

SERDP PROJECT OF THE YEAR ***SUSTAINABLE INFRASTRUCTURE***

APPLICATION OF LANDSCAPE MOSAIC TECHNOLOGY TO COMPLEMENT CORAL REEF RESOURCE MAPPING AND MONITORING

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Recent declines in coral reefs across the globe underscore the need for new tools to better understand ecological patterns and rates of change. Comprehensive assessment of coral reef resources demands a hierarchical mapping strategy involving microscale to macroscale measurements. Of immediate interest to DoD are types of changes within reef systems that can be monitored at the mesoscale—tens to hundreds of square meters.

Dr. Pamela Reid and her research team developed an innovative technology to increase the speed and repeatability with which reef plots can be mapped and inventoried. Specifically, underwater video is used to create landscape two-dimensional mosaics of reef plots in a highly automated way. The primary goal is to construct spatially accurate mosaics and extract meaningful ecological indices of reef condition. As part of this effort, the team has developed a prototype package of instruments, software, and protocol for creating two-dimensional landscape mosaics of coral reefs. In addition, the team is exploring techniques to assist or automate classification of underwater imagery.

This technology can be used to construct spatially accurate video mosaics on the order of 20 m × 20 m with mm resolution, providing an unprecedented multi-scale view of reefs at both landscape and colony levels. These mosaics serve as superior tools for monitoring disease, bleaching, and partial mortality—important indicators of reef health. Mosaics also have excellent archival potential and support the efficient tracking of changes over time from repeated surveys, which are limitations of current state-of-the-art methods involving diver transects, photo-quadrats, and one-dimensional strip mosaics.

For more specific information about this project, stop by Poster #79.