



The Unmanned Research Airplane Facility at the Cyprus Institute: Advanced Atmospheric Observations

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Unmanned Aerial Systems (UASs) have been established as versatile tools for different applications, providing data and observations for atmospheric and Earth-Systems research. They provide an urgently needed link between in-situ ground based measurements and satellite remote sensing observations and are distinguished by significant versatility, flexibility and moderate operational costs.

Building on an earlier project (Autonomous Flying Platforms for Atmospheric and Earth Surface Observations project; APAESO) of the Energy, Environment and Water Research Center (EEWRC) at the Cyprus Institute (APAESO is co-financed by the European Development Fund and the Republic of Cyprus through the Cyprus Research Promotion Foundation), we have built up an Unmanned Research Aircraft Facility at The Cyprus Institute (CyI-URAF). The basic components of this facility comprise four CRUISERS airplanes (ET-Air, Slovakia) as UAS platforms, a substantial range of scientific instruments to be flown on these platforms, a mobile Ground Control Station and a well-equipped workshop and calibration laboratory. The APAESO platforms are suitable to carrying out atmospheric and earth-surface observations in the (Eastern) Mediterranean (and elsewhere). They enable 3D measurements for determining physical, chemical and radiative atmospheric properties, aerosol and dust concentrations and atmospheric dynamics as well as 2D investigations into land management practices, vegetation and agricultural mapping, contaminant detection and the monitoring and assessment of hydrological parameters and processes of a given region at high spatial resolution.

We will report on some of the essential modifications of the platforms and some of the instrumentation that were instrumental in preparing the research airplanes for a variety of collaborative research projects with.

The first scientific mission involved the employment of a DOAS-system (Differential Optical Absorption Spectroscopy) in cooperation with colleagues from Heidelberg and Mainz, Germany and test flights that have been successfully completed. We also engaged in a new research project aimed at measuring vertical profiles of aerosols in the Eastern Mediterranean. This is being achieved in field campaigns employing an innovative aerosol sampler in close collaboration with colleagues from the University of Frankfurt, Germany as well as with colleagues from the Universities of Tel Aviv and the Weizmann Institute (Israel). More recently, we have started to prepare our platforms to carry out research missions in the context of the newly funded EU-BACCHUS project.