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Author: Mr. Federico Toson
CISAS "G. Colombo" - University of Padova, Italy

Mr. Alessio Aboudan
CISAS – "G. Colombo" Center of Studies and Activities for Space, University of Padova, Italy
Mr. Carlo Bettanini
CISAS – "G. Colombo" Center of Studies and Activities for Space, University of Padova, Italy
Dr. Giacomo Colombatti
CISAS – "G. Colombo" Center of Studies and Activities for Space, University of Padova, Italy
Ms. Irene Terlizzi
CISAS "G. Colombo" - University of Padova, Italy
Dr. Sebastiano Chiodini
University of Padova, DII / CISAS – "G. Colombo", Italy
Dr. Lorenzo Olivieri
CISAS "G. Colombo" - University of Padova, Italy

THE ATMO DEVICE: ALL-IN-ONE SOLUTION FOR EARTH MONITORING AND OBSERVATION

Abstract

In today's context, Earth observation plays a key role in both technological development and environmental protection. Precisely for the second aspect, which is increasingly topical and of global interest, the scientific community is striving to define methodologies that provide a complete picture of the well-being of the environment and its inhabitants. For this reason, the ATMO (Aerospace Technologies for Earth Monitoring and Observation) project aims to develop a compact and easily deployable device, by means of drones or stratospheric balloons, for monitoring pollutants in the atmosphere and for a global analysis of the areas below, such as the assessment of the vegetation below, the detection of highly impactful light sources and signs of sudden changes in ecosystems. Clearly, where satellite analyses are sporadic and low resolution, a tool such as the one described can provide a more accurate and immediate view of various environmental indicators. This is also through correlation of the different phenomena contributing to climate change.

ATMO will be equipped with two cameras (one colour and one monochrome) for analysing the spectrum on the ground, sensors for assessing light pollution, and a pool of additional sensors for analysing the most common tropospheric pollutants: O3, NOX, SOX, CO2. Consideration is also being given to not only implementing the cameras with a set of filters for multi-band analysis, but also to integrating a near-IR camera or SWIR camera to achieve higher wavelengths than CMOS-type sensors. This would broaden the possible uses of the instrument such as the analysis of structures, landforms and soil composition. Data collected by ATMO can complement or extend less accurate information provided by static ground-based and satellite observation bases. The applications of this device are many: from the definition of the vegetation index to the correlation of this index with pollutants in the air or water in the soil. Furthermore, analyses to correlate light pollution and the presence of pollutant determinants resulting from photochemical reactions can be carried out.

The benefits of ATMO deriving from its versatility, compactness and ease of deployment will be described in this paper, and the results of the testing of this mountable prototype on drones and balloons will be analysed and its future use evaluated.