Little Eyes Everywhere

DMEA MicroSensors Transfer Commercial Technology to Wartime Uses

How do you monitor activity in a foreign environment without people knowing they are being observed or watch for intruders over a vast area with a limited force? DMEA's answer to these questions is unattended microsensors.

Problem:

The Department of Defense needs a portable, affordable way to protect high value assets and soldiers in hostile environments. "Miniaturized unattended sensors provide the answer," according to Bill Davis, DMEA program manager. DMEA is working with a public/private team led by Signal Technology, University of Alaska, Fairbanks' (UAF) Office of Electronic Miniaturization and North Dakota State University's (NDSU) Center for Nanoscale Science and Engineering to identify solutions that can be used in the field today.

Solution:

The team has developed the MicroSensor System, an ultra-low power battlefield sensor communication system made up of inexpensive sensors that can look like rocks. The sensors could be distributed around the perimeter of a camp or a storage facility to detect movement, and then turn on an imaging camera for a closer look.

The miniaturization technology used in the sensors is being transferred from Morgan Hill, California-based Alien Technology Corp., a company that specializes in creating RFID tags and tag readers for retail applications. The low cost, small size and high sensitivity sensors that work well in commercial applications work well in military settings. The sensors, which create what is essentially an electronic trip wire, can distinguish between a man, a man with metal – say, a gun – a small vehicle and a large vehicle – all important things to know in a battle setting. Because the sensors are inexpensive when mass produced – approximately $100 each – they can be abandoned when the camp moves.

Chip Scale Packaging another commercial electronic miniaturization technology is being utilized by UAF and NDSU. The semiconductor packaging technology transferred from San Jose, California-based Tessera Technology focuses on miniaturized packaging of electronics in sensors such as global positioning system technology so it can be placed in suspect vehicles James Bond-style. When the vehicles pass designated checkpoints, they automatically transfer information on where they have been. Both technologies rely on transmitting large amounts of information from small, inexpensive, unobtrusive devices to find out what the enemy is doing without them knowing they are being watched.

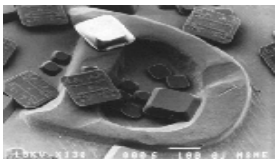
Case Study:

The MicroSensor System will be tested in the fall under simulated field conditions to ensure reliability. The technology could be in the wartime theater in six to nine months.

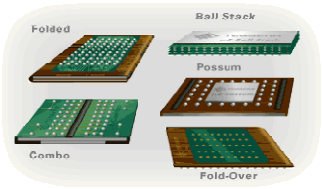
Benefits:

Low-power, battery operated
Inexpensive, disposable hardware
Sensitive enough to detect small movements and distinguish between sources
Small enough to be undetectable

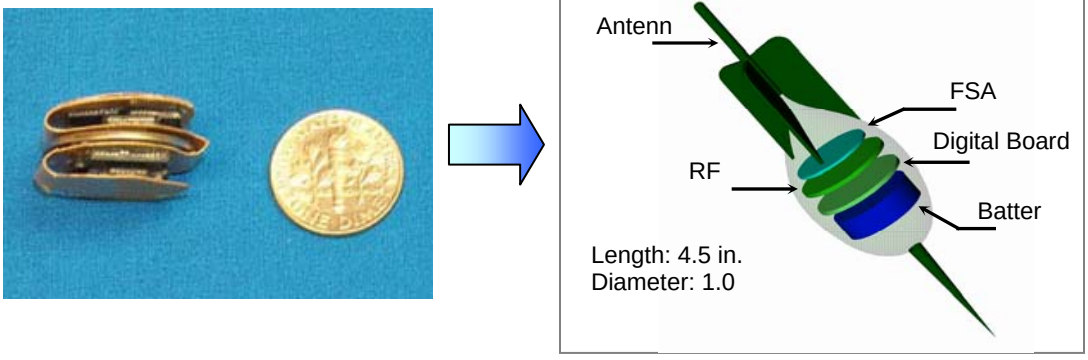
Davis, who has a relative serving in Iraq, says "The reason we work here is so we can support the warfighter. That is the biggest thrill."



Integrated circuits from Alien Tech (this is the 'D' for the Denver mint on a dime)



Chip Scale Packaging from Tessera



Sensor Packaging Concept

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