Air Force SBIR/STTR

Transition

Air Force SBIR/STTR Transition Story

SBIR Topic Number:
AF06-204

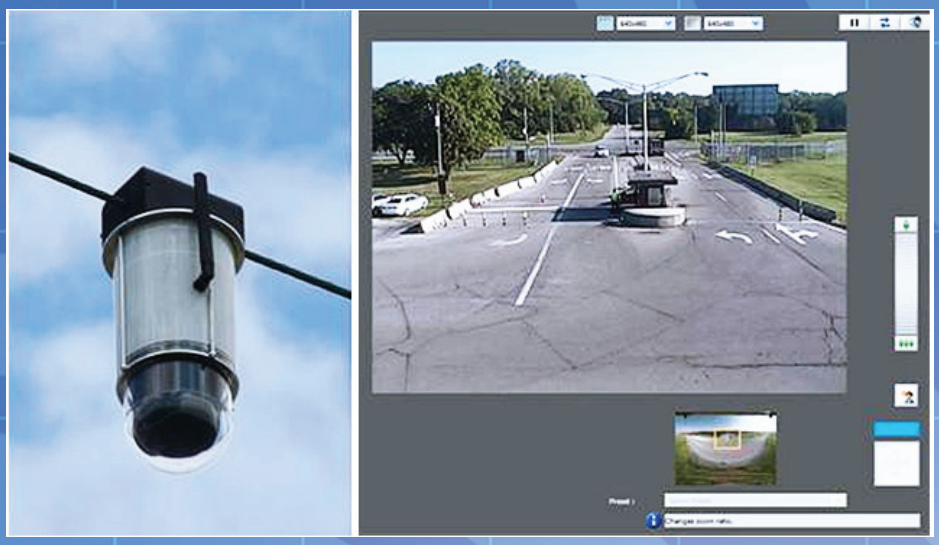
SBIR Title:
Long-Duration, Eye-in-the-Sky Monitoring for Airfield Threat Detection

Contract Number:
FA8650-07-C-1118

SBIR Company Name:
Defense Research Associates, Inc., Beavercreek, OH

Technical Project Office:
AFRL Sensors Directorate, Wright-Patterson AFB, OH

An example of Air Force supported SBIR/STTR technology that has been transitioned into an Air Force or other DoD system or subsystem or used by Air Force test ranges and facilities or maintenance depots.



Left: Vigilant Sensing System (VSS) installed on power line. Right: Video shot from VSS unit on left to remote laptop graphical user interface (GUI).

Innovative Energy Harvesting Technology

- Research objective was to design and develop camera/sensor platform that mounted directly onto any transmission distribution line for inductively harvesting enough power to support long-term deployments without the need for periodic maintenance or replacement of batteries.
- Defense Research Associates, Inc., created a small and reliable platform known as the "Vigilant Sensing System (VSS)" that can be installed directly onto any power line world-wide.
- Supports the Warfighter in urban environments as well as domestic law enforcement entities when it comes to "hot-spot policing" and border security.
- Sales so far:
  - University of Dayton Research Institute (UDRI)
  - Greene County, Ohio, Sheriff
  - Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
  - Unit under evaluation at U.S. Marshall's Office
  - Unit under evaluation at Dayton Power & Light (DP&L), Dayton, Ohio
  - Unit under evaluation by the United Kingdom Ministry of Defence

Commercialization Pilot Program Series

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Air Force Requirement

The objective of this research effort was to design and develop a small camera/sensor platform that can be mounted directly onto distribution power lines world-wide for Air Field Threat Protection applications.

SBIR Technology

Defense Research Associates, Inc., (DRA) developed a small, reliable, camera/sensor platform that can be installed directly onto power lines known as the Vigilant Sensing System (VSS). The development process produced technology meeting multiple areas of this SBIR requirement, to include:

- System inductively harvests enough power to support long-term deployments without the need for periodic maintenance or replacement of batteries. And no direct connection to an alternating current power source is required.
- System can be easily deployed within minutes using trained personnel from local power companies.
- Remote access to the camera/sensor system is provided through existing cellular infrastructures world-wide eliminating the need for Wifi or direct cable connections.
- System designed to be highly efficient for operating at extremely low power line current levels
- System designed with special power throttling self-protection circuitry in the event line currents reach excessive levels.
- System architecture that could capitalize on low-cost commercial off-the-shelf (COTS) such as cellular Ethernet routers and Pan/Tilt/Zoom Network cameras. This capability provided complete flexibility in the selection of cellular services and camera/sensor types to accommodate the continuing improvements in technologies without the need for expensive system redesigns.
- Development of a microprocessor-based controller that autonomously monitors available radiated energy from the power line and operates the internal systems accordingly. Operation includes the initial power-up sequencing of the cellular system and sensor, as well as the throttling of available remaining power to a heating/cooling system. Periodic disabling/enabling of the sensors/supporting systems is also carried out based upon available power.
- Embedded Web server designed within the microprocessor allows remote system monitoring and diagnostic checking through cellular link. On-site visits for maintenance or periodic checks not required.

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Transition Impact

The need of the Warfighter to have access to reliable real-time reconnaissance data to support efforts within urban environments is an ongoing challenge. Capitalizing on existing readily available infrastructures such as public utility power lines and cellular communications, the VSS system developed under this SBIR effort is intended to address these needs. The VSS provides a small, compact camera/sensor platform that can be deployed within minutes using local power company personnel and provide the high-quality real-time reconnaissance data desired. Supporting the Warfighter in urban environments as well as supporting domestic law enforcement entities when it comes to "hot-spot policing" and border security can be realized through the use of this technology.

For over a year now, VSS units have been deployed by outside law enforcement agencies for aiding in various ongoing investigations involving drug-related and high-crime areas where it is undesirable to post an investigator on site. After a week of use, lead officer agreed to personally endorse this product to his peers.

After seeing the significant security applications potential of this product, the University of Dayton Research Institute recently purchased several units for the purpose of demonstrating its technical capability to law enforcement agencies.

Company Impact

The SBIR program allowed DRA to respond to major customer requirements for a very fast deployable sensor system. These new technologies are being sought after by various multi-billion dollar industries such as law enforcement, facility security, and power companies who wish to monitor their own infrastructure.

U.S. AIR FORCE

SBIR/STTR

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