



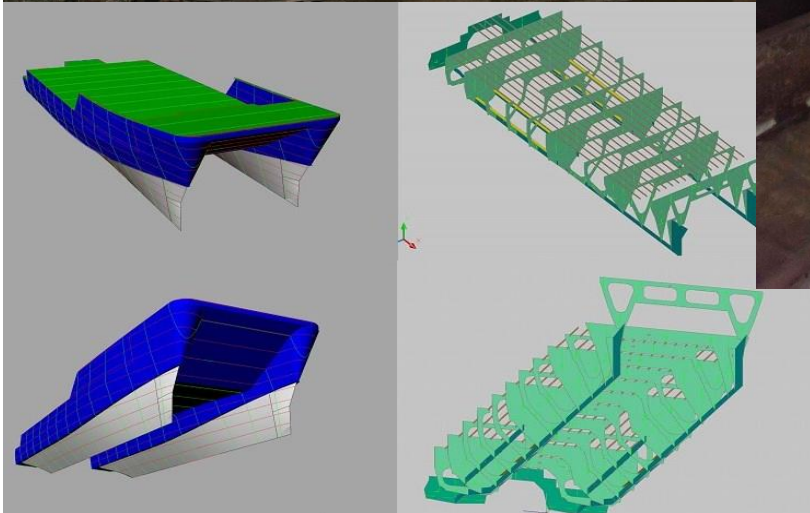
UK Maritime - Autonomous Systems Conference 2020

Vessel Standards

Alan Cartwright – Chair, IMarEST Small Ships Group



IMarEST Small Ships Group – Who are We?



Regulatory and Operational Developments for Autonomous Vessels



- Autonomous vessels are in use by a number of operators: L3 ASV, Thales, Qinetiq and many others here today;
- Purposes range from hydrographic, oceanographic and seismic survey vessels, target vessels, to experimental cargo and passenger ships;

NOTE:

- While not yet disputed in Court, **autonomous vessels come within the definition of a 'ship', under UK Merchant Shipping Acts, Regulations, Notices and Guidance;**
- Regulations (IMO Conventions, MCA Regulations, Class Society Rules, etc.) have not anticipated autonomous operation – However



Regulatory and Operational Developments for Autonomous Vessels



- Maritime UK has provided the 'Industry Conduct Principles and Code of Practice' (3rd edition), guiding on design and construction standards applicable, vessel registration and operation;
- Lloyd's Register has provided a Code for design, build and in-service requirements:

[https://www.lr.org/en-gb/unmanned-code/;](https://www.lr.org/en-gb/unmanned-code/)

- Bureau Veritas has provided risk-based guidelines:

http://erules.veristar.com/dy/data/bv/pdf/641-NI_2019-10.pdf;

- DNV-GL has also introduced guidelines for autonomous and remotely operated ships:

<https://rules.dnvgl.com/docs/pdf/DNVGL/CG/2018-09/DNVGL-CG-0264.pdf>



Regulatory and Operational Developments for Autonomous Vessels



- The Maritime UK Industry Conduct Principles and Code of Practice (3rd edition) should be used as a guidance document for ‘best practice’;

Note: Safety (Part 1- 6) is a fundamental requirement for compliant operations, and includes vessel design, construction, certification and registration (Part 2 – 6, 7 & 13);

- Adoption of industry-led ‘best practice’ demonstrates clarity of safety-led culture and operations;
- Certification of your vessel ensures that demonstrable safety standards are achieved by your vessel and operation;

Note: Operation of your vessel outside UK waters requires Registration as a UK Ship – MCA UK Registry Part 1 – and consideration of Maritime Labour Convention Requirements.



Autonomous Vessel Design & Construction – Best Practice

- For vessels over 24m on the Load Line: Follow Classification Society Rules and Guidelines on vessel design, construction, autonomy and cyber-security, e.g. LR:
 - <https://www.lr.org/en-gb/rules-and-regulations-for-the-classification-of-special-service-craft/>
 - <https://www.lr.org/en/unmanned-code>
 - <https://www.lr.org/en/cyber-safe-for-marine/>
 - or BV / DNV-GL / other MCA approved Recognised Organisation equivalents.



Autonomous Vessel Design & Construction – Best Practice



- For vessels under 24m on Load Line:
 - The MCA 'Workboat Code 2 – Amendment 1' (published 2019) is applicable:
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/827913/The Workboat Code Edition 2 - Amendment 1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/827913/The_Workboat_Code_Edition_2_-_Amendment_1.pdf)
 - Follow the applicable rules and guidelines of your chosen MCA-approved Certifying Authority.
- Note: If a vessel is 'doing work', rather than being used for 'Sport or Pleasure' (as defined in Merchant Shipping Regulations), **then it is a 'Workboat'**. The 1996-98 MCA 'Colour' Codes, MGN280(M) and the Code for Sport and Pleasure Vessels (ongoing development) **are no longer allowed** for certification of vessels that are primarily 'workboats'.



Vessel Standards: Hull, Machinery, Systems & Equipment



- For vessels over 24m on Load Line, hull, machinery and systems design and construction should be to standards recognised under Classification Rules:
 - MCA-approved IACS Classification Society Rules (e.g. LR Rules for Special Service Craft);
 - Service-restricted notation may well be appropriate (e.g. LR Machinery MCH Notation);
- For vessels under 24m on Load Line, hull, machinery and systems design and construction should be to standards recognised in the Workboat Code:
 - Classification Society Standards (e.g. LR Rules for Special Service Craft);
 - Standards called up under the EU Recreational Craft Directive (e.g. ISO12215, ISO 12216, etc. as appropriate to the hull, machine, equipment or system).
- Where an autonomous vessel is to be manned for part or (in support of) the whole of its operation, then safety equipment and appliances must be provided, in accordance with UK Merchant Shipping Regulations.



Vessel Standards – Safety Equipment & Appliances

- When an autonomous vessel is unmanned for its operation, then consideration should be given to the essentiality of safety equipment and appliances, such that UK Merchant Shipping Regulations are complied with, for such times that the vessel may have personnel onboard.
- Target vessels provide an interesting example of when such consideration is necessary, for prevention of maritime pollution, following damage from operations:
 - Life-rafts, life-saving appliances and navigation equipment may all cause pollution.



Recent Small Ship Code Activity with the UK MCA



- IMarEST SSG members sit on a number of Working Parties with the UK MCA:
 - The Industry Technical Standard Working Group (revised the 1998 'Brown' Code, for workboats and pilot boats): a voluntary Technical Standard was published in 2014. MCA 'Workboat Code 2' was published in December 2018 and editorially amended in 2019;
 - The Harmonisation of Codes Working Party: Revisions for 'Sport and Leisure' vessels are being developed by MCA with RYA & YDSA, to update MGN280(M) and the 'Yellow' and 'Blue' Codes;
- While none of the existing Codes or UK Regulations specifically include scope for maritime autonomy, the MCA is aware of current developments:
 - IMarEST is supporting coordination of MCA Code Vessels and Smart Ships & Automation Policy officers' work on adapting regulations for autonomous systems;
 - MCA Ship Standards Officers are reviewing aspects of the Workboat Code, for applicability to autonomy: 'Workboat Code Edition 3' may include (in Section 25) relevant guidance.



Autonomous Vessel Standards – MCA Areas of Concern



- The Maritime UK Industry Conduct Principles and Code of Practice (3rd edition) gives valuable information and guidance on vessel standards.
- However, two areas of concern remain to the MCA:
 - Ballast Water (Part 2 - 15.6). Note: There is no lower Tonnage limit for this IMO Convention; and
 - Carriage and Transfer of Dangerous Cargoes (Part 2 - 16).
- If your autonomous vessel is likely to carry ballast water or carry / transfer dangerous cargoes (including fuel for transfer), then you **MUST** seek MCA Shipping Policy Department guidance and approval, **prior to design and construction:**

Katrina.Kemp@mcga.gov.uk



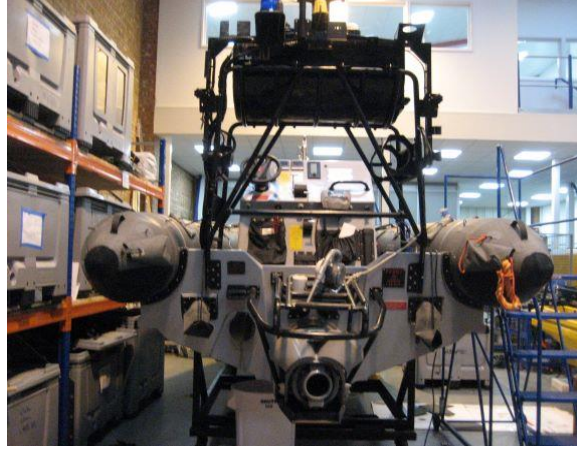
Vessel Standards – MCA Consultation



- MCA is in process of consulting with the autonomy industry, to help develop UK regulations that encourage and support this important sector of maritime activity.
- Funding for this work is being provided by the UK Government.
- Areas of interest and purpose include:
 - Appropriate regulation and useful guidance;
 - Identification and highlighting existing regulations and guidance that already apply to lower levels of autonomy;
 - Ensuring that UK activity are coordinated and consistent with IMO developments for autonomy, leading and guiding, where appropriate;
 - Encouraging a positive environment and culture for growth of the UK maritime autonomous system sector.
 - Working with MCA, Classification Society and Certifying Authority colleagues, to ensure growth of understanding.



Vessel Standards – Further Guidance



For further guidance and support to ensure that you develop your autonomous system for safe operation, contact your Classification Society / Certifying Authority, or the MCA:

IMarEST – Chair Small Ships Group and MECAL Principal Surveyor: Alan Cartwright:
alan.cartwright12@gmail.com

MCA - Smart Ships & Automation Policy Officer: Dr Katrina Kemp:
Katrina.Kemp@mcga.gov.uk