Sitting here in my patented Code 3 swivel chair, I’m pondering the results of the latest “after action” conference. These are typically held following major events. Perhaps like you, I attend these gatherings because they’re always exciting. It is easy to predict that “communications” will be named the biggest problem.

Yes, that is a negative view; and no, that’s not always the case. There are many fine, well-equipped public safety agencies who manage disasters and emergencies with apparent ease. I think those are the exceptions rather than the rule.

What are the typical complaints?
- Not enough radio channels
- Available channels were saturated
- Too many units, too much radio traffic
- Not enough dispatchers
- People talked over each other
- Trunked system was too slow
- Interoperability was not possible
- Radio coverage was inadequate
- Radios didn’t work in buildings
- Field users couldn’t hear dispatchers
- Dispatchers couldn’t hear field users
- Batteries went dead in the field

Those are a few of the issues raised. There are many more, and some unique to the agencies.

Enough Channels
Will there ever be enough channels? Some agencies report that they have enough and don’t understand why others have a problem. Truly, there are places in the U.S. where agencies can license as many channels in nearly any band that they want. Yet, in many metropolitan areas, frequency congestion is so bad that systems are barely usable during “normal” hours.

Many agencies have the number of channels they have because they were the only ones available. If you need ten but can only license five, then five may be your limit. If you create a new city in an urban area, you might find that no channels are available.

What is “enough”? The answer can be very elusive. What may be enough today may not be sufficient for tomorrow. What is okay for “normal” operations may be inadequate if anything abnormal happens.

Since there is financial value attached to each channel, you may have to justify your request. If you really need only five channels, but thirty are available, someone overseeing your finances might justifiably object to the unneeded extras.

Saturated Channels
If your channels are routinely congested on Friday and Saturday evening (or any other busy time), you can expect paralyzing saturation during an emergency or disaster.

One thing that has often puzzled me is the seemingly irrational desire of some managers to put all resources on the same channel during an event. For the sake of argument, let’s say you have a major building collapse and fire, with hundreds of casualties. Is it practical for police, fire, medics, and utilities to share one channel? It reminds me of the seemingly chaotic New York Stock Exchange. Can it work? A conditional yes, but is that what you want?

Not Enough Dispatchers
Staffing is staffing. It might be great to have ten firefighters on the first fire truck, or six officers in a patrol car. What we do have in real life is minimum staffing – the minimum to get the job done. The job is based on that curious word “routine” however it is defined.

I know of no agency that staffs for disasters. It’s not practical. So when a major event takes place, the minimum staffing will never be adequate. There certainly should be plans to quickly augment the staff.

Unfortunately, we have to consider real situations. It might be one of Murphy’s Laws that your disaster is likely to happen when you have a bunch of trainees working with a new supervisor.

People Talking Over Others
That’s probably not going to happen if you have a trunked radio system, but it will with all other systems. Talking over or on top of others is a constant problem, and especially during major events.

Radio users are cautioned to listen before transmitting. Yet in the real world, the field user may be in a noisy environment and oblivious to others on the radio.

Trunked System Too Slow
Trunked systems are wonderful and most users love them. Not all, but most. Sometimes there’s a tendency for them to operate slower than the older legacy systems (where people talk over others?).

The problem with the trunked system is that the computer decides when it is ready for you to talk. If there are others, you might be put in queue. That really isn’t much different than a legacy system that requires you to wait for a clear channel before you transmit. But to trunked users, it seems like the system is slow during major events.

No Interoperability
This is a topic we could talk all day about. The “after action” reports typically decry the fact that police could not talk to fire and neither could talk to medics, and somehow none of these could talk to the National Guard, electric companies, or the F-16s circling overhead.

I suppose you could go a step further and say that some police agencies can’t talk to other police, and so forth. The police chief might tell me that they use a Mutual Aid channel. True, but it’s band-sensitive. Since we have police on VHF Low Band, High Band, UHF, UHF-T, and 800, and since the radios typically operate on only one channel, having one Mutual Aid channel in one band won’t permit communication with agencies not in that band. You can have Mutual Aid channels in each band, but that won’t help those in different bands.

I prefer to think that software-defined radios (SDR) are in our future. If the SDRs can cover multiple bands, maybe that’s the answer. I don’t object to agencies having the ability to intercommunicate broadly. However, interoperability has the tendency to conflict with the chain of command and the unity of command.

Radio Coverage Inadequate
Some radio systems are engineered by engineers, some by vendors, and some are best described as “seat-of-the-pants” operations. In any case, what you asked for, even what was engineered, may not be what you get.

Assume that a new radio system is needed and the elected officials ask for an estimate of the cost. The guestimate is ten-million.

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dollars. The board sets that amount aside and directs staff to call for bids. The lowest bid (which may be non-compliant) might be fifteen million. What happens now? Either the board adds more money to the project, the scope of the job is reduced, or the project is scrapped.

It’s possible that the bid called for 98% portable coverage throughout the agency’s jurisdiction. To reduce the bid, that coverage can be reduced in increments until the project is within the budgeted amount. This means fewer towers, perhaps fewer channels, but almost invariably, reduced coverage.

Poor In-building Coverage

Many of the existing radio systems were designed and engineered for portable and mobile radios operating “in the open” throughout a jurisdiction. Buildings are built with little regard to the existing public safety radio systems. Here we’re talking about malls, high-rise buildings, underground garages, subways, tunnels, all places where the typical public safety radio system may not work. Yet those are all places where incidents and events occur.

Buildings (etc.) can be designed for public safety radio operation, and they can be retrofitted.

Can’t Hear Each Other

Yes, that does happen. An officer at the front door of a suspect’s house can’t hear the radio transmission of the officer at the back door – calling for help. In some cases, one radio user can see the other, but they can’t hear each other. Why?

It could be as simple as the radios being mistakenly set on the wrong channels. But a great number of radio systems use a repeater. Low-powered portables may have to reach out a good distance to the repeater, and it may not make it. There are other possible problems, including antennas and body armor. Antennas can be defective, broken, or just positioned wrong for the frequency. (Antennas for the lower bands should be positioned vertically, but users often hold the portables horizontally.) A portable’s power can be diminished by body mass, body armor, a vehicle, a building or the contents in the building. Weak batteries can also be a problem.

Batteries Go Dead

The industry is working hard to improve batteries, and they are getting better. My wireless phone operates continuously for two or three days with regular usage. These advancements are making their way into public safety radios. If you are using older portables, you may have to wait for the next generation. But help is coming.

Some agencies manage their battery resources, and that’s a good idea. Still, I see agencies that leave battery charging up to the field personnel. Unless you have assigned equipment, that’s not a good idea.

These days, if I travel, I carry a spare, charged wireless battery. It’s a small price to pay for peace of mind. You can be sure that if I worked the street, that’s one thing I’d insist on carrying.

Bottom Line

The perfect radio system has never been built, and I don’t know of any agency or jurisdiction that can afford to buy it. I doubt if it’s feasible to have 100% coverage in 100% of your area 100% of the time. I don’t think the FCC will ever free up enough spectrum for all the agencies who need channels to have them.

There probably will never be enough dispatchers when they’re needed. And since we can’t define Interoperability, it’s going to be hard to attain it, whatever it is. Or whatever you think it is.

It is hard to comprehend how much radio has changed just in my lifetime. When I was born, one-way radio was the primary means of communication. Now with satellites, computers, miniaturization, it seems that nothing is impossible.

I’ll leave you on that positive note. Nothing is impossible. I look forward longingly to attending an “after action” conference where “communications” is not at the top of the problem list.

Questions

What topics would you like discussed here? E-mail suggestions, comments and questions to burton@alanburton.us. Tell us if you want your name used.