Operating Theatre Integration – New Efficiencies

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Theatre Integration – New Efficiencies

Objective:

- Understand what exactly is an "Integrated (or "Smart") Operating Theatre"

- How did they evolve ?

- Impact on Efficiency & Room Design

- Case studies

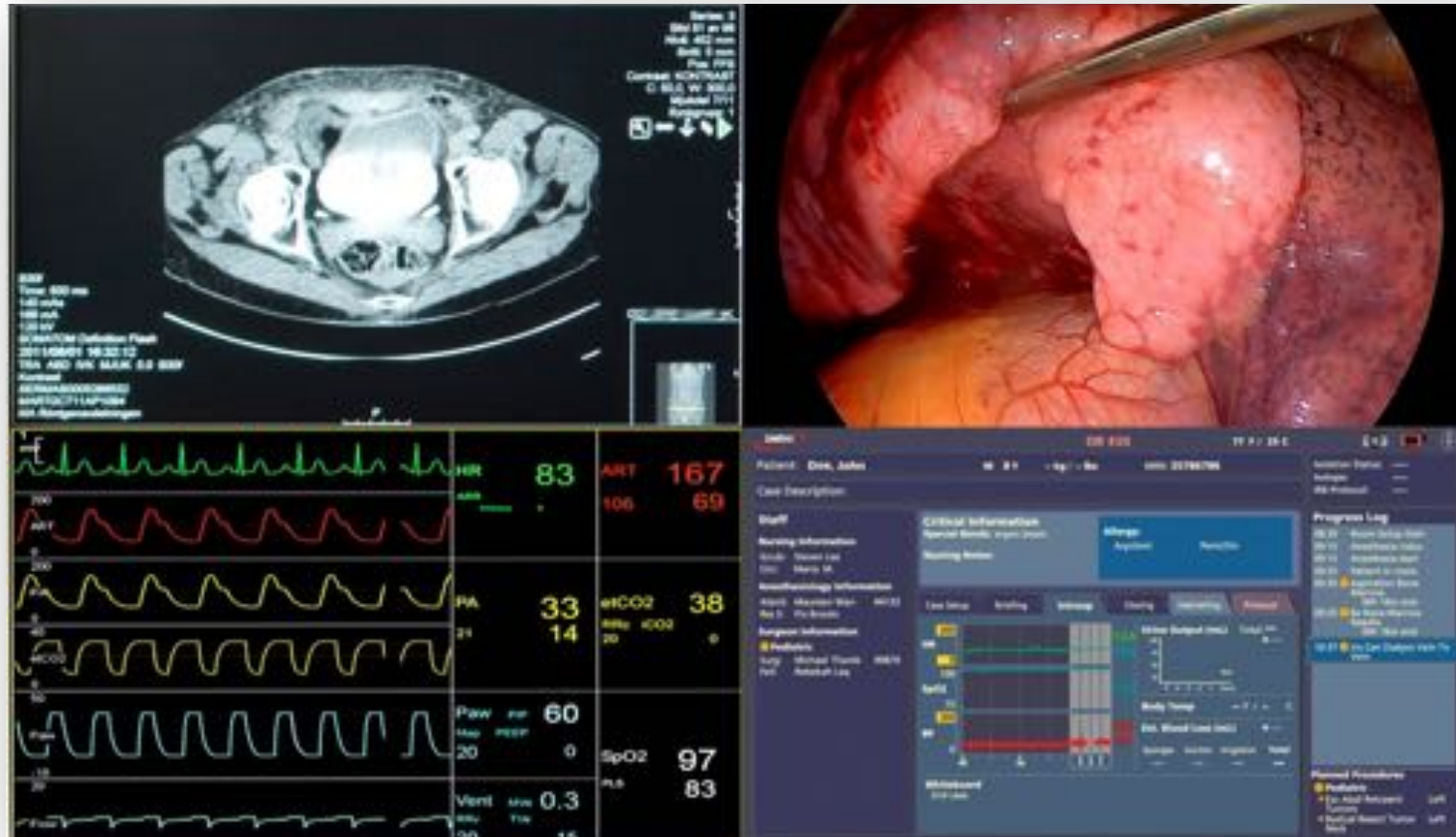- Is this the default for all Operating Theatres?

Theatre Integration – New Efficiencies

Key Elements:

- **Ergonomics**

- **Integration**

- **Efficiency** (40% increase in procedures 2005 to 2015)

Integrated Theatre Definition

Integration

Integration:

- Historically – nothing was connected
- Evolved out of a need to interconnect various instrument/device sources to single external displays
- Remote adjustment/control of devices
- Driven by the Surgical and Endoscopic Camera business

The Camera drove the Solution!
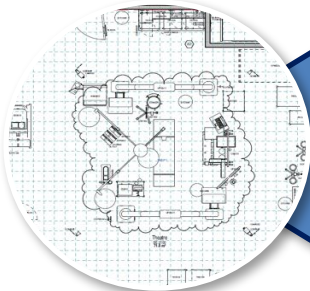(and who currently has the best camera?)

Recent Integration Drivers

Drive towards minimally invasive surgery

Increasing use of 3rd Party devices (i.e. Da Vinci robot)

Improving Information Governance & GDPR Requirements

Increasing need for visualisation from a variety of sources

Centralised control from Camera Head

Demand for Open Architecture Platform
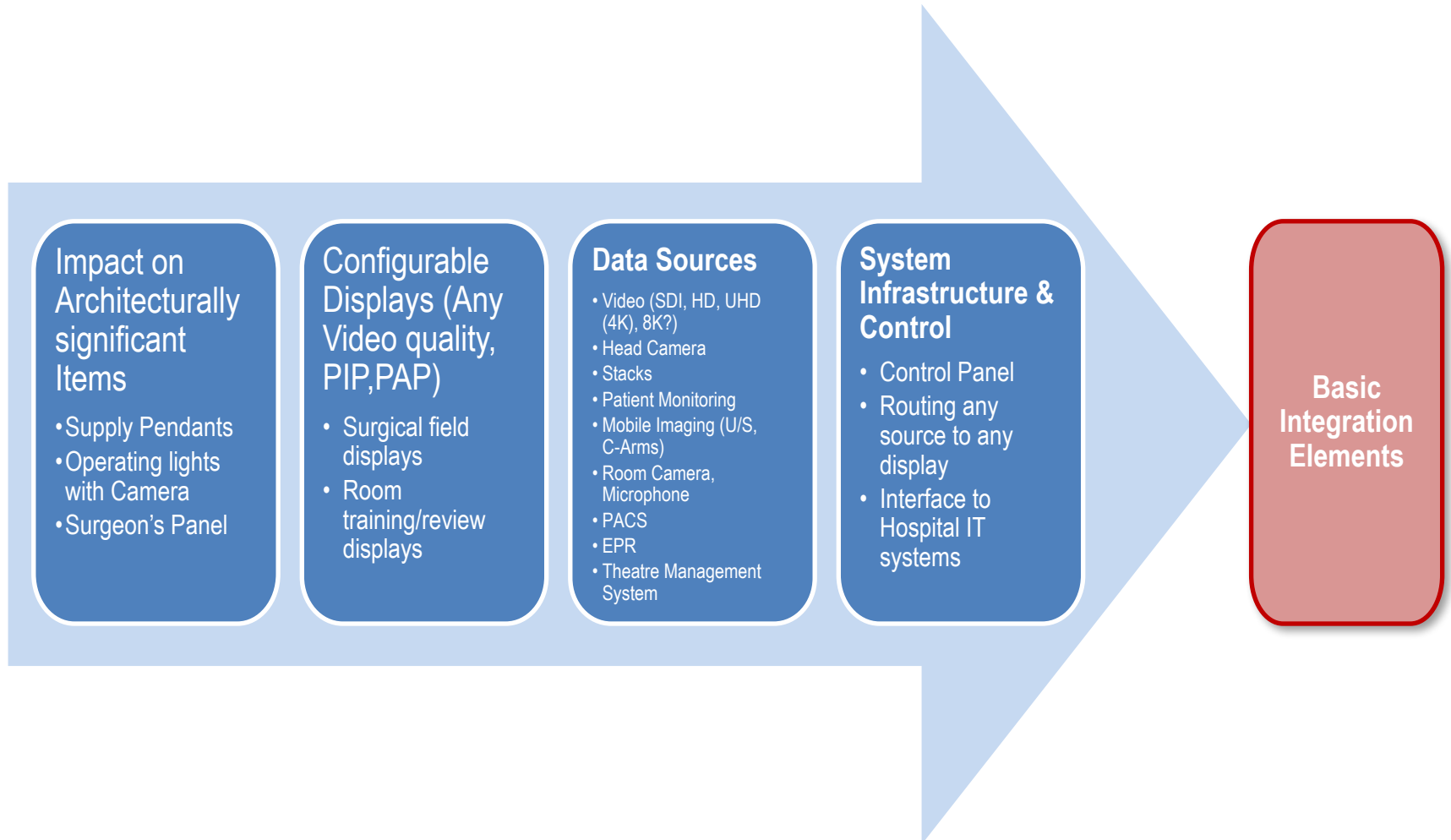
HBN 26 (Facilities for Surgical Procedures)
- Recognises increase in Laparoscopic and robotic procedures (55 m^2 size)
- Recommends medical services installed to support it in the future
- Minimally Invasive Theatres should be designed to support conventional procedures as well
- Unified approach to IT systems

Driven by Safety, Ergonomics, GDPR, Data management & Reporting

Specifying a Smart Theatre
What do you need to consider?

Impact on Architecturally significant Items

- Supply Pendants
- Operating lights with Camera
- Surgeon's Panel

Configurable Displays (Any Video quality, PIP,PAP)

- Surgical field displays
- Room training/review displays

Data Sources

- Video (SDI, HD, UHD (4K), 8K?)
- Head Camera
- Stacks
- Patient Monitoring
- Mobile Imaging (U/S, C-Arms)
- Room Camera, Microphone
- PACS
- EPR
- Theatre Management System

System Infrastructure & Control

- Control Panel
- Routing any source to any display
- Interface to Hospital IT systems

Basic Integration Elements

Integrated Theatre – Example

Layout and Design Considerations – Where does it all go?

Room Design Elements
- Architectural Hardware and Displays
- Signal Source and Video over IP Video Routing
- Image control, Archiving and routing
- Technical Space

Hardware Elements
- Displays (Stack, Pendant and Wall mounted)
- Microphones
- Speakers/Audio
- Room Cameras

Documentation Management & Archiving
- Video/Still image capture and editing
- Checklists
- DICOM compliant archiving (Archived locally, in VNA, PACS etc)
- Bi-directional updating of legacy databases (ie Patient Record, HIS, Theatre Management System)
- Interface to Hospital Unified Comms Strategy

"Ideal" Integrated Theatre

Integrated Theatres – Hybrid Example

Where are the Medical Device Vendors?

Vendor Neutral solution

- Medical grade displays
- Video over IP across a fibre infrastructure
- Utilises Industry standard infrastructure hardware so proven reliability
- Utilises legacy video sources
- Utilises legacy Hospital databases and applications
- A Turn Key solution
- Seamless integration with legacy device suppliers

Vendor Independent Providers

- Maquet
- Brainlab
- Caresyntax
- Steris
- Merivaara
- Jones AV
- Sony

Vendor Specific

- Require Instrument Control
- Require a specific "Brand" of Documentation Control
- Require a total camera to screen "Turn Key" solution

Device Manufacturers ie Camera/Stack vendors

- Storz
- Olympus
- Stryker
- Arthrex
- Wolf

Integration Costs Guidance

Item	Comment	Guide Cost Ex VAT
Group 1&2 Equipment	Pendants/Lights/Surgeon's Panel etc	£82,000
Group 3 Equipment	Anaesthetic equipment, Table, Monitoring, Diathermy etc	£270,000
	Total standard Theatre Cost	**£352,000**
AV Typical functional solution	For 1 Theatre with wall mounted displays and 3 qty 32" 4K surgical grade displays – Stacks extra!	£115,000
Documentation System	For 1 Theatre – Depends on solution	£30,000
	Total integrated Theatre	**£502,000**

Case Study 1 – Midland Metropolitan Hospital

Clinical Output Specification required 13 Theatres

- 2 Laparoscopic Fully Integrated
- 4 Trauma/Orthopaedic UCV
- 1 Ophthalmic/ENT
- 3 Elective/General
- 1 Emergency General Laparoscopic
- 2 Maternity

Issues:

- Insufficient Budget
- Trust withdrew from Gynae-Oncology services
- Could not replace legacy HD Stacks and scopes with 4K equipment
- Difficulty engaging Clinicians
- Multiple disciplines, Multiple stacks

Planned: 13 Theatres

- Integration driven by Orthopaedics
- Theatres defined as 6 "Integrated" and 5 "Integrated Ready"
- Integrated Theatres encompassed display ergonomics and mounting solutions
- Integrated Ready Theatres planned for "Plug & Play" infrastructure only installation

Case Study 2 – New Papworth Hospital

Clinical Output Specification required: 2 Theatres

- 6 Theatres (inc 1 Hybrid)
- 6 Cath Labs (Inc 1 Hybrid
- 2 Bronchoscopy suite rooms

Issues:

- Rooms designed without Integration being considered
- Most rooms have pendant mounted PACS displays, Room & OR light cameras but no means of connecting them
- Require active routing of physiological measurement displays
- No documentation Management
- Connectivity to MDT Rooms required
- Difficulty engaging Clinicians

Planned:

- 5 Integrated Theatres, 1 Bronchoscopy Room fully integrated
- Planned Procurement of Vendor Neutral Solution with AV distribution to building for MDT and Training etc
- Infrastructure to be fitted to each area
- Solution made best use of pre-installed display ergonomics and mounting solutions
- Documentation system planned to overcome IT Governance issues

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Planned: 12 Theatres

- Planned Procurement of Vendor Neutral Solution
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- Documentation system planned to overcome IT Governance issues
- 5 Integrated Theatres

Case Study 3 – St. Elisabeth Rhein-Ruhr

Specification required :

- Vendor Neutral Solution for 35 Theatres
- Video over IP Solution
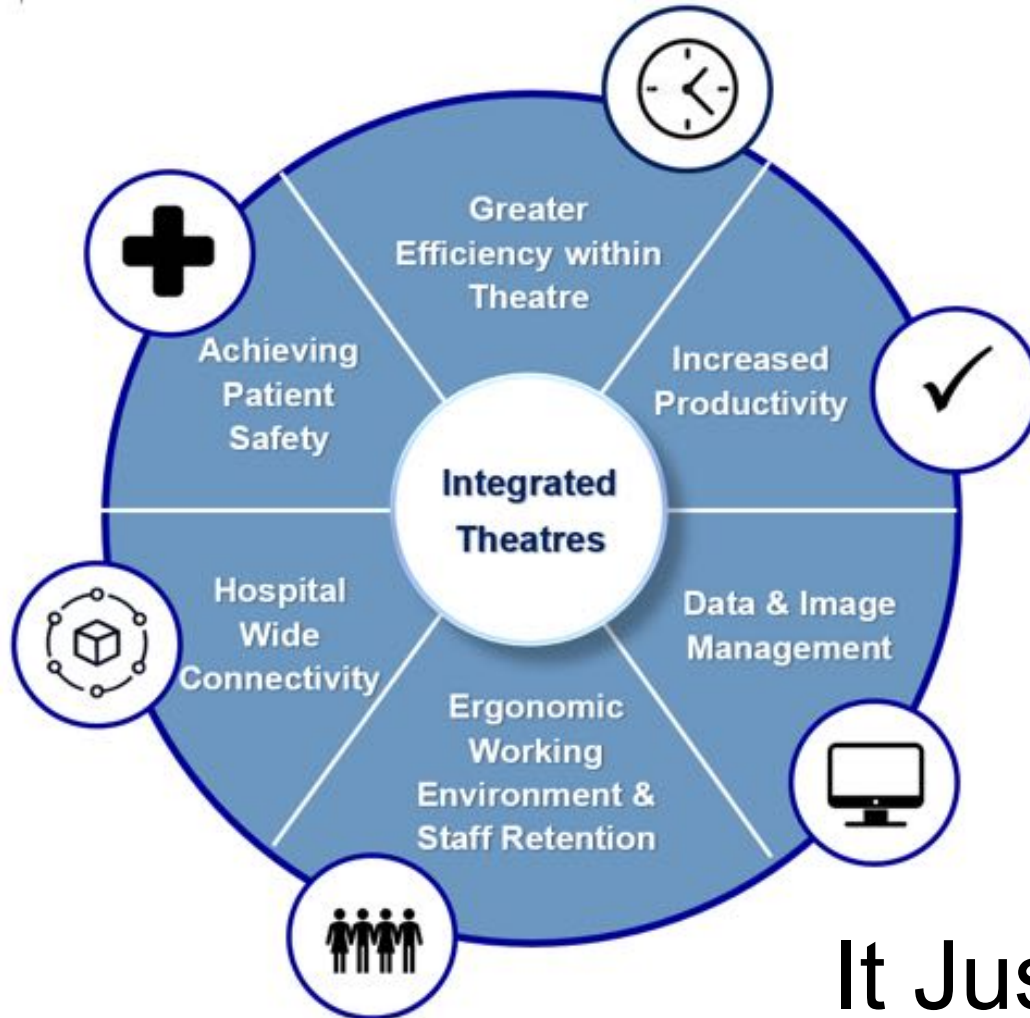- Integration with existing Platforms

Issues:

- Guaranteed Expandability
- Flexibility regarding modalities in use
- Theatres contributed 45% to revenues this has to be sustained or grown

Outcome:

- Future proofed solution up to 16K Video over IP
- Common infrastructure across 35 Theatres
- Provides any signal source, any format, anywhere
- Full integration with Brainlab Buzz Documentation Management System

Critical Characteristics

It Just Works!