



Calhoun: The NPS Institutional Archive
DSpace Repository

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

2023

The Role of Unmanned Systems in Meeting Climate Challenges

Fletcher, Kristen; Lesse, Marina

Monterey, California: Naval Postgraduate School

<https://hdl.handle.net/10945/71748>

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>

The Role of Unmanned Systems in Meeting Climate Challenges



UxS Saildrone Explorer using solar technology as its energy source.

Also pictured: Devil Ray T-38, littoral combat ship, and U.S. Coast Guard cutter.
Arabian Gulf on June 26, 2022

Photo by Chief Petty Officer Roland Franklin

Problem Statement

- While the Department of the Navy (DoN) recognizes climate threats to operations and is seeking net zero emissions by 2050, the Shipbuilding Plan calls for increases in the fleet, including UxS. UxS are in a unique position to meet future climate change challenges.
- This project will:
 - (1) provide an analysis of this intersection of UxS and climate change to provide a foundation for the use of UxS in climate mitigation and adaptation;
 - (2) analyze whether the proliferation of UxS reliant on fossil fuels reduces the ability to meet the net zero goals; and,
 - (3) propose policy options to address the role of UxS in meeting climate challenges.

Impact

The intersection of unmanned systems (UxS), artificial intelligence (AI) and climate change is increasing. This work will address current research gaps by:

- Analyzing UxS emissions, how AI might help UxS be more energy efficient or adapt to changing environments; and,
- Addressing how UxS might be used to meet climate challenges including data gathering, monitoring, and operations that can reduce the climate impacts on crewed vessels.

Findings can aid the design of Navy and DoD policies and shipbuilding plans to positively impact warfighter effectiveness.

Success will mean that more holistic policies for UxS are developed so that UxS meet operational mission goals and climate challenges.

Transition

- This work is relevant to UxS designers and operators who are tasked with helping DoN meet emissions targets and address climate impacts on operations.
- Numerous DoN entities are engaged in the Lines of Effort under the Navy Climate Strategy, including training and equipping for climate resilience. Understanding how UxS may advance the Climate Strategy goals will help the DoN address future challenges resulting from climate change.
- Future support will be sought through ONR, OUSD(R&E), DASN Operational Energy and related funding mechanisms for UxS and climate emissions work. Researchers will explore funding to provide direct research support to DoN and DoD through climate change funding in FY23 and beyond.