



# The Do's and Don'ts of OR Integration

## 10 keys for planning and equipping a wired surgical suite.

Kenneth Ross and Rikin Shah  
Plymouth Meeting, Pa.

**T**oday's ORs are hubs of information, pulsing with video and audio signals from cameras, monitors and C-arms. Managing all this information requires an OR integration system that routes the sights and sounds of surgery to their proper place — be it a wall-mounted display monitor visible to the entire surgical team or some other peripheral device. Here's a list of do's and don'ts to keep in mind when wiring your suites.

**Do: Make Sure Your Architect Knows** If you're adding an integration system as part of new construction or renovation, instruct your architect at the earliest planning meetings that you want to be able to route images around the OR. While integration has become more common in modern ORs, most architects aren't initially planning for it, and adding a system late in the process will result in costly change orders when rooms have

**▲ FROM SITE TO SIGHT** The surgical suite is a hub of information, and surgical technology is continually advancing to better collect and present that information.

to be rearranged for equipment and monitors.

Make sure your architect (and your equipment planner, if you're hiring one) allocates space for the system's central components, which typically require about 4 square feet. This isn't a particularly large footprint, and it can be located either in the OR (under the nurse's workstation, for instance) or directly outside of it (in an equipment hold). But, as you know, space is highly coveted in the surgical suite, so stake a claim for your integration system before that space is committed to other uses.

**Do: Run Conduit Everywhere** Integration systems are defined by the source and display devices they serve. For each source, 1 or more cables will carry the signal to the central components, and 1 or more cables will run from there to each display destination. The best way to plan a system is to run conduit not just from the component site to every source and destination, but also to other potential locations: to walls where viewing monitors or cameras could be mounted; to

the main hallway, which would enable you to link systems for room-to-room communication; or to a conference room for remote viewing.

Running 1.5-inch to 2-inch conduit to these locations may seem expensive and unnecessary, but consider this: No one can predict what video signal format will be used 10 years from now. Conduit will let new cabling be installed and new system components added without opening drywall, which is not only expensive but may also require rooms to be re-inspected and re-certified.

### **Do:** Seek Your Staff's Input

For most capital purchases, you can learn a lot about what you'll need and whether a particular piece of equipment is right for you by interviewing your peers at other facilities on their experiences. Keep in mind, though, that effective OR integration depends on fully customized systems that can offer a wide range of features and functionality. No 2 systems are identical, and what one facility needs might not be needed by another. For example, while a teaching hospital needs the ability to conference remotely from the OR, a surgical center probably does not.

As a result, a thorough evaluation, selection and planning of an integration system demands the input of your surgical staff early in the process. They'll be able to help you assess the benefits of a system and determine the necessary system requirements. Their frontline experience will pay off in efficiency after the system's implementation, since they'll be the ones operating it.

### **Do:** Create Competitive Bidding

Use the request-for-proposal process to your best advantage by creating a competitive bidding environment. Integration systems are constructed from a large number of third-party, off-the-shelf components, and their costs can include a hefty markup for system design and installation. It's acknowledged that the purchaser is paying the vendor for its expertise in pulling this complex system together, but what exactly is the right price for the hardware?

The only way to know for sure is to obtain competitive offers and compare them, line item by line item. Regardless of what your favorite sales representative tells you about the unbeatable deal he's offering, the best way to drive down the price and identify the best system is to let him know you're shopping around.

### **Do:** Assign Responsibilities

Another complexity of an integration system is that, since it harnesses together so many different pieces of surgical equipment and technology, it may be difficult to identify who its "owner" is. That is to say, who's responsible for overseeing the design and purchase? You'll need to obtain buy-in from all clinical parties, especially the nursing staff, since they'll be most affected by the changes it will bring to the work process.

Beyond that, though, who'll be trained to operate it? Who'll maintain the system after its implementation? These tasks may fall to several people, of course, with administrators, IT and biomedical engineering staff and surgical personnel among them. Be sure to carefully consider and address all the logistics involved, including workflow, staffing, system responsibility and ownership before the system is up and running.

### **Don't:** Design Only for Present Needs

The surgical suites you build today may be around for more than 20 years, and the video equipment you're outfitting them with should last you a while as well. Since we don't yet know which video formats and other technologies will become tomorrow's chosen standards, it's essential that you build your system with expandable and upgradeable components. It's also advisable to purchase the most up-to-date technology your budget can afford to keep your capabilities current. Don't let a vendor install outdated technology (analog-only or standard-definition source or destination devices, for instance), limit cable connectors to those that your current equipment requires or fail to provide your system with the ability to add additional input sources.



Karl Storz Endoscopy-America

**▲ ROUTING** Every OR integration system must be uniquely configured to handle the differing outputs of each source.

## The Basics of OR Integration

On the most basic level, an OR integration system provides standalone audio and video routing. Each OR operates as an isolated system and has the ability to route AV signals from 6 to 12 sources — such as endoscopic cameras, physiological monitors, PACS workstations, surgical site or headlight cameras, computers running clinical information systems, C-arms or ultrasound scanners — around the room to display monitors and other devices.

While the concept behind such a system may seem simple, it is made complex by the fact that the sources don't all utilize the same video format. Consequently, every OR integration system must be uniquely configured to handle the differing outputs of each source, which may include 1080p, 1080i, 720p, 480p, 480i, NTSC or EIA343. Additionally, a system must be able to accept any of the connector and cable formats that the facility's video sources use, such as component, S-video, SDI, HD-SDI, HDMI or DVI.

This complexity has led more than a few facilities seeking to integrate their ORs into design errors, though these mistakes are not entirely their fault. Vendors often fail to fully inform their customers of the consequences of their selected system design. For example, in order to accommodate a tight budget a vendor may install a less-expensive system in every room rather than installing more-expensive equipment in fewer rooms. Or, instead of including additional inputs for future expansion, a vendor may design a system that only accommodates the signals needed at the time or implementation. That's why professional assistance is essential.

— *Kenneth Ross and Rikin Shah*

## Don't: Automatically Bundle Your Purchases

Conventional wisdom says that bundled purchases bring volume discounts. The companies that design and install integration systems, in purchasing the components from third-party vendors, can frequently obtain pricing that's better than what a surgical facility could negotiate on its own — but not always.

You can save big if you remove 2 components from a system purchase. First, purchase your large, flat-panel, wall-mounted monitors directly from an electronics store or online retailer. Since these monitors won't be in the surgical field, they won't need to be "medical grade." Just make sure that they can accommodate a sufficient number of inputs and that your cost savings offset the loss of the warranty and service protection the integration company offers.

The other component to consider is the surgical field displays themselves. These monitors are often available through your boom supplier or endoscope manufacturer. List both of these items as optional in your RFP and purchase them from the integration company only if their stated price beats your other choices.

## Don't: Limit Your Vendor Options

Your RFP process can help you to explore a broad range of purchasing options, so don't limit your considerations to the surgical equipment vendors you're familiar with. Hospitals and surgical centers often learn about OR integration systems through endoscopy vendors who are interested in growing their businesses. But there are about a dozen vendors who offer these systems, each with a unique perspective on how best to accomplish the task. By considering as many vendors as possible, even those who don't have ties to the equipment in your surgical suite, you can ensure that you're obtaining a fair price and not building a technological infrastructure that unnecessarily commits you to 1 manufacturer for years to come.

## Don't: Overpurchase

Clinicians are accustomed to hearing the words "We can't afford that" from their administrators. Sometimes it's true. Adding features

---

can increase the price of equipment to the point at which buying it is a budgetary impossibility. That's why you have to shop realistically and not purchase the bells and whistles you don't plan to use.

OR integration systems have a wide range of price points, with pricing determined by the number of rooms to be outfitted, the complexity of the system, whether fiber or copper cable is used, how much high-definition signal will be routed and the number of source and destination devices the system serves. Deciding which features and components to include and which to leave out can be difficult, so when you're putting together your RFP, describe the base requirements you need, but also ask for pricing on the extras your clinicians want. This way, you arm yourself with enough information for multiple options. You can add items to the extent that they fit your budget or, if the price comes in high, negotiate it down or pare your requirements.

**Don't:** **Give Vendors an Open Door** Any new construction or major renovation project will invariably get the vendors circling. When they begin to influence your surgeons, difficult purchasing decisions become ever more politically sensitive. The wise administrator doesn't grant vendors direct access to her surgical staff. Instead, she exercises control by planning a number of site visits for her core selection team to observe what other facilities have done, what they like and what they dislike about a vendor's system. This approach keeps the playing field more level while also providing you with the information you need to select and design your own system. **OSM**

---

*Mr. Ross ([kross@ecri.org](mailto:kross@ecri.org)) is a senior program manager and Mr. Shah ([rshah@ecri.org](mailto:rshah@ecri.org)) is an associate in the applied solutions group at the ECRI Institute in Plymouth Meeting, Pa.*

---