



## **High-Precision and Low Latency RT-GNSS Processed Data for Diverse Geophysical and Natural Hazard Communities.**

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UNAVCO has been providing infrastructure and support for solid-earth sciences and earthquake natural hazards for the past two decades. Recent advances in GNSS technology and data processing are now providing position solutions with centimeter-level precision at high-rate ( $>1$  Hz) and low latency (i.e. the time required for data to arrive for analysis, in this case less than 1 second). These data have the potential to improve our understanding in diverse areas of geophysics including properties of seismic, volcanic, magmatic and tsunami sources, and thus profoundly transform rapid event characterization and warning. Scientific and operational applications also include glacier and ice sheet motions; tropospheric modeling; and space weather. These areas of geophysics represent a spectrum of research fields, including geodesy, seismology, tropospheric weather, space weather and natural hazards. Processed Real-Time GNSS (RT-GNSS) data will require formats and standards that allow this broad and diverse community to use these data and associated meta-data in existing research infrastructure.

These advances have critically highlighted the difficulties associated with merging data and metadata between scientific disciplines. Even seemingly very closely related fields such as geodesy and seismology, which both have rich histories of handling large volumes of data and metadata, do not go together well in any automated way. Community analysis strategies, or lack thereof, such as treatment of error prove difficult to address and are reflected in the data and metadata. In addition, these communities have differing security, accessibility and reliability requirements.

We propose some solutions to the particular problem of making RT-GNSS processed solution data and metadata accessible to multiply scientific and natural hazard communities. Importantly, we discuss the roadblocks encountered and solved and those that remain to be addressed.