Session: TE-1 Observing with autonomous vehicles in polar regions

Polar program: None

Title: Unmanned Aerial Systems over Sea Ice during the SeaState and PIPERS expeditions

Author(s): Guy Williams[1,2] (guy.darvall.williams@gmail.com), Darren Turner[3], Ted Maksym[4], Hanumant Singh[5], Stephen Ackley[6]

Institute(s): [1]University of Tasmania, Institute of Marine and Antarctic Studies, Hobart, Australia, [2]Antarctic Climate & Ecosystems Cooperative Research Centre, Hobart, Australia, [3]University of Tasmania, TerraLuma UAV facility, Hobart, Australia, [4]Woods Hole Oceanographic Institution (WHOI), Woods Hole, United States, [5]Northeastern University, Electrical and Computing Engineering, Boston, United States, [6]University of Texas at San Antonio, San Antonia, United States

Text: In recent years we have deployed multi-rotor and fixed wing Unmanned Aerial Systems (UAS) in support of Autonomous Underwater Vehicles (AUV) missions beneath sea ice in both the Arctic (ONR DRI SeaState - Beaufort Sea, Oct 2015) and Antarctic (NBP1704 PIPERS - Ross Sea, Apr-Jun 2017). Despite significant logistic and meteorological challenges in the polar environment, our UAS project has developed into a cost-effective and integral component of the modern sea ice research expedition. Using ´off-the-shelf´ multi-rotors and a delta-wing photogrammetry UAS developed by the TerraLuma facility at the University of Tasmania, we achieved icebreaker-based and ice station launch and recoveries with over ten hours of missions. These missions collected visual imagery for ice reconnaissance, floe-size distribution over marginal ice zones and 3D surface topography of larger floes in concert with AUV ice draft mapping below. New fieldwork is planned for the Antarctic marginal ice zone that will incorporate additional thermal IR and hyperspectral capabilities, together with an evolution towards longer missions beyond visual line of sight, once again in tandem with long-range AUV missions.

Preferred Presentation Type: Oral Presentation

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