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## **RACK 'EM UP!** **Deep-Dish Serving** **of Chicago Projects:**

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# AN INSIDE VIEW OF Chicagoland Village's Video Venture

A well-known Chicago suburb, the Village of Schaumburg is also becoming noteworthy for its progressive video security solution. Details are shared on the village's five-year plan to add video security to more than 30 locations. **By Robert D. Grossman**

**CITIES, TOWNS** and other municipalities are continuing to discover the enhanced safety and value afforded to them through the use of today's video security systems. The great news is video platforms and system components have advanced in capabilities to bring more scalability, flexibility, compatibility, usability and affordability. This is allowing manufacturers, consultants, integrators and end users to make rock-solid investment cases that are helping loosen funding constraints and bring to fruition the power of fully realized collaborative security solutions. A prime example of this all coming together can be found just outside Chicago.

The Village of Schaumburg is a well-known northwestern suburb of Chicago

and recognized by many in the security industry as the former home of Motorola. With a population of just less than 75,000 residents, Schaumburg was recently ranked as the best place to live in Illinois (2018) and the ninth best place to live in the United States (2017) by *Money*. In talking to both residents and village employees, the reason behind these high scores becomes apparent; there is an unrelenting focus on cost effectively delivering value to residents in terms of safety, services and community resources.

In 2016 the village began to implement a plan for adding video cameras to various properties as a proactive measure, with a goal of creating an enterprise platform for video security. "This was not

driven by a specific incident or group of events," explains Peter Schaak, the director of IT for the village who led the project. "We felt there was a need to capture certain activity at critical areas, without being intrusive to residents and employees." The system was to look outward, not inward, and was divided into five logical steps, or phases, with a multiyear implementation envisioned.

The initial approach was to design the system internally, as with other IT projects, but the benefits of working with an outside consultant became apparent as the team got further into the project. "We wanted someone to look over our shoulder and catch common oversights based on their experience," Schaak says.

A higher level of detail based on similar experience would minimize ambi-

(l-r) Peter Schaak, Director of IT, Village of Schaumburg; Pentegra Systems' President Greg Augspurger, CEO Ed Karl, Security Engineering Manager Gene Brierton and Sales Manager Jim Lichter; Chris Westgor, Technical Services Manager, Village of Schaumburg.

## CASE STUDY: SCHAUMBURG VIDEO SECURITY SOLUTION

guities in the technical specification, reducing costs as there wouldn't need to be as great a buffer for unknown contingencies. A more comprehensive and well documented design would also make the project more enticing to a higher tier of integrator and give the village a sense of security, in that there would be someone on the team who had done this before. "And it was nice not to have to do this all on our own," adds Schaak.

Following is an inside account of how the consultant, integrator and end user have smoothly coordinated the project thus far.

### Designing the System

The village took the work it had done to date on a system design and incorporated it into a Request for Qualifications (RFQ) for consulting services. Thirteen respons-

es were received, with R. Grossman and Associates (RG&A) ultimately selected to design, bid and project manage the years-long enterprise. Having clearly defined requirements from the client was tremendously helpful and using its RFQ as a starting point for the system design, an extensive information gathering effort was undertaken to create a design that, when complete, will connect and centrally monitor in excess of 200 cameras in 30 locations throughout the village. These include the Village Hall, performing arts center, public safety building, senior center, municipal airport, commuter rail station, engineering and public works building, five fire stations and 12 water infrastructure facilities (towers and tanks).

The system was designed with a distributed architecture to minimize the bandwidth requirements while maintaining image quality (frame rate, resolution and compression). For the most part, cameras would be recorded on a server at each location, with the exception of a few spots that were already connected via fiber and had dark fiber strands available. Servers installed in conditioned space (or open interior space where temperature was not an issue) utilized 1RU Razberi servers with four data drives that can be put into a RAID-5 configuration, and a solid-state drive (SSD) for the operating system and VMS software. Locations that did not have any sort of temperature control (such as water towers) utilized hardened servers rated for an operating environment ranging from -13° F to 140° F with 10% to 90% noncondensing relative humidity, to be on the safe side.

All servers were integrated boxes, incorporating integrated PoE+ network switches for the associated cameras, and were sized for the implementation of all phases. For example, if there were two adjacent buildings that were covered in different phases, the server was sized to handle the total camera count, reducing costs in later phases. Reliability was important as well; all patchable cabling utilized pass-through keystone jacks rather than 110-style punch-down blocks to simplify troubleshooting later. SSDs were used exclusively on the hardened servers for both the operating sys-

tem and VMS software, and a separate SSD was used for data. Surge protection and UPS systems were implemented throughout.

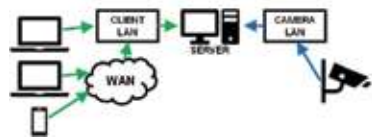
### Selecting the Integrator

The RFP was released October 2016 and was designed to be scalable. There was a base bid that included certain elements common to all phases of the project (i.e. operator workstations) and four additional phases that could, for the most part, be implemented in any order — all required the base bid, but only Phase 5 had other dependencies. The 11 responses were generally excellent and included a good cross section of national, regional and local integrators. Pricing was varied — the high bidder was almost three times as much as the low bidder — but fell into roughly three pricing bands, once bidders that lacked credibility were disqualified. Choice of a VMS impacted pricing, so some time was spent on that to narrow the field (see *Deploying a Modular System Design* sidebar).

After careful consideration, Addison, Ill.-based Pentegra Systems was selected as the integrator believed to best serve the village and this project. Founded in 2000, Pentegra has won several awards and was extremely responsive throughout the evaluation process. Its team, including CEO Ed Karl, President Greg Augspurger, Security Engineering Manager Gene Brierton and Sales Engineer Jim Lichter, impressed with their knowledge, experience and collaborative approach, and their references echoed those sentiments. Their solution included Antaira Technologies hardened network switches, Axis cameras, EnGenius EnStation AC wireless links and Razberi servers (both hardened and rack mounted). Once the final submittals were received and approved and contracts were in place, work commenced on Phase 1 of the installation, which included six locations and roughly 70 cameras.

### Installing the Solution

The on-the-ground task of managing the installation fell to Chris Westgor, technical services manager for Schaumburg, and Brierton at Pentegra, with remote support and site visits at key milestones from RG&A. Almost immediately, West-



### Proper Network Design Keeps Cameras From Phoning Home

There has been a lot of attention paid to cameras from certain manufacturers being able to "phone home" and potentially report sensitive information back to their manufacturer and potentially a government entity that may be affiliated with said manufacturer. While the theoretical danger is understandable, with a properly designed system this is simply not an issue.

One way to do this is to build two separate LANs, either with discreet network switches or by setting up a VPN. Consulting firm R. Grossman and Associates advocates doing this with separate switches as it makes servicing the system easier, but either way only the Client LAN is exposed to the outside world; cameras are on their own network with no Internet access. To view a camera, you need to go through the system firewall and the VMS software, as the servers bridge the two LANs. Cameras cannot phone home, regardless of manufacturer or country of origin, and a hacker cannot disable a camera without first going through the server and proprietary client software that they are likely unfamiliar with.



The video security system will span 30 locations throughout the village. These include the Village Hall, performing arts center, public safety building, nursing division, senior center, municipal airport, commuter rail station, engineering and public works building, five fire stations and 12 water infrastructure facilities.

gor and Brierton shared the virtue of always looking ahead. Understanding it was a multiphase project, they seemed to focus on lessons learned, proactively. While this led to some fine-tuning on Phase 1, the idea was to have consistency across all phases, improving quality while being mindful of efficiencies that could be achieved.

Phase 1 included cameras in the Village Hall, Schaumburg's renowned Prairie Center for the Performing Arts (including an outdoor stage), a senior center, the Engineering and Public Works building (including a fuel station), the municipal airport (including fueling station, terminal building, parking areas and hangars), the commuter rail station, and one of the water towers. With the number of different venues involved, Pentegra liked the variety.

"Each location was different and required adjustment and flexibility to install, and each presented unique challenges to provide the camera views that the village was looking to achieve," notes Brierton. This presented a major coordination effort, however. "Proactive communication and scheduling with the village departments and personnel required extra attention. Each has its own daily tasks and calendars that work in conjunction with each other," he adds.

This required multicollaboration, for which Pentegra earned high praise. "For the most part, unless there were specific issues to address, we didn't even know Pentegra was there," remarks Westgor.

Asked to describe a specific area that presented challenges, Brierton pointed to the municipal airport. "The Schaumburg Airport site was one of the most challenging to coordinate since it involved tenants, flight crews, aircraft, village staff and the public on a daily basis," he says. "There were special power considerations that required specialized cameras and lenses to achieve specific views as well as point-to-point wireless systems for the camera network." In particular, RG&A had specified the use of light poles for camera mounting positions that were later ruled out for various considerations, forcing alternate locations to be sought out and mounting methods to achieve the desired views. Pentegra was instrumental in making this happen, offering field modifications and product substitutions that improved upon the initial design.

Pentegra went the extra mile in this and other locations. For example, a specification requirement was to paint conduit and housings to match, to the greatest extent possible. At the airport hangars, this meant using three separate colors to hide the conduit; at the performing arts

center where the cameras and wireless antennas were visible as part of the stage, even the antennas were painted to blend in with the surroundings (see photo on page 50).

Water towers required careful consideration as well. "You can't just drill a hole in a water tower for cabling," observes Westgor. "Engineering review and approval are essential to minimize the number of penetrations, and cabling sharing the same penetrations needed to be compatible to minimize signal interference." As all but one of the water towers are in later phases, this will be an area of focus and coordination going forward.

Asked how working with a municipal contract like Schaumburg is different from working with commercial/industrial clients, Brierton remarks, "There are many departments within a municipal entity that are involved rather than one individual. Collaborating with all departments in a team environment was key to providing a successful project and satisfied customer. Working with the Village of Schaumburg, you begin to understand they are all working together to support their public customers. Working within that environment is much different from a commercial/industrial company that is mainly responsible for its employees at a given facility."

## CASE STUDY: SCHAUMBURG VIDEO SECURITY SOLUTION



The system was designed with a distributed architecture to minimize the bandwidth requirements while maintaining image quality (frame rate, resolution and compression). Aesthetics were considered as well as technology and usability, with devices being painted to blend in with the surroundings (top right).

### Learning as You Go

The advantage of a multiyear project is that you aren't sitting back when it's all over, talking about what you would do differently in the future. You can implement the improvements you would like to make, even going back to earlier phases to make improvements. In some areas, pole-mounted cameras were moved to buildings because of power issues at the poles. Server data drives, initially in a JBOD configuration, are slated to be configured as RAID-5 arrays, both in future phases and retroactively for the Phase 1 servers. Some of the locations with multiple fixed cameras facing different directions on a single pole will be getting multisensor cameras to improve the outward appearance and add camera views. A radio antenna tower that was to be used for a camera mounting platform was replaced, requiring plan modifications to achieve the desired coverage.

The first phase also included several change orders due to unforeseen construction issues. Working closely with Pentegra's Lichter and Brierton, RG&A did a pricing refresh for Phase 2 that incorporated these lessons learned



and should eliminate change orders except for the most extenuating of circumstances. "This refresh gave us an opportunity to make the unpredictable less so," says Lichter. "The project team was very receptive to new ideas and applications of the video system when presented, and we'd be foolish not to take advantage of that," adds Brierton.

As everyone heads into Phase 2, the Phase 1 cameras that had previously been installed were already paying dividends. Without naming specific incidents for confidentiality reasons, Schaak remarked on the comparison of design intent to results. "We may not have gotten everything on our wish list right away — there are always other considerations, and we are just starting down this road. But we got exactly what we were told we would get during the design process," he says. Referring to the



### Deploying a Modular System Design

When security consultant R. Grossman and Associates (RG&A) designs IP-based CCTV systems, it likens it to a "Lego" approach, dividing the components into three distinct categories. First and foremost are edge devices, or cameras in the case of CCTV systems. These should conform to industry standards, providing a wide range of compatibility. There can be special features, but they shouldn't require a proprietary client to take advantage of them.

Second are servers and hardware, which includes cabling and infrastructure. Again, adherence to standards is critical, and RG&A tries to stay away from proprietary boxes with embedded operating systems. If a client likes Dell servers, for example, they should be able to use them here, and leverage their service and support expertise.

If these first two areas are done properly, there is some flexibility in selecting a VMS vendor, and it doesn't necessarily have to be done upfront. In the case of the Village of Schaumburg project, RG&A picked a VMS vendor for the specification that used industry-standard servers and integrated with a wide variety of edge devices, and allowed substitutions. VMS submissions that were essentially the offerings of camera companies were not accepted as these rarely integrate with their competitors beyond the feature limited ONVIF standard.

While it was not the specified solution, after an onsite "shoot-out," the Genetec Security Center VMS was selected. It has a strong feature set, the village liked the user interface and felt Genetec made an outstanding foundation for future electronic security efforts. Surrounding communities and other agencies have already committed to this VMS, and it is in use in the local school district as well.

team of client, consultant and integrator, Schaak concluded, "The team has turned our RFP into reality, and we are happy to see that happen." SSI

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