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## **Radio issues reported nationwide [The Evening Sun, Hanover, Pa.]**

(Evening Sun, The (Hanover, PA) Via Acquire Media NewsEdge) Sep. 6--York County isn't the only place that has been having problems with a digital radio system.

Such systems have been failing from Virginia, to California to Canada, according to a weblog compiled by a California telecommunications entrepreneur that lists 79 links to different news reports and other documents concerning problems with digital radio systems. The reports, listed by Daryl Jones on his site [blog.tcomeng.com](http://blog.tcomeng.com), date back to 2002.

"There are a sufficient number of stories to establish reasonable doubt as to the suitability of these systems," Jones writes. "In fact, there is a clear pattern that would cause a reasonable and prudent person to entertain a strong and honest suspicion as to the suitability of this technology for mission-critical public safety radio communication." "The problems relate to the nature of digital signals, which use computer language to code and decode a radio signal. The code can be compressed to transmit across a very narrow signal. But that can also mean not enough of the code reaches the receiver, leaving garbled messages -- or silence.

Both problems have been reported by firefighters in the Hanover area, and York County officials who were involved with selecting and approving the \$36 million P-25 digital trunk system -maintained now by Harris Corp., based in Melbourne, Fla. -- acknowledge there have been problems with their system.

Based on his research, Jones writes on his weblog that some P-25 digital systems can cost as much as 700 percent more than an analog system, depending on the number of hand-held and vehicle-mounted radios and the area to be covered.

He believes there are deeper forces at work that have been pushing fearful elected officials and an equally fearful public toward the digital systems.

"There's a tremendous amount of money to be made selling these systems," he said.

But the officials don't agree with Jones that the digital system isn't a good option for police, fire and EMS. In fact, Eric Bistline, executive director of the county's Department of Emergency Services, said it is the way of the future as more and more emergency agencies switch to digital.

"We're all faced with it," he said of the conversion to digital. "It's the way we have to move in the two-way communications world of today." System history Calls for a new system in York County date back decades, driven by fire officials and police who said the old Legacy analog system was outdated. A news report from 2002 noted parts of the system still used vacuum tubes.

The push for the P-25 system started in earnest about that time.

Though the police departments had changed to a higher-end analog system in 1989, the fire and EMS agencies still were using the old system that was about four decades old, Bistline said.

"It was failing," he said.

On top of that, it was only about a year after the Sept. 11, 2001 terrorist attacks that spurred many emergency management agencies across the country to upgrade equipment, noting how police, fire and EMS in New York City were unable to talk to each other on the same radio.

After hearing enough complaints, the York County Commissioners hired L. Robert Kimball & Associates of Ebensburg to review the existing radio system and make recommendations.

At about the same time, the county formed a radio committee made up of police, fire and EMS personnel from the county, as well as county commissioners and engineers. The group, which still exists, includes several people from the Hanover area. Bistline was also a part of the group from the start.

In addition to the need for a new radio system, the old emergency services center was not big enough, or advanced enough, to hold it.

The county took out a bond issue to cover the \$67.8 million price tag to upgrade to the new digital radio system, as well as build a new emergency services center in Springettsbury Township.

The top two bidders for the radio system were M/A-COM, which is now owned by Harris, and Motorola. Bistline said the proposals were fairly similar, and less than a million dollars separated the bids.

M/A-COM won the bid in 2005 for more than \$36 million, guaranteeing the industry standard of "95-percent coverage 95-percent of the time." Testing for the system started in 2008 after installation of hardware, software and 22 towers.

As part of the testing, Kimball and the county asked police, fire and EMS leaders in the county to note what buildings in their coverage areas they deemed medium- to heavy-density. Digital radios sometimes have difficulty receiving signals in buildings made of dense material, such as certain kinds of concrete.

Testing was done in 334 buildings throughout the county.

In addition, the workers tested in "critical infrastructure buildings," including every school, hospital, nursing home with more than 25 residents and numerous day-care centers, Bistline said.

The testing showed the system met the 95-percent coverage guarantee.

Police were put onto the new system in November, and immediately problems were found. They were fixed after a few months of work.

At the end of July, the fire and EMS services were put on the new system, using lessons learned from the experience with police, Bistline said.

Most of the county's 68 fire and EMS companies have seen problems they've encountered fixed, Bistline said, stressing that the system meets or exceeds the 95-percent industry standard.

Meanwhile, York County Commissioner Steve Chronister said he believes progress is being made to fix the issues.

But he said he and former commissioners Doug Kilgore and Lori Mitrick, who were on the board when the project was approved, heard more about the benefits of digital systems and less about problems other governments were having. The radio committee reviewed the systems and made the recommendation to the commissioners, who gave final approval.

"In fairness to the people who made the decision, it was made based on what's put in front of them," he said. "I don't know that we heard about the problem-child cases, but we did hear the success stories." Fixing Hanover Hanover Borough Councilman Sonny Eline last week related a story about a conversation he and York County Commissioner Doug Hoke had at a social function at the Gitt Memorial Library, which is atop the Pigeon Hills along Broadway.

"I motioned my hand over our little valley and said to him, 'Welcome to the 5 percent,'" Eline said, referencing the 95-percent guarantee.

Since before the fire and EMS agencies switched to the digital system, elected officials in Hanover, Penn Township, West Manheim Township and elsewhere in the southwestern corner of the county had been hearing from emergency responders that there were problems with the system.

At least four fire chiefs and several municipal boards have been publicly critical of the new radio system.

Signal reception for the radios and digital paging system used by volunteer and career firefighters and EMS officials has been spotty here.

Things recently came to a head at a fire in Hanover in early August, where firefighters had difficulty communicating with each other.

As a result, fire chiefs from Hanover, Penn Township, Pleasant Hill and Jefferson fire companies decided their personnel would use the old analog radios while on fire scenes instead of the new digital radios.

Plans are in the works to address the problems, Chronister said. That could involve building another relay tower to add to the 22 in the county. Or some other technological upgrade could be suggested.

"A recommendation (from Harris) is coming next week on how to proceed," he said last week. "We're not going to spend a half-million dollars to put a tower up if it's not needed." But, based on the problems they've seen in Hanover, coupled with similar reports from across the country of dropped or missed radio calls or pages, some are wondering about the choice of system.

Even with its 1950s-era technology, Penn Township Fire Chief Jan Cromer had more faith in the old system because of upgrades made to it specifically to serve the Hanover area.

"I will prove to anyone that the radio system Hanover and Penn had with added-on repeaters (on the analog system) worked better than the system does now," he said.

'A different animal' But, even after upgrades are made, will the problems be fixed? Jones, who maintains the weblog dedicated to documenting the emergency services communication industry, said digital systems can be good. However, they might not be the best choice for emergency services. Because such systems are very complex, they can be more of a hindrance.

He noted because of the nature of radio waves -- which bounce and reflect off objects between sender and receiver -- analog systems could be better.

"With analog, it doesn't matter," he said. "The human brain can make sense of it.

"But in digital, all the signals add and subtract from each other. You get digital bit errors. The software in the radio is unable to reassemble the bit stream into usable speech.

"What you get is garbled or nothing heard at all." Bistline agreed there is a

drawback to digital's all-or-nothing transmissions.

"It's a different animal," he said. "It'll take them a while to get used to it." The solution? Cell-phone companies found one as they continue to build their digital networks across the country, Jones said.

"They built lots and lots of low-elevation tower sites," he said. "They built numerous towers that didn't transmit very far." The obvious drawback with that is the expense. Cell companies can afford to do it because they are nationwide and can raise prices if necessary. Counties aren't very large and raising their rates -- the tax rate -- is usually very unfavorable.

Meanwhile, Jones argues proper planning can make analog systems just as good as a digital radios, with certain channels being designated to certain purposes and controlled with higher-end equipment.

There are numerous other alternatives out there. Analog technology is proven, reliable and relatively very inexpensive," he said.

"The question is, why was (digital) needed in the first place?" DARYL JONES Taken from Daryl Jones's biography on his weblog: I am a serial entrepreneur in the telecommunications field with focus on developing advanced technology for public safety. My associates and I design, build, and maintain telephone and data communications systems for the police, fire and emergency medical sector. We are contractually responsible for more than twenty-five E911 dispatch centers, hundreds of base stations, dozens of radio sites and 80 fire stations in the San Francisco Bay Area. I live and work in San Mateo County, California.

I've been active in the open-source software community for many years, with particular interest in applying open-source solutions to local government.

ANALOG vs. DIGITAL There are advantages and disadvantages to both technologies. Here's a quick breakdown: Analog: An example of an analog radio is a children's walkie-talkie or an AM radio. The technology translates a signal -- such as a human voice -- into an electronic radio wave.

-Advantages: Better able to communicate where signal is weak or scratchy. It also is fairly simple and inexpensive.

-Disadvantages: Only one conversation at a time can occur on each channel, and the number of channels is limited.

Digital: An example of a digital radio is a modern cell phone. The technology translates a signal into computer code -- a series of ones and zeros -- that is then decoded by the receiving unit.

-Advantages: Able to transmit multiple conversations or other information over a single channel because the computer code can be compressed. When

the signal comes through, it is clear.

-Disadvantages: Different radio manufacturers have different kinds of technology that aren't always interoperable. Because improvements to the technology advance quickly, radios can become obsolete and are generally more expensive and complicated. If signal is garbled, it is unintelligible.

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