

Cost Effective UAS Solutions for Coastal Zones

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Abstract

Management of coastal environments is handled by municipal governments, state agencies and various federal departments. Coastal regions are very fragile but at the same time quite dynamic. Beach, berm and dune variations create an evolving landscape. Factors including weather, tidal forces, pollution and property development are just a portion of the dynamic inputs affecting these areas.

For coastal engineers, hard data is key. With a large dataset, evaluated over time, coastal environments can be effectively managed and preserved. The type of data presently used is based on land surveys, aerial photography and terrestrial photography from specific sensitive areas. Field observations are also quite important.

Bama Consulting Services has partnered with Indian River County, Florida to perform UAS-based surveys of 3 coastal zones impacted by Hurricane Matthew in 2016. These 3 areas are currently the focus of beach restoration activities. The goal for Bama Consulting Services was to provide support to the municipal authorities overseeing the restoration. It was discovered that a unique suite of product offerings could be leveraged from the data collected. This suite includes 3D models of the dune, berm and beach structures, analysis of plant life, volumetric calculations of relative sand displacement, orthomosaic products and wildlife habitat data at a level of precision not presently available in a cost-effective package. To truly exploit these services, a unique means of ground control was developed to ensure scale and orientation are maintained while preventing escalation in the cost of the product.

Technologies for future enhancements to this package are being evaluated. These include native multispectral and infrared imagery as well as underwater imaging solutions for areas near the shore.