Simplified Tidal Datum Calculation from Water Level Measurements

JOA Surveys, LLC (JOA) has developed a free, online service called TideLab that will automatically compute United States tidal datums from raw water level measurements. The online tool is built to be flexible, simple, powerful and accurate. Up to now, datum computations in the United States were time-consuming, required manual intervention, and were generally only available to tidal analysts with years of experience. TideLab allows users to unlock additional value from their water level data by quickly and simply computing tidal datums with minimal user input

The TideLab algorithm is accessible through the TidalDatumTool website. Data submitted through the website is processed with a series of low pass filtering sequences with empirically derived parameters. High and low tides are extracted and designated following the rules outlined by the National Oceanic and Atmospheric Administration's Center for Oceanographic Operational Products and Services (CO-OPS), the United States authority on water levels and tidal datums.

To validate the accuracy of the automated approach, tidal datums for 429 water level data sets from the CO-OPS database were computed and compared against the published values. Differences between TideLab datums and published CO-OPS datums were within 5mm RMS for 52% of the stations and 5cm RMS for 99% of the stations.

Automating the datum computation process allowed JOA Surveys to investigate the effect of data series length and observation interval on datum accuracy. Data series were truncated to 3, 7 and 10 day data sets to determine the accuracy of shorter observation periods relative to published datums. Data were also decimated to 15 minutes, 30 minutes and 1 hour. In general, data sets of 7 days or more were within 10cm RMS of the published datums. Data collected up to 30 minute interval compared well, but suffered at 1 hour and beyond.