Capabilities Brief
Smart Electrically Powered And Networked Textile Systems (SMART ePANTS)
Research Program

IoT/AI has a long history of developing wearable sensors and communications technologies for NASA, DOD, and other agencies for physiological monitoring, exposure monitoring, personnel communications, and other applications.

We were recently the awardee of the Strikewerx Challenge for developing a wearable personal communicator device (*think: Star Trek badge*) for aircrew alerting for nuclear bomber personnel under USAF Global Strike Command. This extremely reliable, rugged, secure wearable device is fully operatonal and currently under extensive environmental, exposure, and security testing. As part of this effort, we have partnered with NextFlex- a flex circuit consortium based in San Jose California to explore the development of a flexcircuit design that would allow the integration of this personal communications device into a garment, with appropriate ruggedization, wearability, and other attributes.

For the SMART ePANTS initiative, we would leverage the above effort, which is built on the IoT/AI Pico Platform- *the **world's most advanced ultra-secure/ultra-rugged/intelligent edge computing, communications, sensing, and AI/ML edge system ever produced***. This platform is an ***open, modular, flexible system of IoT building blocks*** (ala *IoT Legos*) for building IoT solutions. These boards literally ***snap together*** to realize or ***reconfigure for a multitude of applications***. This ***open modular approach*** also enables other groups to develop boards by adhering to the module interconnection standard, as well as makes the system future-proof- as new processors, radios, sensors, etc are produced, they can be easily incorporated into the system.

The Pico Platform is being developed with significant funding from USAF (ACC ACE, Strikewerx, RSO), SOCOM, DTRA, OSD, and other stakeholders to realize an extremely low SWaP, open sensor, edge compute/analytics, and communications platform for use in many applications, including covert EW/ISR, to secure LPI/LPD comms, wearable sensing, etc, and would be leveraged and potentially provide co-funding to this initiative.

In addition, one particular technology that we have integrated with the Pico Platform is an Army-funded Intra-Soldier Wireless (ISW) radio, which provides very high bandwidth (up to 480Mbps) with extremely low signature (2m) and power, to enable a WPAN sensor network of bodyworn sensors.

Thus, our goal for the SMART ePANTS initiative would be to provide the open platform and bodyworn communications framework, designed as a flexcircuit and capable of integrating with other great sensors, analytics, location tracking, and other capabilities with partner companies to yield the best solutions for our government stakeholders.

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