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Transition of NOAA's GPS-Met Data Acquisition and Processing System to the Commercial Sector: Inital Results

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In April of 2014, NOAA/OAR/ESRL Global Systems Division (GSD) and Trimble, in collaboration with Earth Networks, Inc. (ENI) signed a Cooperative Research and Development Agreement (CRADA) to transfer the existing NOAA GPS-Met Data Acquisition and Processing System (GPS-Met DAPS) technology to a commercial Trimble/ENI partnership.

NOAA's GPS-Met DAPS is currently operated in a pseudo-operational mode but has proven highly reliable and running at over 95% uptime. The DAPS uses the GAMIT software to ingest dual frequency carrier phase GPS/GNSS observations and ancillary information such as real-time satellite orbits to estimate the zenith-scaled tropospheric (ZTD) signal delays and, where surface MET data are available, retrieve integrated precipitable water vapor (PWV). The NOAA data and products are made available to end users in near real-time. The Trimble/ENI partnership will use the Trimble Pivot™ software with the Atmosphere App to calculate zenith tropospheric (ZTD), tropospheric slant delay, and integrated precipitable water vapor (PWV).

Evaluation of the Trimble software is underway starting with a comparison of ZTD and PWV values determined from four sub networks of GPS stations located 1. near NOAA Radiosonde Observation (Upper-Air Observation) launch sites; 2. Stations with low terrain/high moisture variability (Gulf Coast); 3. Stations with high terrain/low moisture variability (Southern California); and 4. Stations with high terrain/high moisture variability (high terrain variability elev. > 1000m). For each network GSD and T/ENI run the same stations for 30 days, compare results, and perform an evaluation of the long-term solution accuracy, precision and reliability. Metrics for success include T/ENI PWV estimates within 1.5 mm of ESRL/GSD's estimates 95% of the time (ZTD uncertainty of less than 10 mm 95% of the time).

The threshold for allowable variations in ZTD between NOAA GPS-Met and T/ENI processing are 10mm. The CRADA 1&2 Trimble processing show a variation of 4$\pm$2mm and 3$\pm$8mm respectively. The threshold for allowable variations in PWV between NOAA GPS-Met and T/ENI processing are 15mm. The CRADA 1&2 Trimble processing show a variation of 2$\pm$4mm and 10$\pm$13 respectively. The T/ENI PWV and ZTD values meet and exceed the requirements outlined in the CRADA for the first two networks processed.
T/ENI Partnership brings a footprint of GNSS and meteorological stations that could significantly enhance the latency, temporal, and geographic density of ZTD and PWV over the US and Europe.

We will provide a brief overview of the Trimble Pivot™ software and the Atmosphere App and present results from further testing along with a timeline for the transition of the GPS-Met DAPS to an operational commercial service.