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## Danish Maritime Museum Visitor attraction sets sail





In addition to being built on an ever-increasing slope to give the feeling of being on a swaying ship's deck, the AV installation at Europe's newest maritime museum threw up some further challenges. Nial Anderson sees how integrator Stouenborg handled the project.



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**Audio**  
 Behringer MA 400 monitor mixer  
 Blackbox AV headphones  
 Meyer Sound MM4-XP loudspeakers  
 Meyer Sound MM-10ACX subwoofers  
 Panphonic SS loudspeakers  
 Tannoy Di 5A loudspeakers

**T**wo years shy of its 100th anniversary The Danish Maritime Museum has moved from its historical home in Kronborg Castle near Elsinore to a new, purpose-built base. The attraction is located in a specially constructed underground area surrounding an old dry dock that boasts 82,000 sq ft of exhibitions, theatres, interactive installations and games.

The building project itself was quite an amazing task. After the water was removed and the area had been excavated the docks started to float away, so more than 1,000 anchors had to be sunk around 40m into the ground to hold it in place.

The museum itself features paintings, photographs, libraries and exhibits that cover the history of shipping in Denmark from around 1400 to the present day. The move into a new premises was an opportunity to re-imagine how to tell the story of Denmark's shipping industry – the seventh largest in the world and one which 10% of the world's goods are carried by.

In the summer of 2012 Danish integrator Stouenborg was invited

to take part in a workshop with a Dutch company that had been tasked with designing the new museum. Five months later Anders Jørgensen, a partner in Stouenborg, found a project tender for the museum waiting in his email inbox.

"Two other companies bid, and ultimately we were chosen due to our background and experience of handling similar projects," he said.

"We signed the contracts for the AV part of the project that was around €240,000. But more and more things kept coming up like showcase lighting and exterior lights. So we ended up doing the AV, the lights, the sound and the auditorium. The total installation budget ended up to be around €750,000."

With Stouenborg's responsibilities on the project snowballing in such a fashion this brought benefits for both the company and the client, according to Jørgensen.

He said: "From an installation point of view it was a real benefit for our company. From time to time deliveries of hardware get stuck in customs or things like that which means people are doing nothing for two days if you are just dealing with the AV."

Jørgensen explained the client also enjoyed cost savings as there was only one set of crew facilities that had to be paid for, rather than multiple ones for different companies.

Internationally renowned architects BIG (Bjarke Ingels Group) handled the design of the building, a structure that Jørgensen praised as "an art piece". The route that visitors take through the building goes gradually downward so they feel slightly off-centre, as if they are at high sea and the ship is rocking from side to side. This unique method of building the museum also meant Stouenborg had to alter their angle of attack.

*“ It took more than 2,000 man hours to carry out the video rendering, stitching and soft-edge blending for the museum. ”*  
 - Anders Jørgensen, Stouenborg



< “The method of construction made it a really big task to install all the exhibitions,” he explained. “They needed to be elevated and exactly at the right position to compensate for not having a flat floor. This meant making the legs slightly different heights and when we were putting up the projectors we had to take into account that nothing in the room was at the same height.”

Another unusual aspect of the install was the way Stouenborg handled video. One theatre showing a film on how navigation was done called for 11 projectors, each taking content from an SD card, to play onto a panoramic screen of around four metres high and 40m wide. The budget would not stretch to a Pandoras Box from coolux which would have enabled an easy way to handle soft edge blending.

“We ended up doing it with BrightSign players that don’t have that feature,” he explained.

“But they can be synchronised so we made the mask in Pandoras Box for each projector and then exported that mask to a rendering program, Final Cut. From there we exported the rendering out to each SD card which was put in the media players which each projector had.

“From then on we had the opportunity to make these masks all the way to create all the panoramic

views and we did that in a lot of the places in the museum. When you’re rendering more than 1,000 gigabytes of 4K material it takes forever. It took more than 2,000 man hours to carry out the video rendering, stitching and soft-edge blending for that museum.”

The tight budget meant that Stouenborg had to deal with products and brands that they might not normally have done. Jørgensen said after some initial skepticism, he was pleasantly surprised with the Mitsubishi projectors that were chosen for the project.

“When we first saw the tender we thought ‘oh no, we don’t have any experience with Mitsubishi projectors,’” he explained.

“But there are 60 of them that have been running since the end of May almost every day and we haven’t had any faults. The colour temperature between the units aren’t quite the same but that’s the only negative thing to say.”

In other areas of the museum, Vivitek pocket projectors were chosen for the portholes which visitors can peer into and see a film playing. In another area of the museum, Casio projectors are used because they have the option of playing at 90 degrees. They project onto a book stand where a trading game can be activated if someone places in it a book with RFID tag.

Stouenborg stayed faithful to the initial kit list drawn up by the designers except in a couple of instances. Firstly, they changed from the specified LCD projectors to DLP projectors.

“Our experience with LCD projectors is after two years time you get blue or green screen instead of a nice picture. We find the DLP have a longer life,” explained Jørgensen.

The other change occurred in a specific part of the museum, where Stouenborg insisted on a change of speakers. This part of the museum shows battle ships at war and it was found that the speakers specified did not have sufficient low frequency capabilities for the task.

Jørgensen said: “In the rest of the museum they use Tannoy [Di 5a units] which is a really decent speaker but it only goes down to 100Hz and it’s a little hard to represent the bombs and explosions which are heard in this area. Instead we put in the Meyer Sound MM4XP system which really helped.”

The kit list called for a Medialon system to handle the start up and shutdown of the museum and to provide feedback on the projector lamp life. Jørgensen said he would have preferred to choose another system in this case but was bound by budget constraints.

“We normally use Crestron to deal with these things,” he said. “The Medialon system was a little too complex in my opinion. We just controlled the startup and shutdown and the feedback about the lamp time of the projectors, and it took a long time to program such simple tasks. With Crestron that might have taken 40 hours but instead this took around 250 hours.”

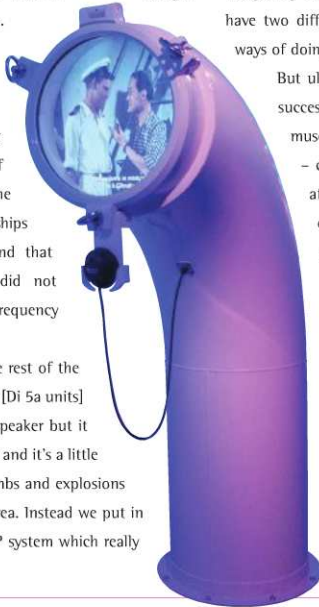
The biggest challenge with the nine-month project didn’t come from the equipment, however, but the difference of nationalities between the design company and the AV installation company.

“It’s been a really difficult process to complete this project smoothly,” Jørgensen explained.

“You have a Dutch design company, a Danish integrator and a project manager that is also Danish and you have to communicate across a big distance. Everything needs to be carefully planned because you have two different countries with two very different ways of doing things.”

But ultimately the project has been extremely successful. A near disaster - when the maritime museum project almost sank like the Titanic - caused a delay which thankfully did not affect Stouenborg too much. In this case, ducts for the heating system were not adequately sealed and in July of this year a huge level of rainfall hit Denmark.

“Basically there was a waterfall coming into the building,” explained Jørgensen. “I went there immediately when I heard but we were really lucky. Walls, floors and some of the cabling needed to be replaced but besides that nothing got damaged. We did have to postpone our work but that was only a bump on the road in the project.”



**Tech-Spec**

**Video**  
 Bright Sign HD220 & HD1020 media players  
 Calibre HQView210 scaler  
 Casio XJ-M255 projectors  
 Chief RPAUW, CMS003W, CMST115W mounts  
 Medialon LT control system  
 Mitsubishi XD720u, XD700u, XD360-u, EW331-ST projectors  
 Vivitek pocket projectors  
 Samsung 460MX-3  
 Winsonic CH17W5, CH2155, CH2705 displays  
 Fiber Network with 16 switches in 5 racks