From concept to commissioning

Six top integrators explain what they do and how to pick a good one

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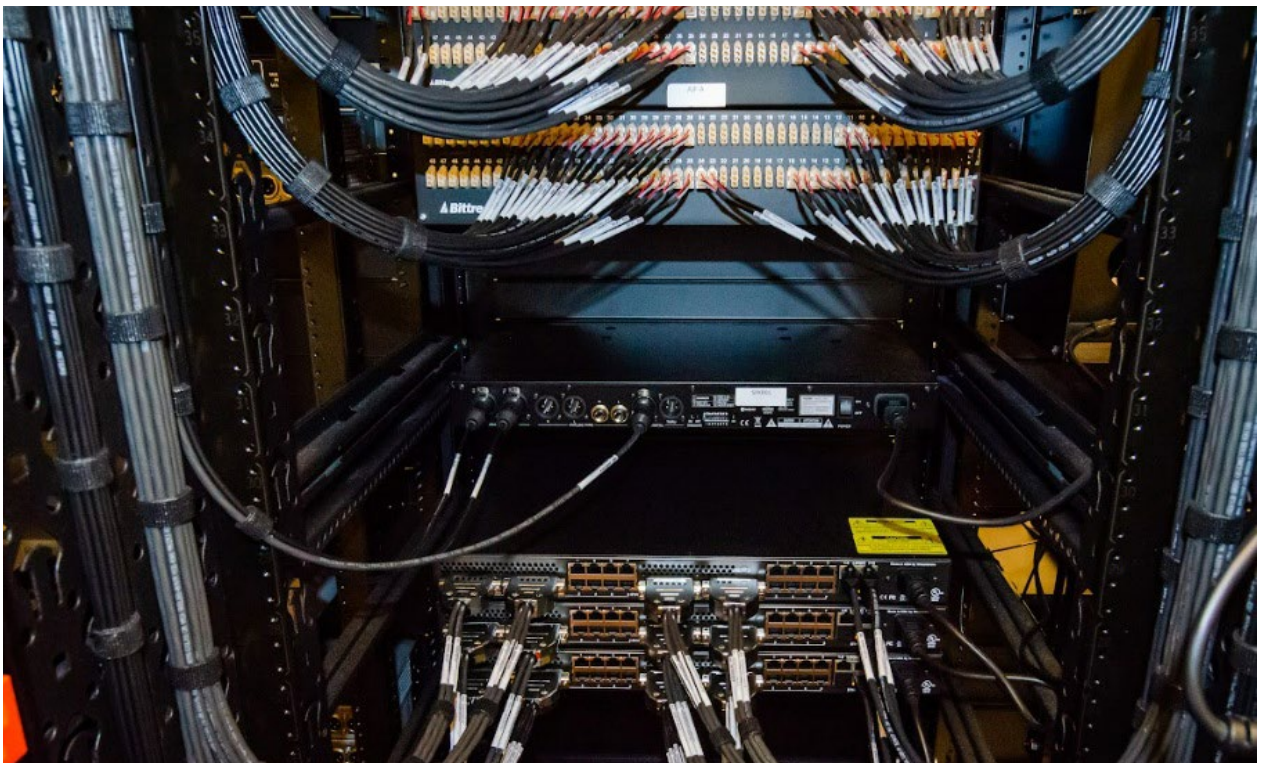


Above
Rear view of a rack of patching and Wheatnet-IP Blades installed by Utter Associates at KING-FM in Seattle.

For many radio broadcasters, system integrators are crucial partners in planning and building new facilities. Integration is a specialized business even in the specialized world of broadcast technology, and it requires skills and knowledge that span audio, IT, AoIP, RF, acoustic design, ergonomics, construction, electricity, health and security considerations and much more.

We wanted to know what a broadcaster should be thinking about when choosing a system integrator, what questions they should ask. Also, how do SIs develop and maintain their skills in a fast-changing world of technology? What trends do they see as important in creating broadcast workflows and facility design?

We talked to six leading integrators, all based in the United States but whose work is seen around the world. Most of the conversation centered on studio work though much of it applies to RF as well.

Scope of work

The professionals told us it's crucial to have a careful conversation at the outset with your prospective provider.

"We have to decide what the integrator is and what are they not," said Edwin Bukont, who founded E2 Technical Services LLC in 2009.

"An integrator might offer design services, they might offer procurement services, they probably offer some customization services, they might offer contract engineering services; but the integrator may not natively be a designer, an equipment provider or a contract engineer."

Find somebody you can trust, said Greg Dahl, founder of Second Opinion Communications Inc., whose radio clients include KCRW in Santa Monica, WHYY in Philadelphia and WAMU in Washington.

That sounds obvious but it means you need to check their track record.

"You can communicate your concerns without friction and verify their credentials. The technical and mechanical specifications will get addressed as you develop the plan with the system integrator; but it's important to know what your endgame is," Dahl said.

"Explore each avenue and not just go with the cheapest. You need functionality; you need longevity. You need to make sure it's the right equipment. And it's important to understand how this equipment will be supported — either by me as the integrator and then continuing maintenance, or by the manufacturer.

"There's no golden question that puts it all together."

Left
Woof Boom Radio's WMUN in Muncie, Ind., is an AM station with an FM translator. New Axia infrastructure, BE AudioVault Flex automation and Raritan KVMs went live in February. Second Opinion Communications helped plan the installation, executed by Woof Boom's engineers in Indiana and Ohio.

Inset
Greg Dahl of Second Opinion Communications

Shaun Dolan, partner at Inrush Broadcast Services, said, "Sitting down to make an equipment list isn't really the first step."

Inrush is a media technology integration firm with 10 employees that does provides consulting, installation and maintenance services; it has worked with companies like iHeartMedia, Beasley Media Group and Syracuse Public Media, and it manages broadcast tenants at the premiere transmission facility in Chicago.

"The first step is figuring out the needs. What are the workflow needs? What are the cost constraints? What are the real estate concerns? How are the talent using the studio, how are they operating remotely? It's a project in and of itself to figure out what the constraints and goals of the studio or transmitter site build is."

This phase also helps a client communicate expectations among their own stakeholders and management, and proceed to preparing a budget or a request for proposal.

All of our experts made a similar point. "Know what you need before you go to an integrator, as much as you can. Then the integrator can help you with things that you didn't know you need," said Jim Hibbard, a studio integrator with construction and acoustical expertise who started Pacific Mobile Recorders with a 48-track mobile recording studio in a Mack truck more than 40 years ago.

"Often, if a station is going from an old analog world to digital, they have no idea — they don't understand the concept that any studio can be anything, in any room. But if we start with a scope of what they do, I don't need to spend billable hours trying to figure all that out. If they have that info for me ahead of time, it can save them money, then we can pick the right gear for them."

Hibbard does recommend that a client bring him to the worksite for a survey prior to finalizing a plan. "I'll do some interviews and give you some free advice; then you pay me for a day to come out and see what you currently do," he said. For instance, does the station's workflow involve handing a program off from one studio to the next? What do they need for talkback? Is the staff doing a lot of remotes? Is there a news person, a producer or a call screener involved?

"I need to know what they're used to doing, before I design a room or a facility."

Hibbard did a job for a client in Tahiti where an advance

Above
Somar Communications station WSMD(FM) in Mechanicsville, Md., is a client of Ed Bukont's company E2 Technical Services.

visit wasn't practical. "When I got there, it was eye-opening, because their workflow was not what I'm used to. We made it work, but it was on-the-job training."

Bo Hoover is president of Technical Services Group, founded in 1989, which today has 24 full-time employees.

"Clients need to decide who's going to be responsible for the vision, the design, the objectives — quantify the scope of work," he said. "That makes it easy for the integrator to cost it out, generate a bill of materials, put labor and timeline schedules to it.

"Most often they know what they want but they do not know how to get there, so we find ourselves in budget development, design, consulting. Then we come back with a good-better-best cost scenario."

Today everything is integrated and networked, so expect an enterprise approach.

"Once, we could just go blow up Production 2," Hoover said. "Now everything is on Ethernet, and we have security issues we've never had to deal with before. To make it all work is exponentially more complicated."

He says getting expectations right is often the most difficult challenge. "If you take a legacy facility, many general managers don't appreciate all of the accrued layers of cap-ex that have been put in over eight or nine years, whether it's routing, satellite distribution, every aspect of it. The impact of a single change has many, many ripples throughout the facility. To go from an analog distribution plant to an AES plant or a Livewire plant or whatever, there's a lot of stuff underneath the hood, beyond new furniture and a new console. I have to work through all that with them.

"It's not hard, but they're not necessarily aware. It sounds simple: Let's just change out the phone system. Well, that was easy when it was a Gentner or a STAC or analog standalone phone system with a hybrid. But now it's SIP, it's Ethernet, it's multiple layers of how we integrate this stuff."

Ed Bukont refers to an approach taught by Avixa in the AV industry. "You have a design aspect, you have an integration aspect and you have another 30% after the sale, which is support.

"Well, support is really contract engineering. Not every integrator offers that, but you probably are going to need it in a networked plant because you're going to want to make changes. That may not involve changing wires; they may involve remotely logging in and making changes to a system." But ask about it up front.

Below
Ed Bukont

And do you want the integrator to pull wires and solder connectors; or do you want an integrator who uses structured wiring? There are serious cost differences in those approaches, Bukont says; with traditional wiring, materials tend to be cheap, while labor tends to be expensive. But labor means time, so if you're trying to get it done fast, you might choose to spend more on materials for structured wiring but get it done in a fraction of the time.

Again that upfront communication is crucial. "I know what 'a' radio station needs, but I may not know what YOUR radio station needs," Bukont reiterated. "Tell me

Above
Shaun Dolan of Inrush Broadcast Services

how you expect this facility to function."

In doing so, be as specific as possible.

"Pick a standard for a video monitor, and I guarantee you half the monitors you want to reuse don't meet that standard," he continued. "Or you've got a WideOrbit system; that's great; but what other applications have you purchased and installed on that? MusicMaster? DJB Radio's Spider program for FTP? What do you already have? Do we need to buy something, do I need to allow time for installing it?"

A new application may require an application key, which means the integrator will need the internet. "But did you order internet at your new studios? Most general managers think they don't need it until the studio is operational, but we need internet so we can MAKE it operational."

Another tip: Your organization needs to focus on the project. "If the integrator can't get answers out of your various departments in a timely manner because they're too busy, you'll have less than desirable results. Appoint champions so we have a point person to talk to, whose job is to get the answers back to the integrator."

Bukont notes that his own most important contribution may be getting dissimilar pieces to talk to one another in a way that a designer or vendor may not have articulated. He may spend weeks on a project without even touching a tool.

"The products that you use are going to be dependent upon the networking technology that you choose. For example, some audio consoles don't have headphone or cue amps. So you go to your favorite vendor and they say, 'Oh, buy this product from Angry Audio, it'll work.' But they're not selling you the wire in between, they're not sure how that's going to interface," he said.

"The job of the integrator, especially when a designer hasn't given detailed plans, is to try to take these dissimilar parts and put them together in a holistic rather than a Rube Goldberg manner. Someone has to program the system."

This "commissioning" role is familiar in TV, Bukont said, but was less so in radio until recently.

Context matters

Bo Hoover finds that the radio industry has divided into two types of clients.

"At larger groups, these design and planning decisions are being done at the corporate level, and the local engineer has very little say in it: 'This is what you're gonna get. Rinse, wash, repeat.' A very small group of people makes those decisions — architecturally, what the local capabilities are in these markets, where the industry is going — and at scale.

"Then we've got smaller groups and owner operators, still very involved in our communities, doing production, trying to make things more efficient, requiring more people. This is the client who probably benefits the most from us, because we can provide them the design, the consulting, the latest and greatest, and they don't have to have the scale of 900 stations."

Erik Utter is president of Utter Associates, which he describes as "engineering- and design-focused" and whose clients include Seattle's KING-FM and KEXP(FM), Oregon State University and News-Press & Gazette.

Utter notes that the planning process may be different at a public station owned by a university or college. These operations tend to approach things a little bit differently than commercial clients.

"When you walk into an NPR station, sometimes you're looking at tech that is 25 years old, maybe older, long in the tooth," Utter said. Their projects tend to have a much longer planning and funding cycle than those in commercial radio.

"They typically have project teams that put in the time to really think these things through. They're funded very well and typically at a higher level, with a lot of careful consideration. They know this place has to serve them for 25 years. The technology may change, but that infrastructure — acoustic control, conduit, power, rack layouts — has to serve us for a very long time."

Given how tech evolves, such planning is difficult regardless of whether you work in public or commercial radio.

"It's hard to even imagine where we might be in 10 years," Utter said. "You're not going to want to rip open walls, to change infrastructures, in 10 years.

"Also, how involved will your SI be with planning your workflow? We want to be involved; it offers an opportunity to make recommendations based on our experience with other customers."

Finally, will your integrator be involved as the project wraps up, in the cutover and in training staff?

"Usually management has made a lot of the decisions

about workflow and what the technology looks like," Utter continued, "but when the users, the operators and DJs come in and are ready to get trained, there's a lot of anxiety in the air. You can just sense it, they're wondering, 'How's this going to change the job I have to do every single day?'"

Utter likes being involved in this part of the process because he can walk users through the workflow, letting them feel the ergonomics, see the sightlines, sit in their chairs and operate the automation. "At the end of the first training day, that anxiety is melted away, and it's smiles and high fives. That's a successful project."

The outsider

Do local chiefs feel resentful or threatened when their employer brings in an integrator?

"Some do, absolutely," Bukont replied. And occasionally he's had to sit down with an engineer who had laid out a studio wiring plan and explain why another way will be better. The integrator, he said, needs to be a politician.

Bukont notes that on any given studio or RF job he might be involved in systems engineering, configuration and testing; design; verification and validation; documentation; systems troubleshooting; and custom cabling.

"One of my buddies likes to say, we build more in a year than most engineers do in a career. But I don't want your job. If I wanted to be a chief, I would be a chief. My job is to make your job easier and make sure everything gets done on time, on scope, on budget."

Bo Hoover said, "Modern chief engineers with a lot of responsibilities welcome us more as a partner. Every organization should have a technical person available, and we can provide him the tools and manpower to accomplish the goals that he might not have the time to do himself."

Or as Jim Hibbard puts it, "My job is to make you look good. Because when I'm done, I'm going to go away, and it's going to be your shop."

Shaun Dolan hasn't sensed resentment but said an integrator must keep in mind that "we're there at the pleasure of whomever we serve. If the project essentially entails helping build what amounts to a sports car and then handing over the keys and letting them drive it off the lot and waving goodbye, that's a privilege in and of itself."

There's no question, though, that some circumstances call for an outside expert.

"The reason our company is called Second Opinion," said Greg Dahl, "is that often we are brought midway through projects. A lot of times owners tried to start something, it's gone south on them, and then they start looking for a second opinion."

Keeping current

It's often said that a broadcast engineer needs to be conversant with many kinds of technologies and systems.

That's even more true for an integrator, who might be called upon to deal intelligently with, for instance, Cisco, Juniper or Arista systems; Wheatstone or Axia networks; various automation platforms; internet STL links; numerous brands of transmitters and specialized audio processors; cybersecurity; acoustic studio design; cabinetry; and many other disciplines.

"We have to understand all these construction trades," said Erik Utter, who before doing integration was a director of engineering at several facilities and helped NBC Sports cover four Olympic Games.

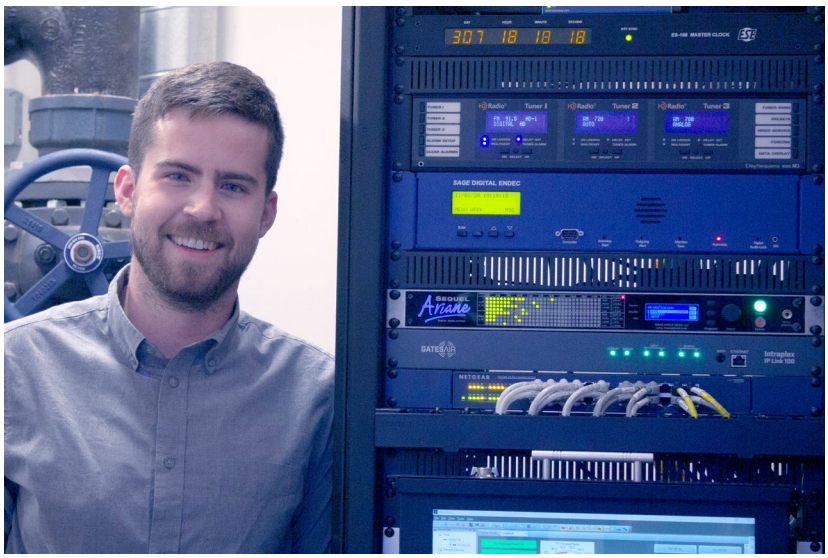
"We have to understand the mechanical systems that are going in. And not only the performance of the cooling, but what's the impact on the acoustics of the space? What's the noise generated by the HVAC? Electrical, construction schedules and coordination, all this isn't directly related to broadcast technology."

Ed Bukont said, "And let's not forget that video is now part of the radio experience. Video … lighting … that's the snowball, now you want cameras, a switcher."

"I have a construction background," said Jim Hibbard, whose company has installed perhaps 1,000 studios, including for Kim Komando, Dan Patrick and Rich Eisen. "I know how to build a wall. I have no degrees for those things, but when you've been doing it for as long as I have, you get quite good at it. I learned by doing it, by making mistakes."

That need extends to considerations such as the electrical load imposed by HVAC, how much air conditioning is needed for a given space or how a studio door should be installed. The variety of skills involved can be staggering.

"I was working for a client in New York," Hibbard said. "Typically in cities with high-rises, you have a studio strobe so operators know if the building's on fire; they really want to get your attention. But for this client I had to connect equipment to the fire alarm to mute all of the control room monitors — if they had a fire, it fired a salvo and turned all the monitors to 'no source.' Then we had a reset to put



Below
Mike Dorris, a partner at Inrush Broadcast Services, visits a community radio station client in downtown Chicago.

Above
Pacific Mobile Recorders counts Kim Komando's company WestStar MultiMedia Entertainment as a client.

Inset
Jim Hibbard of Pacific Mobile Recorders.

everything back. There are some things that you just learn as you go along." While such on-the-job learning is crucial, formal training can be an important part of the life of the integrator.

Ed Bukont says the industry is rich with educational resources from organizations like Avixa (the former Infocomm), the Society of Broadcast Engineers, SMPTE, AES and BICSI.

Of course, much of that kind of training can be costly. Expert-level certifications from a company like Cisco costs many thousands of dollars. Then there's the downtime.

"I've got to take that day or that week," Bukont notes. "As an integrator, if you budget your time at 35 or 50 bucks an hour, you've got to figure out, 'Okay, what's a week of lost income and project delays for me to learn this new thing that I might not even use for six months or a year? But when the question shows up on a job, I've got to be able to talk intelligently to the vendor."

As an example of the payoff, Bukont remembers winning a contract for an urgent six-studio project because the client's director of engineering noticed a ByteBrothers cable tester in Bukont's test bag. "He knew I had the skill set."

Who sells what?

One question you should ask your integrator is whether they hope to sell you the equipment directly.

"I have no huge desire to sell equipment," said Greg Dahl. "That's what BGS does." In such cases an integrator may partner with a particular vendor; indeed Dahl co-founded the Next Best Thing Media Tour with Broadcasters General Store during the pandemic.

Shaun Dolan of Inrush said, "We're not a dealer, so we don't have a specific financial stake in any particular manufacturer, which helps us be independent and help the customer. They know that when we're recommending something, it's not because we get to sell it to them."

"I don't really push myself as a box items provider," said Ed Bukont, though he'll provide direct sales if asked. He does prefer to sell the actual wiring components, to make sure all elements are compatible.

Bukont says that a client who buys products through an integrator may expect them to provide warranty service, on-site repairs and loaners, but he said most integrators don't want to be involved in that unless it's under a separate contract.

By contrast Bo Hoover prefers that as a selling point. "We're direct with around 300 manufacturers. And while I don't market our organization as a 'sales organization' because I can't compete against the online sales type

marketers, we prefer having that direct relationship. We can control procurement and shipping," he said.

"There's 'one throat to choke,' whereas when someone else supplies the equipment, I have lost control of the deliverable."

Another question to ask your potential integrator is whether they specialize in one or another particular technology platform, as with audio over IP.

"If you ask me to recommend something based on my experience, most of the time it may be Axia," said Bukont. "But thanks to the supply crisis, you know, sometimes we've got to work around the limitations. And if you ask me to install your Wheatstone, I'm going to install it, and Wheatstone is going to give me support, and it's going to be a beautiful installation."

Jim Hibbard, who works often with Wheatstone systems, made a similar point in reverse.

And Bo Hoover said he'll make recommendations based on reliability and quality, "because we started out as a service company and we still are a service company. But if the client has a preference — if they're a Gates house or a Nautel house or a Rohde house — I certainly respect that and am not going to go try to sell them something different."

Radio today

So we wondered: What do these experts see as notable trends in how radio workflows and project designs are changing?

Of course, the move from AES audio to audio over IP has been a huge one. "That has greatly improved and simplified things," said Erik Utter. "It's important to the end user, to management and to ownership that if you're going to invest heavily in a space, it's got to be as flexible as possible."

AoIP supports that flexibility, including remote workflows, whether it's voice-tracking from a centralized studio or from home.

"It used to be you'd make an AES connection through some kind of gateway to get into your audio IP world, but now those codecs are shipping with the audio IP support built in, whether it's AES67 or WheatNet," Utter said.

"In the TV world we're moving to SMPTE 2110, and the audio side of that is AES67. That has pushed console manufacturers who want to play in both worlds into AES67, to the benefit of radio. You're seeing companies move to support AES67 instead of just their proprietary formats."

Jim Hibbard notes, "We spend more time doing configuration than we do wiring these days. Everything is configured, you don't have to 'take this one to this one.' If you want a source to go 10 places, you put 10 places on the crosspoint in your switchers and routers."

Partly as a result of these changes, Shaun Dolan agreed that the flexible studio model is prevalent.

"Having a particular station tied to a specific studio, or a particular function assigned to a particular studio, is falling out of fashion. As real estate costs are in the bullseye for a lot of organizations, the mandate becomes to do more with less space; and as we all proved during COVID, remote work is possible even in broadcast," he said.

"So our focus has been making studios flexible so that they can be used for anything from a morning show to simple voicetracking.

"And then, a physical studio is not always required. When studio functions are abstracted to software, running in the cloud or otherwise, it becomes a lot easier to transition talent, producers and other content creators between a dedicated studio somewhere and a remote studio. They're able to have the same functionality in both places more

Below
A GatesAir Flexiva transmitter installed by Technical Services Group at WTLQ(FM) in Ft. Myers, Fla.

Inset
Bo Hoover of Technical Services Group.

easily and not have to compromise when they're working remotely," Dolan said.

From a design standpoint, Dolan says clients today want things open, airy and well lit. And with the advent of video conferencing, there's less emphasis on the traditional model of a morning show that can see into an adjoining control room. "It doesn't really matter if that studio is across the hall or adjacent or in another building, or in another state."

Ed Bukont has done integration and consulting projects for clients like Audacy, Salem Media, Alpha Media, Telemedia Broadcasting and regional and small broadcasters throughout the United States. He marvels at what can be done with today's programmable surfaces and systems.

"In any older plant there's a bunch of switches that drive people nuts. You know, 'Every time we do this show, we've got to push this button and turn this knob and flip this switch.'"

With a properly configured modern network, he said, a station can enjoy the benefits of "any signal, anywhere."

"We can make the room function the way they want it to. I can control what they do in a profile; then if your morning show spilled coffee on the console in Studio A, they can go pull that profile up in Studio B, and your million-dollar morning show still goes on."

One Bukont client had a lot of Aphex Compellors in a rack but needed space for a new automation system. "I told him, 'I can give you those processors in software at each console. We're going to take all these Compellors out of the rack and we'll have room for the automation system. And since it's all on audio over IP, we're not reusing all that stuff in the back of the rack connecting all the Compellors. You'll have 10 network cables in that rack when we're done.'

"It's really amazing how much legacy stuff we pull out."

Further, Bukont says, "We have gone from brand-driven systems to network technology-driven systems. And as we do more with technology and do more remotely, we are buying fewer consoles, we are buying smaller consoles, we're buying less of everything."

That does not necessarily mean a lower cost for projects, but it's moving the dollars. "A lot of general managers, program directors and operations guys don't see that; but if we only have three or four faders up at a time, why do we need a 24-channel console anymore?" Bukont said. "You're not buying six cart machines at $2,000 apiece, but you're probably buying two Cisco switches at $6,000 apiece."

Bukont also notes that the number of channels or destinations for your content are proliferating. "I can literally build a studio today with a few network cables: One is the KVM; one is to a node for the device that plugs a microphone in and a headphone; one cable is going to an editing computer. Now we have all this equipment in the tech center, our servers and network switches. We're not building a radio station, we're building an audio data center."

But when the operator opens the mic, the audio now is sent not to one transmitter, but to your FM, to the HD1, to one or more streams of various bitrates. And to that audio content you're adding metadata — song, title and artist, for display on RDS, HD Radio, Quu.

Asked how workflows have changed, Bo Hoover says the needs of a live show aren't dramatically different today even though the tools have evolved. "The first question is still, 'Do we want stand-up or sit-down?'"

But clients aren't asking for large production rooms anymore. "It's more of an edit suite doing ingest, a single person in a much smaller room. Or maybe we don't need four production rooms, we need one to bring a client in, but everything else is an edit suite. Or they can do production on a desktop, on their laptop, they work at home."

Jim Hibbard said he understands that working remotely has become part of radio's normal workflow, but he laments a lack of attention to the audio quality from those locations.

"Being a processing guy, I cringe sometimes. I listened to one national talk show, it's on 400-plus stations, the guy was filling in as a guest host. It was horrible, it sounded like he was doing a show sitting on the pot in the bathroom. In some ways we're lowering the bar."

That trend goes beyond a temporary situation due to COVID. "Now it's okay for people to buy a Rode Podcaster and record their podcast or voice tracks and do it remotely and not have to show up for work. Yeah, we can do it, but does it sound as good? I don't think so."

In the bigger picture, changes in workflow are following changes in ownership, said Erik Utter.

"What's the overall trend for ownership? On the commercial side, it's eliminating payroll positions," he said. "So that's all about automation. No one really wants to talk

"My job is to make you look good. Because when I'm done, I'm going to go away, and it's going to be your shop."

Air-studio

about that; but let's face it, it's been going on for a very long time.

"Consolidation for ownership is great. We can voice-track from L.A. for every market we're in; and we're reducing headcount. That's what's attractive to ownership. I think anybody who cares about the industry hates seeing that," said Utter. "But it's certainly beneficial to the SI, because almost every time there's an ownership change the SI is going to come in and move them or consolidate more stations."

And in the 21st century, integration work may be about creating template solutions to be reproduced for numerous markets.

Inrush Broadcast Services recently helped a large national broadcast company modernize its studios across the country. "Our initial role was to help develop instructions, based on our integration experience, for putting standardized studios together piece by piece, instead of a boutique model where the studio belongs to a particular talent, morning show or syndicated program," Dolan said.

"The challenge was to come up with instructions that could be standardized and built by people who had never built broadcast studios before. But they know what cables are, they know what an RJ45 is and how to put furniture together. Developing cable harnesses streamlines the process.

"How do we come up with an instructional model that allows them to succeed and build studios that work the first time, even though they've never set foot in a radio station before? It turned into almost like Ikea instructions. It was all about efficiency while maintaining quality. It's been used across the country and overall, it's been a success."

Cloudy outlook

What role is the cloud playing in designing facilities?

"Unfortunately there's a lot of baggage that comes with the word," Dolan said. "However we've found a number of customers that will have benefited quite a bit from moving operations to the cloud or to a decentralized data center, focusing more on software architectures that run centrally, whether in the cloud or in a private data center in a central rack room somewhere.

"We've been able to do things with the cloud or with software-based architectures that just would not have been possible in hardware. We recently helped manage deployment of broadcast phone systems for a customer

Above
Utter Associates provided turnkey design, procurement and integration for premiere independent KEXP in Seattle. The job included multiple air studios, productions rooms, edit rooms, a live studio, TV control room and TOC.

Inset
Erik Utter of Utter Associates

across the country. We're able to do that for hundreds of stations and essentially spin these up in a matter of days, as opposed to having to get the hardware and wire it in. The effort would be astronomical to try to do this in the traditional manner, if we had to put one of those in each studio or even one in each facility," Dolan said.

"The cloud is a tool like any other. It's important to have someone on project who can evaluate what solutions are out there that can be migrated to the cloud, and to take a hard look at what kind of cost savings and efficiency gains they can get you."

Jim Hibbard definitely sees broadcasters moving to a model that incorporates the cloud, at least for redundancy if not beyond that.

"Companies are going to have backup automation systems with the logs backed up at the transmitter site. If everything goes haywire, at least it can play the log locally and play the commercials while they put out the fire at the radio station."

Greg Dahl, whose staff of five not only handles studio and RF integration but also helps maintain clients' facilities remotely, agrees that the industry will continue to downsize, enabled by cloud-based or remotely accessible applications.

"The thing that holds us back at the moment is microphones and headphones. There's still a significant delay, and it varies because we're going across the internet, based on how the audio is being generated from the home studio to get where our automation sits.

"I believe we're going to figure this part out," Dahl continued. "With cloud-based automation, there might be a better solution. Everything has a slight delay to it in somewhere. We're probably going to need another program to sync audio with some type of clock. I'm not a programmer, but I can see that we need to tie these cloud-based applications together, to sync them somehow. I don't have that solution but I can see it coming."

Living the dream

Systems integration is a lifestyle.

Hoover — who likes to say he works "in the industry of noise and pictures" — estimates that his company has 30 to 50 projects running at any given time.

"I'm working at One World Trade and on Mount Wilson in Los Angeles. We have active projects in Tampa, Fort Myers, Louisiana, Mississippi, Alabama and Maryland at the moment." The company also does non-broadcast jobs involving sporting arenas, corporate meeting rooms, even an opera house.

The nature of the work tends to go in cycles. "The past five years has been heavily focused on RF because of the 175 transmission facilities that we built from the TV repack effort. That's winding down. Now all the radio people are feeling lonesome and want new transmitters, new antennas, or to fix this and that."

Hoover says he loves all facets of the work, which is the only justification for working 60 to 80 hours a week at it.

"Some of the harder things I've done have been some of the most fulfilling things," he said.

Based in Louisiana, he remembers Hurricane Katrina and the challenges of helping to get local broadcast facilities back in operation.

"And when the earthquake hit Haiti, the people we'd met at the commission said, 'Hey, we need somebody to go build two radio stations now.' We were tapped to fly over there and put two radio stations on the air so that they could distribute public information about food and services."

Hoover is 60. "My wife keeps asking when I'm going to slow down. Our demand curve seems to have hit its peak about the time I'm wondering while I'm still doing all this!"

He is teaching his son Chase the business. "I've had probably more fun with him in the last five or six years, seeing him grow and start out at 100 kilowatts, where I had worked myself up to it. And with further consolidations, fewer and fewer people will have the advanced skill set. There's no shortage of opportunity, it's as big as he wants to make it."

Lessons learned

What other tips can these expert integrators share to help you get the most out of the integrator relationship?

"Get started early," Shaun Dolan said. "We occasionally are brought in after the equipment has been purchased and there's a small plan together, and we're asked to finish it up; and that's fine. But the most fruitful and long-term partnerships we've had with broadcasters have resulted from people calling up and saying, 'Hey, what do you think about this?' We've been able to help some broadcasters do some pretty interesting things, especially with software architectures, that wouldn't have been possible otherwise, because we got the conversation started early."

"Begin with the end in mind," said Bo Hoover. "Do the engineering planning or drawings, even if it's a well-developed napkin sketch, and work the project backwards. It's the only way we can get back to how much it's going to cost, how long it's going to take. You have to take a holistic approach. Don't get in too big a hurry, do the homework first."

In your early meetings, Erik Utter encourages you to discuss with your integrator how change management will work. "What kinds of things might trigger a change in cost or change work? When there is a design change, or a workflow change, or a construction delay, what happens? Have a documented change order process, so that everybody is on the same page and you can minimize surprises."

Crucially, include the staff in the planning phase. "Because they're the ones that have to operate it and make it work," said Greg Dahl. "If you make it difficult for them, it doesn't do any good for you."

Don't pay an integrator for work that can be done more efficiently by a local resource. "In every market, there's a company that pulls hundreds of thousands of feet of Cat-6 every month for every business in town," said Ed Bukont. "It's usually far cheaper to have them pull your wiring between the studios and terminate it than paying a contract engineer or integrator who may already be overloaded and doesn't have the time to even do that for you."

Work can proceed on multiple tracks at once. Bukont relates that for one project involving 10 racks and a half dozen networked studios, he borrowed space in an idle printing plant and laid out the system, plugged it together and programmed it, then put it "back in the box." While his client was building the physical space and installing the cabinetry, he was able to wire, program and test out the system. "When the furniture is ready, we show up, drop it in and plug it in."

A system integrator can be your partner in meeting ambitious goals. Jim Hibbard still talks about the satisfaction of building an infrastructure for Dan Patrick's show, which involved both TV and radio, and a nationwide technical footprint. "We had 11 HD cameras in Connecticut, New York and Washington, D.C. But all of the camera switching and the directors were in Southern California. Everybody's doing that now. But 12 to 14 years ago they weren't, with directors talking to guests 3,000 miles away." The meshing of on-air schedules for television and radio, with different breaks, also created all sorts of challenges that Hibbard found satisfying to solve.

Focus on the needs of the air talent. Bo Hoover said the users will be the ones who determine whether a room is successful. "If they're going to be sitting at that production area for four to six hours, it has to work for them. We had a production meeting last week. The challenge was: What do we do with the six keyboards and the mice? We've got to get them out of the way. Well, I can design and organize at the application layer to make it easy for them to work. We can run eight applications — we might have the DAD primary, the DAD backup, the phone system, NewsBoss — we can do it all with two keyboards and two mice across eight screens, without it looking like a jumbled mess of monitors hung so that you can't see the person you're interviewing on the other side of the desk."

There is more than one right way to do things, said Hibbard. "In some places they don't have to have profanity delays. Or when they're recording a call it's for archiving, not to edit it up on a VoxPro. In France they may put effects, reverb and Harmonizers on their voices. In some Hispanic markets one talent will create a conversation consisting of two voices; they'll talk on this microphone, and then use this other mic that's through a Harmonizer. It's almost like a ventriloquist, so you have to find a way to flip those controls. The integrator has to learn and tailor what you install."

On the other hand, the customer is not always right. Hibbard has had clients who set up their on-air processing by listening to the station stream on their phone. "It's like, oh God help me, what are you guys doing?

Our last word is reserved for Jim Hibbard, who captured the sentiments of all of our experts in sharing final advice about working with a systems integrator:

"Just tell them what you want. And then listen to what they have to say."

RADIOWORLD

June 2022 eBook
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FUTURE US, INC.
130 West 42nd Street, 7th Floor, New York, NY 10036

Radio World (ISSN: 0274-8541) is published bi-weekly with additional issues in February, April, June, August, October and December by Future US, Inc., 130 West 42nd Street, 7th Floor, New York, NY 10036. Phone: (978) 667-0352. Periodicals postage rates are paid at New York, NY and additional mailing offices. POSTMASTER: Send address changes to Radio World, PO Box 1051, Lowell, MA 01853.

Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR)
www.futureplc.com

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