

The safety and inclusion guidelines for the design and deployment of maritime autonomous systems



INTERSECTIONAL^{TAS}

Challenge

The maritime sector has long been male-dominated, with limited opportunities for women and other underrepresented groups. Underrepresented groups face cultural stereotyping, discrimination, and limited career progression. In many cases, MAS components may not have been designed to address diverse needs, due to biases within user testing or within machine learning training datasets; screen readers that work only in English; displays that overwhelm neurodivergent thinkers; or facial recognition technology that won't recognise people of colour. These are just a few examples that put people at increased risk. How will you or your organisation work towards understanding and addressing safety and inclusion risks?

Equity in MAS design

When designing MAS, we need to recognise that even if human-centred design standards have been followed, it matters **who** has been involved as 'end-users' either in conceptualisation, feedback or testing to address equity issues. People carry their lived experiences into operational environments, which are influenced by various aspects of their identity coming together in that context. We need to recognise how and why these experiences shape the way diverse people may use MAS differently.

In a human-centred design process, design begins by understanding the user context, and coming up with ideas to suit the user's needs. Whereas, within MAS, some components may not have been developed with the user in mind, but to respond to specific safety, technical or functional requirements. In these cases, it's also important to **test and evaluate MAS in simulated environments or through experimentation with diverse users.**

For human-centred design and testing to be safe and inclusive, consider finding user segments of underrepresented groups that:

- Demonstrate **Similarities** in more than one underrepresented personal characteristic *such as women carers, lesbian women, or religious women as distinct user segments*
- Cover **Diversity** across underrepresented groups *such as examining designs across women, minoritised ethnic groups, people living with a disability or neurodiversity*
- Or if unsure, gather **Multi-stakeholder** perspectives by including and consulting with local unions, civil society organisations or community groups.

Think about your inclusion strategy along these lines and **co-design** or **test** MAS with them. Reach out to the Trustworthy Autonomous Hub researchers for further targeted advice.

Voice in MAS operations

It is not enough to design MAS inclusively to make them safe. Organisations need to pledge to understand and address equity issues in their working environment.

This involves looking at **working patterns and conditions, career progression pathways, facilities, psychosocial safety, and recruitment policy**. All staff need to share inclusive values.

Appoint a **Safeguarding officer** with responsibility to respond to potential and/or actual incidents due to equity issues, biases (implicit or explicit) and discrimination. allow for confidentially reporting of experiences/observations.

It is also vital to include underrepresented groups to examine operational standards through appointing an **advisory board** (panel of diverse staff members and experts who can consult during decision making), holding **town hall meetings** (during which you solicit feedback or allow underrepresented communities to raise concerns), or doing **after action reviews** (to enable underrepresented groups to review policy implementations, accident reports, and query organisational activity).

Transforming maritime autonomy for a safer, more inclusive maritime sector

Get involved in influencing longer-term change within the maritime sector, by proactively promoting social justice and the protection of human rights in the following ways.

Participate in and support widening participation programmes to help diverse young people enter MAS-related careers. Review **organisational training and recruiting pathways**, considering unconventional routes into training and employment.

Make an **institutional pledge** along the lines of the Maritime UK's Diversity in Maritime Charter. Set specific targets for recruiting and progression to become a diverse organisation, and develop an **Action Plan** based on these guidelines.

(Re)Consider **Accident reporting**. Identify expected risks and mitigations for diverse stakeholders, and report data disaggregated by gender, age, ethnicity, disability and other protected characteristics. **Revise data collection practices** to incorporate additional datasets that go beyond gender and nationality.

Get in touch

If you'd like to learn more, or if you'd like to discuss these guidelines and how they could apply to your context, get in touch with the Trustworthy Autonomous Hub research team lead, Dr Caitlin Bentley caitlin.bentley@kcl.ac.uk, who can share further tips or help to organise training on these matters.

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