



Hybrid-Operating Rooms and Endoscopy Units in Modular Construction

Thomas Fritsch
Board of Directors, Managing Director Sales and R&D

---NEUE WEGE---
NEW PATHS



Agenda

- 1. The Company HT Labor + Hospitaltechnik AG**
- 2. Definition Hybrid OR + Endoscopy**
- 3. Requirements and Challenges**
- 4. Conclusion**
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The company

50

JAHRE
YEARS

HT Labor + Hospitaltechnik AG



- **Worldwide** one of the biggest **project planning companies and manufacturers** of components and room systems for laboratories and hospitals
- Modular planning with a **construction kit** for intelligent room systems
- High efficiency and **flexibility**



QUALIFICATION

ENGINEERING + PLANNING

PROJECT MANAGEMENT + PRODUCT PORTFOLIO

HYGIENE TEST + SERVICE

INFECTION CONTROL

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Definition

HYBRID-OR

=

modern OR + intraoperative high-end imaging

MRI

CT

angiography systems



Endoscopy

=

medical imaging via endoscope

videoendoscopy, videomanagement
(workflow integration), fluoroscopy (ERCP)

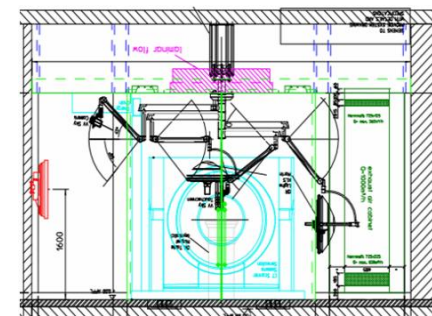
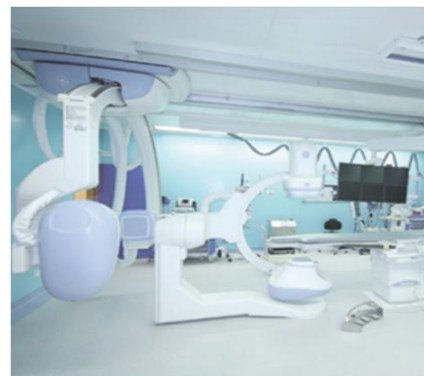




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Requirements + Challenges

- Workflow
- Room
- Imaging systems
- Hygiene + HVAC
- Radiation protection + shielding
- Room lighting
- Visualization
- Data integration
- Innovation
- Project management
- Planning





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Room Planning...

...depends on:

- Location in the hospital
- Clinical applications
- Workflow: i.e.
 - ~ 50m² – ideal 70m² Hybrid OR
 - ~ 45m² ERCP Room
- Potential collision points
- Involved staff:
Surgeon, anaesthesia, nurses, radiologists, cardiologist, perfusionist, gastroenterologist ...
- Imaging system:
MRI, CT, angiography system (floor- or ceiling-mounted), fluoroscopy system



Source: <http://www.orthozentrum.ch/Kniearthroskopie-Kniegelenksspiegelung.aspx>





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Imaging Systems

Hybrid OR



CT



MRI



Mobile C-Arm

Source: Siemens



Robotic technology

Source: Siemens



**Biplane
Floor- + Ceiling-mounted**

Source : GE



Ceiling-mounted

Source : Toshiba



Floor-mounted

Source : Philips

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Surgical endoscopy

Source : Storz



Rigid endoscope

Source : Richard Wolf



Flexible endoscope

Source : Olympus

Hygiene



Scrub



LAF



Supply Air Ceiling Diffuser

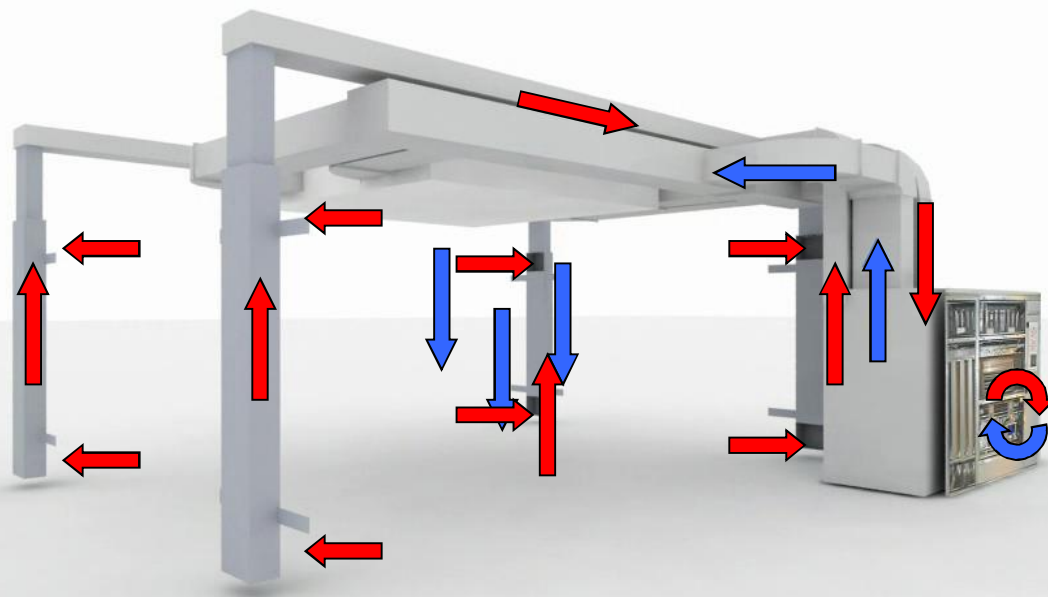


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HVAC

LAF

- Choice of angiography machine affects the HVAC system
- e.g. heavy duty ceiling system for the LAF field



Supply air system
100% fresh air

OP-KLIMATISIERUNG

Air circulation
system
x% fresh air
x% circulating air

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Hygiene

Wall materials



GLAS
GLASS

GLASS

- Safety glass
- Insulating glass
- Transparent glass
- Glass with coloured foil in the back
- Glazed glass
- LED-backlighting glass



STAHL
STEEL

METAL

- Stainless steel grinded
- Stainless steel powder-coated
- Steel powder-coated

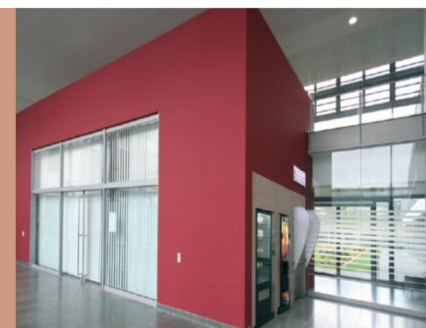


IMPACT
IMPACT

IMPACT

fiber cement board: 12mm
fire resisting material category A2-s1

- Ceramic coating, IMPACT CERAMIC
- Pure acrylate coating, IMPACT FULLCOLOR
- Laminate coating, IMPACT LAMINATE

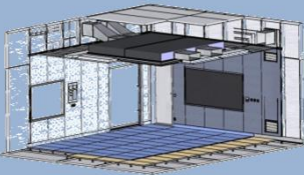


Radiation Protection Shielding (MRI)

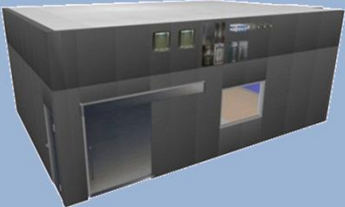
Room



Wall



Ceiling



Outer shell



Glazing

Persons



Safety glasses



Protection clothing



Reduce radiation



Briefing your staff



Warning



Image quality



Room Lighting



Technical requirements:

- RGB
- Enough space in the ceiling because of white light and RGB within one illuminator
- Different light scenarios



Clinical requirements:

- Diagnostic: dimming
 - e.g. anaesthesia: bright light / endoscopy, x-ray: dimmed light
- Avoiding reflexions on monitors



Patients and staff:

- Sense of well-being



Workflow:

- Rapid adaption



Visualization



Rembrandt :
Anatomy of Dr.Tulp, 1632

Clear view for all...



...via workflow centric display positions





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Conclusion

P

Progress

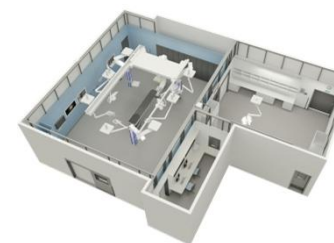
Innovation: high versatility, different user



P

Planning

Complexity: wide range of technical functions



P

Project Management

Complexity: many involved parties (manufacturer and disciplines)



Modular Room Systems

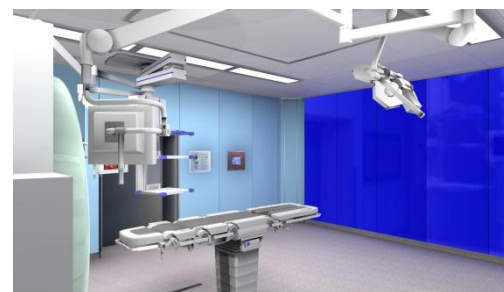
Advantages of modular room systems

Flexibility and retrofitting

- Room planning
- Radiation protection / shielding
- Panel-system



Flexible positioning of the walls
Radiation protection up to 40Pb
Rapid installation



Easy exchange of
single panels
Different materials
can be combined



Modular Room Systems

Hygiene

- Glass-Wall-Systems
- Monitors
- Media
- Glazing and doors



Easy cleaning through flush installation

Sense of well-being



Flush with wall panel

Blinds

Glazing with metal foil

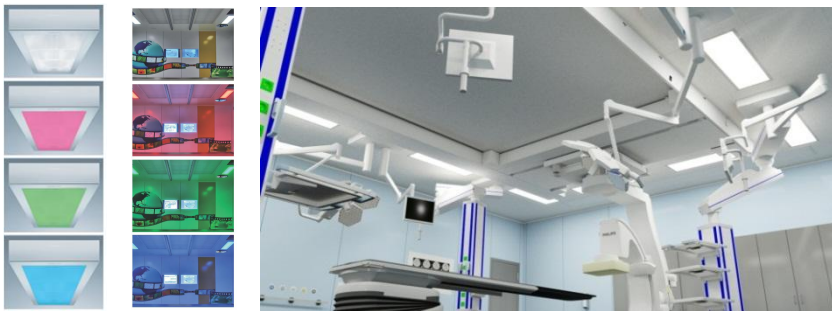
Radiation protection doors



Modular Room Systems

Ceiling system and HVAC

- Room lighting
- Ceiling substructures

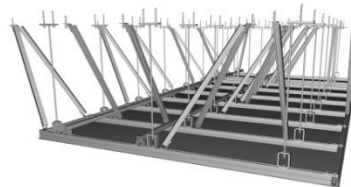


Clean room illuminator with white light and RGB light within one illuminator

→ Saves space in the ceiling

Degree of protection IP 65

Clean room
(over- and underpressure)



Metal-ceiling-panel as clamp-system

Bearing weight of LAF etc.



Independent from existing ceiling



IT-Supported Room Control

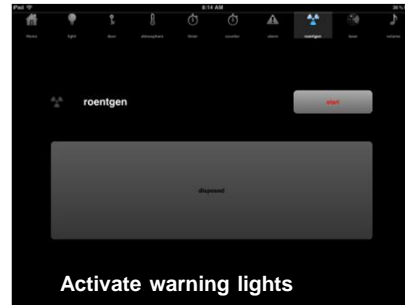
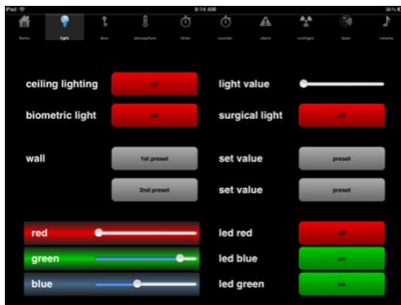
Advantages of IT-supported room control

Hygiene and HVAC



Touch-Screen control unit behind glass or installed flush into the wall

Flexibility

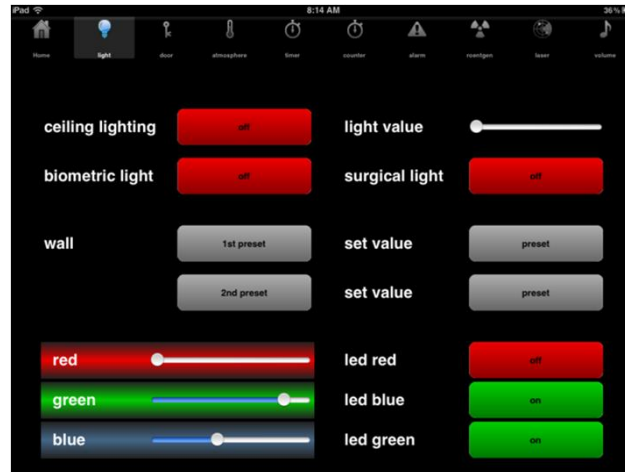
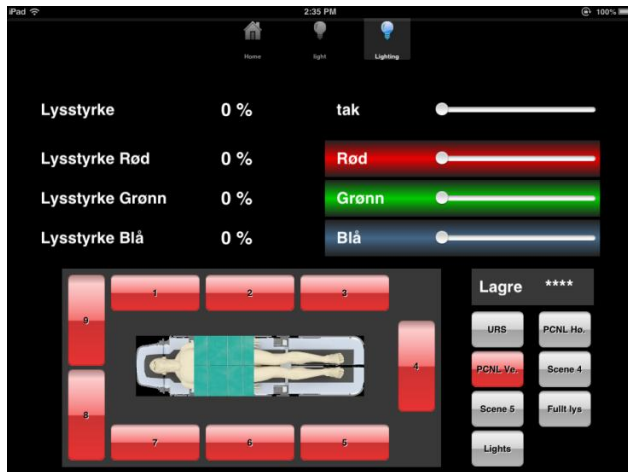


Software solution for flexible design of the user interface
→ even after installation

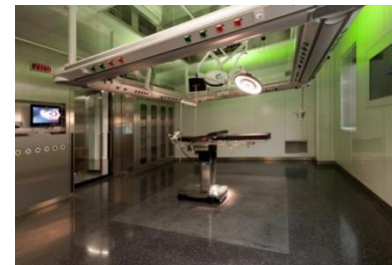


IT-Supported Room Control

Lighting



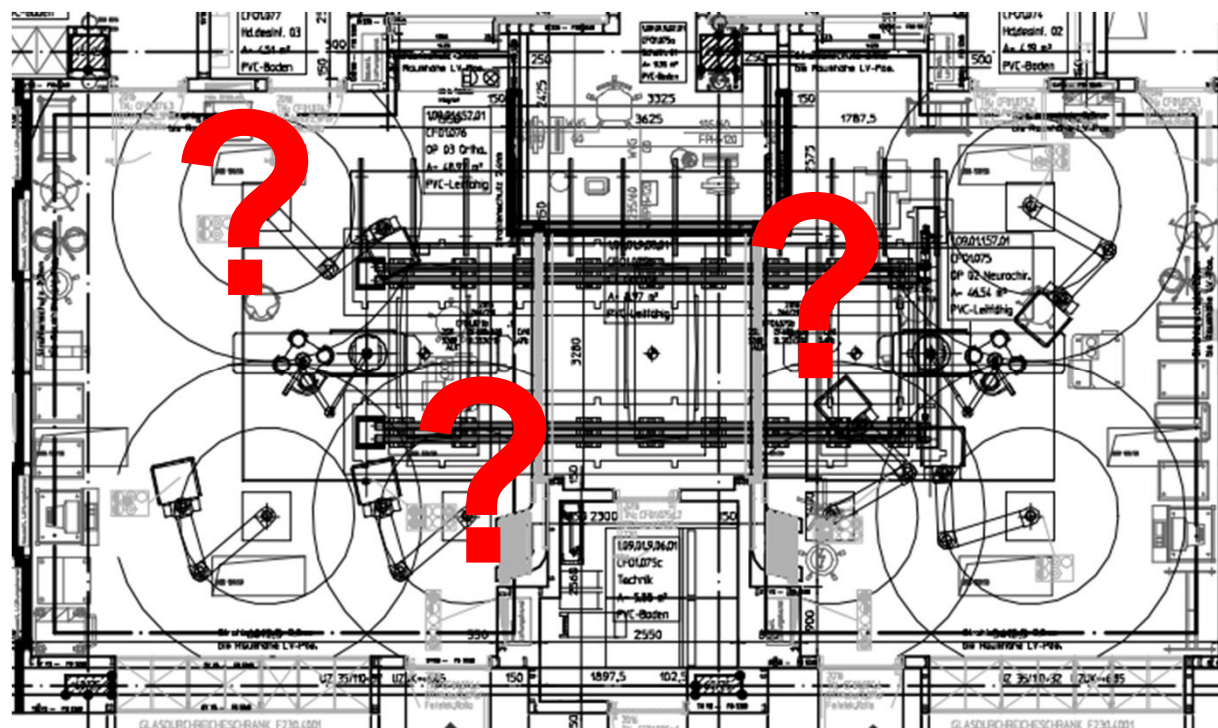
Individual setting of light scenarios with memory functionality





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Planning



- High **concentration** of technical building services and medical technology in wall, ceiling and floor
- Demanding construction **requirements** for statics, radiation protection, noise protection, fire protection and hygiene
- High **investment costs**
- Requirements for **flexible systems** / modules for wall, ceiling and floor

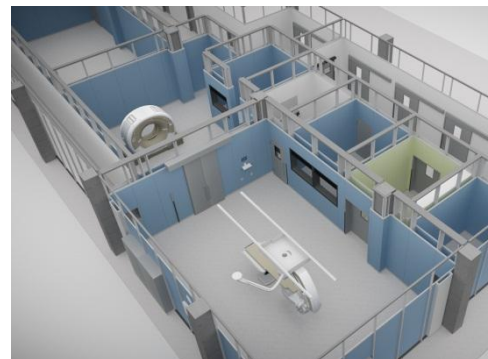
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3D Project Planning



FROM 3D PLANNING TO FINISHED PROJECT



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Project Management

- Clear responsibility
- Cooperation between users and suppliers
- „Turn-Key“ solution



PROJECT MANAGEMENT



PROJECT MANAGEMENT

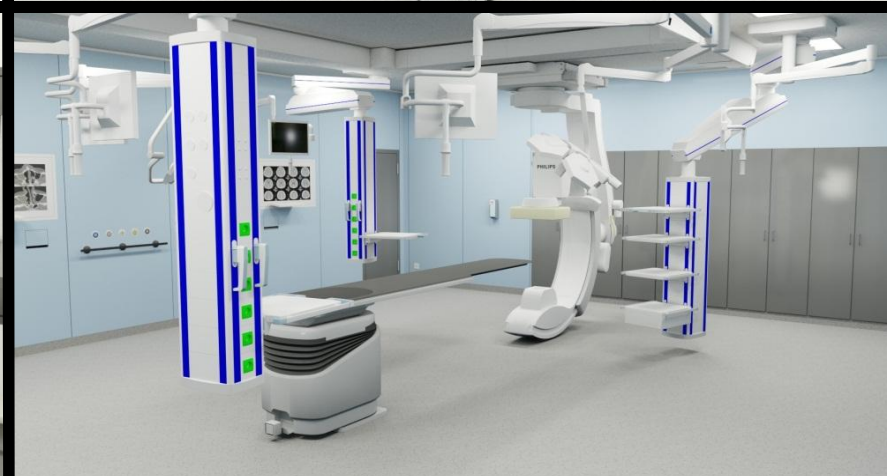




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3D Planning

INO Bern Hybrid OR



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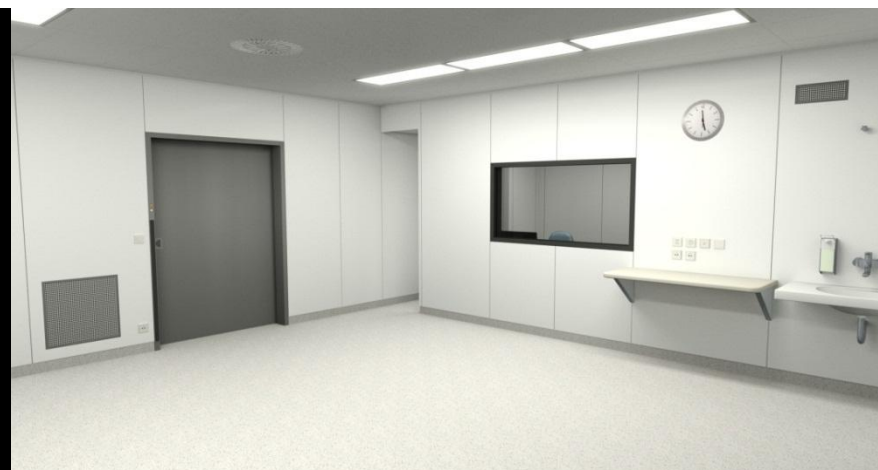




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3D Planning

INO Bern Endoscopy



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Summary

Advantages of modular construction

Today:

- Flexible system as construction-kit
- Innovative detail solution
- Requirements for hygiene, fire-, noise-, and radiation protection are fulfilled
- Defined calculated costs for a complete area
- High planning security
- Extremely rapid installation

Future:

- Open for new technologies
- All materials are recycleable



Summary

Future perspective: IT-supported building management





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THANK YOU FOR YOUR ATTENTION!



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| <p>Managing Board</p> <table border="0"> <tr> <td data-bbox="230 1270 801 1367"> <p>Thomas Fritsch Board of Directors, COO</p> </td> <td data-bbox="801 1270 1944 1367"> <p>Yvonne Brühmann Management Assistant E-Mail: yvonne.bruehmann@ht-ag.de</p> </td> </tr> </table> | | | <p>Thomas Fritsch Board of Directors, COO</p> | <p>Yvonne Brühmann Management Assistant E-Mail: yvonne.bruehmann@ht-ag.de</p> |
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