

## Wide Area Surveillance at the University of Michigan's "Big House"



### Background

As America's largest Football stadium entered its 80th year, the University of Michigan "Big House" recognized it was faced with a new era of security needs. The typical football Saturday at the University of Michigan Stadium doubles Ann Arbor's population by inviting more than 107,501 football fans to witness gridiron action all within a 540,000 square foot area. With so much activity and people in a densely packed area keeping an eye on everything while maintaining command and control is challenging to say the least. A \$280M renovation project gave the Athletic Department and the Department of Public Safety (DPS) the opportunity to go back to the drawing board with a clean slate to develop the security solution they really wanted.

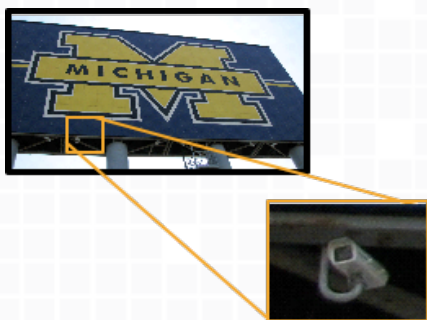
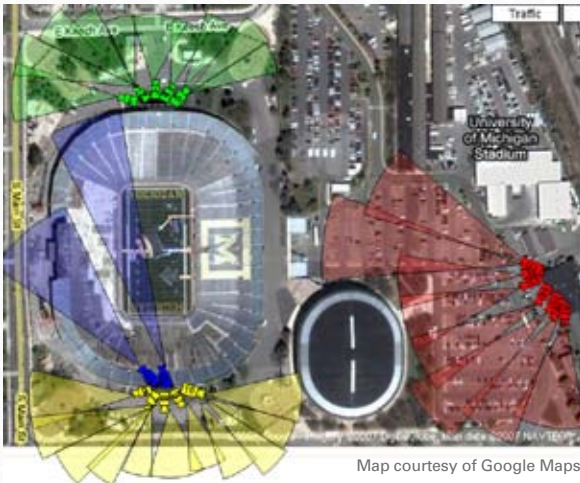
### Security Operations

On any given game day there are more than 200,000 individuals inside and outside the immediate stadium vicinity that DPS has jurisdiction. More than nine different agencies are required to work with each other including local and state police, FBI, the athletic department, fire, and Homeland Security just to name a few. Altogether there are over 2000 forces keeping fans safe and secure. To organize such resources, having rapid, accurate communications and information are the most important ingredients to averting and resolving unwanted occurrences. When DPS went to address these two requirements for game day security operations, they knew that leveraging technology was going to be a key part of their solution.

### The Right Video Solution

Along with an integrated radio communications system and bio/radiation detection sensors, full-facility visual awareness was absolutely necessary to complete DPS's new security system. This required a surveillance video system that could integrate with the existing IT infrastructure while meeting their future needs in providing advanced video capabilities. The solution that best fit DPS's current and future needs was Pixel Velocity's Video Fusion™ system.

The Pixel Video Fusion™ solution creates panoramic views that allow staff to drill down into high definition detail on live and recorded video. Its unique architecture conserves bandwidth while delivering high definition video on a wide-area panoramic basis. The first phase of the stadium project received Homeland Security funding to harden the outside of the stadium by creating visual layers at the north and south ends of the stadium and parking lot. This created detailed scenes of all vehicle and people entrances and adjacent exits. The second phase was completed a year later and focused on stadium construction observation and crowd flow within the concourses areas. The Athletic Department shared in funding the system to leverage video for identifying overcrowding points and enabling reallocation of personnel resources dynamically. The Pixel Video Fusion™ system was flexible enough to layer on non-security related applications in order to expand overall system functionality. The upcoming third phase of the project will consist of coverage in all seating areas with face recognition detail.



## Key Issues Addressed

### Communications Enhanced by Video

Prior to security technology upgrades, communication processes often left field personnel less informed of situational awareness and response actions. In addition, command level decision makers were dispersed throughout the stadium thereby limiting coordinated response activities. The first change was to consolidate the decision-making into a single nerve center, providing a centralized means to manage game day operations.

The Pixel Video Fusion™ system brought full domain awareness to the remote command and control room by being able to deliver high definition video over the stadium's existing network. This was the same network shared by game day media (ESPN, news writers, etc.), operations (ticketing, concessions, etc.), and security (yellow jackets, Athletic Department, other governmental agencies) without having to degrade the image quality. Having full-coverage and full-detail facilitated the means by which control room staff could see the exact same scene as field personnel. In addition, the panoramic views allowed ground forces to communicate in a way that was not dictated by a camera location but an overall area of interest. This increased the communication flow considerably. Rather than spending time to describe a scene or an incident, the field staff could immediately receive pertinent information and respond accordingly.

The Pixel Video Fusion™ easy-to-use interface also allowed individual agencies to customize virtual camera scenes at their workstations by utilizing the many high definition and panoramic video search and discovery tools. As an example, the Washtenaw County Sheriff's Department was primarily interested in analyzing traffic intersection activity. The Pixel Video Fusion™ flexible interface allowed them to create customized views for traffic analyses; however when a major incident occurred, the command room coordinator had the ability to assume system control and focus everyone's attention. From there all agencies would look at the same pieces of video information thereby enhancing coordinated decisions around field staff responses.



### Information vs. Poor Video

Clear, obtainable video information is a significant asset in DPS's decision making capabilities. Video must: 1.) provide full area coverage in order to obtain as much activity as possible. 2.) provide significant enough detail to provide clues and evidence that truly solves crimes and serve as usable evidence; and 3.) be accessible quickly so that an immediate response can be coordinated rather than spending critical seconds looking for the right piece of video.

DPS needed to be able to recognize faces and license plates on live and recorded video while not losing the context of the overall scene. This is the level of detail DPS needed to apprehend and prosecute suspects, thereby leading to the prevention of unwanted events.

### Results

As Jeff McDole, IT Manager for DPS, accurately states, "90% of the time the clue that breaks the case is not found by focusing on the suspect, but it's found on the periphery of the crime scene. It's almost always that car idling in the background or that person standing off to the side of the video scene that breaks the case. This is because they end up being that key witness or accomplice. While 99.99% of video captured is of no use to us, it is that 0.01% that when we need it we really really need it. High definition and video and search and discovery tools give us the ability to truly break cases. Edge based storage, appropriate bandwidth management, and an end-to-end solution make it practical to implement these utilities." This was validated by DPS as they quickly apprehended a suspect who had jumped over a fence. The Pixel Video Fusion™ system enabled DPS to immediately identify an individual on the periphery whose behavior conveyed a vested interest in the event as well as a cell phone call (to the suspect nonetheless). DPS ended up having the suspect's cell phone number as well as his companion. This was just one of many events aided by the Pixel Video Fusion™ system.

The Pixel Video Fusion™ solution also resulted in a number of cost savings. It was estimated that it would take over 200 cameras to achieve the level of coverage provided by 31 Pixel Video Fusion™ cameras. In addition, Pixel Video Fusion™ cameras are typically clustered at one point that can be tied to existing building exteriors; in DPS's case the scoreboard and command center roof. This eliminates the need to run connections to multiple disparate locations via trenching or wireless. DPS knows the Pixel Video Fusion™ system will withstand the technology curve longer due to its multi-megapixel resolution, distributed processing architecture, and video automation.