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EVALUATION OF PLEIADES-1A TRIPLET ON TRENTO TESTFIELD

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Abstract. The Pleiades mission is part of the French-Italian ORFEO system (Optical and Radar Federated Earth Observation) and has the aim to provide very-high resolution optical imagery from space for civilian and military needs. Within the Pleiades evaluation program, the 3DOM Unit at the Bruno Kessler Foundation in Trento (Italy) received a triplet by Pleiades-1A over Trento testfield for research purposes. The images composing the triplet were acquired on August 28, 2012 with across-track angles close to nadir and alongtrack angles of 18 °, -13 ° and 13 ° in average with respect to the flight direction (Fig. 1) and a mean GSD between 0.72 m and 0.78 m. The aim of this paper is to investigate the quality of the Pleiades triplet and derived Digital Surface Model (DSM). The image analysis was conducted by evaluating the radiometric properties of the images (noise characteristics, image artifacts, spilling) and the geometric accuracy. After image orientation, three DSMs were generated with advanced image matching algorithms using two image combinations and the triplet. The DSMs were compared to the reference Lidar DSM (1 m grid spacing) for quality analysis in areas with different characteristics (land use and cover, topography). Thanks to the availability of other very high resolution satellite imagery in the testfield, the results were compared to those previously obtained using WorldView-2 ad GeoEye-1 stereopairs acquired on the same area.

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