OBJECTIVE: Develop a pouch technology that serves as a docking station for personal electronic devices, connecting these devices into a body-worn electronics network.

DESCRIPTION: While home and office docking stations provide for quick pre-wired connection between a computer and local peripherals, those docking devices have not yet been adapted for wearable systems (Reference 1). Small batteries can charge individual devices, but must be paired directly to the device (Reference 2). Connectors for personal electronic devices are getting smaller, more robust, and are preparing for a booming market in wearable technology (References 3 and 4). The Army desires a pouch that can serve as a docking station for a personal electronic device and connect into a body-worn network. This pouch development effort will explore unique methods for combining electronics docking with textile systems.

When the personal electronics device is inserted, the pouch will guide the device to a connector and not allow incorrect insertion/connection. The pouch may require different configurations for the size of the device and the type of existing connector on the device. When mated, the device shall be connected to the power (5V minimum) and data network. Data transmission from the electronic device will use USB protocol compatible. Typical connectors on personal electronics will include variations of USB such as Type A/B/C, mini-USB, micro USB, and Lightning. Upon insertion of the device into the pouch, there shall be tactile feedback that the User senses to assure that a power connection is made.

The pouch connector shall vary as a function of the existing personal electronics devices. Examples of Personal Electronics Devices used in Army Aviation include (but are not limited to) Lightweight Wearable Environmental Control System (LWECS), 45 Watt battery, End User Device (EUD) (an Android cell-phone-sized device adopted from Nett Warrior by Air Warrior), and the Electronic Flight Bag (EFB) (a tablet-sized Android device).

The pouch shall provide protection from an aircraft environment to include sand and dust, Petroleum/Oil/Lubricants (POL), electrostatic accumulation, flash-fire, and rain. The pouch configuration may allow insertion of the device from the bottom so the connection is at the top of the pouch if it provides better protection from contamination. Other innovative approaches to avoiding sand and dust contamination are welcome. The pouch shall retain the personal electronics device and shall maintain connection between the pouch connector and the inserted device. The connection between the device and pouch shall not be broken during normal user motion to include walking, running, crawling, and jumping. The connection shall be rated to IP68 (International Protection Marking, IEC standard 60529).

While power and data requirements are driven by the particular device the pouch contains, the docking pouch will be used in an aircraft environment. Electromagnetic signal emission and susceptibility shall be compatible with Army rotary wing aircraft.

PHASE I: This effort shall be used to develop a strawman architecture and design for a docking pouch solution that integrates with a body-mounted power network. The offeror shall identify viable manufacturing technologies and techniques that can be used in the assembly and production of the docking pouch solution. Proposed solutions shall be robust for military applications. If weight savings can be achieved with an innovative attachment and carriage system for use with a tactical vest, the technology shall be presented in this phase. A trade study shall be presented which compares the potential technologies with relevant parameters, including performance measures, size, weight, reliability, cost, and manufacturability. From this trade study, the offeror shall provide a recommended path forward.

PHASE II: This effort shall be used to develop the docking pouch technical details and to produce a limited quantity of test articles. The offeror shall develop the details for the physical and electronic components, as well as the human performance features. The offerer shall develop an approach to verify that the objectives are achieved. Twelve sets of pouches (one battery, one EUD, one EFB, and one LWECS) shall be delivered. The offeror shall conduct a lab demonstration of the pouches and perform initial aircraft compatibility to include electromagnetic interference and electromagnetic compatibility tests. The offerer shall maintain communication with IPC-8941 Subcommittee developing Guidelines on Connections for E-Textiles (Reference 5). Communication from the subcommittee shall be
used to ensure compliance with emerging standards. Lessons-learned from development shall be communicated back to the subcommittee for their consideration.

PHASE III DUAL-USE APPLICATIONS: Military personnel will be able to quickly recharge mission equipment in their docking pouches, and well as automatically connect to wired and wireless aircrew information systems. Other potential benefits as a result of this effort include commercial applications such as safety and situational awareness gear for outdoor enthusiast market, mine safety, and off shore oil and gas consumer markets.

REFERENCES:

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6. Q and A information from the Pre-Solicitation Period v1.pdf List as: Questions and Answers

7. SPADES architecture
8. Aircrew Combat Ensemble specification
9. Aircrew Clothing and Equipment interfaces and configurations
10. LWECS System Illustration and PCU Dimensions

KEYWORDS: e-textiles, electronic clothing, tactical vest pouches, smart fabrics, docking station, flame retardant fabric, connectors