

AZWCS Seminar Session

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Focused Aerial Sensing for Hydraulic Analysis:

High Resolution Photogrammetric Surface Modeling for Applied Environmental Analysis

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#### Abstract

The Arizona Water Science Center is developing a product-based aerial sensing team to create surface models for better informed environmental analysis. Advances in photogrammetric software have made digital photogrammetry competitive with airborne and terrestrial Lidar for the acquisition of surface models in the arid West. Lidar is still the best way to create 'bare-earth' and 'total above-ground biomass' models in densely vegetated environments because of its ability to penetrate vegetation, but in arid regions photogrammetry is providing a comparable product for a fraction of the cost and processing time. Additionally, photogrammetry provides color orthoimagery, and digital surface models, as well as X,Y, Z-point clouds. Sensors can be easily changed to provide color infrared (vegetation health and species identification), thermal infrared (animal and spring detection), Normalized Difference Vegetation Index (NDVI- plant productivity and health), and with repeat scans, change detection and volumetric calculations. Different aerial platforms are available for data acquisition depending on the specific logistical needs of the project (airspace, landownership, study area and resolution needs). With current sensors, digital surface models and orthoimagery can be made ranging from sub-2cm to 12cm pixels and accuracy estimates of 1.5cm to 8cm when flying at 200 to 1,000 feet respectively (sUAS vs manned aircraft).