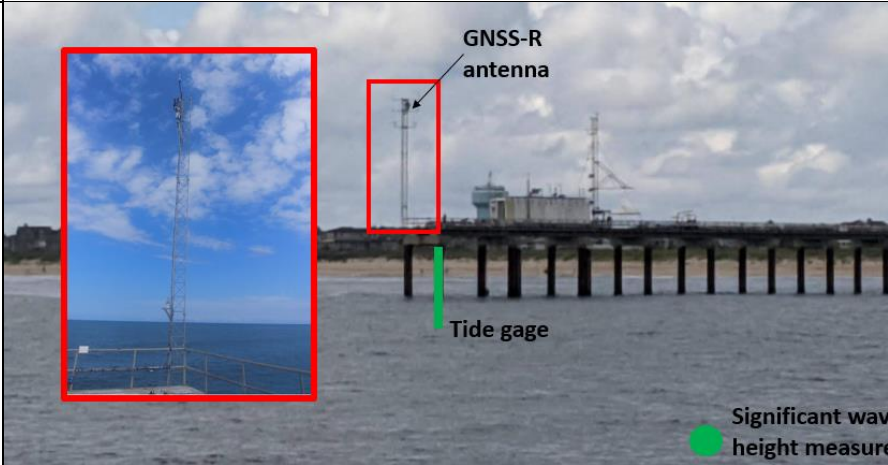


<b>UTC Project Information</b>	
Project Title	Using GNSS to Evaluate Threats to Mobility of Resources and People on Coastal Roads in USDOT Region 10
University	Oregon State University
Principal Investigator	Meagan Wengrove
PI Contact Information	<a href="mailto:meagan.wengrove@oregonstate.edu">meagan.wengrove@oregonstate.edu</a>
Funding Source(s) and Amounts Provided (by each agency or organization)	University of Washington PacTrans \$40,000 Oregon State University \$ 40,000
Total Project Cost	\$80,000
Agency ID or Contract Number	69A3551747110
Start and End Dates	August 16, 2019-December 15, 2021
Brief Description of Research Project	<p>Our objective is to develop a new technique to assess the hazard intensity of coastal erosion hotspots to existing and planned coastal roadways by continuously monitoring coastal water levels and wave heights using a new remote sensing technique with land-based GNSS.</p> <p>The proposed technique will measure nearshore water levels and wave heights using land-based and easily mobilized Global Navigation Satellite System (GNSS), which is an all-weather, continuous, global radio satellite system. GNSS is a remote sensing technique. GNSS is easy to instal and maintain, it is economical for coastal DOTs to buy with relatively low budgets (an antenna receiver is ~\$3000).</p> <p>GNSS can continuously monitor during storms without being in destructive sea-states (like tide gages and coastal buoys), or depending on optical clarity (like cameras). Additionally, the proposed method generates water level observations with respect to the geodetic datum, which is tied to the land survey datum, so there is no need to convert between datums as with other monitoring techniques.</p>

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>The research outcome (estimating water levels and wave heights using GNSS-R) was carried out at a test field site on the coast (see picture below).</p> <p>The techniques developed and supported by this work have led to a new project granted to PI Park to implement using GNSS-R for monitoring water levels and potentially wave heights in remote areas in Alaska where reliable water level measurements are scarce. This project is to adapt Global Navigation Satellite System (GNSS) as a new operational water level measurement facility, referred to as the GNSS Water level Observation System (GWOS), which will improve existing coastal monitoring capabilities of water level. During the project, an operational water level monitoring GNSS-R methodology will be developed. Also, we will characterize the site dependent parameters of GNSS-R for east, west, south coasts of the continental US, and Alaska for optimizing GWOS. The project will produce a standalone executable software package for producing WL measurements using GNSS-R data.</p>
	
<p>Impacts/Benefits of Implementation (actual, or anticipated)</p>	<p>Implementation will lead to the ability to estimate water levels and wave heights in regions where there are not tide gages or wave buoys available. This could allow the USDOT to measure the anticipated vulnerability of their roadways real time using a GNSS network.</p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project Website</li> </ul>	