

High-tech system scans destruction after Baltimore riots

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Engineer Robert Graham mounted a high-tech camera and scanners on the rear and roof of a police sport utility, running wires through the windows to his laptop in the front seat.

When he and Thomas Wisner, a crime lab technician, pulled out of the police headquarters parking bay Thursday, a Foxtrot helicopter hovered, ready to follow them.

The sport utility vehicle embarked on a first-of-its kind mission to map and scan buildings and blocks ravaged by the Baltimore riots. The goal: to treat the city as a crime scene writ large and assess the damage as officers would for a police report.

Only this time, the report would be more detailed than ever before — and hopefully would provide information that could help city officials and police better protect businesses and blocks when civil unrest turns violent.

"There's no precedent for this. Most of the post-riot documentation is not well developed," said Steve O'Dell, director of the Baltimore police crime lab.

Using nearly \$200,000 worth of imaging and surveillance equipment typically used by engineers to build roads and bridges, police took 3-D images of the protest routes, burned-down convenience stores, blown-out businesses and a senior center left in rubble, to create a multidimensional map and model.

O'Dell said the uses of the information are almost limitless, as forensic science has rarely been applied to studying riots. He said the data will not only help pinpoint damage but will aid arson investigators and inform future plans for how to deploy in large-scale events.

Hundreds of businesses and cars were damaged April 27 when a confrontation between youth and police began at Mondawmin Mall and ignited violent clashes, fires and looting across Baltimore. The unrest followed days of protests over the death of Freddie Gray a week after suffering a severe spinal injury in police custody.

Gov. Larry Hogan has given a tally of the devastation: About 250 businesses, mostly minority-owned, were destroyed, burned or looted; more than 170 cars were vandalized; more than 100 fires were set the night of April 27 alone, and a number of homes were damaged.

Hogan spokeswoman Shareese Churchill said the federal Small Business Administration has visited the city to help calculate the economic toll. A handful of state agencies are trying to calculate the damage as well as overtime and other expenses incurred by the state during the response.

The Police Department and other city agencies also are tracking the costs to eventually submit them to the federal government in hopes of emergency response reimbursements.

As Wisner drove toward West Baltimore, dots appeared on Graham's laptop screen that represented some of the 10 satellites communicating with the GPS rigged to the imaging system hanging off the unmarked Ford Edge.

"5826 we are coming up 83," Wisner told Foxtrot over police radio. As the SUV drove, the system mapped destruction from street level while Foxtrot took aerial images for police to compare side by side.

O'Dell said he wanted to find a revelatory way to document riot damage beyond photographs and video and called LiDAR USA, a surveying, mapping and imaging company, to ask about borrowing their high-tech mobile system.

The Somerville, Ala., company donated its services and sent Graham, a contractor for the company, to the city in a pickup truck with the expensive gear. Renting the equipment or hiring the company for mapping would have cost more than \$5,000, O'Dell said.

"They were willing to contribute to the Baltimore cause," he said.

The ScanLook 2.0 system on the SUV, also called "Snoopy" because of its shape, employs a "GoLook" camera system that includes seven high-definition video cameras that record 360-degree views.

The camera system juts straight into the air in a blue box while a rotating laser scanner that looks like a gray canister spins at the back of the car, taking a sweeping, fan-patterned view. A FARO scanner below it captures 3-D information of the road surface.

The different parts synchronize to cover about 328 feet in every direction, providing police with a virtual replica of damaged blocks and neighborhoods.

The technology has been in use since the mid-2000s by engineering firms, Graham says. This is the first time a LiDAR system has scanned riot damage, according to the Graham. After Hurricane Sandy, the company sent Snoopy into flooded New York subway tunnels attached to a work train to find structural damage.

Just off North Avenue, Wisner pulled over to radio the helicopter when three passers-by stared curiously at the contraption hanging off the Ford. At Baker and Mount streets in West Baltimore, the vehicle passed a charred yellow corner store.

"So is this the district that TV show is about?" Graham asked. He had just arrived in Baltimore hours earlier.

"The Wire?" Wisner asked, before answering: "Yes."

Wisner told Graham that a 10 p.m. curfew, imposed by Mayor Stephanie Rawlings-Blake to quell unrest, had been lifted, as had the state of emergency declared by Hogan. Life in Baltimore seemed to be returning to normal, he said.

But as the SUV drove toward the Western District police station, it encountered concrete barriers that continue to stop cars from coming close to the station.

"I had no idea that was still blocked off," Wisner said, turning the Edge around. "I figured they would have taken these Jersey walls down."

The trip rolled on. "There was a liquor store apparently burned," Wisner said, pointing as he drove west on North Avenue. "That one right there."

He circled the store, the camera system capturing images of the charred door and boarded-up entrance affixed with a red sticker warning people to stay out.

They passed a CVS store that remains shuttered near North and Pennsylvania avenues. A peace sign, heart and

"One Baltimore" were scrawled on the red brick facade, alongside "Police Go Home."

At another burned-out CVS at West Franklin and Evergreen streets, the smell of smoke lingered. Molted metal from the store sign had fallen to the ground.

Wisner then drove to a Rite Aid in the 300 block of Martin Luther King Blvd. where the pharmacy drive-thru's charred ceiling hung in tatters. At the front of the store, workers wearing white hard hats and soot-covered uniforms went in and out of the charred entrance. A trash bin nearby contained sacks of vitamins and other goods that had been hauled out.

Snoopy captured it all. The SUV headed toward East Baltimore and the remnants of a senior housing complex and community resource center that was under construction before the \$16 million project was burned.

"I guess this would be it," Wisner said. All around, construction vehicles rumbled on the site to level the building so the project can start over.

"Wow, they tore it down fast," Graham said. "So this is a senior center?"

"Was," Wisner said.

Baltimore Sun reporter Erin Cox contributed to this article.

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