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Collection Device for Dolphin Hormones in Blowhole Jet Flow Field ERIC ABELE, KERRICK RAY, JAMEY JACOB, RICHARD GAETA, Oklahoma State University — Marine biologist are able to quantify the stress in bottlenose dolphins through analysis of hormones in mucus samples released from the blowhole while breathing. To capture the samples, petri dishes attached to an Unmanned Aerial System (UAS) can fly through the flow field of the dolphin's expelled breath. Analysis of the flow into the dish was performed with Particle Image Velocimetry and flow visualization. The resulting data was used to indicate key areas of flow across the petri dish indicating both clean and separation areas. In preparation for UAS trials, the collection device is connected to the UAS for flight-testing to measure significant changes in control, lift, and drag while the petri dishes open and close. For the UAS trials, the system is flown through the "breath" of a simulator to emulate the 20-140 liters per second in a timeframe of 0.26-0.31 seconds of the dolphin breath. The resulting data is used to provide validation of the systems capability for in flight sample collection.

Kerrick Ray
Oklahoma State University

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