Use and Acquisition of Unmanned Systems in the Department of the Navy
Naval Research Advisory Council (NRAC)

TERMS OF REFERENCE

These terms of reference establish the Secretary of the Navy (SECNAV) objectives for the Naval Research Advisory Committee (NRAC), a permanent subcommittee of the SECNAV Advisory Panel (SNAP), to conduct a study on the use and acquisition of unmanned systems throughout the Department of the Navy (DoN).

Mission Statement: Examine current DoN Unmanned Systems (UxS) policies and acquisition strategies. The goal of the study is to provide recommendations to the Secretary on the application of autonomous and robotic systems across the naval mission set to include levels of autonomy, learning machines, and human-machine teaming.

Additionally, conduct a detailed examination of current acquisition strategies for Navy and Marine Corps UxS including how to ensure common open systems architectures. These common architectures should be addressed on three levels: autonomy, the physical vehicles, and the integration and data sharing across and throughout the multiple physical domains in which the Navy and Marine Corps operate.

The acquisition strategy study should include an examination of the verification, validation, and accreditation (VV&A) policy for autonomous and robotic systems including an assessment of the role of modeling and simulation. The study should further include a discussion of the approach for risk acceptance for non-deterministic autonomous and robotic systems.

Issue Statement: SECNAV has established proliferation of UxS as a DoN strategic goal. However, UxS does not fit the traditional acquisition model. Challenges include: the speed of technological advance; reduced involvement of human operators; non-deterministic behavior of the autonomous systems; different VV&A requirements; and the cost and interoperability advantages of modular software and hardware components. These challenges are amplified by the desire for commonality in architectures throughout the multiple operational domains. Additionally, systems to date have largely relied on discrete interfaces that impede shared functionality and interoperability across subsequent programs of record and domains.

Traditional VV&A procedures can impose testing schedule and monetary costs that account for a large share of UxS program resources. Moreover, traditional testing regimes can result in extended delays. Modeling and simulation is increasingly used in programs of record such as the heavyweight torpedo to offset the number of in-water experiments required for certification. The current fiscal environment requires design choices that reduce cost and schedule across the DoN UxS portfolio rather than just in a single program of record.

Most UxS use proprietary software that cannot be readily adapted by DoN without incurring high costs. The prevalence of proprietary software also limits the interoperability of UxS with many Navy platforms. Improving interoperability and commonality at the system level will increase opportunities for modular mission sets. Furthermore, commonality promotes opportunities for

small businesses to develop software and hardware payload modules and empowers program managers to reduce cost and schedule burdens by accessing a library of software and hardware that function across DoN UxS. Increased commonality will expedite enhanced autonomy, expand the capabilities of learning machines, and facilitate human-machine teaming throughout the entire naval mission set.

Objectives and Scope: NRAC will address the following specific objectives:

a. Assess how autonomous systems operating across the different domains will inform the common architecture discussion on three levels: architecture of the autonomy, architecture of the unmanned vehicles, and architecture of the integration and data sharing across multiple domain platform hosts.

b. Examine the issue of establishing effective and efficient Verification, Validation, and Accreditation (VV&A) policy for autonomous systems. Assess the role that modeling and simulation will play and how to approach risk acceptance for VV&A policy.

c. Assess how DoN should apply different levels of autonomy, learning machines, and human-machine teaming across the naval mission set.

Methodology: NRAC assessments will be conducted in compliance with all pertinent regulations of the Federal Advisory Committee Act (FACA).

Deliverables: Because of the scope of the work and relevance of the problem to future UxS policy and acquisitions, NRAC shall provide a report by June 2017. NRAC will deliver progress updates in October 2016 and February 2017.

Membership: The members will address the task as delineated below:

a. NRAC: Dr. Bellingham; VADM Bowes (Ret.); Dr. Bruno; Dr. Gates; Dr. Padilla; Dr. Walsh; RADM Young (Ret.).

b. Per the SNAP Charter, non-voting subject matter experts (SMEs) may be appointed to assist SNAP or its subcommittees on an ad hoc basis to address specific issues under consideration. These SMEs are not members of SNAP or its subcommittees and will not engage or participate in any deliberations.

Support: The Department of Defense through the Office of the Secretary of the Navy, shall provide support, as necessary, for the performance of the committee's functions, and shall ensure compliance with requirements of the FACA and established DoD policies and procedures.