Use and application of photogrammetry software to develop geospatial products. Case study: Tárcoles river basin, Costa Rica

C.Vargas*[a] DATA-P28/ ISPRS36-459

*[a] Consejo Nacional de Rectores (CONARE), Centro Nacional de Alta Tecnología (CeNAT), Laboratorio PRIAS, Investigador, cvargas@cenat.ac.cr

Introduction

Grande de Tárcoles river basin has an approximate area of 2551 km2 and is home to more than 2.5 million people according to the 2011 Census (INEC, 2011). This basin passes through 5 of the 7 Costa Rican provinces, and much of the industrial development of the country takes place within it. A lack of urban planning, poor coordination of governmental institutions, the diversity of vegetal coverage, and different land uses all exacerbate territorial conflicts (Astorga, 2011).

The importance of aerial photography is that it allows to analysis in a defined and limited linear scale of the fast and disproportionate growth of urban areas and the increased vulnerability of the population's water supplyrability that even today is present in the water supply in the basin.

General characteristics of the basin

The Rio Grande de Tarcoles is located in the center of the country known as the Central Valley, where 60% of the population lives, works and develops all kinds of activities for livestock agriculture, commerce, industry and services. His extreme limits are in the upper basin borders the Cordillera Central (CVC) and in its lower part with the Pacific Ocean, east of Costa Rica. The capital San José and the other provincial capitals as Alajuela and Heredia are the points most predominant population and housing tributary. Figure1

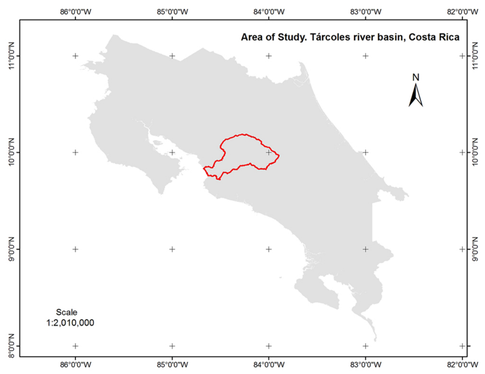

Figure1. Area of Study

Data and methodology

For this study aerial photography was used, the data coming from the photogrammetric project known as TERRA years 1997-1998, released by the National Center of Geo-environmental Information (CENIGA). A total of 66 aerial photographs, format JPEG and MrSid, were used. Seven images were scanned from paper format.The information is digitized in a single format, TIFF, and then processed using the photogrammetric software Agisoft PhotoScan Professional to obtain geospatial products.

The data used in photogrammetry software were: aerial photographs centers, obtained from a vector file, shape, supplied by CENIGA, using CRTM05 projection official for Costa Rica; Ground Control Points (GCP) extracted from ortho-photographs of the Project Cadastre Regularization, acquired in 2005 with a resolution of 60 cm / pixel; and the variable Z (elevation), using a raster elevation model obtained from the Digital Atlas of Costa Rica 2008 version (ADCR). Figure2

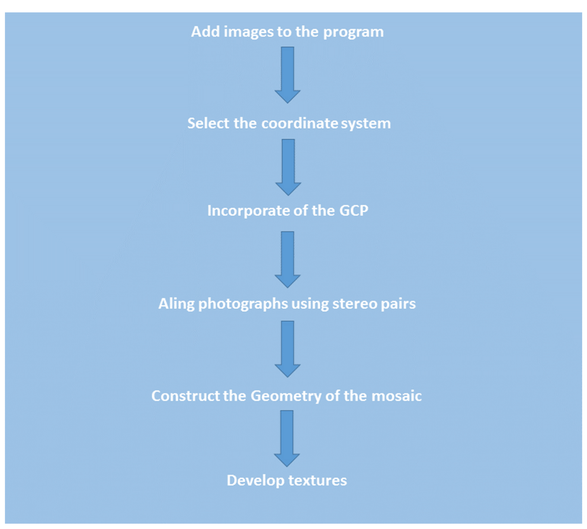

Figure2. Workflow in Agisoft

The 36th International Symposium on Remote Sensing of Environment
11-15 May 2015, Berlin, Germany

Results of the photogrammetric process

Acording with the workflow, presented the following products in Figure3.

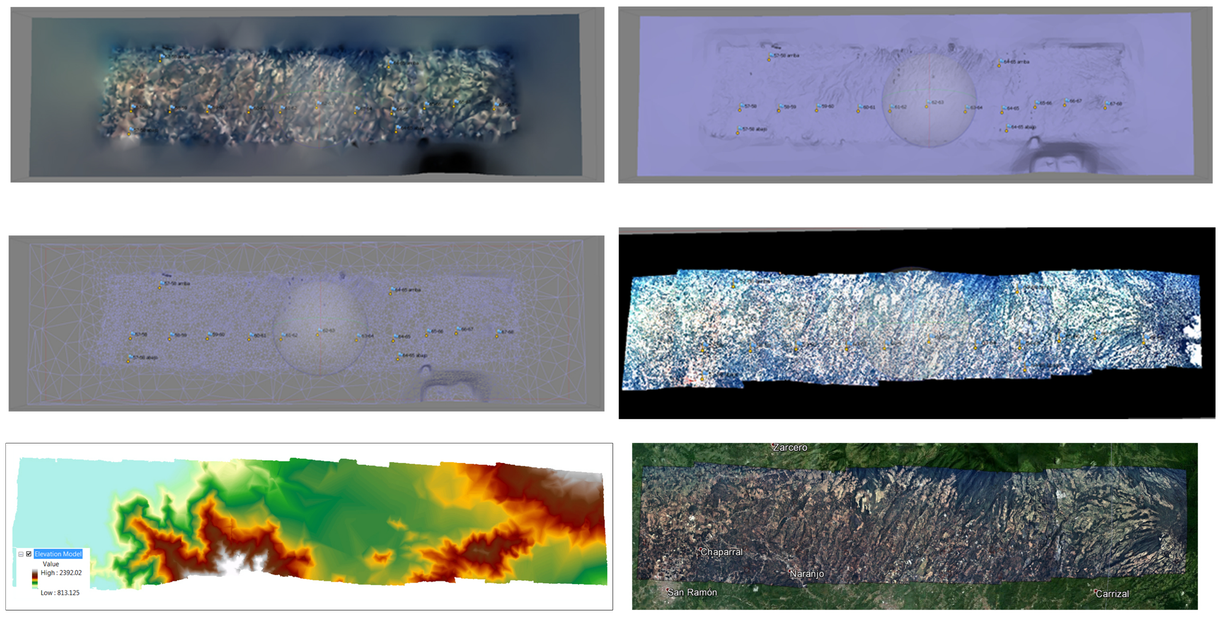

Figure3. Diferents products of Agisoft and final ortho-mosaic

Conclusions

Advances in lower cost technologies for geospatial information capture used for the development of high-consumption products such as ortho-mosaics, DEM, and point clouds facilitate interaction between the data supplier and end user.

The workflow used with this solution reduces data processing time to 30 minutes, compared to 3 hours for an operator making a similar workflow.

The resulting products provide reliable data with the advantage of fast production and formats compatible with several GIS software and information displays.

Acknowledgements

Thanks Alvaro Aguilar and Sara Mora for contribute with aerial photographies

References

Astorga, A.,2011, "Territorial Ordenace in Costa Rica, 2010", State of the Nacion Report Seventeenth(2010).

INEC.,2011, "National Census of Costa Rica, 2011", National Institute of Statistics and Censuses