

Energy Independent Intelligence, Reconnaissance & Surveillance (ISR)

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With Dr. Vlad Dobrokhodov and Dr. Kevin Jones

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Abstract:

The presentation looks at two ongoing research projects carried out by NPS researchers and students in an effort to extend the operational endurance of autonomous sensing assets to weeks or months rather than hours. To achieve this, the assets must absorb all the energy necessary to function from the environment, in the form of photovoltaic energy and convective atmospheric energy. The first project, Tactical Long Endurance Unmanned Aerial System (TaLEUAS), is a glider, or rather a large flock of gliders, that is intended to stay aloft for 3-6 months, surviving on solar energy and thermal updrafts and the ability to efficiently cooperate to share mission objectives and knowledge of atmospheric conditions. The project began as a student thesis topic and has led to several other theses including two outstanding thesis contributions. The second project, Aqua-Quad, is an unusual hybrid fusion of a sonobuoy and a quad-copter, providing an underwater sensing capability with limited air mobility. While it is not realistic to fly the quad-copter continuously on solar energy alone, solar energy collected while floating is used to charge batteries which allow it to fly some of the time. Again, intended to work in large flocks, cooperative behaviors allow for the group to produce higher fidelity data and improved tracking of moving underwater targets. This project has involved two outstanding student theses, both also earning awards in undersea warfare.



Dr. Vlad Dobrokhodov



Dr. Kevin Jones

Dr. Vlad Dobrokhodo Biography:

Dr. Dobrokhodov is a Research Associate Professor at the department of Mechanical and Aerospace Engineering of the Naval Postgraduate School. He earned his Ph.D. in Aerospace Engineering in 1999 from the Air Force Engineering Academy (AFEA) of Russian Academy of Sciences. In 2001 he was awarded the US National Academy of Sciences National Research Council postdoctoral fellowship to work at the NPS, and in 2004 he joined the NPS as a faculty member. He is the author of over 80 refereed publications with the primary focus on flight dynamics and aircraft control, cooperative control of multiple heterogeneous UAVs and their trajectory optimization, and in the design and implementation of advanced GNC algorithms onboard of unmanned aerial vehicles. His work has been supported by ONR, NASA, USMC, and USSOCOM.

Dr. Kevin Jones Biography:

Dr. Kevin Jones is a Research Associate Professor in the department of Mechanical and Aerospace Engineering at the Naval Postgraduate School. He earned his Ph.D. in Aerospace Engineering Sciences at the University of Colorado in 1993. From 1994-1997 he was awarded a PostDoctoral Fellowship by the US National Academy of Sciences National Research Council to work at the NPS, and in 1997 he joined the NPS as a faculty member. He is the author of over 100 publications with the primary focus on fluid dynamics, aeroelasticity, flight mechanics and aircraft design. His work has been supported by ONR, NASA, USMC, USSOCOM and others. He earned his PhD, MS, and BS in Aerospace Engineering Sciences from the University of Colorado, Boulder.

