GUIDANCE AND BEST PRACTICE FOR OPERATORS CONSIDERING UNMANNED VESSELS

Increased investment has resulted in exponential advancements in autonomous vessel technology. Such funding has made way for more autonomous designs to be realised and there is a distinct possibility that in the future, when choosing new vessels to replenish or expand their fleet, Members will consider the acquisition of vessels which incorporate some level of autonomy.

As a result of these new technologies, it is also possible that flag States may approve reduced manning levels which will deliver a cost saving for Members.

THE APPEAL

Following discussions with a selection of groups designing and building autonomous vessels, the Club understands that autonomous and remotely operated vessels will be desirable to ship owners as the use of such technology is expected to reduce operating costs, increase vessel efficiency and enhance the level of safety on board.

The operation of unmanned vessels requires considerably less personnel and as a result, it is believed that incidents involving crew on board will be reduced. However, it must be noted that autonomous technology still requires a degree of human influence. It is still possible that incidents will still occur as a result of the human element originating from shore based control and monitoring in the form of the vessel operators/controllers.

THE CHALLENGES

Before unmanned vessels can begin operating on a large scale commercially, there are certain challenges that must be overcome. In particular, the challenge of social acceptance among those in the industry who do not consider unmanned vessels as a safer alternative. This issue is most apparent when considering the risks associated with passenger vessels, as commentators question - is it acceptable for a vessel with hundreds of passengers on board to be operated and controlled by an intelligent computer?

Applicability of and compliance with current International Maritime Organisation (IMO) conventions also remains a challenge. The IMO has added unmanned vessels to its agenda in order to determine whether it is possible to operate unmanned vessels in compliance with existing regulations, or whether new legislation is needed to ensure operators conform to the expected safety, security and environmental standards within the maritime industry.

The likelihood of wide scale utilisation of unmanned vessels will only be possible when many of the practical elements of ship operations are realised, such as:

- Navigation and interaction with manned vessels, especially in high traffic density.
- Mooring operations and the development of port infrastructure to provide reception services and support for unmanned vessels.
- Manoeuvring in close quarters to other vessels where there is limited sea room, for example in ports.
- Arrival at and departure from port and interaction with Pilots and VTS services.
- Cargo work and the interaction with shore stevedores where there are no crew to oversee operations.
- Apportioning liability in the event of an incident.
CURRENT RESEARCH PROJECTS

Trondheim fjord has been designated by the Norwegian Maritime Authority and Norwegian Coastal Administration as a test area for unmanned vessels making it the first of its kind in the world. The first high profile trial is to come as the result of a partnership between Bourbon, Kongsberg and Automated Ships Ltd. The aim is to design, build and test a vessel, which will be named Hrönn, capable of autonomously providing services to the offshore, fish farming and survey sectors. The project will be overseen with the support of DNV-GL and the Norwegian Maritime Authority.

Several other working groups are looking to develop solutions for the stated challenges presented by commercially operating unmanned vessels. The Advanced Autonomous Waterborne Applications (AAWA) is a collective of universities, designers and manufacturers who are focused on developing an autonomous vessel in conjunction with the ship operators Finferries and ESL Shipping.

Plymouth University, MSubs and Promare are also working collaboratively on the Mayflower Autonomous Ship project which incorporates green energy as well as autonomy. Upon completion, the ‘Mayflower’, will undertake a voyage to mark the 400th anniversary of the original Mayflower crossing from Plymouth to North America.

Independent designers and shipbuilders, such as ASV Global, already have unmanned autonomous vessels in operation. The vessels are working on research and survey projects in conjunction with offshore vessels which act as the mother ship. This allows them to develop their technologies in a controlled manner with the support of a manned vessel and technicians which remain close by should there be a need for assistance. Recently, two of ASV’s autonomous vessels were registered with flag States. The first of its kind registered with the Maritime and Coastguard Agency (MCA) and another with the Australian Maritime Safety Authority (AMSA), demonstrating the gradual of acceptance of these technologically advanced vessels.

FUTURE DEVELOPMENTS

As already detailed, there are numerous research groups that are developing and conducting trials on board fully autonomous and remotely operated vessels. With this will come a further understanding of the capabilities and limitations of these new technologies and it is expected that it may become possible to retrofit remote operating and autonomy systems to existing vessels.

In addition, navigation assistance systems that utilise the technology of autonomous vessels may be used as an advanced form of navigational aid for watch keepers, whereby the immediate environment can be analysed (including weather and traffic situations) and a series of possible scenarios or navigation solutions formulated and presented to the seafarer responsible for maintaining a navigational watch. This may be a good intermediate option and help ship owners to ease into the new technologies and see how they may benefit from it in the long run, encouraging them to be more accepting of fully autonomous vessels as the industry develops.

BEST PRACTICE AND GUIDANCE

Maritime UK has published an Industry Code of Practice for Maritime Autonomous Systems Ships (MASS), which has been compiled by Members of the UK Maritime Autonomous Systems Working Group (MASRWG) in an effort to provide guidance for unmanned vessel design, construction and safe operation. This guide has been pro-actively prepared by the working group to assist those in industry and compliance is voluntary. Formal regulatory framework is still under development. This code of conduct can be accessed from the Maritime UK website.

This is one of a series of articles produced by the Club on the topic of unmanned vessels from the Club’s perspective. View the series so far.