

Manufacturing Processes for Integration of Electro-Optics and Conductors into Textiles

PROBLEM / OBJECTIVE

Soldiers systems such as Land Warrior must have communications and electronics devices integrated throughout the uniform and equipment. Since components such as connectors are not able to withstand traditional manufacturing processes, new methods of integration were needed.

The objective of this project was to demonstrate integration and manufacturing processes to reduce costs of integrated key pads, cables, connectors and antennas.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

The results of this project are currently being evaluated for transition soldier systems.

- A modified flat connector and textile based cable system for Land Warrior V2.0.
- Manufacturing and prototyping of “pin-less” connectors.
- A model for understanding fiber geometry, mechanical behavior, and forces induced on fibers during the industrial manufacturing of various types of woven fabrics used to prototype several fabrics with embedded wires and fiber optics.
- Manufacturing process for tinsel wire and aracontm fibers as narrow woven and braided structures to be used as radiators in wearable cross-loop low frequency antenna.
- Integration of a textile based computer input device into the Battle Dress Uniform
- Process for integrating wires and fiber optics into/onto a textile substrate using a DuraSealTM stitch less seam.

Implementation and Technology Transfer:

Technologies developed in this project will transition to soldier systems such as Land Warrior, Military MP, Objective Force Warrior, and Future Warrior Systems as appropriate.

Expected Benefits:

This technology will reduce manufacturing cost of current Land Warrior soldier and cable network and connectors by 15%. Net Present Value of benefits is \$5.9 and integrated fiber optic and conductors will



Woven Conductive Fabric Bend & Strait Sections

also increase combat effectiveness safety and communication range for soldier systems.

TIMELINE / MILESTONES

Start Date: October 2000

End Date: September 2001

First Army Fielding: TBD

FUNDING

Army ManTech: \$1.662M

PARTICIPANTS

- BAE Systems
- American Competitiveness Institute
- Photonics Labs with Philadelphia University
- Navel Post Graduate School
- Exponent & Thor Electronics Inc.
- Clemson Apparel Research at Clemson University
- WRONZ EuraLab Limited / Soft switch Electronic Fabrics