)	G/R/E/-/-
Nearest_Single_GNSS	RTCM 3.x (MSM4)	G/R/E/-/-
IMAX_GNSS_AG	i-MAX RTCM 3.x (MSM4)	G/R/E/-/-
IMAX_GNSS5	i-MAX RTCM 3.x (MSM5)	G/R/E/-/-

G= GPS; R= Russian (GLONASS); E= European (Galileo); C= Chinese (BeiDou); J= Japanese (QZSS)



# Three Components to the change

- Horizontal
- Coordinates
- Vertical

## NGS's Plan

As part of a [Federal Register Notice](#) in October 2024, NGS released the following key details for the transition to the new datums in the modernized NSRS to help users and interested parties prepare for the coming change:

1. NGS will roll out components of the modernized NSRS over time (2024 - 2026). As each component is released on the [Beta.ngs.noaa.gov](#) site, it can be publicly tested with feedback provided to NGS. The testing will continue for at least 6 months after the final component is released on [Beta.ngs.noaa.gov](#).

2. While the modernized NSRS is being rolled out and tested, the current NSRS will remain the official NSRS of the United States. The website [geodesy.noaa.gov](#) will only hold the official NSRS – currently NAD 83, NAVD 88, etc. Only one major improvement to the current NSRS is expected during this time: the [International Terrestrial Reference Frame 2020 \(ITRF2020\)](#) will be integrated into all products and services. This is expected to happen in late 2024 or early 2025.

3. Once enough testing is done, and all modernized NSRS components seem stable and correct, the [Federal Geodetic Control Subcommittee \(FGCS\)](#) will be asked to vote to approve the modernized NSRS and new datums (likely in early to mid 2026). If affirmative, a Federal Register Notice will be released and NGS will begin a several-month process of transitioning all modernized NSRS components to the official website at [geodesy.noaa.gov](#). During this transition, the Beta Products website may be wiped of submitted data and no further submissions to the NGS Integrated Data Base (IDB) (the repository for the current NSRS) will be accepted.

# ODOT's Plan

- ▶ Complete State Plane Legislation by end of 2025
  - ▶ Not usable until NATRF2022 is released
  - ▶ Added to Current legislated coordinates
    - ▶ OCRS
    - ▶ OCRS2022
- ▶ Compute NATRF2022 Coordinates for ORGN
- ▶ Two All Stations List (NAD83 & NATRF2022)
- ▶ Dual NSRS Systems in ORGN (Dual RTK products, separate ports)
  - ▶ NAD83 (Port 9882)
  - ▶ NATRF2022 (Port 9885)?
- ▶ Announcement of End Date of NAD83?

Good Meta Data for All Projects will be **Critical**

# Questions?

Where in Oregon?

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Oregon Real-time GNSS Network

<https://www.oregon.gov/odot/orgn/pages/index.aspx>

## FAQ's

- ▶ What is the difference between MAX & VRS?
- ▶ What is the difference between MAX & IMAX?
- ▶ Can I use 2 rovers on the same account? [**Concurrent Connection Messages (Too Many Users)**]
- ▶ How far outside of the network can you go and still get correctors?
- ▶ How far away from the master station can I be and still get correctors?
- ▶ Can I use the AG product, and is the accuracy less?
- ▶ Why does my rover change master station (bounces between master stations)?

