Automated Autopilot & Geopointing Payload “AETOS”

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This paper presents the describe the functions and the possibilities of a newly developed payload with main task the continuous Geo-Referencing of Video Flow From Small Low-Cost Civilian UAVs. The method of geo-referencing the video data acquired by a small civilian use UAV, which is specifically designed as an economical, moderately functional, small airborne platform intended to meet the requirement for fast-response to time-critical events in many small private sectors or government agencies for small areas of interest. The developed mathematical model for geo-locating video data can simultaneously solve the video camera’s interior orientation parameter (IOP) (including lens distortion), and the exterior orientation parameters (EOPs) of each video frame. First experimental results collected by the UAV at the established control field will be analyzed. It also measures an unknown target in order to estimate the target coordinates and then track and follow the unknown target continuously. The results are mainly promising for inspection and surveillance missions, but not adequate for airborne mapping systems because the boresight matrix was usually assumed to be a constant over an entire mission in a traditional airborne mapping system. With a newly developed method, each video is geo-orthorectified and then mosaicked together to produce a 2-D planimetric mapping. Productivity and cost related issues are also discussed when the payload comes to mass production. Mission case studies are also presented.

AeroFilms LTD is a dynamic SME that expertizes in the area of Geospatial air photographing, Direct Georeferencing, ground surveillance, real time mapping missions and more. AeroFilms has years of experience in Unmanned Aerial Vehicles (UAV) operation and the utilization of these systems in numerous types of missions that help civil engineering purposes. Moreover, AeroFilms has entered the field of UAV design and manufacture with a series of prototypes including fixed-wing designs and an innovative Tilt-Rotor. The year of 1999 was the starting point of AeroFilms and some first photogrammetry results were presented in 2004 in world-wide conferences. Vassilis OTEINOPoulos, founder of AeroFilms cooperated with THALES SA, CEA and the University of Tubingen in order to develop new methods in georeferencing and real time mapping and contributed in the mDRONES ICT Project (Micro DRones autOnomous Navigation for Environmental Sensing) and presented its results during 2008. AeroFilms’ development of UAV payloads is another area that AeroFilms covers. Currently an innovative automatic Pan-Tilt Cognitive Vision system utilizing Optical and Infrared Cameras is under development with the code name —AETOS‖ (Eagle in English).