

## **SIMULTANEOUS HIGH-RESOLUTION ORTHOIMAGES AND DIGITAL ELEVATION MODELS FOR GEOLOGIC MAPPING**

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Recent developments in the field of digital photogrammetry have opened new perspectives for the use of photogrammetric products in geoscientific applications. A case study on geologic mapping was based on data products of the digital photogrammetric High Resolution Stereo Camera - Airborne (HRSC-A). The system provides digital elevation models (DEM) with decimeter accuracy and multispectral orthoimages with typical ground resolutions of 15-100 cm. Fast acquisition of topographic data covering large areas, including inaccessible and hazardous areas, is made possible through digital data acquisition, automated processing, and the minimized need for ground control points. A geologic map at scale 1: 5,000 of La Fossa (Vulcano Island, Italy) was prepared by photogeologic techniques and field work based on HRSC-A data. The high geometric accuracy and resolution allowed for using image maps at scales of up to 1: 2,500 and was especially useful for the recognition of small critical surface features. Moreover, the simultaneous DEM enables direct 3D localization of structural elements identified in the orthoimage for meso- and regional scale analysis. Using derived products for visual interpretation such as stereoscopic projections with adjustable vertical scales or DEM follow-up products such as relief and slope maps was possible with low processing efforts. In conclusion, it is expected that ongoing and future work in regional and planetary exploration, monitoring of geological and environmental hazards and also geophysical or engineering applications requiring topographic data corrections or modelling of surface processes will benefit from fast acquisition of digital photogrammetric products with high geometric resolution and accuracy.