

Laser In-situ Scattering and Transmissometry–Stream-Lined 2 (LISST-SL2) Testing

Overview: The U.S. Geological Survey (USGS) in partnership with the Federal Interagency Sedimentation Project (FISP) proposes to award a cooperative agreement to Virginia Tech to conduct a study entitled: Laser In-situ Scattering and Transmissometry–Stream-Lined 2 (LISST-SL2) Testing. The USGS and FISP conduct and sponsor research on emerging tools and technologies for measurement and analysis of fluvial sediment properties. The purpose of the proposed work is to provide testing of a field deployable laser diffraction instrument. The instrument, LISST-SL2, is a second generation isokinetic river sediment monitoring device that measures suspended-sediment concentration and particle size between 1 and 500 microns in 36 log-spaced bins at a point in a river every 2 seconds. The second generation device addresses limitations noted by FISP, who funded testing of the first generation device. Field testing of the second generation device is needed to determine the extent of the modifications on determining suspended-sediment concentrations and particle-size distribution. The work will be led by Dr. Jonathan Czuba who extensively researched the theory, field tested the original LISST-SL, and compared LISST-SL readings to hundreds of samples. Dr. Czuba compiled, analyzed, thoroughly described, and reported the results in a journal article for Water Resources Research, a top-ranked international journal.

Scope of Work: Dr. Czuba will conduct field testing on a minimum of two streams in Virginia. Dr. Czuba has both the experience and equipment required to conduct an effective and efficient study to meet the project's purpose. During the LISST-SL2 testing, concurrent physical water samples will be collected. The samples will be analyzed in a lab for suspended-sediment concentration and particle size-distribution. The LISST-SL2 results will be compared and regressed against the physical sample results. Dr. Czuba will also analyze LISST-SL2 datasets from other USGS or FISP efforts. The recipient will compile, analyze, thoroughly describe and report the data and results, and make recommendations based on results. The report will be reviewed and published in a publicly accessible record of Dr. Czuba's choice (at minimum posted on the FISP website).