



Quality of DEMs derived from Kite Aerial Photogrammetry System: a case study of Dutch coastal environments.

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Coastal protection is one of the main challenges for the Netherlands, where a large proportion of anthropogenic activity is located below sea level (both residential and economic). The Dutch government is implementing an innovative method of coastal replenishment using natural waves and winds to relocate sand from one side to the other of the country. This requires close monitoring of the spatio-temporal evolution of beaches in order to correctly model the future direction and amount of sand movement. To do so -on the onshore beach- we tested a Kite-Aerial Photography System for monitoring the beach dynamics at Zandmotor (<http://www.dezandmotor.nl/en-GB/>).

The equipment used for data collection were a commercial DSLR camera (Nikon D7000 with a 20mm lens), gyro-levelled rig, Sutton Flowform 16 kite and Leica GNSS Viva GS10, with GSM connection to the Dutch geodetic network. We flew using a 115 m line with an average inclination of 40 to 45°; this gave a camera vertical distance of ~80 m and pixel size of ~20 mm.

The methodology follows that of Smith et al. (2009), and of Paron & Smith (2013), applied to a highly dynamic environment with low texture and small relief conditions. Here we present a comparison of the quality of the digital elevation model (DEM) generated from the same dataset using two different systems: Structure from Motion (SfM) using Agisoft Photoscan Pro and traditional photogrammetry using Leica Photogrammetry Suite. In addition the outputs from the two data processing methods are presented, including both an image mosaic and DEM, and highlighting pros and cons of both methods.

References

Smith, M. J. et al. 2009. High spatial resolution data acquisition for the geosciences: kite aerial photography. *ESPL*, 34(1), 155-161.

Paron, P., Smith, M.J. 2013. Kite aerial photogrammetry system for monitoring coastal change in the Netherlands. 8th IAG International Conference on Geomorphology, Paris, August.