Dual PhD Thesis

(The Cyprus Institute – University of Crete)

In collaboration with the National Observatory of Athens (Greece) and CEA (France)

(Starting date: Sept. 2019)

CLOSING DATE FOR APPLICATIONS: 31st May 2019

Atmospheric profiling of aerosol properties using the new generation of Unmanned Aerial Vehicles and miniaturized atmospheric sensors

Scientific context: The combination of the most recent developments on Unmanned Aerial Vehicles (UAVs) and miniaturized sensors creates unique opportunities to establish rapidly cost-effective observations of the atmospheric column and fill the gap between ground-based and satellite measurements. Thanks to lowering the cost of investment and field operation, new UAV-sensor systems have the potential, yet unexplored, to enhance vertically the geographical coverage of international atmospheric networks and play a critical role in the rigorous quantification of the effect of climate forcers (such as aerosols) on the earth radiation budget and climate.

Objectives: This PhD project aims to provide innovative solutions to perform cost-effective in-situ profiling of aerosol properties in the first kilometres of the troposphere using UAV-sensor systems, and explore the lower stratosphere (up to 15km altitude) from UAV-balloon technology. Leveraging prototype developments initiated by the National Oceanic and Atmospheric Administration (NOAA, USA), the French Atomic Commission (CEA, France), and other European Research Performing Organizations, this project will qualify and exploit a comprehensive suite of UAV-based sensors enabling the profiling of key aerosol chemical/physical/optical properties. The long-term monitoring capacities of UAV-sensor systems will be demonstrated from routine flights performed in contrasted environments ranging from the dusty Mediterranean to the pristine Amazonian atmosphere.

Research programme: The successful candidate will be working at the Unmanned System Research Laboratory of the Cyprus Institute (http://usrl.cyi.ac.cy) among a highly qualified team of electronic/mechanical/system engineers and professional pilots flying commercial airliners. She/He will be responsible for the field measurement and scientific interpretation of UAV-based aerosol properties such as Aerosol Optical Depth (AOD), Aerosol Light Absorption, and Aerosol number size distribution. Several international field campaigns will be performed by the candidate in Cyprus/Greece and above the Amazonian Forest in the framework of international collaborations with University of Sao Paulo (Brazil) and the Max Planck Institute for Chemistry (Germany). The large amount of collected aerosol data will offer the candidate the opportunity to further exploiting them with co-located active/passive remote sensing techniques (e.g. sunphotometer and lidar). His/her work will be embedded within an international scientific environment (with English as working language), active participation in COST actions (InDust; https://cost-indust.eu/) and ERASMUS+ mobility opportunities.

Qualifications: This 3-year dual PhD will be rewarded with two doctoral degrees: the Cyprus Institute (Nicosia, Cyprus) and University of Crete (Heraklion, Greece). It is opened under the Atmosphere and Climate Division of the Cyprus Institute (http://acd.cyi.ac.cy) and will include short periods of research studies at the National Observatory of Athens (Greece). The successful candidate will hold a Master of Science in Environmental Sciences, Chemistry, or Physics with excellent communication and interpersonal skills. Previous experience of field measurements will be an asset for this position. Excellent proficiency in English is a prerequisite[1].

Contact Information: Please submit detailed CV (incl. MSc ranking information) + letter of motivation to:
- The Cyprus Institute (Cyprus): Prof. Jean Sciare (j.sciare@cyi.ac.cy)
- National Observatory of Athens (Greece): Prof. Nikos Mihalopoulos (nmihalo@noa.gr)

[1] For proof of English proficiency, please consult : https://www.cyi.ac.cy/index.php/education/phd-programs/energy-environment-and-atmospheric-sciences/phd-admissions.html