



Calhoun: The NPS Institutional Archive
DSpace Repository

CRUSER (Consortium for Robotics and Unmanned Systems Education and Research) Faculty and Researchers' Publications

2022

Counter Aerial UxS Munition Delivery System

Brophy, Christopher

Monterey, California: Naval Postgraduate School

<http://hdl.handle.net/10945/70851>

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

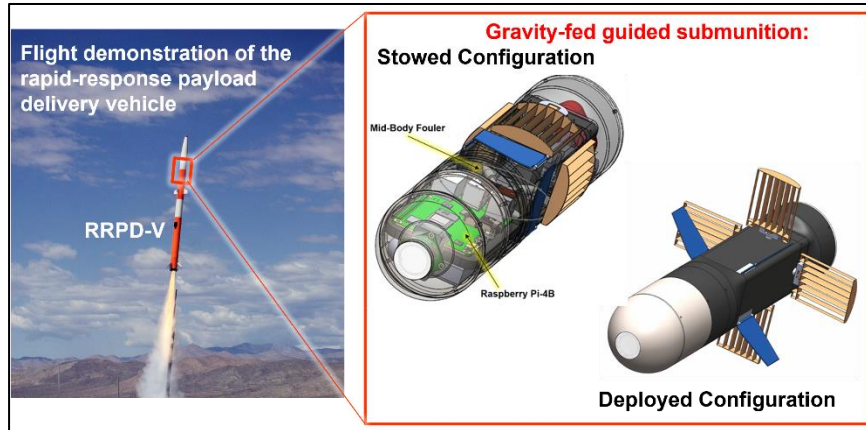
Downloaded from NPS Archive: Calhoun



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

Dudley Knox Library / Naval Postgraduate School
411 Dyer Road / 1 University Circle
Monterey, California USA 93943

<http://www.nps.edu/library>



RRPD-V with re-designed gravity-fed guided submunition

Problem Statement

- Utilize low-cost commercial-off-the-shelf components to develop an autonomously guided rapid-response payload delivery vehicle (RRPD-V) to deliver multiple gravity-fed guided submunitions (GSMs) which are actively guided to intercept and neutralize unmanned systems (UxS) threat(s) with a non-lethal fouling mechanism.
- Leverage existing detection abilities for incoming aerial UxS swarms and engage at ranges up to 1 sm. At intercept, the RRPD-V deploys multiple GSMs to defeat an equal number of UxS.
- The approach relies on system development and refinement through a series of flight-test campaigns for incrementally developing, improving, and validating the various flight systems.

Impact

- Autonomous guided rockets/missiles are typically associated with extremely high price points; however, with the rapid development of microprocessors, controllers, inertial sensors, GPS locators, etc., and subsequently increased availability and reduced cost, makes it possible to create a disruptive, low-cost tactical system for the Warfighter.
- This development seeks to enhance the Warfighter capabilities by providing an autonomous, robust, rapid-response means to deliver a payload to a point in space. Such a vehicle can symmetrically counter aerial UxS swarms or be modified to deliver critical supplies for expeditionary force sustainment.
- Success is determined by achieving integration of commercial-off-the-shelf components into a tactical guided rocket and autonomously navigating to a defined point in space, as well as flight demonstration, guidance, and validation of the gravity-fed guided submunitions.

Transition

- This effort is particularly interesting to USMC, Navy, and Army end users.
- A proposal is currently submitted to USTRANSCOM for \$3.2M over 3 years. If awarded, the effort will result in integrating an autonomous and adaptive, real-time optimal guidance control algorithm with the RRPD-V for expeditionary force sustainment.
- Additional transition partners include Navy Futures Command and US Army Futures Command, which are interested in the RRPD-V for autonomous sustainment/re-supply and high-altitude communications relay deployment for reliant and resilient comms.
- Discussions continue with DARPA and ONR Code 35 for further development of the counter aerial UxS swarm gravity-fed guided submunitions.