Unmanned Maritime Systems

Unmanned Surface Warfare

- Large USV
- Medium USV
- Snakehead LDUUV
- Orca XLUUV

Unmanned Expeditionary Warfare

- Mine Countermeasures USV
- Minehunting USV
- Knifefish
- Razorback

Unmanned Undersea Warfare

Program Executive Office Unmanned and Small Combatants

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
Accelerating Autonomy

1. Peer Groups
   Identify autonomy gaps, requirements, and performance metrics

2. Autonomy Lab
   Uses DevSecOps pipeline to enable developers to rapidly develop and integrate autonomy solutions.
   Includes M&S, HWIL and In-Water Testing

3. DevSecOps
   Automated software tools, services, and standards that enable programs to develop, secure, and deploy applications securely

4. Common Control (UMCC)
   Standardize vehicle planning and control across all PMS 406 platforms

5. Autonomy Architecture (UMAA)
   Standardize autonomy interfaces

Rapid Refresh

Peer Groups

Autonomy Lab

DevSecOps

Common Control

Enablers

Autonomy Architecture

Rapid Refresh

Peer Groups

Autonomy Lab

DevSecOps

Common Control

Enablers

Autonomy Architecture
UMAA Scope

Operational View
Unmanned Maritime Systems

Unmanned Maritime Vehicle (UMV)
The Unmanned Maritime Autonomy Architecture (UMAA) defines the framework for developing Autonomy on UUVs and USVs.

Common Control System (CCS)
Defines a common command and control architecture for all Unmanned Systems.

Vehicle Management
Mission Management
Unmanned Maritime Autonomy Architecture

**Purpose:** Defines the architectural framework for unmanned maritime autonomous systems

**Scope:** Vehicle-based autonomy architecture onboard unmanned maritime platforms

- Common interface and protocol
- Functional breakout to support standard component interfaces
- Government defines interfaces
- Developers provide software and components
- Component definition next
  - Criteria: standardized interfaces where commonality provides value
  - Modularity goal: different component providers
- Independent component development enabled

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**Top Level Functional Breakout***

![Diagram of Unmanned Maritime Autonomy Architecture (UMAA)]
UMAA Standards

Government owned interface standard
- Open published interfaces
- Software reuse
- Component/service competition

Portability of capabilities
- Vehicle portability (USV and UUV)
- Payload portability
- Services portability

Commonality Across the Family of Fleet Vehicles
- Razorback
- ORCA
- Snakehead
- LUSV
- MUSV

Collaborators
- External C2

Vehicle Controller
Mission Autonomy
Payloads

Vehicle Vendors
Mission Vendors
Payload Vendors

Interface Standard
Standard Services

UMAA Products

UMAA Product Hierarchy

**Governing Documents**
- Architecture Design Description
- Governance
- Compliance Specification

**Models**
- Data Model
- Service Definition Models

**Interface Documents**
- Interface Control Document
- Interface Control Document
- Interface Control Document

Corresponding auto-generated IDL code
Currently going through Distribution Statement A release review
Unmanned Maritime Autonomy Architecture (UMAA)
Architecture Design Description (ADD)

Version 1.1a*
(UMAA-INF-ADD)
December 19, 2019

Communications Infrastructure
3.1 DEFINITIONS

Service – A resource that enables access to one or more capabilities where a capability is the ability to provide data and/or effect change within a system. A Service is defined by its message set and functionality as specified by UMAA ICDs.

Service Provider – A realization (or implementation) of a Service

Service Consumer – Any software that utilizes a Service Provider either to obtain data and/or to effect change within a system

Service Participant – A Service Provider or Service Consumer

Component - A deployable software unit that is no further decomposed into separately managed units. It may consist of one or more Service Providers and/or one or more Service Consumers. A 5 UNCLASSIFIED Component may be implemented as a single process running on a single processor or as multiple processes running over multiple, possibly networked, processors.