Watching you watching me

New Boeing system detects optical monitoring devices such as binoculars—or a sniper scope

By Elizabeth Merida

Federal agents are assigned to keep an eye on an area surrounding the open-air platform where a candidate for high office is about to give a speech. A block away, someone else is watching the scene through some sort of optical device. It might just be a supporter. It might be something more sinister.

Agents are instantly alerted to the existence of the optical device and the exact location. Fortunately, it's just someone with binoculars.

How did they detect the optical device in this fictional scenario?

Through Boeing's Surveillance Detection System.

Developed by Boeing's Directed Energy Systems division, the system is capable of detecting optical monitoring devices such as binoculars, cameras or sniper scopes. It can also provide detailed information about and images of the onlookers it "sees," delivering near-real-time range and GPS data to help identify potential threats.

Boeing's team of Directed Energy Systems engineers has extensive experience with the development and application of pointing and tracking algorithms for beam control systems. Optical physicist Nora Tocci said that the team applied this knowledge, along with new detection schemes, to the principle known as "optical augmentation" to develop the new system.

"The combination of good optical design and major advancement in real-time image processing is what allows our system to be extremely flexible and accurate," Tocci said. The device is designed to be mounted on a telescoping pole or tripod, but it is portable enough for hand-held use.

The Surveillance Detection System is capable of scanning terrain from every angle. A spinning line scanner rotates 360 degrees every few seconds, allowing comprehensive surveillance of a given landscape.

Once the scanner skims an area, it captures the imagery in a linear array of pixels. This pixilated information is then transferred to the system's high-resolution interrogation sensor, which uses technology similar to that of a digital video camera to translate the pixels into a detailed, 360-degree image of the landscape. Then, using GPS technology, the system pinpoints both the range and precise position of objects of interest.

Boeing has extensively and successfully tested the system in the field, and it has proved to be reliable, day or night, in a number of tactically relevant scenarios.

The company announced availability of the system last November. It is primarily intended for soldiers in the field.

"Our hope is that it can help soldiers identify and react to potential threats in real time with high confidence," Tocci said. ■

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PHOTO: Boeing optical physicist Nora Tocci is part of the Directed Energy Systems team that developed the Surveillance Detection System. BOB FERGUSON/BOEING

GRAPHIC: The Surveillance Detection System can help soldiers pinpoint when they are being observed by optical devices such as binoculars or a sniper scope. BOEING