



Using the OCRS with the ORGN Presented by ODOT for OGUG at UCC

15 March 2017

Randy Oberg, PLS
Geodetic Surveyor, Oregon Dept. of Transportation
Oregon Real-time GNSS Network



Chapter 6

OCRS Handbook and User Guide

6.1 Using the ORGN with the OCRS

The Oregon Department of Transportation (ODOT) Geometronics Unit operates and maintains the ORGN Real-Time GNSS network. The ORGN supplies real-time GNSS network correctors to rovers in the field and also provides data logged RINEX files for all of the active stations in the network.

ODOT policy requires that the ORGN be aligned with the National Spatial Reference System (NSRS).

To maintain this alignment, the network is constrained to selected NGS Continually Operating Reference Stations (CORS) and adjusted using the NGS program OPUS-Projects. The ORGN broadcasts network

correctors providing latitude, longitude, and ellipsoid height (in the current NSRS) to user's rovers around the State.



- ◆ What is the current National Spatial Reference System (NSRS)?

NAD83 (2011) epoch 2010.00

- ◆ What will be the name of the next NSRS?

NATRF 2022

- ◆ What does the acronym NATRF stand for?

North American Terrestrial Reference Frame



At the rover receiver, data collection occurs in conjunction with the current project and the chosen coordinate system including a map projection zone such as one from the OCRS series.

If you wish to work in a particular OCRS zone you can enter the zone projection parameters into your rovers' data collector coordinate system manager software (or download the data from the office software) and pick that particular coordinate system and geoid model for the current project you are working in.

Once these steps are complete you should see, on the data collector screen, the selected zone northing and easting grid coordinates and the orthometric height in real-time. They would be converted (transformed) from the (rover) observed, ORGN broadcast, geodetic reference coordinates

automatically. In order to get vertical datum orthometric heights you must select the appropriate geoid model on the rover data collector as well. For more information on the ORGN, see: www.theorgn.net.



Coordinate Systems

Name	Type
<None>	-----
Salem	Classic 3D

3DCQ:-.----m 2DCQ:-.----m 1DCQ:-.----m Fn abc 15:16

OK | New.. | Edit.. | Delete | More |



Navigation icons: GPS, Math (Σ), Units (G), Wi-Fi, Bluetooth, Camera, CF card, Battery (CS)

New Coordinate System

Name:

Transformation:

Ellipsoid:

Projection:

Geoid model:

CSCS model:

3DCQ:--.--m 2DCQ:--.--m 1DCQ:--.--m Fn abc 15:26

Store | | | |



Navigation icons: GPS, Calculator, Network, Light, Warning, Camera, CF, CS

New Projection

Name: CottageGro-Cany

Type: Transverse Mercator

False easting: 50000.0000 m

False northing: 0.0000 m

Latitude of origin: 42°50'00.00000" N

Central meridian: 123°20'00.00000" W

CM scale: 1.000023000000

3DCQ:-.---m 2DCQ:-.---m 1DCQ:-.---m Fn abc 15:20

Store



0 Σ 0
G 0

⚡

📶

📷

CF

CS

New Coordinate System

Name: CottageGro- Canyonvil

Transformation: <None>

Ellipsoid: WGS 1984

Projection: CottageGro- Cany

Geoid model: <None>

CSCS model: <None>

3DCQ:-.---m 2DCQ:-.---m 1DCQ:-.---m Fn abc 14:49

Store



0 Σ 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0

Projections | ↶

Name	Type
<None>	-----
CottageGroV-Cany	Transverse Mercator
Salem	Transverse Mercator

3DCQ:-.---m 2DCQ:-.---m 1DCQ:-.---m Fn abc 15:23

OK | **New..** | **Edit..** | **Delete** |



Check your Coordinates

GPS002

0 Σ 0 G 0

CF

CS

Edit Point: GPS0002

Coords Code Images

Point ID: GPS0002

Local latitude: 43°12'39.61530" N

Local longitude: 123°20'29.39067" W

Local ellipsoid ht: 0.0000 m

Class: Ctrl

Sub class: Fixed (Pos & Ht)

3D CQ: 0.0000m

3DCQ:-.---m 2DCQ:-.---m 1DCQ:-.---m Fn abc 08:16

Store | Coord | Next | More | Page

GPS002

0 Σ 0 G 0

CF

CS

Edit Point: GPS0002

Coords Code Images

Point ID: GPS0002

Easting: 49336.5607 m

Northing: 41957.6561 m

Local ellipsoid ht: 0.0000 m

Class: Ctrl

Sub class: Fixed (Pos & Ht)

3D CQ: 0.0000m

3DCQ:-.---m 2DCQ:-.---m 1DCQ:-.---m Fn abc 08:17

Store | Coord | Next | More | Page



Geometronics



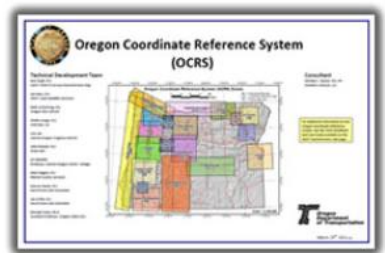
- Department ▾
- About Us
- Contact Us
- Benchmark Retrieval
- Forms & Requests
- Geodetic Control
- Links
- Manuals & Documents
- Maps & Plans Center
- OCRS: OR Coord Ref Sys
- ORGN (GPS Network)
- Remote Sensing
- Right of Way Engineering
- Search Geometronics
- Survey Conference
- Survey Operations

Oregon Coordinate Reference System

- [About the 'OCRS'](#)
- [History](#)
- [Legal Status](#)
- [OCRS Zone Maps](#)
- [OCRS Zone Export \(Parameters\)](#)
- [GIS Projection \(.prj\) Files](#)
- [OCRS Handbook & User Guide](#)
- [Geometronics Online Toolkit](#)

About the 'OCRS'

The Oregon Coordinate Reference System is based on a group of low distortion map projection coordinate systems. Low distortion projections are based on true conformal map projections designed to cover significant portions of urban and rural areas of the state. The term 'low distortion' refers to both the horizontal distortion from presenting a curved surface on a plane and the vertical distortion because these projections are also scaled to a regional height representative of the area to be covered. The advantages of a low distortion projection are;



- Grid coordinate zone distances closely match the same distance measured on the ground.
- Limited distortion and reduced convergence angle.
- Easy to transform between other coordinate zone systems.
- Maintains a relationship to the National Spatial Reference System (NSRS). Can cover entire cities and counties making them GIS friendly.

▲ Back to the top

History



http://www.oregon.gov/ODOT/HWY/GEOMETRONICS/Pages/ocrs.aspx#OCRS_Zone_Exp... Oregon Real-Time GNSS Netw... Geometronics Oregon Coord...

File Edit View Favorites Tools Help

Computer Support Desk Google iLinc ODOT Intranet ODOT OPUS HomePage ORGN TripCheck Verify URL

OCRS Zone Export (Parameters)

Leica LGO - [TRFSET.DAT](#) [***NEW*** All 20 Zones]

[Current ocrs.CSD](#) - The [current ocrs.csd](#) is for Trimble's Coordinate System Manager program; see the [README](#) file for instructions.

[▲ Back to the top](#)

GIS Projection (.prj) Files

Individual Zones:

- [International Foot Definitions](#)
- [Metric Definitions](#)

Grouped Zones:

- [International Foot Definitions](#)
- [Metric Definitions](#)

[▲ Back to the top](#)

OCRS Handbook & User Guide

Use this link to access the [OCRS Handbook & User Guide](#).

[▲ Back to the top](#)

Geometronics Online Toolkit

There are two components of the [Geometronics Online Toolkit](#):

1. Oregon Coordinate Reference System
2. Oregon Real-time GPS Network

The Oregon Coordinate Reference System (OCRS) component of the Online Toolkit allows users to determine the best Oregon Coordinate Reference System low-distortion projection zone for their project. Users can display all of the OCRS zones on a map. They can also view the actual distortion of a particular OCRS zone in the vicinity of their project by placing a point, line or polygon on the map.



State Plane Grid

- ◆ Example: All bearings are grid bearings of the Oregon State Plane Coordinate System, North Zone, NAD83(1991)



OCRS Basis of Bearings

Example:

All distances and bearings are grid values based on the Oregon Coordinate Reference System, Salem Zone, NAD 83(CORS96)Epoch2002

Or

All distances and bearings are grid values based on the Oregon Coordinate Reference System, Salem Zone, NAD 83(2011)Epoch2010.00

Or

All distances and bearings are grid values based on the Oregon Coordinate Reference System, Salem Zone, NATRF 2022



Example of Survey Metadata

Linear unit: International foot

Geodetic datum: North American Datum of
1983(2011) Epoch 2010.00

Vertical datum: North American Vertical Datum of 1988

Geoid Model: Geoid12A

System: Oregon Coordinate Reference System

Zone: Salem

Grant County, Oregon



Oregon Coordinate Reference System