

Plans to Support Modernized CSRS and NSRS Datums in Trimble Software

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Key words: Reference frames; Reference systems; NSRS2022; datum modernization

SUMMARY

The purpose of this paper is to review how Trimble supports the three existing NAD83 datums in the US and NAD83(CSRS) in Canada and discuss our plans to support the modernized NSRS2022 and CSRS2022 when they are released in 2025.

Currently, the National Geodetic survey has three reference frames. The first, NAD83(2011) covers CONUS, Alaska US territories in the Caribbean region. In this, the crustal motion is modelled by an estimate of the North American Euler Pole and an associated deformation model, which contains velocity grids for Alaska and CONUS plus models for 32 earthquakes. The other two are the PA11 and MA11 frame for US territories located on the Pacific and Mariana Plates. In this case the crustal motion is modelled only by a Euler pole. Trimble's implementation of the US deformation is effectively identical to HTDP except that we only support earthquakes that occurred after the 2010 reference epoch. This means that instead of supporting 32 earthquakes we only support four, two in California and two in Alaska and a model for post-seismic deformation for the 2002 Denali Earthquake.

We believe that the Trimble geodetic libraries (TGL) can be configured to support NSRS2022 fairly easily. The deformation model in HTDP will be replaced by intra-frame velocity model which will require new velocity (and possible earthquake) grids. Of course, the velocity grids will now be three dimensional, however TGL already support this. Also NGS will also support coordinates in either ITRF2020 or the North American Pacific and Mariana Plates, however TGL already has functionality allow users to select an Euler Pole so this should not be difficult to implement. NGS also has indicated that along with the 2025 realization epoch they will move to supporting measurement epochs, which may require that TGL implement user selected reference

epochs.

Another change is in the projections. Currently TGL supports the State Plane zones and the county coordinates for Iowa, Illinois, Indiana, Michigan, Wisconsin and Minnesota. However, NSRS2022 will have nearly 1000 projections due to the large number of low distortion zones. We have already begun to implement changes to TGL to make it easier select the appropriate projection in this situation, filtering usable CRS from location.

As far as Canada is concerned, CRS2022 will mean a new datum and a new IVFM and reference epoch but we do not anticipate any problems implementing these.

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FIG Working Week 2023
Protecting Our World, Conquering New Frontiers
Orlando, Florida, USA, 28 May–1 June 2023