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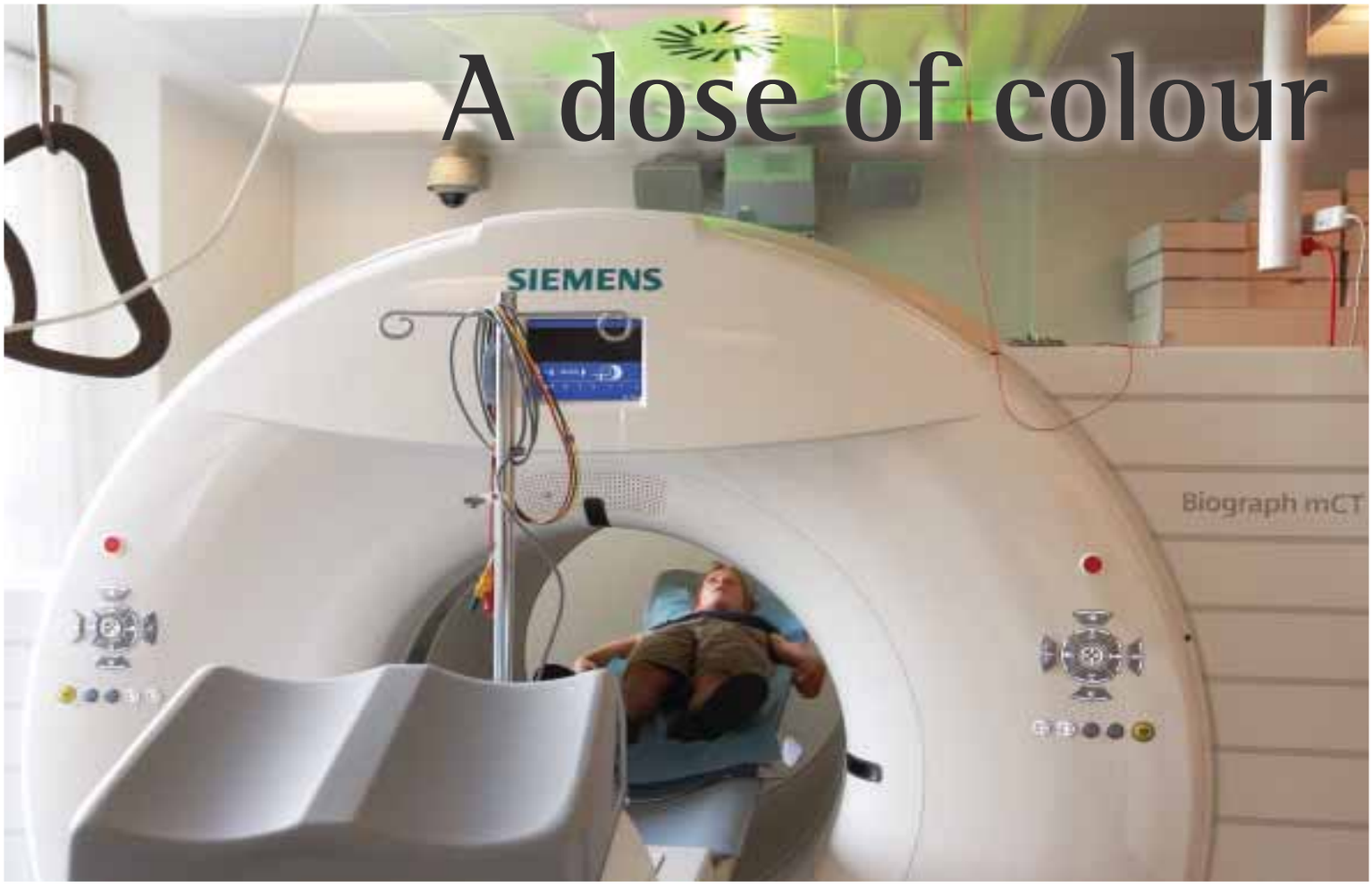
AV deployments inform us, entertain us and help make our daily lives easier. Nial Anderson talks to integrator Stouenborg about a special project that went a step further.

A dose of colour



It is estimated that cancer claims the lives of nearly 100,000 children yearly, worldwide. Although rare, it remains the leading cause of death by disease past infancy.

The most important step in identifying cancer early in order to deliver effective treatment is to obtain clear x-ray images of the suspected problem areas. A critical part in this process is for the patient to lie absolutely still while the CT scanner is working, a process which can take anywhere between five and 40 minutes.

This can be especially difficult for children, a fact that did not go unrecognised when Rigshospitalet (Copenhagen University Hospital) updated its CT scanning suite. Patients can be sedated before they are scanned but this not something high risk groups, like children and the elderly, should undergo too often because of their weak immune systems. The designers of the updated CT suite tried to find a solution whereby the quality of scan images would increase while the use of sedatives would be reduced.

> *"It really makes your job worthwhile when you can see young children smile during an unhappy time in their lives."*
> *- Anders Jørgensen, Stouenborg*

The hospital's chief physician, Lise Borgwardt PhD, recalls the background to the project.

"I wanted to do something different," she explained.

"To keep the kids still during the scans some departments use a lot of sedation, while others try to use distraction. We tried distraction, and before the scanning rooms were overhauled we just had a normal flat screen on a table beside the scanner. This meant the child was lying with their head turned to one side and sometimes this worked and sometimes it didn't."

Borgwardt first contacted a theatre painter to create murals for the walls and a light artist to create a welcoming atmosphere. Danish integrator Stouenborg stepped in to design and install the AV.

"We were doing some work with the project's light designer and they thought this might be something we should work together on," explained Anders Jørgensen, Stouenborg's project manager.

"It was a government project but it was privately funded so the client was more concerned with getting the right result rather than the cheapest price."

To begin designing a possible solution, Stouenborg tried to identify things that keep healthy children sitting still for a length of time.

"TV achieved this best so we looked at how we could bring that into the scanning room,"

Tech-Spec

Audio
Apart speakers
Sennheiser headphones

Video
Brightsign media players
Coolux controller
Panasonic projectors

explained Jørgensen.

The AV experience begins in the waiting area, a long corridor with chairs along one side. As is common in children's wards around the world, the walls were painted with cartoon scenes and characters. Stouenborg worked with the painter and light designer – who also created the digital content - so that the scenes could be brought to life using three Panasonic PT-TW230 projectors that are edge-blended to cover the length of the wall.

"The children will begin to notice small movements," explained Jørgensen, "There's a horse that begins flying across the sky. The waiting room then transforms into a dream world where small images suddenly come to life from a painting that's been done on the wall. The light there slowly changes from one colour tone to another, to give the feeling of a room that is alive and has a pulse, and to make it bit more welcoming."

Because the wall opposite to the projectors needs to be cleaned and dried to a clinical standard, projection screens or coatings could not be used.

"We used Panasonic PT-TW230 projectors because we needed a short throw model with power enough to project straight onto the wall," Jørgensen explained, "We needed something that could perform well despite the ripples and imperfections."

To deliver the content, which runs on a loop, Stouenborg used the same tactics it had employed at its AV installation at the Danish Maritime Museum (See InAVate Nov 2013). Masks and soft edge blending are created in Coolux Pandoras Box for each of the three projectors and then rendered to MPEG2 files. The rendering is then exported to an SD card which is put into one of three Brightsign HD220 media players. Stouenborg used the Widget Designer from Coolux to create a custom user interface and enable remote show control.

"This was the easiest way to do this as all of the projectors use the PJ Link protocol," Jørgensen explained.

As soon as the children arrive at the waiting area they are given a tablet. They can explore the apps loaded on them or choose the films they will see during their scan from a range of around 50 titles. When they go in to be scanned and have gotten themselves comfortable, the nurse can just press a button on the screen for the content to be delivered on the ceiling above the scanner.

In certain types of scans, children need to be injected with a radioactive substance called a tracer to enable more clear images of organs and bones to be seen. After this injection the child will have to wait for up to two hours before the scan can take place. Another room has been equipped with beds where children can draw on the roof with their tablet.

Child draws on ceiling with iPad

> *"It's no longer a normal, grey hospital environment. The atmosphere makes the kids feel like it is their space and they are comfortable there."*
> *- Lise Borgwardt PhD, Copenhagen University Hospital*

Stouenborg used Panasonic PT-CW230EJ projectors in the scanning rooms, one above each of the scanners.

"We needed a projector that could be installed vertically, and that restricted our choices," explained Jorgensen.

"There were about 10-15 models we could use, but we haven't had any problems at all with the Panasonic model we chose."

Sound reinforcement is taken care of by Apart Mask 6 speakers which were chosen strictly due to their price, according to Jørgensen.

"We have a good history with Apart products," he said, "There is no b******t; it just works."

A wireless sound system with Sennheiser EW-300IEM and headphones have also been installed in the scanning rooms to give the possibility of a sound experience that excludes the noise from the scanner.

It is around 15 months since the redeveloped scanning suite officially opened. Studies are currently being undertaken to gather evidence of the project's effectiveness, but for those involved in the installation there has been no doubt.

"The first results we are getting back seem to support our initial goals," said Borgwardt.

"Before the installation, we used motion correction programs in the event that a scan was affected by a child moving during the scanning process.

"We have seen a tremendous decrease in the use of these motion correction programs which demonstrates that the kids have been lying still much more than they did before."

Secondary benefits, she said, included an overall calming environment in the waiting room and play areas. >

"The kids take a deep breath when they come into the waiting room; it's different and they like it," she explained. "They also tend to talk together a little more even though they don't know each other because the pictures are coming to life on the wall and it is a shared experience between them.

"It's no longer a normal, grey hospital environment. The atmosphere makes the kids feel like it is their space and they are comfortable there."

The project has also delivered some unexpected advantages. Some children between the ages of one and three, if undergoing the most motion-sensitive scans, are sedated as a matter of course. Injections are almost always upsetting for children but Borgwardt says that with the new systems installed it has become less of an issue.

"What we have experienced is that the period when the doctor is preparing things and explaining what will happen it is so much easier now," she said.

"When the films have started an injection in the arm isn't the only thing to concentrate on and is almost insignificant for the kids."

With the overwhelming view that this installation has been a success, will this type of project be repeated in hospitals around the world? Not if the hospitals have to pay for it themselves, apparently.

"In most hospital systems there won't be money for this," Borgwardt remarked.

"However, decoration of children's wards has nearly always been funded from private sources. I think charities and private donors will have a lot of interest in this because it is very effective. I definitely think this will lead to similar projects being rolled out in other hospitals."

Child watches chosen film as scanning occurs

Jørgensen agreed, saying he didn't believe there would be a time when governments would fund such installations. But when judging the benefits compared to the relatively modest outlay, he said he expected more hospitals to follow the example of Rigshospitalet, if they can find the cash.

"The effect of this system has been remarkable," said Jørgensen.

"The whole system cost around [€300,000]; that's a very low budget compared to what the hospital has gained."

Jørgensen, himself a father of a young child, said he found carrying out the install at Rigshospitalet a very rewarding experience.

"Systems integrators do what they do to help people and to entertain people," he said. "You could say we're doing the same here, but I think it's a level above. It really makes your job worthwhile when you can see young children smile during an unhappy time in their lives. If we can make just 10 small children smile because they suddenly see a film in the ceiling, instead of hearing some crazy noise from a machine they are afraid of going into, there's no doubt that it has been worthwhile."