



# Oregon Real-time GNSS Network (ORGN) Update/ Challenges (3G, ftp)



Oregon GNSS User's Group

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## Oregon Real-time GNSS Network

- What is the ORGN?
  - Current Status
  
- Growth/ Services Provided
  
- Challenges



## Oregon Real-time GNSS Network

- ▶ MAX (Master Auxiliary), not VRS (Virtual Reference Station)
- ▶ On the NSRS, NAD83 2011 epoch 2010.00
- ▶ Started 2006 with 4 stations Ashland, Grants Pass, Prospect and Central Point
- ▶ Network of 130+ continuously operating reference stations
- ▶ Multi constellation GPS, GLONASS & Galileo
- ▶ Cooperative Network (UNAVCO, WSRN, TURN, Counties, Cities, Schools, Private)
- ▶ Works with many brands of receivers, Leica, Trimble, Septentrio, Topcon, Emlid, Bad Elf.
- ▶ Over 1800 rover accounts (Survey, Construction, Inspection, Agriculture, UAV, OSP, Mobile Scanning, GrubHub/Robotics)
- ▶ Offering many products in many formats.
- ▶ RINEX for Post Processing
- ▶ Managed by ODOT (Randy and Eric)





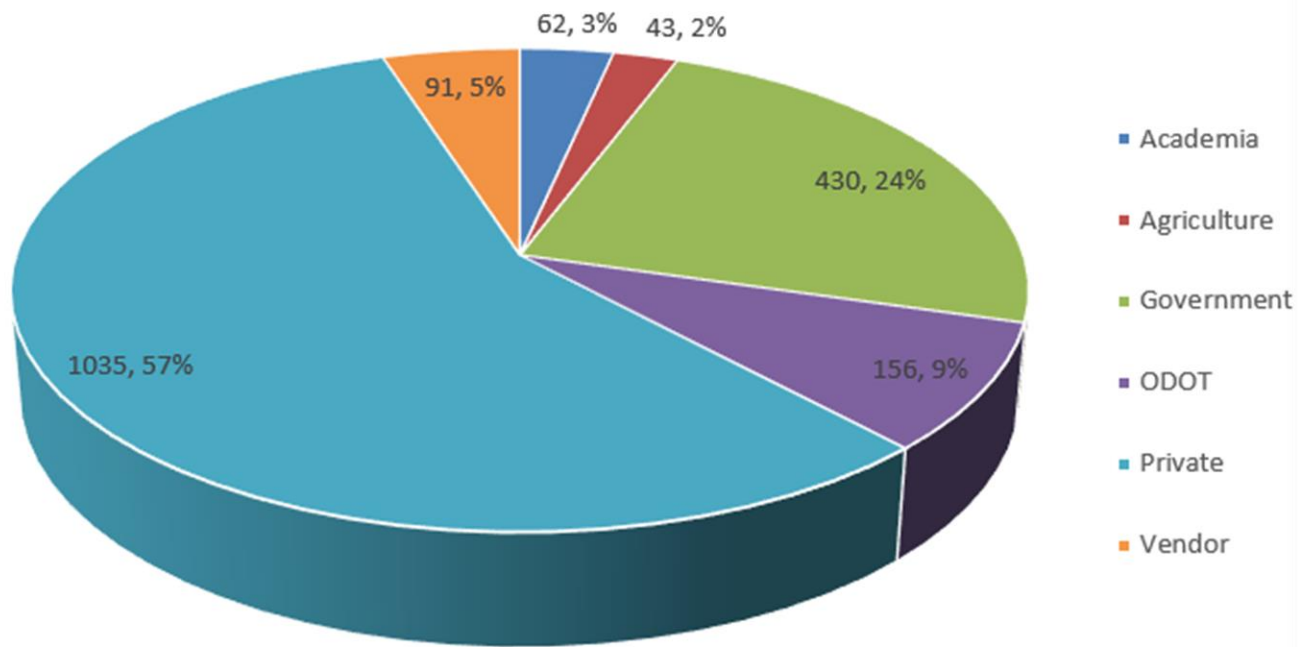
# ORGN Overview

A Cooperative Network - getting data from many sources

- ❖ 133 Stations Total (103 Fully GNSS)
- ❖ 51 are ODOT Owned and Operated
- ❖ 82 Partner Stations
  - ❖ PBO
  - ❖ WSRN, TURN
  - ❖ Counties
  - ❖ Cities
  - ❖ Private Business



## 1817 ORGN Rover Accounts



Data as of April 2022



# Non-Survey Uses

- Machine Control for Construction
- Asset Management
- GIS and Natural Resource Mapping
- Critical Structure Monitoring
- Precision Agriculture
- Intelligent Transportation
- ... and More



# Typical ORGN GPS Sensor Cabinet (Older Leica 1200 Sensor)

Battery Charger

GPS Sensor



Internet Cable

Lightning Protector

Battery

GPS Antenna Cable





## Leica System 1200 Cabinet ~ Septentrio PolaRx5 Cabinet







## Oregon Real-time GNSS Network

- ▶ Growth/ Services Provided
  - ▶ NTRIP Products/ Correctors
  - ▶ Changes, Upgrades, Additions



## NTRIP Products

167.131.109.57

- ▶ Port **9879**
  - ▶ All single-base correctors by name: **GPS-only**, **GG** and **GNSS**.
  
- ▶ Port **9881**
  - ▶ Network (multi-base) & nearest-single-base correctors:  
all are **GPS-Only**.
  
- ▶ Port **9882** (*\*Recommended Port*)
  - ▶ Network (multi-base) & nearest-single-base correctors:  
all are **GG** (with several newly created **GNSS** ones)



## ORGN Transitions

- Lane County
  - LFLO ~ Florence (NGS CORS) GNSS
  - LPSB ~ Eugene (NGS CORS) GNSS
- Marion County
  - WDBN ~ Woodburn (NGS CORS) GNSS
  - STAY ~ Stayton (NGS CORS) GNSS
  - MCSO ~ Salem (NGS CORS) GG
- Deschutes County
  - LAPN ~ LaPine GNSS
  - BEND ~ City of Bend GPS
- Polk County - PCS2 ~ Dallas GNSS
- Yamhill Co. – NWBG ~ Newberg (NGS CORS) GNSS
- City of Beaverton COBO Changed out receiver GG





## Recent Upgrades to full GNSS Thanks to CWU



### 2019

TILL

SEAS

ONAB

LFLO

REED

RDL2

YONC

RSBG

GTPS

### 2020

NWBG

### 2021

LPSB

KFRC

PSPT

PKDL

OAKR

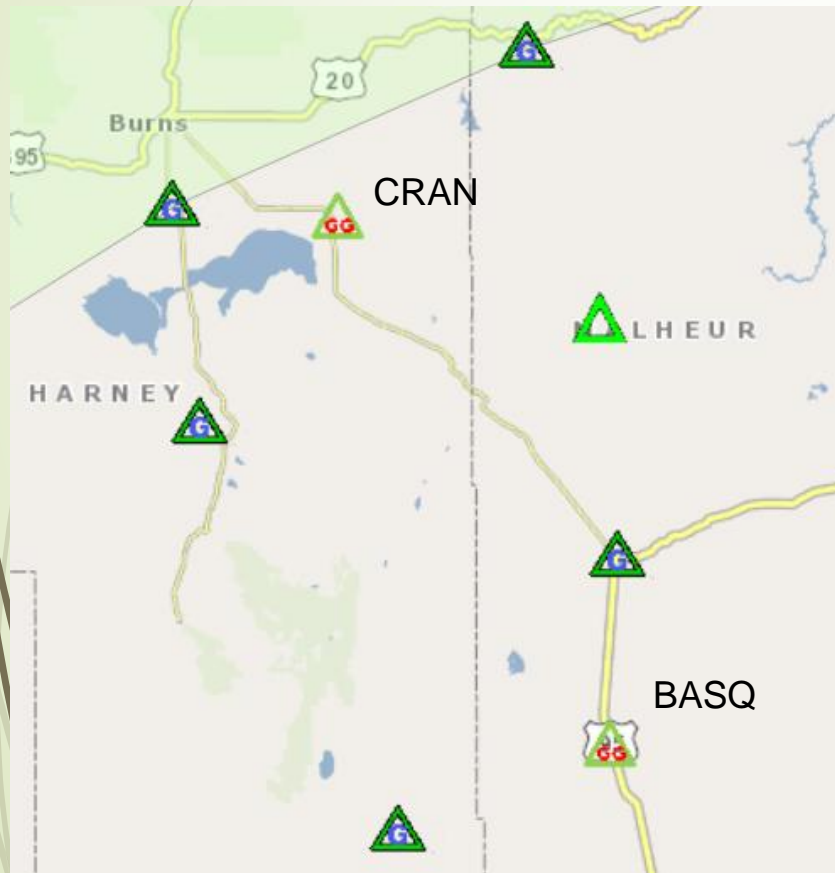
PNVL





## *Newly created (ODOT) ORGN Stations*

Previously ~ Basque & Crane  
Latest ~ ODOT Maintenance Station at Adel





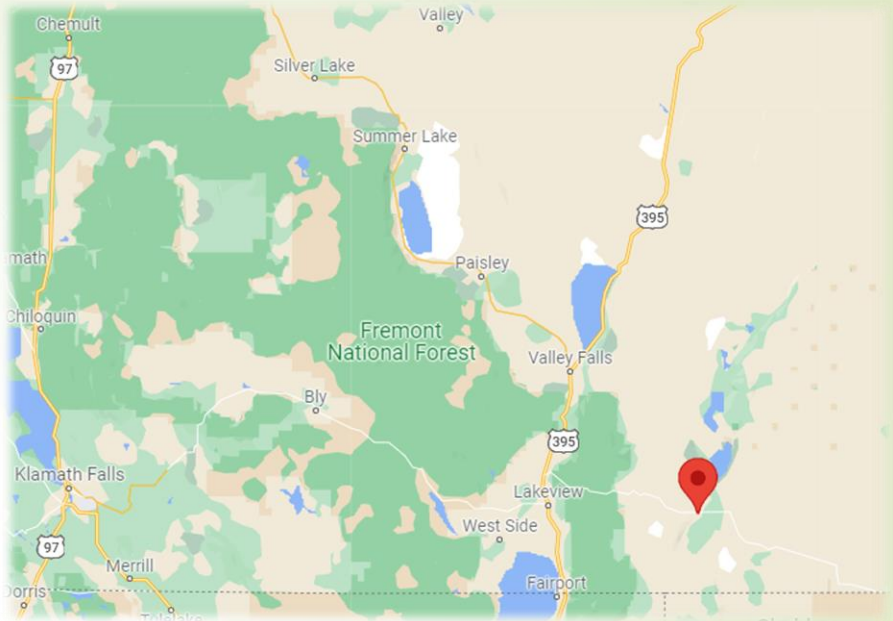


## ADEL

ODOT Maintenance Station

Approximately 30 miles E of  
Lakeview, Oregon

Completed October 2021



**\*PBO +**

CHZZ – W of Tillamook  
AGNS – NE of GoldBeach #  
NOSE – SE of Florence #  
# in the Coast Range

CRLA – Crater Lk, single base only  
National Parks run

OB3C – renamed DOWL

Picking up 3 Idaho stations





## Oregon Real-time GNSS Network

- ▶ Challenges
  - ▶ State/ ODOT Network Outages
  - ▶ Temp Station Outages (less than an hour)
  - ▶ Outside of Coverage Areas (40km for Network)
  - ▶ No GGA Message Being Sent
  - ▶ Concurrent Connection Messages (Too Many Users)
  - ▶ Cell Service Challenges – 3G phaseout
  - ▶ ftp usage (RINEX Files)
    - ▶ Use MS Internet Explorer
    - ▶ Changing host
    - ▶ Use of FileZilla, WinSCP (Microsoft)



## Plan Ahead for Phase Out of 3G Cellular Networks and Service (Source: FCC Website)

- ▶ What is Happening?
  - ▶ Mobile carriers shutting down 3G networks, making room for advanced network services.
- ▶ When is it Happening?
  - ▶ As early as Jan 2022, varies by company and may change. Consult your provider's website.
  - ▶ AT&T to finish shutting down by Feb 2022, Verizon – Dec 31, 2022. T-Mobile – varied. Many sub carriers also use AT&T's, Verizon's and T-Mobile's.
  - ▶ Dates are for "completing" the shutdowns, Carriers may begin retiring sooner.
- ▶ What Do I Need to Do?
  - ▶ Contact your mobile provider or consult their website for more info on their 3G retirement plan.
  - ▶ Some devices may only require a software update to enable VoLTE (HD Voice) or other advanced services. Can search phone model number on the internet to determine if purchase needed or software update.



## Plan Ahead for Phase Out of 3G Cellular Networks and Service (Source: FCC Website)

- ▶ Does This Just Impact Phones?
  - ▶ No, other devices, certain medical devices, tablets, smart watches, vehicle SOS services, home security systems may be using 3G network services. Also some devices use cell as a backup when a wired internet connection goes down.
- ▶ Why Are 3G Networks Being Phased Out?
  - ▶ Older services are periodically shut down to free up spectrum and infrastructure to support new services, i.e., 5G. Similar to when they shut down 2G service to support 4G. Mobile carriers have that flexibility.
- ▶ Need Other Help Staying Connected?
  - ▶ Mobile service providers may be offering special deals on new devices.
  - ▶ Other FCC programs may be able to assist eligible consumers with the cost of phone or internet services.
    - ▶ The FCC's Lifeline program
    - ▶ The FCC's Emergency Broadband Benefit Program





## FTP Issues

### FTP directory /ORGN/RINEX/ at 167.131.116.166

To view this FTP site in File Explorer: press Alt, click View, and then click Open FTP Site in File Explorer.

[Up to higher level directory](#)

01/26/2022 03:01PM	Directory	<a href="#">1 hr 1 sec</a>
01/31/2022 05:34PM	Directory	<a href="#">24 hr 1 sec</a>
07/20/2021 10:45AM	Directory	<a href="#">24 Hr 5Sec</a>
12/31/2021 06:01PM	Directory	<a href="#">ADEL</a>
04/20/2022 06:04PM	Directory	<a href="#">ARLN</a>
04/20/2022 10:31PM	Directory	<a href="#">ASHL</a>
12/31/2021 06:05PM	Directory	<a href="#">BASQ</a>
01/26/2022 11:32AM	Directory	<a href="#">BEND</a>
12/31/2021 06:05PM	Directory	<a href="#">BLY1</a>
12/31/2021 06:01PM	Directory	<a href="#">BNDM</a>
12/31/2021 06:02PM	Directory	<a href="#">BRNT</a>
12/31/2021 06:01PM	Directory	<a href="#">CHEM</a>
12/31/2021 06:00PM	Directory	<a href="#">COBO</a>
12/31/2021 06:01PM	Directory	<a href="#">COND</a>
12/31/2021 06:01PM	Directory	<a href="#">CRAN</a>
04/20/2022 10:31PM	Directory	<a href="#">CTPT</a>
04/20/2022 10:31PM	Directory	<a href="#">ELG2</a>
04/20/2022 10:31PM	Directory	<a href="#">ENTR</a>
12/31/2021 06:02PM	Directory	<a href="#">FWBD</a>
06/12/2021 01:11PM	Directory	<a href="#">GRAS</a>
12/31/2021 05:59PM	Directory	<a href="#">GTPS</a>
01/26/2022 11:41AM	Directory	<a href="#">HALF</a>
12/31/2021 06:02PM	Directory	<a href="#">HRPR</a>
12/31/2021 05:59PM	Directory	<a href="#">JIME</a>
04/20/2022 11:31PM	Directory	<a href="#">JUNT</a>
12/31/2021 05:59PM	Directory	<a href="#">KFRC</a>
04/20/2022 06:38PM	Directory	<a href="#">LAPN</a>
12/31/2021 05:59PM	Directory	<a href="#">LFLO</a>
12/31/2021 06:01PM	Directory	<a href="#">LRVW</a>
12/31/2021 05:59PM	Directory	<a href="#">LPSB</a>
12/31/2021 06:01PM	Directory	<a href="#">MCSO</a>
04/20/2022 10:31PM	Directory	<a href="#">MDRS</a>
12/31/2021 06:01PM	Directory	<a href="#">MTCL</a>
12/31/2021 05:59PM	Directory	<a href="#">NWBG</a>
12/31/2021 05:59PM	Directory	<a href="#">OAKR</a>
06/02/2020 02:34PM	Directory	<a href="#">OB3C</a>
01/26/2022 12:19PM	Directory	<a href="#">ODOT</a>

- Where our RINEX Files are currently being pushed to and hosted.
- *FTP has long been used to exchange files between computers on a network, but it's burdened by enough security issues that browser makers are dropping support for the protocol because the exchange happens without encrypting data in transit between two points.*
- *"The biggest security risk is that FTP transfers data in cleartext, allowing attackers to steal, spoof and even modify the data transmitted."*
- [FTP Is Almost 50 Years Old—and It's Ready to Retire \(vice.com\)](#)
- [Firefox 90 won't handle FTP sites anymore - gHacks Tech News](#)
- [Google strips FTP code from Chrome • The Register](#)
- [End of an era: Now Firefox has dropped support for FTP, too | ZDNet](#)



## FTP Issues

- Initial temp workaround – FileZilla. Format somewhat similar to File Explorer. Does not work for ALL external users. (Access)

FileZilla

File Edit View Transfer Server Bookmarks Help

Host:  Username:  Password:  Port:  Quickconnect

Local site: F:\

Remote site:

Filename	Filesize	Filetype	Last modified
..			

49 files and 44 directories. Total size: 31,551,879 bytes

Filename	Filesize	Filetype	Last modified	Permissi...
Not connected.				

Server/Local file	Dirac...	Remote file	Size	Priority	Status
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Queued files Failed transfers Successful transfers

Queue: empty



## FTP Issues

- Recommended by our IT support: **WinSCP**
- **WinSCP** is a popular SFTP client and FTP client for Microsoft Windows. Copy file between a local computer and remote servers using FTP, FTPS, SCP, SFTP.... Its main function is secure file transfer between a local computer and a remote server.

The screenshot shows the WinSCP interface with two panes. The left pane displays the local file system at the path \\wpdotfill10\... The right pane displays the remote file system at the path /ORGN/RINEX/. The remote file system contains a list of folders and files with their respective sizes and modification dates.

Name	Size	Changed	Rights	Owner
..		1/11/2022 12:00:37 PM		
Administration		11/8/2008 4:35:27 AM		
ArcGIS		3/23/2016 2:07:24 PM		
ArcGIS Explorer		12/27/2017 7:51:02 AM		
Camtasia Studio		9/29/2017 8:13:58 AM		
Custom Office Templa...		4/10/2019 9:28:28 AM		
Custom Production Pr...		8/14/2017 9:56:15 AM		
CyberLink		12/12/2016 9:25:02 AM		
Downloads		7/10/2018 11:07:34 AM		
ESRI Crystal Reports		8/2/2010 12:33:25 PM		
EXCEL		10/2/2017 1:12:19 PM		
Favorites_Chrome		11/20/2018 12:57:28 PM		
fdfix		11/8/2008 4:35:50 AM		
Forefront UAG Remot...		8/2/2012 2:49:21 PM		
GNSS NTRIP Internet R...		7/27/2012 8:05:32 AM		
GNSS Projects		6/23/2016 10:27:40 AM		
GPS Projects		7/19/2012 9:13:51 AM		
Keypoint Interactive		5/14/2018 9:02:01 AM		
Leica Geosystems		6/19/2018 2:57:49 PM		
My Data Sources		2/14/2011 10:13:25 AM		
My Fragments		7/25/2012 1:17:47 PM		
My Music		5/1/2013 5:00:28 PM		
My Pictures		10/12/2021 11:07:18 AM		
My Terrain Projects		8/22/2012 2:45:02 PM		
1_hr_1_sec		1/26/2022 2:01 PM		
24_hr_1_sec		1/31/2022 4:34 PM		
24_Hr_5Sec		7/20/2021 10:45 AM		
ADEL		5/6/2022 8:47 AM		
ARLN		6/6/2022 7:20 AM		
ASHL		6/6/2022 7:27 AM		
BASQ		5/6/2022 8:59 AM		
BEND		5/6/2022 9:00 AM		
BLY1		5/6/2022 9:00 AM		
BNDM		5/6/2022 9:00 AM		
BRNT		5/6/2022 9:01 AM		
CHEM		5/6/2022 9:01 AM		
COBO		5/6/2022 9:01 AM		
COND		5/6/2022 9:13 AM		
CRAN		5/6/2022 9:13 AM		
CTPT		6/5/2022 6:54 PM		
ELG2		6/5/2022 6:54 PM		
ENTR		6/5/2022 6:54 PM		
FWBD		5/6/2022 9:26 AM		
GRAS		5/11/2022 11:01 AM		
GTPS		5/31/2022 10:26 AM		
HALF		5/6/2022 9:28 AM		
URRP		5/6/2022 9:28 AM		



# Questions?

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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 & IMAX?
- ▶ Can I use 2 rovers on the same account?
- ▶ 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)?