



Jul 13th, 11:30 AM - 11:50 AM

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Harpham, Quillon; Herbert, Jennifer; and Skytt, Vibeke, "Creating Best Bathymetry using the IQmulus high volume fusion and analysis platform for Geospatial Point Clouds" (2016). *International Congress on Environmental Modelling and Software*. 30.
<https://scholarsarchive.byu.edu/iemssconference/2016/Stream-C/30>

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Creating Best Bathymetry using the IQmulus high volume fusion and analysis platform for Geospatial Point Clouds

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Abstract: New data acquisition techniques are emerging and are providing a fast and efficient means for multidimensional spatial data collection. Single and multi-beam echo-sounders, airborne LIDAR, SAR satellites and mobile mapping systems are increasingly used for the digital reconstruction of the environment. All these systems provide point clouds, often enriched with other sensor data providing extremely high volumes of raw data. With these acquisition approaches, a great deal of data is collected, but it often requires harmonisation and integration before reaching its maximum use potential. For use in modelling waves and flow in seas and oceans, collections of surveys of water depth are such an example of a potentially 'big data' source structured as a point cloud. Individual surveys vary both spatially and temporally and can overlap with many other similar surveys. Where measurements of water depth differ greatly between surveys a strategy needs to be employed to determine how to create an optimal bathymetric surface using all of the relevant, available data, i.e. the best surface. As part of its SeaZone suite of data products and as a result of the IQmulus high volume fusion and analysis platform, HR Wallingford employs the latest deconfliction techniques to produce such a 'best' surface using its entire collection of survey data. The workflow begins with a methodology for prioritising individual surveys, followed by spline interpolation of adjacent or overlapping datasets with a potentially parallel implementation which includes tiling and stitching to create the final completed surface.

Keywords: bathymetry, deconfliction, point cloud, big data