

P-band Signals of Opportunity Remote Sensing of Land Surfaces

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Abstract— P-band Signals of Opportunity (SoOp) remote sensing is promising for investigations of land surface hydrological and ecological processes along with applications to water resource management, agriculture yield, flood prediction, drought monitoring and weather forecasts. P-band SoOp leverages the transmit signals from existing geostationary P-band (260/360 MHz) Mobile Users Objective System communication satellites, and hence will allow the deployment of passive only receivers to perform bistatic radar scattering observations. It will enable low-cost high-science return of remote sensing of critical land surface parameters, such as soil moisture, snow water storage, and vegetation water content. An overview of the P-band SoOp technology, its fundamental principle and outlook for application to reflectometry and synthetic aperture radar will be provided.

Simon H. Yueh received the Ph.D. degree in Electrical Engineering in January 1991 from the Massachusetts Institute of Technology. He was a postdoctoral research associate at the Massachusetts Institute of Technology from February to August 1991. In September 1991, he joined the Radar Science and Engineering Section at the Jet Propulsion Laboratory (JPL) and has assumed various engineering and science management responsibilities. He served as the Project Scientist of the National Aeronautics and Space Administration (NASA) Aquarius mission from January 2012 to September 2013, the Deputy Project Scientist of NASA Soil Moisture Active Passive Mission from Jan 2013 to September 2013, and the SMAP Project Scientist since October 2013. He has been the Principal/Co-Investigator of numerous NASA and DOD research projects on remote sensing of ocean salinity, ocean wind, terrestrial snow and soil moisture. He has authored four book chapters and published more than 200 publications and presentations. He received the 2021 IEEE GRSS J-STARS Prize Paper Award, 2014 IEEE GRSS Transaction Prize Paper award, 2010 IEEE GRSS Transaction Prize Paper award, 2002 IEEE GRSS Transaction Prize Paper award, the 2000 Best Paper Award in the IEEE International Geoscience and Remote Sensing Symposium 2000, and the 1995 IEEE GRSS Transaction Prize Paper award for a paper on polarimetric radiometry. He received the JPL Lew Allen Award in 1998, JPL Ed Stone Award in 2003, NASA Exceptional Technology Achievement Award in 2014 and NASA Outstanding Public Leadership Medal in 2017. He was an Associate Editor of Radio Science from 2003 to 2007, and the Editor in Chief of IEEE Transactions of Geoscience and Remote Sensing from 2018–2022. He is a member of the American Geophysical Union, a member of URSI Commission F and IEEE Fellow.

