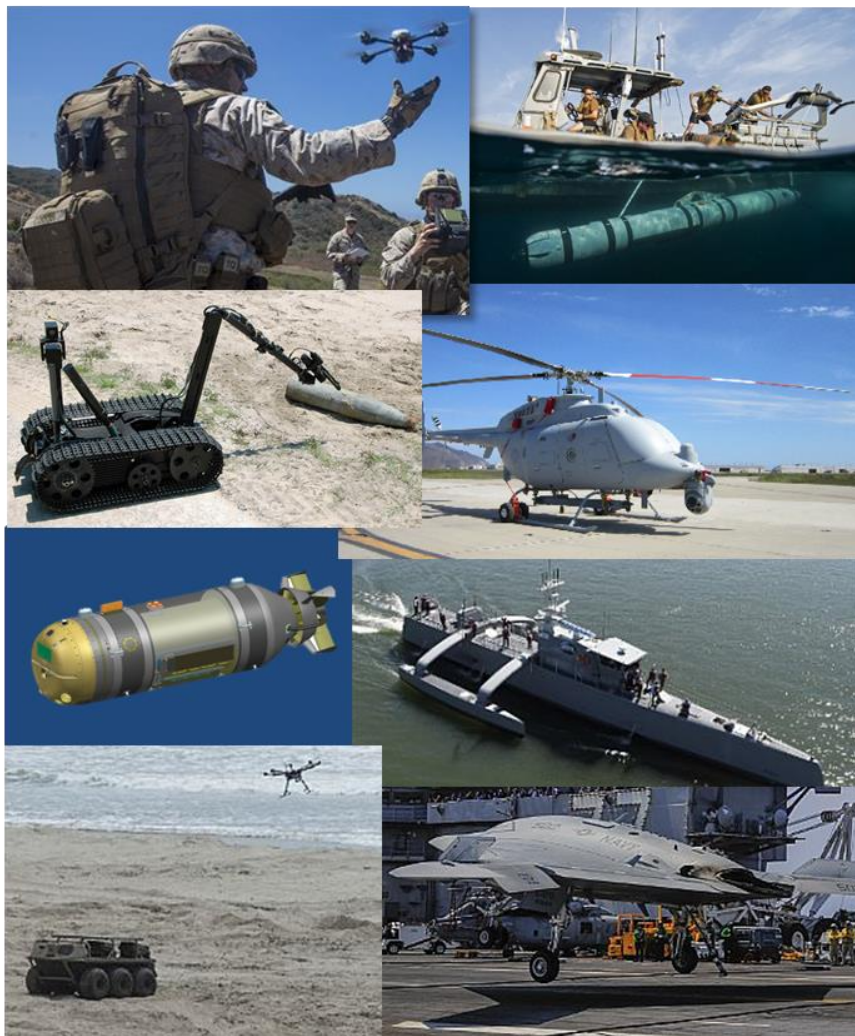# Department of the Navy Strategic Roadmap for Unmanned Systems (Short Version)

Executive Summary

Unmanned and autonomous systems will create fundamental shifts in the way that the Department of Navy (DON) conducts naval operations. Integration of unmanned and autonomous capabilities offers many advantages such as reducing personnel and manpower, risk to personnel, and operating costs, as well as offering greater persistence and range, improved speed and accuracy of data processing, and supporting a faster decision cycle. Unmanned and autonomous technologies will become a powerful and ubiquitous force multiplier in an integrated human-machine team. The combination will provide capabilities that far exceed the effectiveness of platforms or humans alone. Employment of manned/unmanned teams and technologies will transform modern warfare, increasing asymmetric operations, leveraging the technologies to the DON's advantage, and give the warfighter the edge to win the fight.

Roadmap Purpose

As part of the multi-tiered approach outlined in the 2015 DON Memorandum *Treat Unmanned as Unmanned*, a comprehensive Unmanned Systems (UxS) Roadmap was developed to characterize the current state of UxS across the DON and to envision the future employment of UxS and the capabilities they will contribute. Furthermore, the Roadmap identifies the barriers to realizing that future and outlines the proposed actions to overcome those barriers. Ultimately, the roadmap seeks to inform the actions of stakeholders whom possess resources to accelerate the integrated and efficient development and fielding of DON UxS.

UxS Vision

The United States Navy and Marine Corps will seek to achieve a seamlessly integrated manned/unmanned future force. In the near term, the DON will integrate unmanned systems capabilities into operational forces across all domains. These capabilities will drive DON advancement of human-machine teaming by incorporating unique and disruptive elements that only UxS can provide. Unmanned systems force packages will become a viable first response option for operational commanders. To provide the infrastructure and systems required to support these emergent capabilities, DON must modify its Doctrine, Organization, Training, Materiel Solutions, Leadership and Education, Personnel, Facilities, and Policies (DOTmLPF-P). UxS will:

- Operate in every domain

- Always be an option

- Be at their best when teamed with Sailors and Marines

In January 2018 the DON published eight goals in support of this roadmap[1].

UxS Employment Concepts

UxS will strengthen naval power at, on, and from the sea by reducing operational risk and cost. UxS operating in the air, on the surface, under the sea, and on shore as a rapidly adaptable and interconnected network will provide access to areas denied to manned platforms, provide better situational awareness, increase capabilities with greater range and persistence, and enable faster decision making.

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[1] ASN RDA memo of 11 JAN 2018

The Navy will evolve an unmanned systems operating concept that is platform agnostic and capable of operating in highly complex contested environments with minimal operator interaction.

DON UxS Enterprise Objectives

To realize the DON UxS Vision and Goals for UxS, the DON must achieve these broad objectives:

1. **Define and prioritize unmanned and autonomous capabilities required to maintain warfighting superiority:** Capability developers must consider mission requirements, potential offensive use of UxS, existing threats, and governing law and policy.

2. **Be technically capable of fielding and sustaining UxS at will:** Systems must be interoperable and cyber-secure; have sufficient data processing, communications, networking infrastructure, environmental adaptability; utilize human-machine teaming; and have adequate infrastructure and logistics support.

3. **Leverage emerging accelerated acquisition process to enable rapid development, demonstration and fielding of UxS:** Technological advancements are outpacing all aspects of acquisition, hindering insertion of innovative capabilities into the fleet and full realization of UxS employment. Development and use of new policy must match the pace of technology and threats.

4. **Influence policy and law regarding the use of weaponized UxS:** Develop policy to allow implementation of these capabilities and ensure that developed capabilities are legal and that they advance US interests.

5. **Promote operator trust in UxS to achieve manned-unmanned teaming:** As operators use systems that routinely achieve expected and predictable outcomes, trust will evolve and human-machine teaming capabilities will be refined.

6. **Promote national public acceptance of use of UxS:** As policy and laws are developed, public input regarding privacy, offensive use, and safety must be considered.

To achieve these Enterprise objectives, DON must overcome the various barriers standing in the way. These barriers include policy, operator trust, doctrine, force structure, acquisition, and technology development. The DON UxS stakeholder team that developed the Comprehensive Roadmap identified and described 30 such barriers; and they are provided in the Roadmap.

Summary

The Department of the Navy Strategic Roadmap for Unmanned Systems was completed in the Spring of 2018 and will serve as a guide for enabling the integration of Unmanned Systems into every aspect of Naval operations. Only in overcoming the barriers identified in the Roadmap will the DON achieve its vision of full integrated manned-unmanned teaming.

The Full version of the Roadmap is a limited distribution document and is not available for public release but has been provided to all corners of the Department of the Navy.