



Coral Reef environment reconstruction using small drones, new generation photogrammetry algorithms and satellite imagery

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Surveys based on Remotely Piloted Aircraft Systems (RPAS), together with new-generation Structure from Motion (SfM) and Multi-View Stereo (MVS) reconstruction algorithms have been employed to reconstruct the shallow bathymetry of the inner lagoon of a coral reef in Moorea, French Polynesia. This technique has already been used with a high rate of success on coastal environments (e.g. sandy beaches and rocky shorelines) reaching accuracy of the final Digital Elevation Model in the order of few centimeters. The application of such techniques to reconstruct shallow underwater environments is, though, still little reported. We then used the bathymetric dataset obtained from aerial pictures as ground-truth for relative bathymetry obtained from satellite imagery (WorldView-2) of a larger area within the same study site. The first results of our work suggest that RPAS coupled with SfM and MVS algorithms can be used to reconstruct shallow water environments with favorable weather conditions, and can be employed to ground-truth to satellite imagery.