Navigation Safety Advisory Council (NAVSAC)

Resolution 16-01

(Supersedes Resolution #13-05)

(Introduced as Task Statement #15-01)

Unmanned Maritime Systems Best Practices

WHEREAS since 2008, the Unmanned Maritime Systems (UMS) industry has sought guidance and direction from the U.S. Coast Guard with regard to UMS operations.

WHEREAS in December 2013, NAVSAC adopted Resolution 13-05 which recommended that the U.S. Coast Guard promulgate appropriate "best practices" (through a Navigation and Vessel Inspection Circular or Policy Letter) that include recommendations for visual and electronic identification requirements, as well as other safety procedures.

WHEREAS NAVSAC is of the view that, until the establishment of regulations for UMS, these UMS Best Practices serve several important purposes, including:

➢ providing guidance and information to UMS owners and operators concerning UMS development and operations in the maritime environment;

➢ providing notice to vessel operators of the issues and potential risks associated with UMS operations; and

➢ providing UMS owners and operators a means to demonstrate their obligation to support safe and responsible operations of a UMS.

WHEREAS at the May 2016 NAVSAC meeting, the Council reviewed and updated the draft UMS Best Practices provided by the U.S. Coast Guard.

THEREFORE in order to provide the above mentioned guidance, information and awareness, NAVSAC provides the attached recommended UMS Best Practices to the U.S. Coast Guard for its further internal review, submission for interagency (e.g., Department of Defense and National Oceanic and Atmospheric Administration) clearance and eventual distribution to the UMS industry and broader maritime community.

UNMANNED MARITIME SYSTEM BEST PRACTICES

PURPOSE (insert CG legal disclaimer)

The purpose of these Unmanned Maritime System (UMS) Best Practices is to provide guidance and information to UMS owners and operators concerning UMS development and operations in the maritime environment. In addition, these Best Practices can serve to provide notice to vessel operators of the issues and potential risks associated with UMS operations. Finally, these Best Practices provide the UMS owners and operators a means to demonstrate their obligation to support safe and responsible operations of a UMS.

(CG to update) The Coast Guard, acting upon the recommendations of the Navigation Safety Advisory Council (NAVSAC) put forth in its Resolution 13-05; from the discussion of 'break points' at NAVSAC's June 2014 meeting; from recommendations from NAVSAC's February 2015 meeting, and from recommendations from NAVSAC's May 2016 meeting, provides these Best Practices.

The Coast Guard encourages UMS owners and operators to adopt these Best Practices.

SAFETY

To promote **Safety,** UMS owners and operators should ensure that –

- They will not utilize, deploy, or operate a UMS in a manner that presents undue risk to persons, property or environment on the surface or underwater.

- The UMS should be treated as a presumptive hazard to navigation and shall be equipped, deployed, operated and maintained in such a manner as to eliminate unreasonable risk of collision, allision, or harm to vessels, persons, property and the marine environment including, but not limited to, the use of lights, sounds, and electronic signals to ensure that the UMS can be detected and identified.

- The UMS is operated by individuals who are properly trained and experienced to a competent level to operate the UMS. Such training and experience should satisfy certification or license requirements per applicable regulations or standards, if and when developed.

- Non-public UMS owners and operators should obtain and maintain third party liability insurance sufficient to cover foreseeable risks, losses and claims.

- UMS owners and operators should include unique identification markings on the UMS that identify the UMS owner or operator.

- UMS owners and operators should ensure, to the extent practicable, that the UMS is configured with:

    o a flashing white light (Morse code Romeo ".-.") that is visible for at least 2 nautical miles at all times while operating on or near the surface of the water;
    o unique retro-reflective markings;
    o markings that identify the UMS as a UMS, e.g.: UNMANNED;
    o yellow paint;
    o an Automatic Identification System (AIS) that broadcasts a unique identifier; e.g.: UNMANNED;
    o a radar transponder that displays Morse code Romeo (".-.");
    o a sound producing device that, if practicable, can produce the sound signal Morse code Romeo (".-."); and
    o a position recorder.

- UMS operations should be conducted only after a thorough assessment of risks associated with the activity. This assessment should include, but not be limited to:

    o Weather conditions relative to the performance capability of the UMS;
    o The identification of normally anticipated failure modes (lost link, power or equipment failures, loss of control, etc.) and the resultant consequences of the failures;
    o Circumstances with respect to the operating area, including visibility conditions, anticipated vessel traffic to be encountered, compliance with regulations as appropriate to the operation; and abnormal procedures;
    o The need to notify mariners with respect to their intended operations by all reasonable means, including the use of escort vessels where practicable;
    o Communication, command, and control requirements; and
    o Reliability, performance, and seaworthiness in relation to established standards.

PROFESSIONALISM

To exhibit **Professionalism**, UMS owners and operators should –

- Comply with all applicable international, Federal, State, local and Tribal rules, regulations, ordinances, covenants, and restrictions as they relate to UMS operations.
- Operate the UMS as responsible members of the maritime community.
- Be responsive to the needs of the public and other users of the marine environment.
- Cooperate fully with international, Federal, State, local and Tribal authorities in response to emergency deployments and mishap investigations.
- Establish contingency plans for foreseeable unplanned events and share them openly with all appropriate authorities.

RESPECT

To show **Respect** to others, UMS owners and operators should –

- Respect the rights of all members of the maritime community.
- Respect the privacy and intellectual property of others.
- Respect the concerns of the public and maritime community as they relate to UMS operations.
- Support improving public awareness and education on the function, purpose, deployment, value and operation of a UMS.
- Respect the impacts and risks associated with UMS operations in the maritime environment.

PROCEDURES

The following are recommended for UMS operations:

- Develop industry standards amongst similar types of UMS.
- Operating, safety, emergency and maintenance procedures should be documented. Clear demarcation of responsibilities for all stages of the operational cycle of a UMS, including the identification of individual responsibilities.
- A risk analysis should be undertaken for all stages of operations before deployment of any equipment. Responsible individuals are identified for all stages of UMS deployment and operations and given the appropriate directions and authority to act on those responsibilities.
- The UMS should only be operated by approved personnel in a manner consistent with safe navigation to eliminate unreasonable navigational risk.
- Procedures to cover UMS programming and system checks should be documented and protected.
- Procedures for UMS repair/re-configuration/testing should be documented, and agreed upon between manufacturers and operators. Examples include, but are not limited to:

  - Maintenance procedures and intervals.
  - Pre-mission safety and integrity checks.
  - Software function testing procedures for software upgrades.
  - Cyber security protection.

UMS owners and operators are encouraged to comply with these Best Practices to the fullest extent possible and incorporate the practices into their UMS operation procedures.