The integrated management of audio-video signals and devices in the operating room
LEARN XE™ SYSTEM
INTEGRATED CONTROL OF SURGICAL ENVIRONMENT

XE™ System allows the automation and the management of the surgical procedures as well as the integrated management of surgical devices such as video signals, room lights, electromedical devices and integration with the Hospital Health Information System through a single touchscreen display control panel that gives the possibility to:

• Manage all video signals generated by video sources sending them to monitors and to the hospital allowing live stream and conferences;
• Control the room lights (brightness, colour, colour intensity and so on);
• Control the functions of the surgical lamps (focusing, light intensity, videocamera and so on);
• Control all the operating table movements (tilting angles, variations of degrees of freedom and so on);
• Control the electromedical devices of the operating room;
• Capture videos and images allowing the drawing up of surgical register with attached images through standard DICOM;
• Have the electronic health records available in the operating room (electronic patient record, connection with PACS and RIS, medical lab, and so on);
• Connect the telemetric system of anaesthesia column directly to the electronic patient record including the information about patient vital signs directly into the surgical report;
• Manage the electronic patient record through wireless monitoring devices.
ADJUSTMENT TO THE SURGICAL ENVIRONMENT
FLEXIBILITY AND MODULAR STRUCTURE IN SERVICE OF LOGISTICS

The Xe™ System is a platform with several plug-in: the video routing plug-in to manage all the video signals of the operating room, the device manager plug-in to control the electromedical devices in the surgical environment, the EIS™ connecting plug-in to show the electronic health records directly on the OT monitors, the operating worklist plug-in and the P.O.A. plug-in allowing wireless monitoring of post-operated patient vital signs.

Several touchscreen monitors can be placed within the surgical environment (and/or possibly in the pre-operative environment) to distribute control on different locations and to improve the ergonomics of the operating room. In this way many design solutions are available to optimize spaces and increase the ergonomics of the entire room (key resource for the operating environment).
SIMPLE AND IMMEDIATE GRAPHIC INTERFACE
ONE CLICK TO SELECT AN INPUT AND TURN ON A MONITOR

The video management interface has been designed and realized following two fundamental guidelines:

• Usability: thanks to the touchscreen technology other devices such as keyboards and mouse are not necessary. To connect a video source to an output is enough to drag with a simple touch of the screen the corresponding button to the desired output represented by the monitors on top.

• Integration: the video routing software interface allows managing video streams without interaction with other tools, such as video matrix or complicated routing console difficult to be used. All the functions of the routing video are possible thanks to simple controls on the touchscreen monitor.

FEW ACTIONS TO MANAGE VIDEO SIGNALS
VIDEO ROUTING DIRECTLY IN THE OPERATING ROOM

The video routing plug-in gives the possibility to control a video matrix system allowing any type of audio/video digital data application: from the simultaneous sending of a digital or analogic video signal to different monitors (multiplication of signal) up to the acquisition and the streaming in the LAN network, ensuring the highest quality of signals. The plug-in allows managing all the video signals in the operating room. The choice of the audio/video connection type from the medical device up to the Xe™ control unit must be made being careful not to deteriorate the video signal and ensuring the highest output quality, while the choice of the location of the rack system must take into account the logistic requirements of the surgical unit. The connection of audio/video signal can be made through the use of outlets on the medical arms or special wall plates to have a plug & play system in the operating room.

AUDIO CONFERENCE IN CONNECTED OPERATING ROOMS
NO WIRING FOR AUDIO

Through specific audio devices the Xe™ System gives the possibility to establish a voice call between the hospital and the operating rooms obtaining a conference room; several conference rooms can access interacting with the connected operating room. The integration of standards such as VoIP (Voice Over IP) allows the use of the same network used for the transmission of video also for the transmission of audio without the necessary of new wiring infrastructure. Each conference room can ask for establishing a single or half-duplex call to one of the operating rooms and join the conference.

VIDEO CONFERENCES AND TRANSMISSIONS
FULL HD VIDEO SIGNAL DISTRIBUTION

The Xe™ Client Conference software allows viewing the video streams coming from all the connected operating rooms. It is possible to choose video signals among all the available video sources and sending them on the network infrastructure allowing live video of the surgical operation or diagnostic procedure. The connection to an operating room is very simple. By clicking on the streaming icon of the operating rooms from each location connected to the hospital network, an interface with all the connected operating rooms will be displayed. Those in which the video routing of the operating room is enabled will be visible with video preview. Thanks to the Xe™ System it is possible to reach a streaming up to Full HD 1080p.
IMAGES AND VIDEOS DIRECTLY IN PATIENT RECORD
OPERATING REPORT WITH IMAGES AND VIDEOS

The Xe™ System has a plug-in to capture and store videos and images. All video tools (microscopes, endoscopes, laparoscopic columns, videocameras for the operating room, ECG, PACS, and so on) and recorded digital images can be acquired through the touch controls on the screen (or foot-switch) and attached to the clinical documentation of the patient. The system manages all the video files, images and clinical data acquired during operating and/or outpatient procedures. By using lossless compression images can be recovered undamaged for historical controls and search purposes. Frames and video parts can be saved. Each record can be saved in DICOM format on the hospital PACS system. It is possible to store the entire procedure (clinical data, videos and images) both on file system and on optical support.

ARTIFICIAL INTELLIGENCE FOR VIDEO
ALGORITHMS TO DETECT PLIERS AND BLURRED INTERVALS

Photos can be exported in different formats and advanced modules useful to insert text and forms on images to highlight details can be used. The system allows the improvement and modification of image parameters such as brightness, contrast and contour lines. Keyframes can be saved and videos can be seen again from those frames. Artificial intelligence modules allow seeing again videos detecting blurred intervals and instants of foreign body insertion automatically.

WORKLIST
WORKLIST AND OPERATING REPORT WITH IMAGES

The report will be not only a detailed textual description but a document with attached images that can be written out according to the hospital layout automatically. The operating worklist plug-in manages the surgical register and workflows of the different rooms. Each room will have its worklist useful for its data collection process.
E.I.S™- ELECTRONIC PATIENT RECORD
E.P.R. DIRECTLY IN THE OPERATING ROOM

By means of several locations, E.I.S™ Endoscopy Information System can acquire the case history, manage the outpatient, admission and reporting processes of the operating room. The System can trace all the procedures made within an department from outpatient visit booking to hospital admission with the consequent surgical operation to the discharge form. Therefore E.I.S™ gives the possibility to draw the balance of the department activity through accounting modules and statistics.

COMPLETE CLINICAL DOCUMENTATION EVERYWHERE
INCREASED EFFICIENCY AND MORE TIME FOR PATIENTS

E.I.S™ System allows:
• Management of outpatient acceptance
• Management of admission acceptance
• Patient record compilation
• Outpatient cards compilation
• Nursing record display
• Acquisition and management of videos and images associated with clinical procedures
• Accounting management of provided services
• Worklists for daily procedures to be performed

With EIS™ the patient is monitored from the first admission up to the discharge and its clinic history is traced, stored and called back easily considerably reducing this way the clinical risk and printing costs. The system also provides the connection to the hospital information system and the integration with PACS, RIS, LIS and so on through standard protocols such as HL7 and/or DICOM.
MONITORING OF PATIENT WIRELESS VITAL SIGNS
PATIENTS ALWAYS UNDER CONTROL EVEN AT A DISTANCE

P.O.A.™ System is a meters network of wireless vital signs (ISM 2.4 GHz) able to signal and record the evolution of the patient health state. Vital signs are automatically measured and available on each location of the system connected to the network in real time or for later consultations. The system can measure vital signs such as blood pressure (SYS, DYA, MAP), blood oxygen saturation (Sp02), body temperature (Te), heart rate (HR) and send them to wireless receivers sending them to the data collection system. Through BiPS plus OTIS meters for SpO2, HR, SYS, DYA, MAP and Tc and a right number of radio repeaters, it is possible to monitor all the patients in the ward and have all data available on each location connected to the network. Gathered data are included in the nursing record (post-operative monitoring, pre-and post-transfusion, thermometric data and so on) and all reports are updated automatically.

P.O.C.: POINT OF CARE
WORKSTATIONS FOR THE ASSOCIATION OF MEDICAL DEVICES DISTRIBUTED THROUGHOUT THE STRUCTURE

The System provides for ergonomic solutions called “Point of Care” useful to manage the devices association and the data control. “Point of Care” can be placed inside or outside the operating room for the stages of meters association and data consultation for patients moving towards or away from the operating room and/or from the environment of emergency management. From the same “Point of care” placed outside the operating room, it is possible to adjust all the functionalities of the Xe™ System.
DEVICE MANAGER
THE MEDICAL DEVICES CONTROL IN THE OPERATING ROOM

One of the main goals of the Xe™ System is to improve the ergonomics and working comfort for the surgical team. The device manager plug-in allows the operator to control all the most important devices in the operating room and all their main functions such as: the operating table movements, the light intensity of the surgery lights, ambient lights in the operating room and so on. The whole plug-in has been designed for an easy and intuitive use and the interfaces design allows a really effective and immediate interaction between operator and system.
Xe™ DIGITAL INTEGRATION SYSTEM IN THE OPERATING ROOM

ADVANTAGES:

FOR THE STRUCTURE
• Business planning improvement
• Availability of clinical data directly in the operating room
• Management of workflows optimized through appropriate worklists sent daily and automatically
• Real-time availability of the resources provided and workloads
• Cheapness and better quality of reports
• Easy and economic print of reports
• Queue disposal and optimization of calendar procedures management
• Possibility to see again the exams for a better reporting process
• Data and images sharing
• Storage of data, photos and videos of patients and exams
• Possibility to get through the flow of patients on several environments with immediate access to patient information through the virtual storage
• Data and reports backup
• Db and disaster recovery systems redundancy
• Possibility to integrate several vertical applications (medical lab, radiology, cardiology, ecographic modes and so on) on the existing structure
• Integration with the hospital information environment
• Compatibility with devices of the operating room
• Standard interfaces: DICOM worklist and so on
• Easy and immediate management through touchscreen controls
• Centralized management and control distributed to multiple locations
• Interactive playback of images and video directly from the operating room and conference rooms as well as medical rooms both inside and outside the hospital
• Comprehensive digital format collection of patient data

FOR THE MEDICAL STAFF
• Immediate availability of health data
• Immediate access to diagnostic history of patient in standard, simple and easy-to-read report format
• Quick access to all data and video sources
• Optimal visualization on high definition monitor
• Easy images and data storage
• Automatic write-out of report modules
• Diagnosis sharing with personnel
• Automatic reports composition
• High level of usability
• Possibility to customize reports format
• Possibility to customize report formats and their contents through the control panel
• Possibility to obtain advanced search and statistic modules
• Easy access to patient files and records
• Optimization of comfort and ergonomics in the operating room
• Clinical information, images and data everywhere multiplied on monitors in the operating room

FOR PATIENT
• Standard and objective monitoring of procedures
• Waiting time reduction thanks to the optimization of the acceptance procedures, admission and discharge management
• Possibility to check the patient record via web
• Possibility to check reports via web
**Xe™ CART**

MOBILE, SAFE, COMPLETE AND COMPACT WORKSPACE FOR Xe™ SYSTEM MANAGEMENT

The Xe™ Cart is the mobile solution for the Xe™ System. Its control panel ensures the automation of all surgical procedures, the integrated management of all the devices in the operating room such as video signals, room lights, electromedical units and the integration with the hospital information system.

Easy to be installed and used it can be placed inside or outside the operating room; its braked castors makes it truly ergonomic and easy to be moved, simple, flexible and efficient.

It is very useful for the management of video signals, electronic clinical data and for several electronic and information applications in the operating room.

**TECHNICAL DETAILS**

- Compact and provided with braked castors, easy to be moved on smooth floors and fitted carpet, perfect for space limited areas
- For patient and authorized staff safety the entire power system and the FULL Cart are UL/EN/IEC 60601-1 certified for current leakages limits
- Monolithic and jointless working surface to facilitate cleaning and infection control.

**TECHNICAL FEATURES**

<table>
<thead>
<tr>
<th>Routing</th>
<th>Video inputs</th>
<th>I/O Signals</th>
<th>Bandwidth</th>
<th>Video outputs</th>
<th>Compliance with Standards</th>
<th>Max Resolution</th>
<th>Streaming</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VGA, CV, DVI, 1.2Vpp on DVI Molex 24-pin female connectors, SV, HDMI, SDI, HD-SDI, 3 GHD-SDI</td>
<td>1 x Ethernet 1000Mbit, Audio IN 3.5 mm, Audio out 3.5 mm, 2 RS232</td>
<td>Supports up to 2.25Gbps bandwidth per graphic channel</td>
<td>VGA, CV, DVI, 1.2Vpp on DVI Molex 24-pin female connectors, SV, HDMI, SDI, HD-SDI, 3 GHD-SDI</td>
<td>Supports DVI 1.1.</td>
<td>Up to UXGA; 1080p, 1920x1200</td>
<td>H264 or VC1mux</td>
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<td>Rissolution</td>
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<td>Data Rate</td>
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<td>From 400Kbs to 80Mbs</td>
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<td>Frame rate</td>
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<td>Up to 60 fps</td>
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<td>Remote Video Stream</td>
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<td>Audio</td>
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<td>Bidirectional with Codec G711</td>
</tr>
</tbody>
</table>

**OPERATING FEATURES**

- Video routing function and input/output video signals management
- E.P.R.: (Electronic Patient Record) - Access to E.I.S™ platform (Endoscopy Information System)
- P.O.A.: Measurement system of patient vital signs
- Device Manager: Management of all the devices in the operating room and their related functions
- Worklist: Management of surgical register and workflows in the operating rooms
- Control Panel: used to manage input sources and output devices
- Environment: Control of lights, sounds, videocameras

**Dimensions**

- 800 mm
- 740 mm
- 600 mm
### Control unit

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x usb ports</td>
<td>(+2 internal)</td>
</tr>
<tr>
<td>1 x firewire port</td>
<td>(1394) port</td>
</tr>
<tr>
<td>1 x headphone (HD &amp; AC97)</td>
<td></td>
</tr>
<tr>
<td>1 x microphone (HD &amp; AC97)</td>
<td></td>
</tr>
<tr>
<td>1 x Ethernet 1000Mbit</td>
<td></td>
</tr>
<tr>
<td>Video In Interface</td>
<td>DVI-D, CV, Y/C, HD-SDI</td>
</tr>
<tr>
<td>Streaming Audio</td>
<td>(up to 2 independent channels)</td>
</tr>
<tr>
<td>Intel ® Core ™ i5 second generation processor</td>
<td></td>
</tr>
<tr>
<td>2 x 2.0 GB DDR2 SO-DIMM</td>
<td></td>
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<tr>
<td>DVD Burner Dual Layer</td>
<td></td>
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<tr>
<td>Blue Ray burner on demand</td>
<td></td>
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<tr>
<td>RFID Reader and smart card on demand</td>
<td></td>
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<tr>
<td>HDD 1TB SATAII</td>
<td></td>
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<tr>
<td>HDD 8 TB SATAII in configuration Raid1 on demand</td>
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<tr>
<td>Wireless 802.11b/g connectivity on demand</td>
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<tr>
<td>Acquisition unit in Full-HD (High Definition) with HW compression Full-HD</td>
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<tr>
<td>Point to multipoint function - multiplexing compressed video</td>
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<tr>
<td>Video streaming with Tunneling http Protocol</td>
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<tr>
<td>Dual Hardware Codec</td>
<td>SMPTE-421M (Full HD: registration and stream internal to Surgical INTRANET, PAL/CIF: Streaming long bandwidth)</td>
</tr>
<tr>
<td>Compression codec Hardware VC-1 (SMPTE-421M)</td>
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<tr>
<td>CBR/VBR Encoding</td>
<td></td>
</tr>
<tr>
<td>Codec Remote Video VC-1</td>
<td></td>
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<tr>
<td>Codec Audio PCM 44KHz</td>
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<tr>
<td>Windows 7</td>
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</tr>
<tr>
<td>Medical Grade</td>
<td>AC 100V~240V input to DC 12V output</td>
</tr>
<tr>
<td>Video In PIP</td>
<td>3G-HD SDI, HD-SDI, SDI, CV, VGA, DVI</td>
</tr>
<tr>
<td>PIP Bandwidth</td>
<td>DVI-D [Single-link 4.95Gbps], VGA [165MHz], Component YPbPr [30MHz], Composite Video [13.5MHz]</td>
</tr>
<tr>
<td>Max resolution out PIP</td>
<td>1080P/60Hz or 1920x1200@75Hz</td>
</tr>
<tr>
<td>PIP mode and PaP split screen</td>
<td>can be configured in dimensions and position loop equalized and power factor correction</td>
</tr>
<tr>
<td>Input SDI PIP</td>
<td>SD/HD/3G HD–SDI with equalized loop and power factor correction on BNC connector</td>
</tr>
</tbody>
</table>

### ACCESSORIES

**Swing arm designed for videosurgery camera**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal semi-rigid arm, linear shift manual on chromed column</td>
<td></td>
</tr>
<tr>
<td>Pantograph arm for fine manual positioning</td>
<td></td>
</tr>
<tr>
<td>Camera support with manual rotation on three axes</td>
<td></td>
</tr>
<tr>
<td>Prolonged rod for camera control for easy management</td>
<td></td>
</tr>
<tr>
<td>Fluid head provided with plate with ¼” w, standard anchorage max load capacity 2.2kg.</td>
<td></td>
</tr>
<tr>
<td>Built in accordance with Directive 93/42 EEC for medical devices and IEC 60 601-1-1 on electrical systems 1994 edition and further variants</td>
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</tr>
<tr>
<td>Class I Type B</td>
<td></td>
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<tr>
<td>Weight: 61 kg</td>
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<tr>
<td>Videosurgery camera on demand</td>
<td></td>
</tr>
</tbody>
</table>
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