



Seatrade
Cruise News

Cruise Ship Technology Trends

(December 2018)

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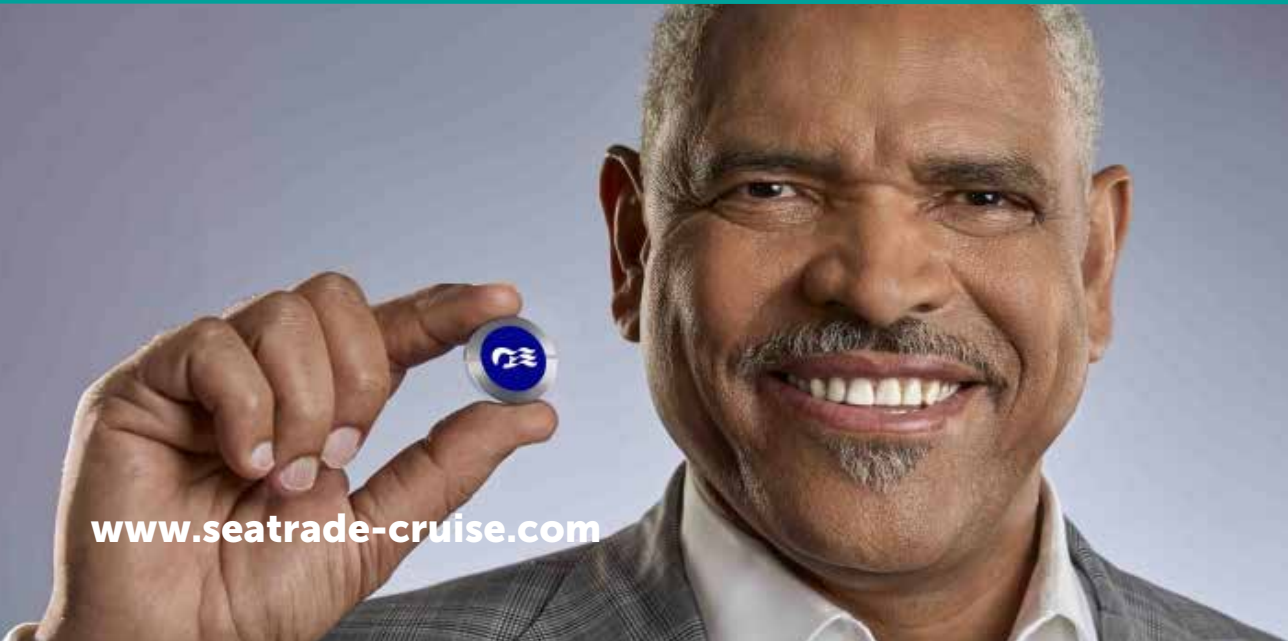


Easy embarkation, disembarkation and personalised experiences

With the need for speedy embarkation on the larger ships, Royal Caribbean has accelerated their 'Excalibur' tech platform rollout, currently in used on 50% of their fleet. Excalibur assists in embarkation, planning passengers' days with a 'daily planner', access to onboard accounts to keep a track on spending, booking things like spa treatments, shore excursions and speciality restaurants.

The days of getting lost on cruise ships are over. While interactive maps aren't a new introduction for cruising by any stretch of the imagination, the 'MSC for Me' app makes getting from A to B even easier – just decide where you want to go and a map will demonstrate how to get there. The MSC for Me wristband also provides over 100 smart features, such as a path finder and reservation service.

Carnival Corp. & Plc's OceanMedallion (which can be fashioned into a necklace, bracelet or clip) is fully implemented onboard Caribbean Princess – where guests can interact with online services via digital displays.



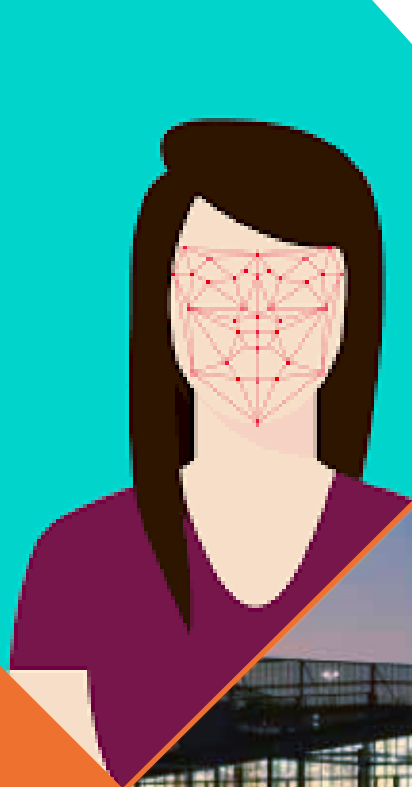
Facial & Voice Recognition technology

Royal Caribbean is even using facial recognition technology offshore at its new Terminal A at PortMiami. How does it work for passengers getting on and off ships? A disembarking passenger, for example, is directed to step in front of a facial recognition camera. The camera then locates the face and captures an image for facial matching and compares it to the facial image captured as part of the embarkation process. If there is a positive match and the passenger has nothing to declare, the traveller is then free to exit the terminal. Not only has it improved the 'guest experience',

and it reduces waste since there's no need to print a lot of documents. MSC Cruises has also joined the party by showcasing intelligent facial recognition as a feature in its MSC for Me concept – this time to enable staff to tend to guests on an incredibly personalised level.

Debuting in 2019 as part of MSC for Me onboard MSC Bellissima, MSC will also be introducing voice-activated technology with a 'digital personal assistant'. The digital personal assistant will harness artificial intelligence to communicate, 'learn' and intelligently

predict passengers' needs in order to provide relevant suggestions. Unlike other home digital assistants that rely on cloud-based programs with internet-connected devices or applications, this digital offering will be designed around a ship-based solution, customised especially for MSC Cruises passengers. They will be able to communicate with the digital personal assistant in seven languages: English, French, Italian, Spanish, German, Brazilian Portuguese and Mandarin.



Cyber security & the digital revolution

With the rise of new technologies onboard, and systems reliant on these technologies, there is an ever increasing threat of cyber-attacks. BIMCO, CLIA, ICS, INTERCARGO, INTERTANKO, OCIMF and IUMI have teamed up and created a document 'The Guidelines on Cyber Security Onboard Ships' to assist cruise lines and their staff in best practice to avoid cyber-attacks.

Digital twinning is used to save time, energy and money by using cloud technology to build identical 'virtual' ships. This allows testing to be done on all the onboard systems to check they work together in harmony. This can be implemented before the ship has even started to be built.



Ships powered by fish

Yes you heard it right! Biogas (which is waste from fisheries, along with other organic waste), will power at least 7 ships in the Hurtigruten fleet by 2021, in addition to LNG and large battery packs. Biogas is considered the most eco-friendly fuel currently available. As Norway has a large fishery sector, the 'fish waste' matter is readily available.

Going full circle, at the new cruise quay in Visby on the island of Gotland Sweden, sustainability issues have played a major role during the project. The ships that come to Visby will be able to empty their waste water into an underground basin, which will then be pumped onward to the sewage works, where the sludge can then be used in biogas production on Gotland.



The future is green (and technology-fuelled)

With new IMO legislation requiring cruise ships to reduce their sulphur emissions from 3.5% to 0.5% by 2020, we can expect to see technology play a bigger role than ever before in reducing the industry's carbon footprint. Royal Caribbean Cruises Ltd., Carnival Corp. & plc, MSC Cruises and Disney Cruise Line have each invested in building LNG-fuelled ships, and many lines are also using exhaust gas cleaning systems (scrubbers) to reduce air pollution.

If you look at the Seatrade Cruise orderbook, there are 20 LNG-fuelled cruise ship currently on order between 2018 and 2027. *

Carnival Corp & Plc has spent hundreds of millions of dollars to install these exhaust gas cleaning systems on 69 of its ships so far (Because they plan to retrofit more of them.)

Other technology available to, and being used by, cruise lines are Air lubrication systems (ALS), which are effective in promoting fuel efficiency by reducing the friction between the hull of a ship and seawater during navigation.

Then we look at a totally different project where Royal Caribbean is backing a wind farm in Kansas, near one of their call centres, in an effort to offset its greenhouse gas emissions. This will enable them to offset up to 12% of their ships' CO2 output.

The image shows a document titled "Seatrade Cruise" which is a detailed orderbook table. The table is organized by year, with sections for 2018, 2019, 2020, and 2021. Each year's section contains a list of cruise lines and their respective ship orders. The columns in the table include: Cruise Line, Ship Name, Year, Class, Length (m), Gross Tonnage, Capacity, and Estimated Costs (\$ million). The document is tilted and overlaid on a background image of a wind turbine.

*Source: Seatrade Cruise orderbook (correct as of 22 November 2018)

Let's look at the in-depth facts and figures for Environmental Technologies & Practices**

- **44% of ships (60% of global capacity)** have been fitted with Exhaust Gas Cleaning Systems (111 ships) – Companies report that EGCS systems remove 99% of sulfur and well over 50% of particulate matter, including elemental and organic carbon. Catalytic filter and other systems further reduce particulate matter by over 30% and reduce nitrogen oxides by 10%.
- **12 ships** are being retrofitted with EGCS and planning is continually evolving for more than thirty additional ships consistent with annual plans
- **27 newbuild ships (49% of newbuild capacity)** are committed to be fitted with Exhaust Gas Cleaning Systems
- **2 ships** are able to operate on LNG in port
- **35% of newbuilds capacity (17 ships)** are committed to using LNG as primary fuel for propulsion
- **60% of ships (152 ships)** are capable of using alternative fuels such as biodiesel etc.
- **22% of ships (55 ships)** have been fitted with Shore Side Electricity (SSE) systems, with **30% of newbuild capacity (17 ships)** committed to be fitted with them
- **13 ships** have air lubrication systems fitted
- **92% of ships (209 ships)** have low friction hull coatings installed
- **62% of ships (136 ships)** have an advanced waste water treatment system on board, approved, used and capable of meeting or exceeding IMO MARPOL Annex IV discharge norms. For newbuild is it 56 ships, which is 100% of all newbuilds
- **83% of newbuilds capacity (48 ships)** will have a waste water treatment facility on board, approved and capable of meeting the discharge standards of the IMO MARPOL Annex IV Baltic Sea Special Area
- Existing and forecast Exhaust Gas Cleaning Systems (EGCS) installations are for hybrid or open loop systems and many include wash water filters. Some include a catalytic filter on the engine exhaust prior to the EGCS, as well as continuous monitoring equipment to automatically record all parameters. A variety of technologies further clean the EGCS wash water stream including fine-mesh filtration, purification, centrifugal separation and dissolved air with flocculant. EGCS wash water filter residue and process tank residue are disposed of ashore.
- Several companies are exploring fuel cell and equivalent technologies for future newbuilds or retrofit projects.
- The following 13 ports/specific berths visited by CLIA (Cruise Lines International Association) oceangoing ships are fitted with shore side electricity / cold ironing capacity: Brooklyn, Halifax, Hamburg Altona, Montreal, San Diego, San Francisco Berth 35, Los Angeles, Long Beach, San Pedro Berths 92 & 93, Seattle, Shanghai, and Vancouver Canada Place, and Juneau
- Many ships are equipped with advanced waste water treatment systems (AWTS) that are capable of exceeding MARPOL Annex IV requirements and are operated to meet or exceed the more stringent sewage discharge criteria in Alaskan waters and/or the forthcoming Baltic Sea Special Area, as well as gray water requirements under the U.S. Vessel General Permit (VGP)

***Source: CLIA (Cruise Lines International Association): Environmental Technologies and Practices CLIA Global Oceangoing Cruise Lines - August 2018). These statistics are based on CLIA Member Cruise Lines only.*

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