

## **A Micro-Balloon for University-based Atmospheric Observatory in Near Space**

Dr. Yunlong Lin

Visiting Scientist, Department of Mechanical and Aerospace Engineering,  
University of California, Davis, One Shields Avenue, Davis, CA, 95616  
Email: [yunlong.frank.lin@gmail.com](mailto:yunlong.frank.lin@gmail.com)

Stratospheric ballooning plays a unique and important role in atmospheric science. Aircraft are available as platforms for studying altitudes below about 15 km, while satellites normally orbit from about 500 km and above. Between these altitudes of 15 km and 500 km the only in-situ access (other than balloons) is by sounding rockets which only make brief transits through the region – a few minutes and generally while traveling at extreme speeds. Between 15km and 40km ballooning provides a near-ideal platform for atmospheric studies – a mechanically stable platform with the capability for long duration float (hours or even days) at controlled altitudes well above what aircraft can access.

In this paper, we present the innovative design of a low cost micro-balloon platform for University-based climate study, which is an ideal long duration float atmospheric observatory in near space. The flight package (gondola) is about 40kg in mass and 40cm x 40cm x 40 cm in volume and 45% of the mass (18kg) is taken up by the instruments. We plan two days long operations and observations duration in the first experimental launch and flight. The scientific instrument package includes a spatial heterodyne spectrometer for stratospheric water vapor measurements; a GPS receiver provided by General Dynamics which is used for Global Positioning System (GPS) signals occultation for atmospheric research; a four channels UV/VIS/NIR imager is designed for limb observations of aerosols and clouds; and a UV/Visible grating spectrometer for remote sensing of other important atmospheric species. It is our hope that such a low cost re-configurable University ballooning platform could provide frequent and long time access to near space to enhance space research and education in University community.