**SUMMARY**

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| **Country** | **Commenced / Commencing Operations** | | **Trial / Test Bed** | |
| **Belgium / Netherlands** | **-** | **-** | Deseo | inland container vessel |
| **-** | **-** | Factofour | inland container vessel |
| **Denmark** | **-** | **-** | Nellie Bly | 10m Tug |
| **Finland** | **-** | **-** | Suomenlinna II | Passenger ferry |
|  | **-** | **-** | Falco | Car Ferry |
| **France** | **-** | **-** | VN Rebel |  |
| **Japan** | **-** | **-** | Sunflower Shiretoko | Car ferry |
| **Korea** | **-** | **-** | Haumgum No. 1 | Mid-sized merchant ship  Coast survey ship (3 tons)  LNG carrier and smaller passenger crafts |
|  |  |  | Aragon XNUMX |
|  |  |  | ?? |
| **Norway** | Yara Birkeland | 80m Container ship | ASKO | Container shuttle |
|  | Bastø Fosen VI | Passenger ferry | **-** | **-** |
| **Singapore** | **-** | **-** | Intellitug  Smart Maritime Autonomous Vessel  Project MINERVA | Tug |
| **Spain** | USV Vendaval | Patrol Ship | **-** | **-** |
| **Sweden** | **-** | **-** | Candela | 7 m leisure craft |
| **USA** | Mayflower | 15m Trimaran | **-** | **-** |
| **UK/USA** |  | 21-72 m -Ocean survey ships | **-** | **-** |

| **PART 1 – COMMENCED / COMMENCING OPERATIONS** | | | | | |
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| **Country** | **Vessel** | **Comments** | **VTS**  **Involvement** | **Reference/s** | **Rapporteur** |
| **Norway** | **Yara Birkeland**  Container ship  80m Length   * 120 TEU * Autonomous * Controlled remotely * Crew (initial phase) | * First voyage to commence end of 2021 * To operate within 12 nautical miles from the coast, between 3 ports in southern Norway. * **Brevik VTS** - Vessel needs permission from the VTS center to “use the water”, e.g sail in to the area, leave port, anchor etc. The VTS centers are authorized to set terms to a permission, e.g when to depart or what route to follow, thus organizing the traffic. * Autonomy will be in stages | Brevik VTS | <https://edition.cnn.com/2021/08/25/world/yara-birkeland-norway-crewless-container-ship-spc-intl/index.html> | Trond Ski |
|  | **Bastø Fosen VI** Passenger ferry   * Autonomous * Crew | * Regular passenger ferry service from Feb 2020 * Have autonous berthing capabilities * **Horten VTS** - Vessel needs permission from the VTS center to “use the water”, e.g sail in to the area, leave port, anchor etc. The VTS centers are authorized to set terms to a permission, e.g when to depart or what route to follow, thus organizing the traffic. | Horten VTS | <https://www.kongsberg.com/maritime/about-us/news-and-media/news-archive/2020/first-adaptive-transit-on-bastofosen-vi/> |  |
| **USA** | **Mayflower Autonomous Ship (MAS)** 15 m length   * Autonomous * Unmanned * Solar powered | * Ocean science, data collection vessel * Trans-Atlantic sailing planned to commemorate 400 years since original Mayflower * 2020 trip Plymouth (UK) to Plymouth, Massachusetts (USA) delayed due to COVID-19 * First trip commenced 15 June 2021 but abandoned due to mechanical issues * Repairs made, local trials in progress Summer-Fall 2021 * Cooperative effort planned with Port of Rotterdam planned during Fall 2021 trials * Second trip planned for Spring 2022 | None locally,  Planned effort with Rotterdam during trials | <https://www.ibm.com/au-en/cloud/automation/mayflower-autonomous-ship> | Michael Trent |
| **US/UK** | **ARMADA FLEET**  Ocean survey vessels  21 to 78 m in length   * Autonomous * Unmanned * Hybrid power | Ocean Infinity made waves in 2018 with the launch of 6 Autonomous Underwater Vehicles (AUV) from a single vessel to vastly expand ocean survey coverage. In 2021, they are launching the ARMADA FLEET, a fleet of hybrid powered, high endurance Unmanned Surface Vessels (USV) to be deployed globally and controlled remotely from centres in Southampton (UK), Austin, Texas (USA) and Singapore. | Building 3 Remote Control Centre for global control of survey vessels | [Ocean Infinity](https://oceaninfinity.com/)  [Armada Fleet](https://oceaninfinity.com/marine-robotics/)  [Building Armada](https://www.marinetechnologynews.com/news/autonomy-inside-building-ocean-608366) | Michael Trent |
| **Spain** | **USV Vendaval**  Patrol ship  11 m length  Remote operated  Power driven vessel | • Operating since 2020.  • Can be operated with and without crew on board.  • Safety surveillance.  • Security surveillance.  • Environmental monitoring.  • Only operate within port limits. | Port of Ceuta | [http://www.puertodeceuta.com/puerto/sistema-de-vigilancia-y-control-medioambiental-svcm-en-las-aguas-proximas-a-las-darsenas-y-muelles-del-puerto-de-ceuta/](https://aus01.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.puertodeceuta.com%2Fpuerto%2Fsistema-de-vigilancia-y-control-medioambiental-svcm-en-las-aguas-proximas-a-las-darsenas-y-muelles-del-puerto-de-ceuta%2F&data=04%7C01%7Cneil.trainor%40amsa.gov.au%7C07ebb546a5b04a375d1108d97cfe18b8%7C7d14b92529214d308f2fa6a3c1245f6d%7C0%7C0%7C637678253054032195%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=U%2FbAzZie886GBYOaOIaNOrBkh%2FJ3QyZ0VmWy2rkpvqs%3D&reserved=0) | Carlos F. Salinas |
| **France** | VN Rebel | The VN Rebel vessel was remotely operated by satellite links from the head office of the SeaOwl group, 16 rue Rivay, 92300 levallois-perret. The ship has been remotely operated since its departure from the quay to the point located to the south-east of the Saint Mandrier prequ'île outside the Toulon harbour and approaches. The conditions for supervising this experiment were authorized by the Maritime Prefecture of the Mediterranean.  **Trial Completed** | No, outside VTS supervision. In contact with the military base | <https://seaowlgroup.com/seaowl-un-navire-tele-opere-par-satellite-pour-les-operations-subsea-en-afrique/> |  |
|  | autonomous surface craft and authorization regime prerequisite for more powerful gear (autonomous vessels). | The decree relating to the methods of experimentation with the navigation of autonomous or remotely controlled maritime floating devices for maritime navigation was published in the OJ of May 31, 2020: https://www.legifrance.gouv.fr/affichTexte.do; jsessionid = 49684741F9CA006C753DCD6D1602E101.tplgfr22s\_2? cidTexte = JORFTEXT000041938890 & dateTexte = & oldAction = rechJO & categorieLien = id & idJO = JORFCONT000041938591 As a reminder, this decree was issued in application of X of article 135 of the LOM.  It establishes a dual regime allowing the conduct of experiments with these autonomous or remotely controlled floating devices: a prior declaration regime for small devices (maritime drones), which meet the criteria established by the decree, and an authorization regime prerequisite for more powerful gear (autonomous vessels).  Declarations and requests for authorizations are made to the maritime prefectures. In addition, it obliges the operators to communicate the results of the tests to the DAM so that the administration can use them within the framework of the preparation of the report intended for the Parliament and of the ordinance relating to autonomous ships which must make it possible to adapt the law applicable to the development of these devices. The publication of this decree unfortunately took place the day after International Drones Day (no sense of communication at DILA) but it concludes nearly 6 months of work largely carried out by Farah and whom I would particularly like to thank. |  |  |  |

| **PART 2 – TRIALS / TEST BEDS** | | | | | |
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| **Country** | **Vessel** | **Comments** | **VTS involvement?** | **Reference/s** | **Rapporteur** |
| **Belgium / Netherlands** | Deseo | The inland container vessel DESEO is sailing between Zeebrugge and Antwerp. The vessel is remotely operated from Anwerp, by SEAFAR. This is the second phase of the test. The first part was from Zeebrugge to Vlissingen.  The tests are under full VTS Coverage. |  |  | Vivian Baetens |
|  | Factofour | The inland container vessel FACTOFOUR is sailing between Hansweert (NL) and Antwerp (BE). The vessel is equipped for autonomous sailing, but at this stage they are only gathering data for the Black-Box.  The tests are under full VTS Coverage. |  |  | (Joint nautical Authority) |
| **Korea** | Haumgum No. 1 Aragon  XNUMX. | * Planned for end of 2021 | ?? | <https://www.maritime-executive.com/article/hyundai-plans-first-ocean-going-autonomous-ship-voyage-by-year-s-end> | Jinsu Jeon |
| **Japan** | **Sunflower Shiretoko**  coastal car ferry | Auto-berthing and unberthing system of the Sunflower Shiretoko at the port. | ?? | <https://www.porttechnology.org/news/mitsui-osk-lines-trial-shows-autonomous-vessel-promise/> | Hideki Noguchi |
| **Finland** | **Suomenlinna II** Passenger ferry | Remote control trial of passenger ferry in a pre-selected area of Helsinki harbor in 2018.  Operated by ABB  **Trial Completed** | N | <https://new.abb.com/marine/marine-references/suomenlinna-ii> | Matti Aaltonen |
|  | **Falco**  Car Ferry | Remote control of car ferry in archpelago of Turku, Finland  **Trial Completed** | N | <https://www.rolls-royce.com/media/press-releases/2018/03-12-2018-rr-and-finferries-demonstrate-worlds-first-fully-autonomous-ferry.aspx> | Matti Aaltonen |
|  |  | One Sea is a high-profile ecosystem with a primary aim to lead the way towards an operating autonomous maritime ecosystem by 2025. The collaboration gathers together leading marine experts and is a strategic combination of top research, state-of-the-art information technology and business.  The work began in 2016, and the aim is to create an environment suitable for autonomous ships by 2025. |  | <https://www.oneseaecosystem.net/> | Olli Soininen |
| **Netherlands** | ?? | Harmen van Dorsser to provide info | ?? | ?? | Harmen van Dorsser |
| **Norway, Singapore et al** | No particular ships | Tests of MASS in ports and port areas | ?? | [MASS Ports](https://www.kystverket.no/en/News/norway-contributes-to-shaping-the-future-of-shipping/) | ?? |
| **Norway** | ASKO  Container shuttle | Autonomous container shuttle designed to carry 16 containers over the Oslo fiord (Moss-Horten). Like Yara it’s to be operated by MASSTERLY, ad Wilhelmsen/Kongsberg collaboration | Horten VTS | [ASKO](https://www.wilhelmsen.com/media-news-and-events/news/2020/massterly-to-operate-two-zero-emission-autonomous-vessels-for-asko/) project | Trond Ski |
|  | Intellitug | * Collaboration between technology provider, Wartsila, marine services provider PSA Marine, classification society Lloyd’s Register, the Technology Centre for Offshore and Marine Singapore (TCOMS) and MPA * 27m harbour tug * Designed to provide supervised autonomous control for harbour tugs * Smart navigation system and collision detection and collision avoidance capabilities verified in a defined trial area | No | <https://www.wartsila.com/intellitug?utm_source=press-release&utm_medium=org&utm_term=marine&utm_content=intellitug-project&utm_campaign=wartsila-and-psa-marine-successfully-complete-initial-sea-trials-of-smart-intellitug-ship> | Chong Jia Chyuan |
|  | Smart Maritime Autonomous Vessel | * Collaboration between technology provider ST Engineering Marine, tug service provider, POSH, classification society ABS, telecommunication provider M1 and MPA * 30.5m harbour tug * Designed to have autonomous capabilities alongside a shore command centre with remote control capabilities * Autonomous navigation capabilities, collision detection and collision avoidance capabilities, and remote control capabilities verified in a defined trial area | No | <https://onward.stengg.com/2020/04/29/sea-trials-for-autonomous-tugs/> | Chong Jia Chyuan |
|  | Project MINERVA | * Collaboration between Keppel Offshore and Marine, ABB, ABS, TCOMS and MPA * 32m harbour tug * First phase of testing in the sanitised trial area which verified remote control capabilities * Next upcoming phase will test autonomous navigation and collision detection and collicaion avoidance capabilities in a defined trial area | No | https://new.abb.com/news/detail/39090/abb-to-bring-autonomous-technology-to-the-port-of-singapore | Chong Jia Chyuan |
| **Sweden** | Candela - 7 m leisure craft and 25-30 pax ship Electric foil boat/ship | Innovative ships designer/producer plannig to scale up 7 m leisure craft design to a 25-30 pax commuter ship in Stockholm, Oslo and San Fransisco. Candela has been granted financing from the Swedish Government and the project is ongoing. | ?? | [Candela Speedboats](https://candelaspeedboat.com/?gclid=EAIaIQobChMIl9aG8biw7QIVQRN7Ch3NZQkIEAAYASAAEgJUYvD_BwE) | ?? |
| Electric & autonomous road ferries | Electric driven (fossil free) road ferries for fully autonomous transit and designed to carry 60 cars.  Route in the Stockholm archipelago (Ljusteröleden and Vaxholmsleden).  Test project started.  Delivery of first road ferry planned 2022/23.  Run by Swedish Transport Administration | ?? | <https://www.trafikverket.se/farjerederiet/om-farjerederiet/nyheter---farjerederiet/Nyheter/2020/fyra-nya-elfarjor-till-stockholms-skargard/>  (So far only in Swedish) | ?? |
| **Denmark** | Nellie Bly  10m Tug | Sea Machines Robotics recently announced it will embark on a 1,000 nautical mile autonomous and remotely commanded journey around Denmark (September/October 2021)  Transits will cover 3 VTS areas | ?? | <https://thedigitalship.com/news/electronics-navigation/item/7500-sea-machines-prepares-vessel-for-1-000-mile-autonomous-voyage> | Dorte Hansen |
|  |  |  |  |  |  |
| **UK et al** | MASS People  MASS training and certification project | A MASS training and certification multilateral project led by UK maritime traning company FUGRO aiming to develop standards for MASS operators and others and subsequently address the IMO with its findings. |  | <https://www.fugro.com/media-centre/news/fulldetails/2021/02/18/fugro-launches-masspeople-international-working-group-for-remote-and-autonomous-training-standards> | ?? |