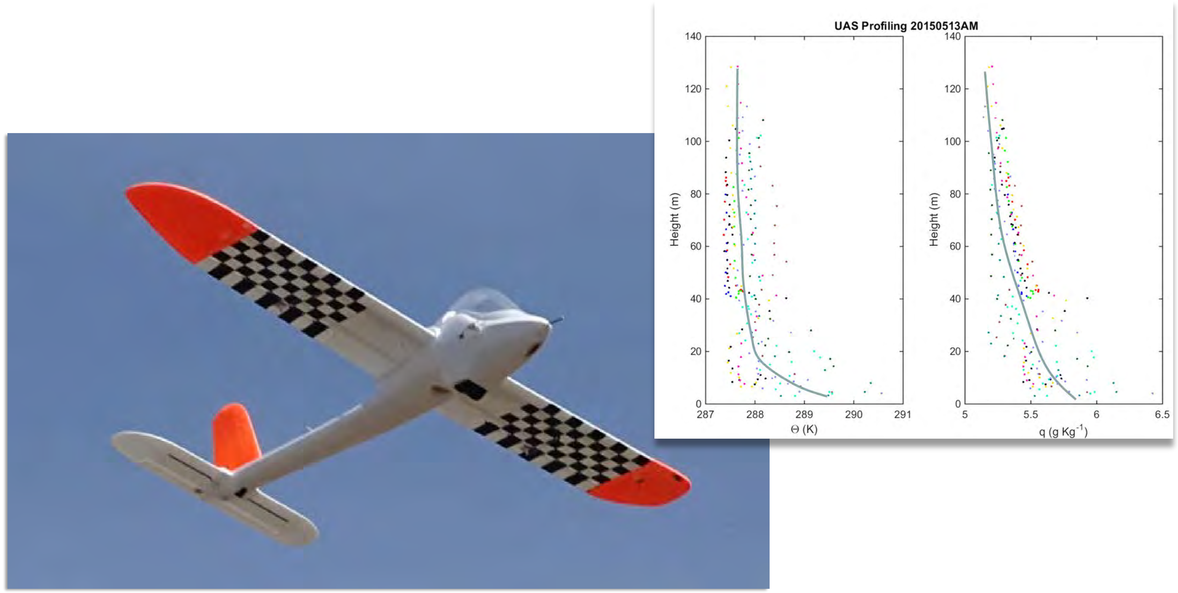
Low-Cost Expendable UAS with Application to Low Altitude Atmospheric Measurements – Phase II

Naval Postgraduate School



P-Met expendable UAS platform for sea-based low-cost near-surface meteorological sensing

- Utilize CRUSER workshop to evaluate past and ongoing atmospheric sampling projects to help guide platform and sensor developments.
- Develop a low-cost, expendable UAS that can safely be hand launched from a research vessel, can be recovered after a water landing or be landed in a net, can fly from 1 wave height to several km AGL, and has an endurance of more than 1 hour with a suitable payload.
- Develop modular sensing payloads for baseline and research atmospheric sampling. Baseline payloads should be very low cost and should exploit capabilities of the autopilot wherever possible, such as airspeed, GPS, compass heading, and data transmission and storage.
- Evaluate the system at JIFX events and as part of the CASPER program.

- Identify emerging technologies and pressing issues for environmental sampling using small UAS and USV by organizing a workshop on the subject under the CRUSER umbrella.
- Develop a low-cost, expendable, sea-based sUAS platform capable of hand launch from a small research vessel, water or net recovery, and atmospheric sensing between roughly one wave height above MSL to several km altitude, and with flight times in excess of 1 hour. Exploit ARSENL swarming developments for coordinated multi-elevation sensing.
- Develop low-cost expendable atmospheric sensing payloads that exploit open-source electronics and sensor fusion with open-source autopilots to the greatest extent possible.

- The proposed project addresses a current data acquisition gap in near-surface marine atmospheric boundary layer measurements needed to validate/improve models for the prediction of electromagnetic wave propagation, a subject area critical to the Navy for targeting, communications, and fleet protection.
- Accurate characterization of the lower atmosphere is needed to initialize or constrain forecast models.
- Ongoing developments in support of the ARSENL Aerial Combat Swarms project have led to very low-cost, robust autonomous platforms and swarming flight controls which may be exploited for low-cost, near surface sensing at sea.

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