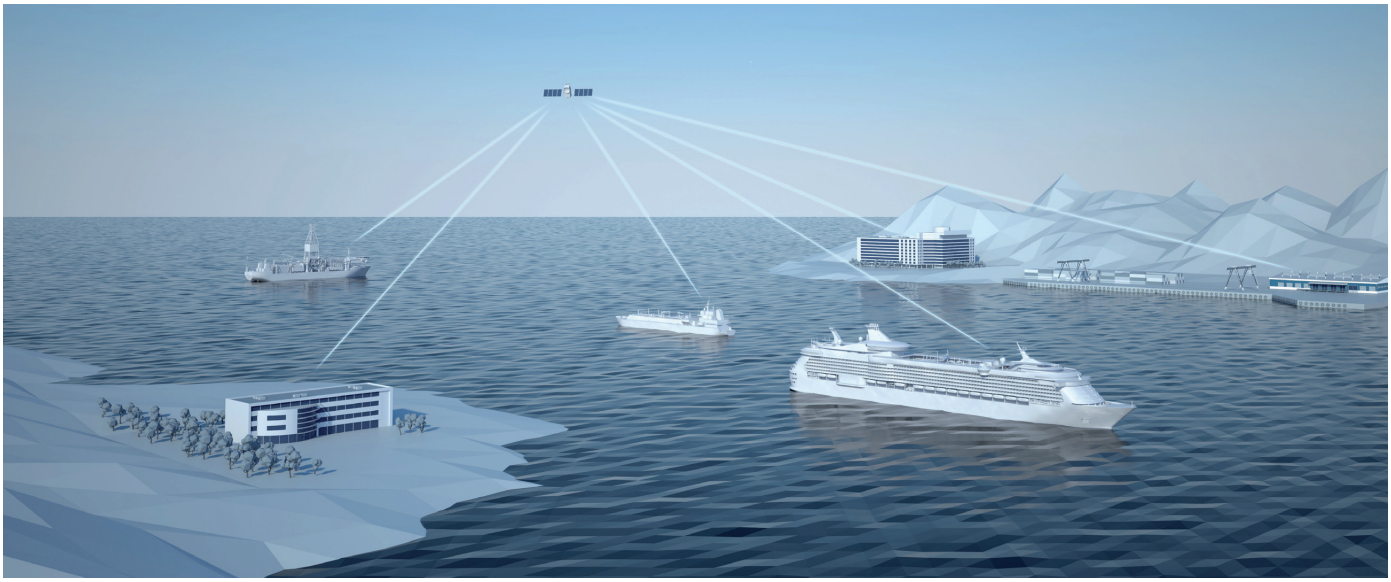
Alliance makes headway towards autonomous maritime ecosystem

COLLABORATION Delivering an autonomous maritime transport system by 2025 will rely on 'collaboration without borders' between major players from the international digital, communications and shipping sectors on regulation, testing and validation and research and development, write Päivi Haikkola, senior ecosystem lead at the Finnish One Sea alliance and Jukka Merenluoto, ecosystem lead at DIMECC Oy



The One Sea ecosystem combines expertise from various stakeholders in the maritime industry

Source: ABB

Digital, Internet, Materials & Engineering Co-Creation Ltd (DIMECC), the Finnish not-for-profit platform that provides administrative and other resources for the One Sea ecosystem, recently unveiled the Sea for Value (S4V) programme. S4V aims to develop concrete research-based recommendations on regulation, business, data usage and sharing, and standardisation for autonomous ships.

The project offers new evidence that an ecosystem for autonomous maritime transport envisaged by One Sea can be achieved in time to meet the alliance's ambitious target of 2025.

Despite its Finnish roots, One Sea is an international initiative: current member partners represent countries such as Japan, Norway, Sweden and the United Kingdom, and the alliance continues to seek active participation worldwide (see box).

Equally important is the unification of competitors and collaborators from various arenas. One Sea is a precompetitive open alliance, bringing together organisations from the maritime industry, information and communications technology and the public sector to contribute towards a single goal: the establishment of an autonomous maritime system by 2025.

Mapping out the future

When it was established in 2017, One Sea prepared a roadmap projecting the path from the alliance's origin to the eventual realisation of its goal: autonomous shipping by 2025 (Figure 1).

The top section of the roadmap in Figure 1, in indigo blue, envisages an initial focus on remote monitoring making way for increasingly autonomous operations. Below, the green bar acknowledges the need for testing – firstly in small, national trials and later on a larger, global scale. While validation continues, regulations will need to be introduced to accommodate autonomous vessels; this is illustrated by the red strip. Underneath, the royal blue area forecasts the progression of autonomy and digitalisation in general and within the maritime sector specifically.

At the bottom of the graphic, One Sea has identified several themes as being pertinent to the creation of an autonomous marine ecosystem. These include ethical issues stemming from the human factor and artificial intelligence; the evolution of cyber security; the launch of new projects and the associated intellectual property rights (One Sea does not accumulate IPR); education in the design and operation of automated ships; and national and global legislation.

A step-by-step process

With its roadmap as a reference, One Sea is engaged in the following activities:

Regulation

The International Maritime Organization (IMO) is exploring the regulatory implications of maritime autonomous surface ships (MASS). Activities have also been launched at the level of Rhine and Danube conventions for inland waterway traffic.

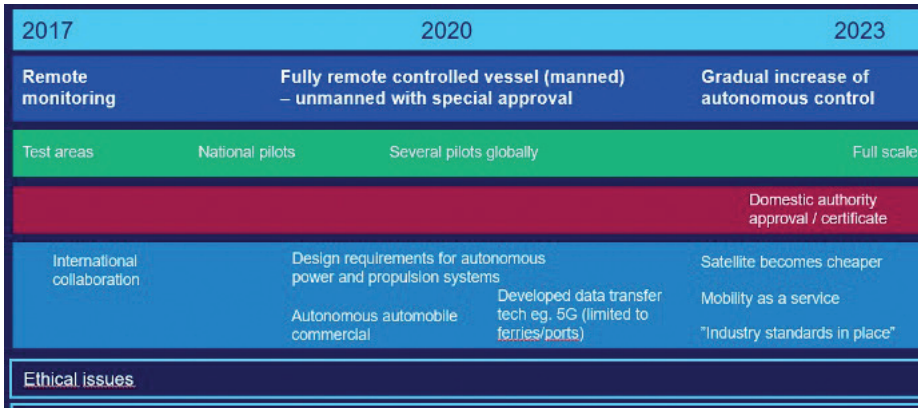


Figure 1: One Sea pathway to autonomous ship ecosystem by 2025 Source: One Sea

Figure 2: A timeline of recent developments in the One Sea ecosystem Source: One Sea

One Sea is seeking to cooperate with the IMO through individual flag states. It worked with the Finnish flag state to contribute two papers to Maritime Safety Committee (MSC) 99 in May 2018. One provided information regarding the test area in Finland (introduced below), while the other considered the definitions for degrees and concepts of autonomy. The alliance has participated in MSC 99, 100 and 101.

Testing and validation

With the support of Finnish authorities, One Sea established a test area in Finnish waters in July 2017. Named 'Jaakonmeri', the site was the first of its kind to open to companies from around the world wishing to trial MASS and related technologies. It is managed by DIMECC and offers the opportunity for testing in icy conditions during the winter.

Relative to the roadmap, testing is in fact ahead of schedule. Recent activities in the field of maritime autonomy and trials are shown in Figure 2.

R&D programmes and innovation

Although much of the technology required for maritime autonomy is already available, there remains room for further research and optimisation. The One Sea ecosystem provides a platform for R&D projects. It also seeks to engage with start-ups and agile businesses to identify and encourage innovation and co-create technology, new systems and services.

R&D programmes in which alliance members and other organisations join forces include S4V, launched by DIMECC in February 2020 to pave the way for remote pilotage and safer fairway navigation.

Product and service creation

Product and service creation is arguably the most important activity in efforts to develop an autonomous marine environment. Like testing, it is currently outperforming targets set out in the roadmap. Due to the precompetitive nature of the alliance, companies tend to work alone in creating products and services. Figure 2 provides an overview of some major commercial applications in recent years.

Disseminating the message

One Sea is striving to communicate its vision for autonomous shipping, sharing information and developments and dispelling concerns. To this end, the alliance speaks at conferences and seminars, participates in discussions and publishes papers. This involves collaboration with authorities, classification societies, research organisations and industry stakeholders.

The road ahead

With the majority of its eight-year roadmap still lying ahead, One Sea is ahead of schedule in its plans to establish an autonomous maritime system by 2025. The international, multidisciplinary alliance has taken a proactive approach to regulation, testing, innovation and education.

Current global One Sea members include:

- ABB, international/Switzerland: pioneering digital technology specialist and founding member
- Awake.AI, Finland: smart port and ship platform
- Cargotec, international: leading cargo systems provider and founding member
- Ericsson, Sweden: prominent telecommunications provider and founding member
- Finnpilot, Finland: piloting company pioneering in digital solutions
- Inmarsat, UK: global mobile satellite communications provider
- Kongsberg Maritime, Norway: knowledge-based technology enterprise and founding member
- Monohakobi Technology Institute (MTI), Japan: R&D subsidiary of NYK Group
- NAPA, Finland/Japan: data-analysis provider and ClassNK subsidiary
- TietoEVRY, Finland/Norway: leading software company and founding member
- Vessel Traffic Services (VTS) Finland: provider of safe marine traffic
- Wärtsilä, international/Finland: marine power specialist and founding member

One Sea also partners with associations and government bodies including: The Royal Institution of Naval Architects, Finnish Marine Industries, Finnish Port Association, Finnish Shipowner's Association, Shipbrokers Finland and Business Finland.