Chemically & Biologically Protected Small Tactical Airbeam Tent CB STAT

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Collective Protection Directorate

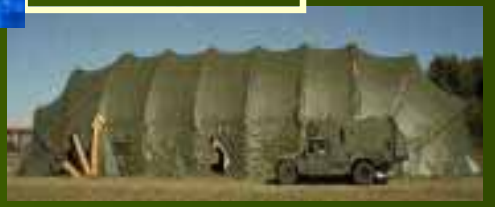
Command Posts (EELS)

Airbeam Technology

Chem/Bio Shelters & Technology

GLOBAL

MISSION



Large Area Maintenance Shelters (LAMS

Solar Covers

RWS Shelter Integration

US Army Natick Soldier Center

Strategy & Team

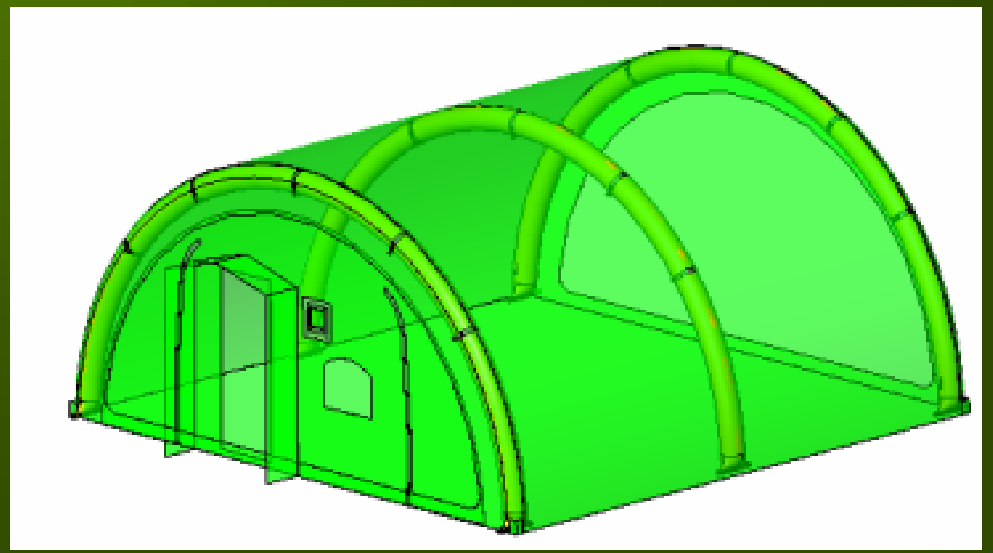
Strategy:

- ✓ **Demo FCS Shelter technology concept to help refine requirements**
- ✓ **Standardize for multiple applications = reduced cost = faster tech transfer**
  - **Next generation CB Protected Shelter**
  - **Joint Expeditionary Col Pro Shelter**
  - **FCS MV-T Shelter Extension Concept Demo**
- ✓ **Advance Small Tactical Airbeam Tent (STAT) Design for CB**

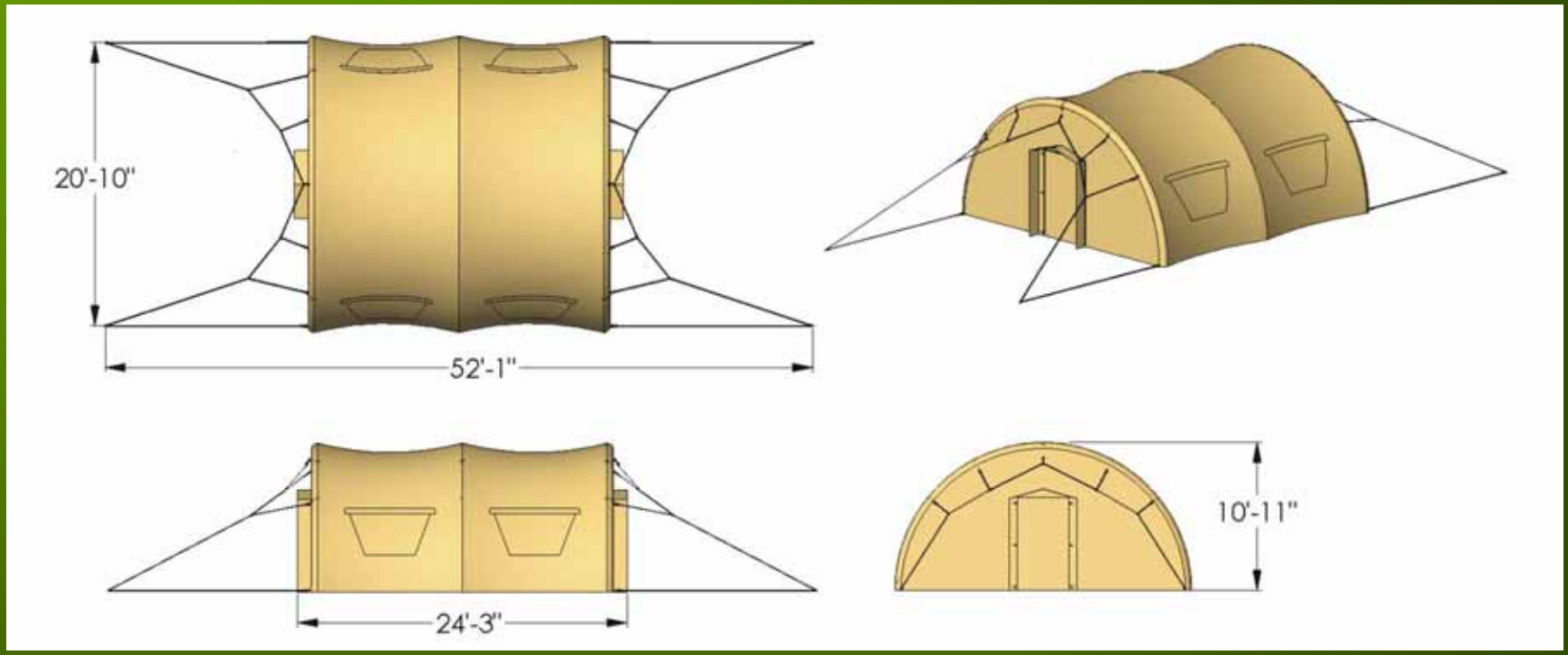
Natick, MA	Lake Elsinore, CA	Merrimack, NH
• Project Lead • Technical Direction • Liaison to users	• Seamless High-Pressure Braided Airbeams • STAT Shelter Design	• Current CBPS Skin Manufacturer • High Performance CB Fabrics

Technical Objectives

- Continue Airbeam Manufacturing Improvements
  - Enhance Performance
  - Reduce Costs
- Upgrade STAT Design for CB Protection
- Demonstrate New CB Outer Skin Fabric
- New Integrations
  - Vehicle Interface
  - Airlocks
  - Advanced thermal liners



The CB STAT



- Potential Applications
  - FCS MV-T Shelter Extension
    - Draft spec: Minimum 300 sq. ft. usable floor space
  - Next Generation CBPS
    - Desired that the deployed fabric structure provide more than 300 ft^2 with a goal of up to 400 ft^2 of usable floor space
  - Joint Expeditionary Collective Protection

High Pressure Airbeam Technology

- Inflatable Composites Replace Metal Structures
- Outstanding Strength to Weight Ratio
- Quick Deployment
- Minimal personnel
- Deflects without damage when overloaded

Advances Beyond Traditional Inflatables

- Patterned Coated Fabrics
- Bonded or Heat Welded Seams
- Low Pressure, <5 psi

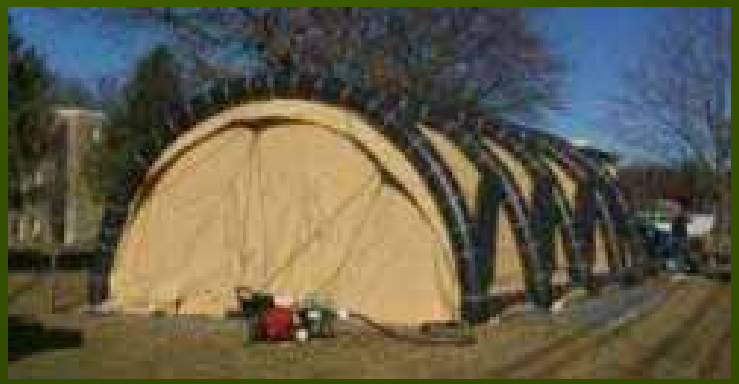
Lessons Learned

- Eliminate seams!
- Go higher pressure!
  - ↓surface area, ↓ Leakage Opportunity, ↓ Weight, ↓ Packing Volume
- Develop automated manufacturing processes

3-D Woven Airbeams

- Chemically Biologically Protected Shelter (CBPS)
  - Seamless, low pressure airbeams
  - Replaced adhesively bonded inflatable technology
  - 3-D Weaving Technology inserted into production contract
- Prototypes fabricated for command post and future medical shelter applications

20 ft. span, 14” dia, 7-10 psi



High-Pressure Braided Airbeam Technology

30 foot span, 12” dia, 65 psi

20 foot span, 10” dia, 40 psi

40 foot span, 14” dia, 60 psi

82 foot span, 30” dia, 80 psi

Small Tactical Airbeam Tent (STAT)

- 430 ft2 or 640 ft2
- Rapidly Deployable
- Integral Airbeams and Floor
- Lights, Liner, Screened Windows
- Developed by Natick Soldier Center and Vertigo, Inc.

STAT Test and Evaluation
Sponsored by Logistics Transformation Agency

Aberdeen Test Center
- ✓Wind
- ✓Rain
- ✓Snow
- ✓Erect/Strike
- ✓Blackout

STAT User Evaluation
31st ADA, Ft. Bliss TX
Training rotations in the field
Recommended for TOC
Easy to use

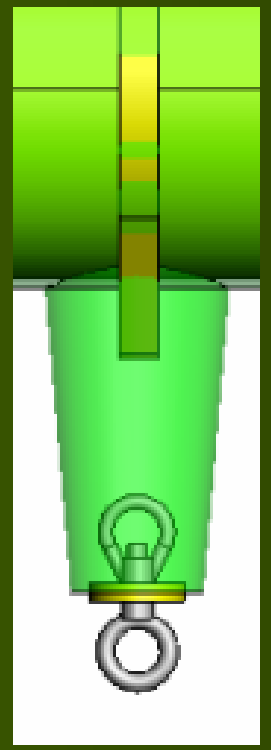
STAT for Battalion Aid Station
1-41st Infantry
Camp Liberty, Baghdad
1 year In Iraq
"Completely effortless to put up"

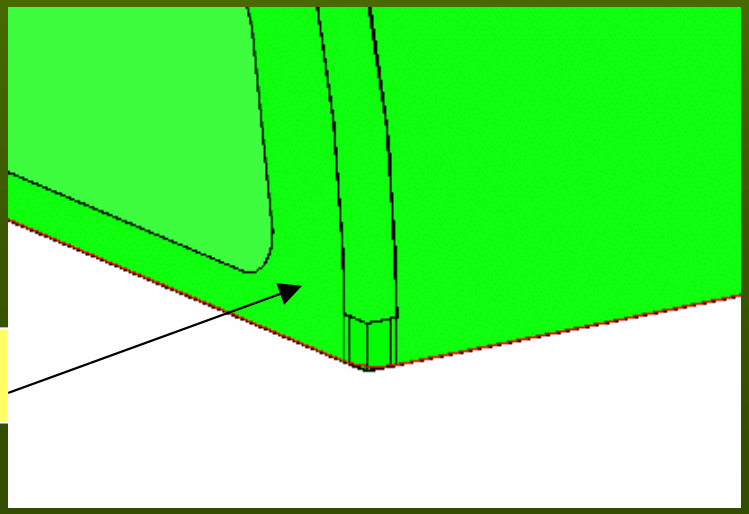
Concept Design - Endwalls

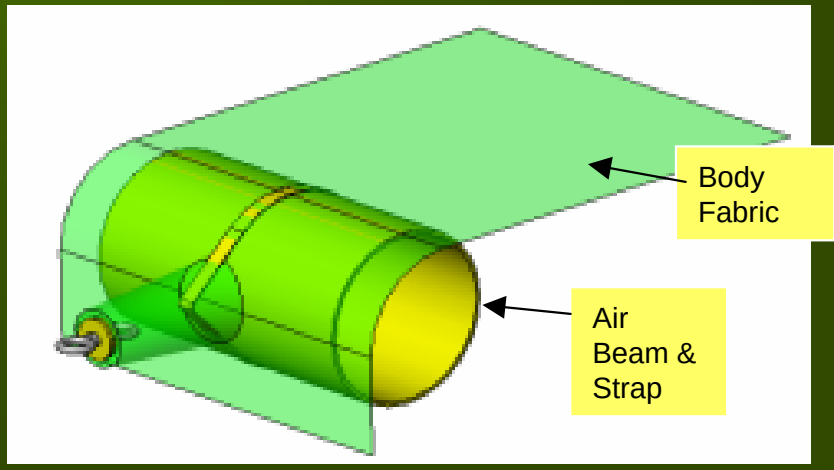
- Vehicle Interface
  - Per CBPS bootwall, 2 ø16” ECU ducts
- Airlock Interface
  - PE & litter airlock integrated with 9’ wide door
  - Window between litter and PE for viewing litter
- Removable for Design Upgrades

CB Skin Design Details

- Saint-Gobain X-23
- Integral Floor – Continuous Wrap
- All Fabric Edges Taped (inside and outside)
- X-22 Reinforcements
  - Air beam retainer straps, Velcro flaps, etc.
- Sealed Corners at Floor / Body Interface
- Liquid-tight Pass-Throughs
  - Guy Lines, Ground Tension Lines, Inflation Manifold







Deployment

Simply Unroll and Inflate

Prototype

CB STAT Demonstration

- Rapid Deployment
- One-Piece Construction
- Validated Environmental Performance
- CB Capability via External Skin
  - No Liner Necessary
- No Ladders / Special Tools
- Baseline Weight & Cube
- Blackout
- Durability

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Technologies for Integration

Next Generation Airlocks

- Integral to Shelter System
- Reduced Logistics
  - Weight, Packing Volume
  - Installation Requirements
- Reduced Dwell Time

Photovoltaic Power Shade

Application:

- Solar shade w/ integral PV power
- Provides 1 Kw of PV power, reduces solar load 80% – 90%
- Design to fit over: MGPTS small, 16' TEMPER
- Modular expandability

Dimensions: 22' x 20' x 10'9"- 14'6"

Power: ~1 **Kw**

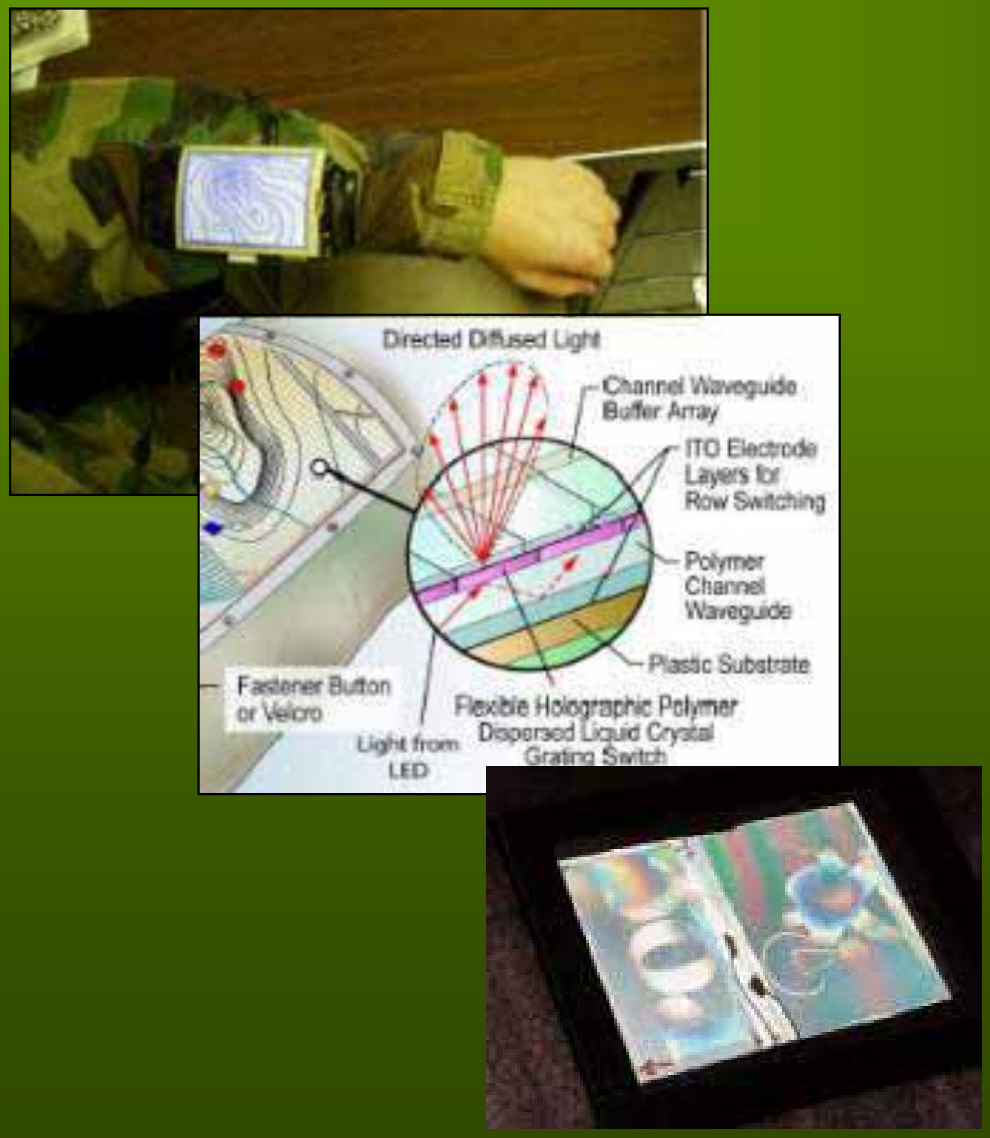
Operating Voltage: 12V

BOS required

PV combiner boxes
Master disconnect switch
Charge controllers
12V Deep cycle batteries
Inverter for 120 VAC use

Flexible Displays

Physical Optics Corporation



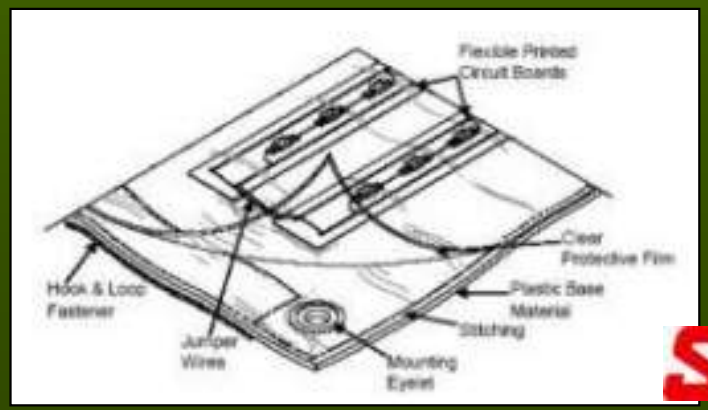
- Display Visual Images on Fabric
- Ultra thin : <1 mm
- Flexible: 6-10 cm bending radius
- High-resolution:
  - 100 mm pixel size
  - 640 x 480 pixels total
- Lightweight
  - <0.5 g per 1 cm^2 of display area
  - <100 g for electronics
- Full-color, real-time
  - 30-60 Hz refresh)
  - High-optical-contrast: >100:1
- Scalable Display: 1 cm^2 to 1 m^2 active area

Solid State Lighting

- Distribute Light = Evenly Illuminated General Area Lighting
- High Quality Illumination
  - Solar Spectrum, Color Index
- Deploy with Shelter System
  - Compact, Lightweight, Integral to Shelter
- Multiple Power Source Capabilities
  - Generators, Shore Power, Photovoltaics
- Extended Lifetime
  - 100,000 hrs, 10x Fluorescent Capabilities
- Durable Designs
  - Rugged, Waterproof, Shockproof, Field Repairable

SOSIL Luminaire

POC Physical Optics Corporation

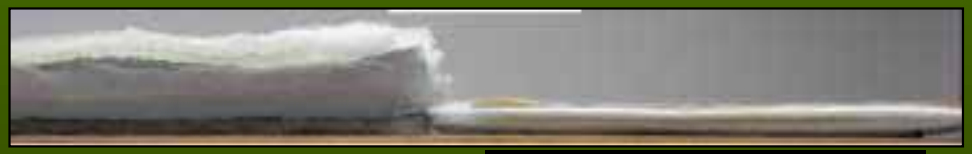


SHOT

High Performance Shelter Insulation

Aerogel Insulation

- 85% ↓ Packing Cube
- R-value > 6 °F·ft²·hr/Btu
- Flame Resistance
- 99% Open Porosity
- Noise and IR Suppression
- Partner with Johnson Outdoors



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ASPEN AEROGELS

Low Packing Volume (LPV) Insulation

- 65% ↓ ECU Power Requirements
- 20:1 Deployed to Packing Volume
- R-value > 6 °F·ft²·hr/Btu
- Weight < 20 oz/yd²
- Flam Resistance
- Automated Fabrication

L'Garde Inc.

Next Steps

- Transfer Emerging Technologies
  - Strategic Industry and Academia Partnerships
  - Natick Tech-Base ColPro Program
- Alternative Sizes and Configurations
- Continue to Reduce Weight & Packing Volume
- Integrate Warfighter Feedback
- Insert into DoD Programs
  - Next-Generation CBPS
  - Future Combat System MV-T
  - Joint Expeditionary Collective Protection

Questions?