

Right of Way and Land Surveys

OCTOBER 2024

Project Title:

Accuracies and Standards for
the Caltrans' Spatial Reference
Network (CTSRN) Project

Task Number: 4120

Start Date: June 30, 2023

Completion Date: June 29, 2025

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Accuracies and Standards for the Caltrans' Spatial Reference Network (CTSRN)

Researching Caltrans GNSS specifications and providing recommendations to update current standards and practices for maintaining the CTSRN.

WHAT IS THE NEED?

Caltrans has a Real Time Network (RTN) that provides precise Global Navigation Satellite System (GNSS) positioning to the Division of Right of Way and Land Surveys and others. With advancements in satellite positioning systems, the amount of Network Real-Time Kinematic (NRTK) surveys tied to the CTSRN have increased.

Caltrans needs to update its GNSS specifications and accuracy standards to address NRTK survey methods and advancements in GNSS technology.

WHAT ARE WE DOING?

This research will examine the use of NRTK surveys connected to a continuous Global Navigation Satellite System (cGNSS) within the Caltrans Spatial Reference Network (CTSRN). Survey stations will be setup at test sites and Caltrans setup procedures will be followed to establish horizontal and vertical control. The NRTK data will be collected at the test sites then processed using Trimble Business Center, then the following key points will be assessed:

- Repeatability of NRTK within the CTSRN
- Frequency of human error and repeatability of measurements when utilizing CTSRN
- Accuracy of NRTK measurements within CTSRN
- Effects of varied constellation configurations on accuracy
- Accuracy related to time-based measurements and precision achieved through redundancy
- Seasonal effects of measurements when using CTSRN



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knowledge that improves
California's transportation system.

WHAT IS OUR GOAL?

The goal of this project is to provide Caltrans better accuracies and recommendations for best practices and procedures in using the CTSRN.

WHAT IS THE BENEFIT?

The project plans to provide Caltrans with innovations in current CTSRN practices. These NTRK surveys are expected to provide greater accuracy in spatial data collection for use in land surveys and construction, thus enabling higher quality and timely completion of construction projects.

WHAT IS THE PROGRESS TO DATE?

The Caltrans task manager (TM) conducted kickoff and Project Panel meetings with the Caltrans customer, Surveys, DRISI representatives, and the university researchers. The university research team in collaboration with Caltrans Surveys established and constructed three passive and permanent base survey station test sites and encountered bias errors in the collected data from the test sites.

The next immediate steps are to start a new data collection campaign that will address the biases and issues from the initial, active data collection quarter.

For more information, please contact the TM.