MERIVAARA OpenOR™

EXCLUSIVELY DISTRIBUTED BY

BENDER

Intuitive Integration & AV System

for operating rooms

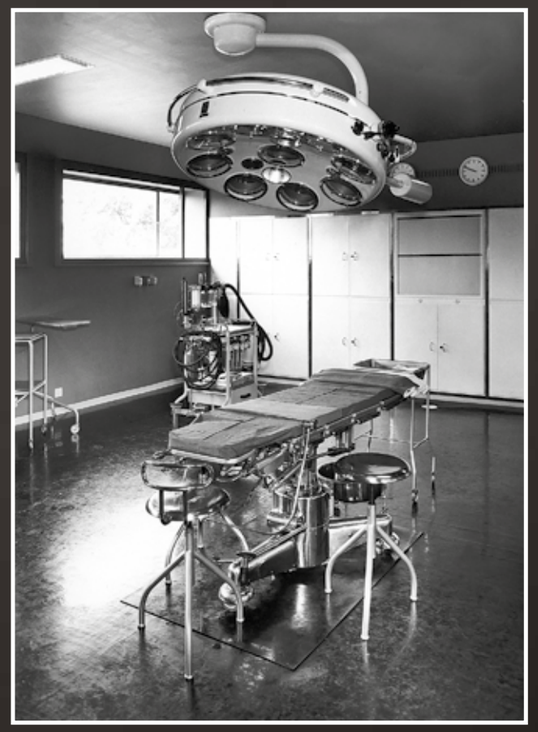
Fluent usability

Since 1901

"In addition to the exquisite quality of work, we have taken the utmost interest in the functionality of the equipment. In this regard, several doctors committed to the cause have contributed their advice, based on their valuable experience."

Juho Merivaara in 1926, founder of Merivaara

DESIGN FROM FINLAND ®



In a modern operating room from the 1950s tables and lights were manually adjusted.

We are proud that the company's values 120 years ago were so ahead of their time that they can still today be fully applied when designing new innovative solutions for healthcare professionals. This is demonstrated by our latest award-winning products, the Q-Flow surgical light and the Smarter Practico operating table with functionality and ease of use at the heart of the design. Our user interfaces are developed together with hospital personnel so that all our products and systems can be used intuitively.

We call this Fluent Usability; operating room teams can focus on patient care, not for the management of complex technologies. Top surgeons appreciate this all over the world.

Solutions

Merivaara Solutions offer operating rooms a wide range of high-quality products, systems and services. Our solutions not only guarantee patient safety, but also provide healthcare operators with the best value for money.

When designing our solutions around the entire surgical team, it is important for us to listen to the customer's needs. This allows us to ensure that the team can implement the procedures safely, quickly and reliably. At the same time, workflow is optimized and the productivity of the entire team will increase.

Merivaara has long experience from leading and implementing projects in operating rooms. For us, keeping projects to schedule and reducing costs is extremely important.

• SURGICAL LIGHTS • EXAMINATION LIGHTS
• OPERATING TABLES • TABLE ACCESSORIES
• INTEGRATION SYSTEMS • MONITORS & MONITOR ARMS
• PENDANTS • PROJECTS • MERIVAARA SERVICES

As simple as it can get

in your language

The OpenOR integration and AV system is designed to be so simple to learn that everyone likes to use it. This is due to its intuitive and streamlined interface available in your own language. To help a new team member adapt quickly to the OpenOR, the system is supported by a self-learning platform with videos. This will help new users deploy the system quickly and easily. OpenOR can also be used with tablets, which increases usability and ergonomics. Overall, OpenOR, through team collaboration, increases operating room performance and patient safety.

See the OpenOR in Kymenlaakso Central Hospital

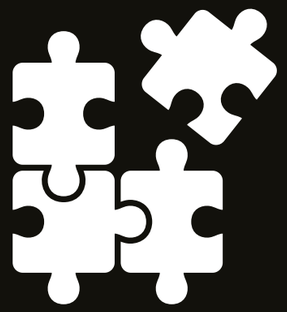
Benefits of the OpenOR

1. REDUCED RISK OF INFECTIONS

The OpenOR system enables efficient information flow among colleagues. You can place an information screen outside the operating room telling the situation in the operating room, such as ongoing surgery. This reduces the need to open the operating room door unnecessary. OpenOR can also be used to automatically control the air ventilation in the operating room to reduce the risk of infection.

2. IMPROVES PATIENT SAFETY

With the OpenOR, you can improve patient safety in many ways. It automates the workflow and reduces errors. You can send, receive, and save images and videos, and easily return to them for later use. Work quality control and patient safety are improved when each surgery is documented and archived before, after, and during the surgery. The OpenOR enables less traffic in the operating room and better communication with the team. This helps focus on the patient and thus better care, patient safety, and surgical team's satisfaction.



3. FREEDOM TO CHOOSE

The OpenOR is a flexible system that allows you to add new features to your system when needed, reducing significantly the cost of initial investment. The open architecture allows you to use the system on all your devices regardless of the supplier. To ensure that the OpenOR is a reliable solution for your needs in the future, we are constantly developing the system to offer new, innovative features to operating room teams. On request, we can also work together to develop features just for your specific needs.

4. KNOWLEDGE SHARING

The OpenOR system is an easy way to share information quickly, accurately, and systematically among healthcare professionals in and outside the hospital. In teaching hospitals, it is an excellent tool for training surgeons and other colleagues in real time, or you can save images and videos to a USB stick for later use. In addition to sharing photos and live videos, you can get real-time advice from other surgeons remotely.

Just one touch to control

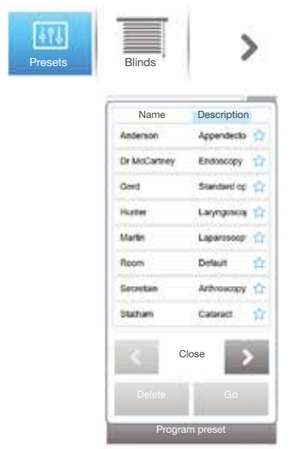
the different functions in the operating room

When the operating room functions as a single unit, the surgical team can focus on their core tasks instead of learning how to use a collection of differently functioning user interfaces of various devices. This means less room for errors, resulting better working conditions and thus better patient safety.

Merivaara's OpenOR™ is an operating room management and AV system based on open architecture. This means that you can integrate any manufacturer's device into the system and manage it with the OpenOR's intuitive and easy-to-use interface. This allows the entire surgical team to learn how to use the system quickly and efficiently in the user's own language.

With the OpenOR the surgical team can easily connect all video and audio sources, medical devices, and room function, such as lighting and air ventilation, to be displayed on monitors or info screens. It has tools for improved patient safety, operating room hygiene and efficiency as well as relaxation for patients.
As OpenOR is a modular system, it grows with your needs.

OpenOR communicates with hospital information systems (HIS), building management systems (BMS) and picture archiving and communication systems (PACS).



Fluently from one surgery to another

If the surgeon needs to perform endoscopic and open surgery procedures that require different lighting and image routing, with preset configurations the OpenOR system enables to change from one surgery to another with only a touch of a button.

It doesn't have to be like this...

...when it can be like this

Integrate all your functions under one interface

FREEDOM TO CHOOSE

Device control

REDUCED RISK OF INFECTION

Air flow control

OR info

WORKFLOW OPTIMIZATION

Efficient information sharing

Automation

Worklist

FLUENT USABILITY

Intuitive touch control

LIFECYCLE SUPPORT

Maintenance, training and support

MEDIA MANAGEMENT

Sharing and storing images and videos

LIVE CONNECTIVITY

Auditorium

Intercommunication

Integration

Device control

OpenOR™ is an operating room management system based on open architecture. This means that images and videos from any manufacture's endoscopy, microscope, C-arm, and camera can be stored and managed through the system. OpenOR also provides management of surgical lights, operating tables, cameras, and environmental controls, such as general lighting and air ventilation. On request we can together develop other controls based on the users' needs.

Air flow control

With the OpenOR's dynamic air flow control you can select either automatically or manually the level of hygiene required in the operating room. There is no need to configure any technical parameters, making the OpenOR's air flow control extremely easy to use. Just push the button such as 'Infection' or 'Ultra clean' depending on the level of hygiene needed.

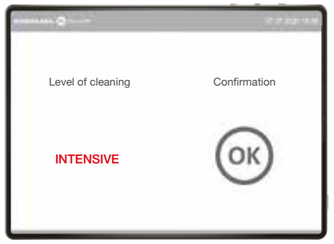
OR Info

The OpenOR Info screen is a touch monitor panel which is installed outside the operating room. It visualizes status information inside the operating room and gives information to hospital teams outside the operating room. Info screen helps to decrease the infection risk by reducing the number of unnecessary openings of the operating room door. Overall, the OpenOR Info screen helps to make the surgical department processes more efficient.

OPENOR INFO SCREEN GIVES STATUS INFORMATION INSIDE THE OPERATING ROOM, SUCH AS:

'On Air' sign will automatically appear on the OpenOR Info screen when there is a video stream open somewhere in the operating room. The sign disappears when the streaming stops. As the sign operates automatically, there is no need to remember to turn it off separately.

With the OpenOR Info screen the surgical team can inform people outside the operating room of special circumstances, such as X-ray or laser operations. This helps to reduce the number of times doors are opened and thus ensures that there are no distractions at critical moments.



With the OpenOR you can send a call to the cleaning team. The cleaning team can clearly see on the OpenOR Info screen which rooms are ready to be cleaned and what level of disinfection is required. Once the OR is again ready to be used, the cleaning team clicks the info screen and the system goes back to normal mode.

Efficient information sharing

Merivaara's OpenOR system enables monitoring surgeries also outside the operating room to better plan the overall operations of the department. Efficiency is further increased through the automation of routine tasks.

Automation

With the OpenOR it is possible to automate routine tasks, such as air flow control based on the surgery type, or to use presets for smooth transition from one phase of operation to another. This simplifies the work of the entire surgical team.

Preset configurations available to prepare the OR for patient arrivals. General lighting, music, and images on the monitors create welcoming and soothing ambience.

When changing from one phase of the operation to another, surgeons can use preset settings according to their the preferences. For example, the color temperature of a surgical light can be adjusted in advance, depending on the needs of the surgery.

Worklist

OpenOR integrates PACS and hospital systems for patient worklists and data integration. Choosing the patient data from the PACS's patient worklist saves time and chances of error is reduced when there is no need to handwrite the lists.

Auditorium

The OpenOR system provides for the lecture hall or conference room inside the hospital a very accurate and lossless image, which exactly matches the original image. This, combined with high-quality two-way communication, enables fluent lectures for students or specializing doctors.

The user interface of the OpenOR is very simple to use. Therefore, it is easy to select which room to contact and which video sources are routed to the displays in the lecture hall and conference room.

There are no delays in image transmission inside or outside the operating room giving a premium level of university teaching outside the operating room.

Intercommunication

The OpenOR intercommunication enables high quality telementoring to share images, live videos, and two-way communication for training purposes and conferences between the operating room and the outside audience.

OpenOR's over IP based audio and video management capability provides flexible video routing between sources and displays, allowing live procedures to be viewed and streamed outside the operating room to any given location via a web browser or a third-party teleconferencing system.

Sharing and storing images and videos

During the surgery videos and images, such as X-rays can be shared on monitors in the operating room for the reviewal of the whole team. After surgery, it is possible to select the images that the surgeon wants to save and send them to the hospital's PACS system. Videos can be clipped and uploaded to PACS with the desired video footage. Thus, the hospital needs less storage space in PACS, saving money. Less data in PACS also means that it is easier to find photos and videos for later use.

In case live lectures cannot be used, with the OpenOR you can record or save videos from multiple surgeries on a USB stick or network disk and select the most interesting points to show them later in lectures and conferences.

Maintenance, training and support

Merivaara offers maintenance and support services to ensure operating room is in use for maximum time. Our support includes among other things preventive maintenance, troublesoothing, software updates, and training. We have extensive experience in various operating room integration and AV projects. For this reason, we join the integration projects in early stage to plan together with the users the best possible package for their needs.

Pay as you grow –

OpenOR modules can be added also afterwards

If you do not need all the OpenOR features immediately, the modularity of the system allows you to start with our AV system and expand it later. The OpenOR's AV system offers fluent workflow with audio, image, and video management.

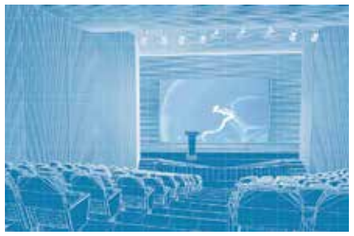
Merivaara is a pioneer in the field of network based medical AV management. As we continue to invest in cutting edge technology also in the future, you can count on us to be your reliable partner.

IN THE OR DURING THE SURGERY

The flow of information is smooth when all functions are controlled from a single system that allows for easy documentation of surgery for later use.

OUTSIDE THE OR DURING THE SURGERY

Live remote telementoring and teaching is very convenient with any device with a browser.



AFTER THE OPERATION

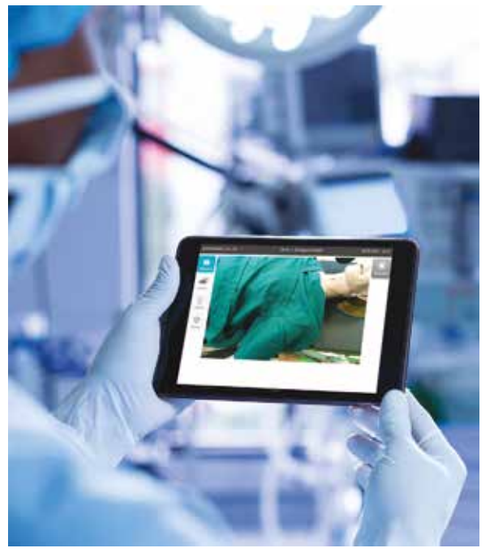
Archived images and videos can be used for educational purposes, analysis, and improving the workflow of the surgical team.

Create pleasent environment both for surgical team and patient with professional audio solutions

Investing in audio pays off because designing an audio system requires professionalism to make the soundscape work properly. Merivaara has extensive experience in implementing high quality audio systems according to customers' requirements. The sound quality and functionality are influenced by many things, such as what kind of speakers are chosen and whether the sound sources are prioritized so that the speech goes beyond the music.

The OpenOR's AV system offers a wide range of audio solutions, e.g. music over the Internet, which allows you to create a soundscape in the operating room, helping the surgical team focus on the ongoing operation. Music and images displayed on monitors can be used to calm the patient before the start of surgery.

You can use some of the OpenOR's functions on your tablet, e.g. video routing, video recording, and snap shots. This allows surgical team to stay by the patient's side during operations, which improves workflow and increases patient safety.



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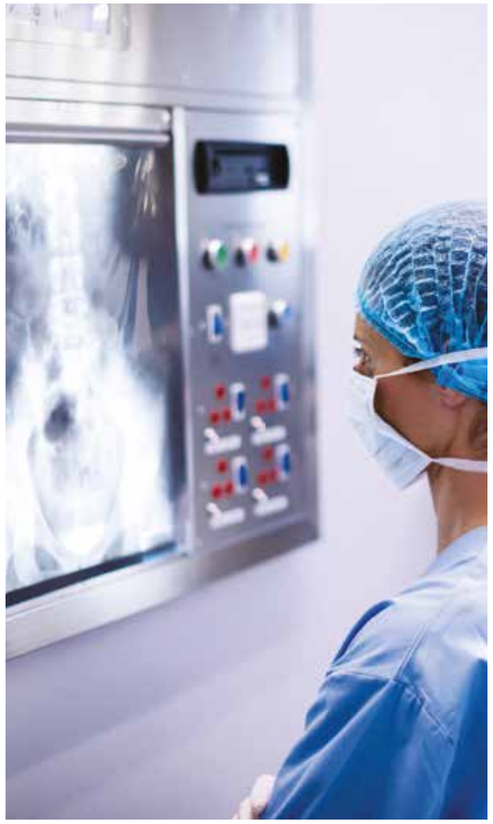

AV

Automation

OpenOR's AV function enables to automate routine tasks, such as sending images to PACS or preparing the operating room for the patient's arrival. The presets also help the surgical team quickly determine the correct AV settings that the surgeon needs for each operation.

Intercommunication

Refer to page 13 to learn more about this function.

Sharing and storing images and videos

Refer to page 13 to learn more about this function.

Worklist

Refer to page 12 to learn more about this function.

Auditorium

Refer to page 13 to learn more about this function.

Maintenance, training and support

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Options for OpenOR

TOUCH PANEL

- to control the OpenOR system
- In wall/on wall/pendant mount

ENCODERS/DECODERS

- various types of video inputs
- We also offer housing kits for encoders that are used with endoscopes, C-arms and other mobile devices

FIBER SWITCHES

- for optimal performance
- 40/100 Gb, 100 Gb backbone

MONITORS & MONITOR ARMS

- Merivaara offers customized monitor arms for medical monitor mounting.

INFOSCREEN & MEDIA TABLET

- Android tablet used as Info screen or media tablet

TABLET/WEB UI

- Tablet UI enables free hand photography with the tablet camera
- Tablet UI functions as a remote control for OpenOR video routing and other frequent tasks

PTZ CAMERA

- enables overall view from the operating room

CENTRAL MONITORING

- view multiple operating rooms at the same time

LIGHT CONTROL

- to control operating room's general lightning with DALI

RELAY CONTROLS

- to control for example curtains, lights, and signs

MERICONNECT™

- acts as a media and information hub between OpenOR, hospital information systems, and remote users
- can also be used for editing and storing images and video from any web enabled computer

Technical Specifications

SYSTEM TOUCH SCREEN

- Supported resolution: 1920x1080 and 1920x1200 *
- Sizes: no limitation, generally sizes 21,5" – 27" available *
- Support for two synchronized touch screens

SYSTEM AV MATRIX

- Offers in single operating room max
  - 46 pcs dual Full HD connections, or
  - 23 pcs 4K connections, or
  - any number combination of dual Full HD connections and 4K connections to match 46 ports
- Based on 48 port 10 Gbit fiber switch

VIDEO ROUTING

- Via 10 Gbit/s fiber network, OM3 Multimode 125/50 um
- AV signal latency from encoder to decoder typically 20 ms
- Support for 2D and 3D, HD/4K, Line-interleaved/ Dual-stream
- Security
  - AES 128 encrypted video, data and control signals

AUTOMATIC BACK-UP VIDEO SOURCE IN MEDICAL DISPLAYS**

IMAGE INPUTS

- Supported connectivity via input specific encoder***
  - DVI-D / HDMI (HD)
  - HDMI (4K)
  - DisplayPort (4K)
  - VGA, CVBS, S-video
  - SDI, HD-SDI, 3G-SDI (HD)
  - 12G-SDI, Quad-SDI (4K)
- Supported resolution
  - HD encoder: up to 1920x1200 @ 60 Hz
  - 4K encoder: up to 4096x2160 @ 60 Hz
- Color depth
  - RGB 8-bit, YCbCr 4:4:4: 8-bit or YCbCr 4:2:2 10-bit
- 3D
  - HD and 4K

IMAGE OUTPUTS

- Supported connectivity via decoder**
  - DVI-D / HDMI (HD)
  - HDMI (4K)
  - DisplayPort
- Supported resolution **
  - HD decoder: up to 1920x1200 @ 60 Hz
  - 4K decoder: up to 4096x2160 @ 60 Hz
- Display layouts
  - HD decoder: full screen, Picture in Picture, Side-by-Side
  - 4K decoder: full screen, Picture in Picture, Side-by-Side, Quad matrix, Quad layouts
- Display sizes: no limitation, generally sizes 24" – 58" available**

FIBER INTERFACE FOR USERS

Neutrik OpticalCON QUAD

AUDIO INTERFACE

Stereo line in and headset/stereo line out (**), (***) 3.5 mm TRRS jack

TRIGGER INTERFACE

Provided via encoder***

- 1–2 pcs 3.5 mm jacks, support for:
  - 3.5 mm TRS jack Tip-Sleeve contacts (T-S)
  - 3.5 mm TRS jack Ring-Sleeve contacts (R-S)
- Event type: normally open (NO)

*) Depending on the specifications of the touch screen monitor
**) Depending on the specifications of the display and the decoder
***) Depending on the specifications of the encoder and the video signal

MERIVAARA

Health Technology with a Human Touch

Made in Finland with respect
for our unique nature.

BENDER

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