

NUCLEUS™

The smart Digital Operating Room



Compatible.

Reliable.

Unique.

eSATURNUS

The future at your fingertips



NUCLEUS™ smartly integrates digital operating rooms

The smart digital operating room

You are looking into a rapidly changing hospital environment and are preparing for a future-proof system. Today's operating rooms are continuously evolving, due to the arrival of new medical equipment. The surgical suite needs to be productive during and after this transition, requiring an overdose of flexibility. Any future-oriented hospital should consider tomorrow's expansion today.

NUCLEUS™

Imagine a tool that answers all of tomorrow's questions. A system that provides centralised and coordinated access to all audio/video technology in the OR. A platform offering various ergonomic enhancements such as control over surgical lamps, cameras, ventilation and others. A smart aid during diagnostics. A software that is intuitive, flexible and future-proof. This is what we call NUCLeUS™ and is your choice of quality.

Your partner before, during and after surgery

Key features

- » Integration
- » Switching
- » Data management
- » Streaming

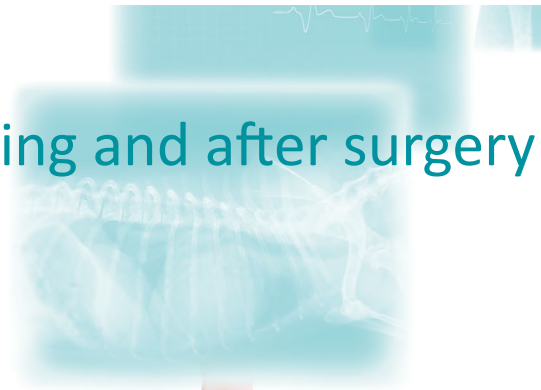
Benefits

- » Increased patient safety
- » Surgical comfort and efficiency: more information in the surgical environment
- » Information workflow improvement: enriched information where and when you need it
- » The hospital's positioning as a high tech centre of excellence

Why choose NUCLeUS™?

NUCLeUS™ is ready for the digital future

Its software platform puts the entire world at your fingertips. Using the existing IT infrastructure, NUCLeUS™ can be installed before you can say 'knife'. The smart digital operating room integrates any medical device, from any vendor, making NUCLeUS™ a cost-effective investment.



Compatible.



Beyond the imaginary limits

The need for integration

The current situation

Traditional operating rooms use classic audio-visual or AV solutions, which work perfectly well in predefined configurations. Still they are limited when operating rooms need to be expanded for better hospital integration. These AV systems are characterised by extensive cabling, cable clutter and complicated matrix configurations. Patient data management and growing configurations can only be controlled using intelligent processing. By digitizing, medical data can be modified and edited, broadcasted and shared, customised and standardised.

NUCLEUS™ smart integration

NUCLEUS™ is the ultimate solution for data management and AV control in the surgical suite. With its patented RtoR™ technology, NUCLeUS™ is a state-of-the-art medical efficiency catalyst. By its integrating powers, it increases surgical precision, leading to a faster hospital workflow. By enabling source switching in the OR, surgical ergonomics are drastically rising. In order to manage its data, NUCLeUS™ provides various options that are useful for post-interventional reporting, archiving as well as for internal discussions. Also education is a cornerstone feature of NUCLeUS™ providing live interaction during surgery using high-quality images.

The operating room of the future

OR over IP

As in a digital operating room, images from surgical endoscopes are projected on flat screens in real-time. A nurse visualises digital files and scans from medical records, giving the surgeon instantaneous access to critical data.

Hospital over IP

A week after the intervention, the clinical staff meets. The image-based reviews help surgeons and nurses to recollect the surgery. The OR manager follows the meeting from his desk on the other side of the hospital.

World over IP

Hundreds of miles away, a video stream of the operation is relayed to the consulting specialist's monitor. Offering his expertise, he diagnoses remotely. This surgeon is connected with a packed classroom and interacts with the students during an educational session.

NUCLEUS™ technology

In 2007, eSATURNUS was the first to offer a digital operating room entirely running on top of the hospital's IP network.

IP-technology offers the hospital a reliable and flexible investment with a high return. NUCLeUS™ transmits via the existing IT network and therefore hardly needs any dedicated hardware. Moreover, the use of IP (Internet Protocol) is the most open and standardised system to communicate with. Just keep a little bandwidth for NUCLeUS™ and you are ready to go. You just can't get any smarter.

- » Digital by design
- » Future-proof and scalable
- » Versatile and robust
- » Single-cable solution
- » RtoR™ technology

Switching

There is so much information within the OR, ranging from live video signals of the endoscope, ultrasound streams, PACS workstation input and biplane fluoroscopes, to the positioning of operating lamps and surgical tables. NUCLeUS™ |OR is a digital control panel protecting clinicians from information overload. The platform includes many flexible visualisation options such as switching to multiple monitors in full screen, picture-in-picture or in multi-split. This is advantageous for OR ergonomics, efficiency and lastly, financial benefits.

What is RtoR™?

NUCLeUS™ uses patented RtoR™ technology. RtoR™ stands for real to real and maintains all qualities of the reality during digitisation. Using RtoR™, surgeons have no latency or visual artifacts. Surgeons will not notice the difference between native or video-over-IP imaging but they will certainly benefit from the digital flexibility.

Compatible.

Data Management

NUCLeUS™ provides convenient archiving of all patient and image data. The recordings can be seamlessly integrated with PACS, EPR and HIS. High-definition images are paramount to presentations. NUCLeUS™ introduces a unique feature with the simultaneous recording function. The surgeon can record multiple sources at the same time and can even postpone the choice of recording quality until after the intervention. High-quality and archiving-quality clips can be launched at the same time and be used flexibly at a later stage.

Data Life Cycle Management?

The key idea is to only keep information that is still potentially relevant. As a rule of thumb, it is safe to say that over 50% of all content generated by NUCLeUS™ loses its medical relevance after a couple of weeks, around 10% remains medically relevant over multiple months and only a very small fraction should remain accessible for several years.

In practice, typical measures taken include transcoding older recordings to more space-efficient codecs, transferring them to secondary file servers, removing them once they are old enough, etc. In other words, archived data are pushed through a life cycle.



Reliable.

Unique.

A highly flexible tool for any hospital need

Telemedicine

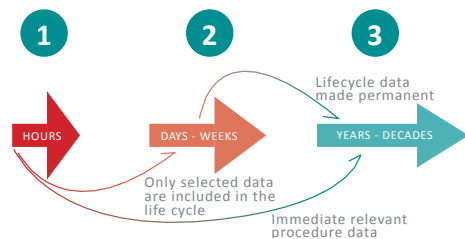
Sharing knowledge is the key to better healthcare. NUCLeUS™ offers a powerful streaming module to trigger communication inside and outside the hospital. The NUCLeUS™ broadcasting module is your companion to educate and teach. Start up meetings with peers or even go outside the hospital and share your surgical event with the world.

A wide variety of channels

Intervention:
data generation
100% data relevance

Data Life Cycle:
temporal storage
50% - 10% data relevance

Clinical important data:
permanent storage
<10% data relevance



Streaming in NUCLeUS™ is an easy accessible tool since no software or hardware is required. This way, a narrowcast can be launched on the fly and be shown to a limited group, securely logged into a webpage. No need for preparation.

NUCLeUS™ | Broadcast supports bi-directional audio communication or instant messaging. Both functionalities can be launched from different places for genuine interaction.



How it works

NUCLeUS™ is a smart combination of new and existing components, all integrated into one user-friendly workflow. NUCLeUS™ is the surgeon's silent friend. It is easy to implement and maintain by the IT department and has a low cost of ownership.

In the operating room

NUCLeUS™|OR is the central tool that collects all operating room data in one user-friendly interface. The encoders and decoders, invisibly hidden behind the surgical devices or screens, capture the image streams on one side and visualise them on the other.

In the server room

The data coming from the encoders and decoders is transmitted over the hospital's data network. All NUCLeUS™ processing takes place in the server room. In case of an unexpected server breakdown the vital surgical sources are primary cabled. This failsafe system prevents any surgical trouble.

Outside the hospital

The server room can be connected virtually with multiple sharepoints. This can be inside the hospital, as well as outside.

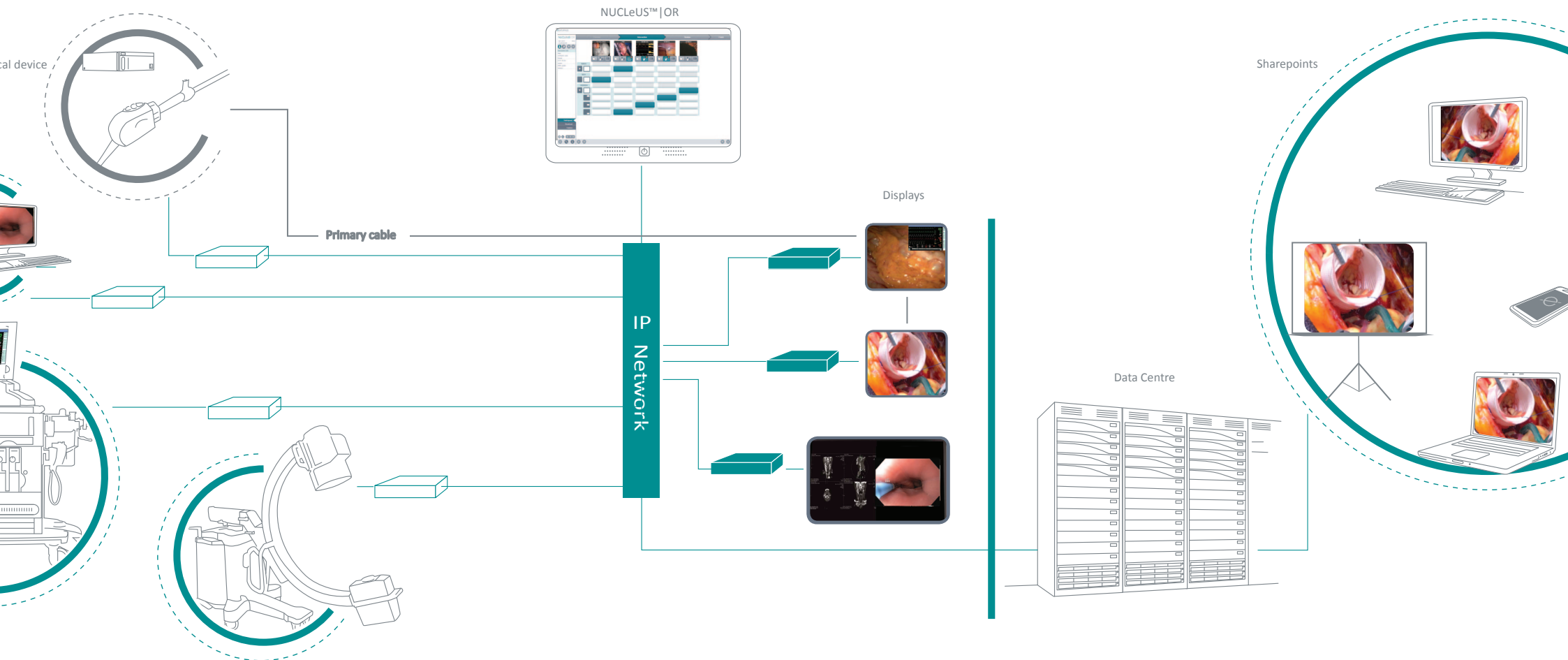
Any medic



Reliable.

Unique.

The most flexible medical platform

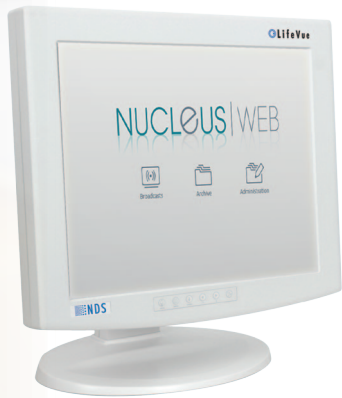


Compatible.

The key to smooth integration

NUCLEUS™ Components

NUCLEUS™ consists of a unique combination of a user-friendly software platform, limited hardware units and a powerful computing server.



Software

NUCLEUS™ | OR

sets up, manages and monitors the IP streams between encoders and decoders. The clear touchpanel gives surgeons control over all OR equipment.

NUCLEUS™ | Archive

is the safe and secure data management suite where recordings can be reviewed, edited and annotated.

NUCLEUS™ | Broadcast

is the virtual place to meet when sharing content and setting up communication.



Encoders & decoders

Single cable solution

Nothing more than one IP cable between two NUCLeUS™ boxes provides all multimedia, video and power. This results in a transparent install, no cable clutter and cost-efficient image distribution.

PoE

The use of Power over Ethernet technology makes an extra power adaptor obsolete, which increases OR design flexibility. The boxes can be placed independently from the positioning of electric sockets. But above all, PoE allows central maintenance at server level. A technical overhaul, will go unnoticed in the operating room.

Vendor-neutral

NUCLEUS™ captures any medical device.



eNSOR™

Dedicated power

NUCLEUS™ extreme computational power provides fast and high-quality images while all processing takes place in the data centre. No more worries about hygiene in the OR because of the medical equipment.

Preconfigured server

The eNSOR™ preconfigured server guarantees dedicated traffic between server room and OR.

Fast install

eNSOR™ is a plug-and-play appliance, developed for a cost-efficient and short integration time.

- » Compliant with IHE standards
- » DICOM & HL7 compliant
- » According to information safety codes
- » Complies with the electrical and mechanical safety standards
- » In line with infection prevention guidelines

Compatible.

Technological Assets

RtoR™ patented technology

Latency

NUCLEUS™ IP-based technology uses patented and proprietary RtoR™ technology. NUCLeUS™ uses this technology to ensure immediate video display.

Video quality

The same technology preserves the original video quality. When converting the analogue video signal into digital format, 100% of the information that reaches the human eye is retained.

The combination of perfect visual quality with a video playback in realtime makes this technology real to real.

Safety

Server redundancy

The NUCLeUS™ server system is conceived to be highly reliable. Its virtualised servers can automatically migrate in case of a hardware failure, safeguarding NUCLeUS™ management services.

Network redundancy

NUCLEUS™ makes use of the redundant hospital IP network. The connection between operating room and data centre functions as the backbone of the network.

Graceful degradation

Important sources, typically endoscopes, have two video links: one over the network, the other one directly between the source and the display. NUCLeUS™ automatically swaps between the two links in the rare case of network failure, thereby guaranteeing its availability.

Double consolidation

High-quality clips

NUCLEUS™ can record any source at the highest quality on the market.

Archiving quality streams

NUCLEUS™ can record entire interventions continuously at lower quality. This is ideal for archiving and back-up.

The best of both worlds

A highly unique feature: both recording types can be launched at the same time in parallel for multiple sources.



Reliable.

Unique.

NUCLEUS™ re-imagines digital operating rooms globally

Compatible.

- » Vendor neutral
- » Scalable and future-proof
- » With the surgeon's needs
- » With the budget needs
- » Integration with PACS and EPR

Reliable.

- » Safe and secure
- » Proven technology
- » RtoR™ patented quality
- » A hybrid solution
- » Smart processing in the server room

Unique.

- » Intuitive software
- » Customisable and configurable
- » Fast learning abilities
- » Low maintenance costs
- » Blends with the IT infrastructure

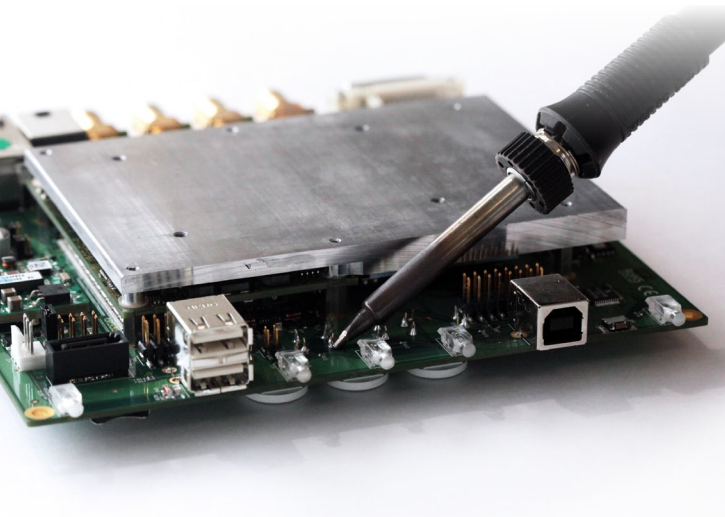
A choice of quality

Service pack

Being a cutting-edge medical innovation, NUCLeUS™ keeps up-to-date with evolving technology. To stay abreast of further innovative breakthroughs and software upgrades, make sure you select the NUCLeUS™ full omnium service pack.

Commercial benefits

- » Full support and maintenance
- » Extended warranty
- » Extended service level
- » Free NUCLeUS™ upgrades
- » Evaluation new functionality and hardware
- » Feature requests & trials
- » Access to hardware exchange program
- » Special conditions on major upgrade
- » NUCLeUS™ Academic Partner membership



Tailored packages for professionals

Modular system

NUCLeUS™ is a highly flexible tool, in both operation and purchase. NUCLeUS™ consists of system modules which can be mixed and implemented in accordance with hospital needs.

NUCLeUS™ Pro

NUCLeUS™ Pro is a customisable and budget-friendly product with a choice of your favorite features.

NUCLeUS™ Pro+

Get the best functionalities without any restrictions.

NeBULA™

The NeBULA™ medical documentation platform exists both in a stand-alone application and in a hospital integrated environment. NeBULA™ is an excellent video and photo viewer and can record, edit and annotate any medical video source.

Case Study

A hybrid operating room needs many switchable sources during the intervention but considering the minimally invasive character of these surgeries, no recordings are needed.

The hospital wants to organise realistic training in-house. All sources need image streaming on demand to the hospital's conference room. In order to improve the hospital's reputation, the overview camera inside the hybrid room needs to be broadcasted to a related care centre.

A smart combination of NUCLeUS™ modules can be compiled for this hospital.

NUCLEUS™

		Pro	Pro+
Switching & routing	Up to three displays	<input type="radio"/>	<input type="radio"/>
	Unlimited displays		<input type="radio"/>
Multimedia data management	One video source	<input type="radio"/>	<input type="radio"/>
	Unlimited recordings		<input type="radio"/>
Intranet streaming	One preconfigured video source	<input type="radio"/>	<input type="radio"/>
	Any video source		<input type="radio"/>
Internet broadcasting	One preconfigured video source		<input type="radio"/>
	Any video source		<input type="radio"/>

Switching & routing

- » Distribute an unlimited amount of video sources to displays
- » Intuitive user interface
- » A dedicated controlled data network is required

Multimedia data management

- » Acquire server-based video recordings
- » Archive data management system with an integrated lifecycle
- » Web-based interface and a search engine for multimedia data
- » Visualisation and UI front ends can be integrated within an EPR
- » Can be linked with the NeBULA™ platform

Intranet streaming

- » Videoconferencing technology within the hospital network
- » Office broadcast from the OR to any office desk
- » Inter-OR video conferencing for shared expertise and training
- » Auditorium broadcast for training and conversation during training

Internet broadcasting

- » Videoconferencing technology outside the hospital network
- » Integrated control within the 'switching & routing' user interface
- » Inter-hospital video conferencing for webinars and telemedicine
- » Audio via bi-directional communication

5 reasons to choose NUCLeUS™

- » Intuitive touch panel controls the entire operating room
- » The central NUCLeUS™ system is a smart but simple system architecture and can be implemented in any hospital
- » Patented RtoR™ technology adds no latency during digitisation and retains 100% of visual quality
- » The hospital already has the infrastructure to launch NUCLeUS™. Insert the network cable and start using the centrally integrated software
- » Keep your options open and expand in accordance with hospital needs

A strong foundation

The roots of eSATURNUS lie in the universities of Leuven and Oxford. Through dedicated, technological innovation, the company improves the quality of healthcare.

Our state-of-the-art solutions are the result of the close collaboration between everyone involved in the modern hospital supply chain. Through the knowledge of our partners, hospitals and clinicians, eSATURNUS develops smart applications that really matter. Intelligent processing of video, audio and other data in an open platform is the basis of novel applications.

Better Healthcare through Smart Innovation

 eSATURNUS

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