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REGISTRATION OF OPTICAL DATA WITH HIGH-RESOLUTION SAR DATA: A NEW IMAGE REGISTRATION SOLUTION

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Abstract. Accurate image-to-image registration is critical for many image processing workflows, including georeferencing, change detection, data fusion, image mosaicking, DEM extraction and 3D modeling. Users need a solution to generate tie points accurately and geometrically align the images automatically. To solve these requirements we developed the Hybrid Powered Auto-Registration Engine (HyPARE). HyPARE combines all available spatial reference information with a number of image registration approaches to improve the accuracy, performance, and automation of tie point generation and image registration. We demonstrate this approach by the registration of a Pléiades-1a image with a TerraSAR-X SpotLight image of Hannover, Germany. Registering images with different modalities is a known challenging problem; e.g. manual tie point collection is prone to error. The registration engine allows to generate tie points automatically, using an optimized mutual information-based matching method. It produces more accurate results than traditional correlation-based measures. In this example the resulting tie points are well distributed across the overlapping areas, even as the images have significant local feature differences.

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