# Collective Protection S&T

## Protection Capability Area


**COL Ben Hagar**

**Joint Science and Technology Office**
**for Chemical and Biological Defense (JSTO-CBD)**

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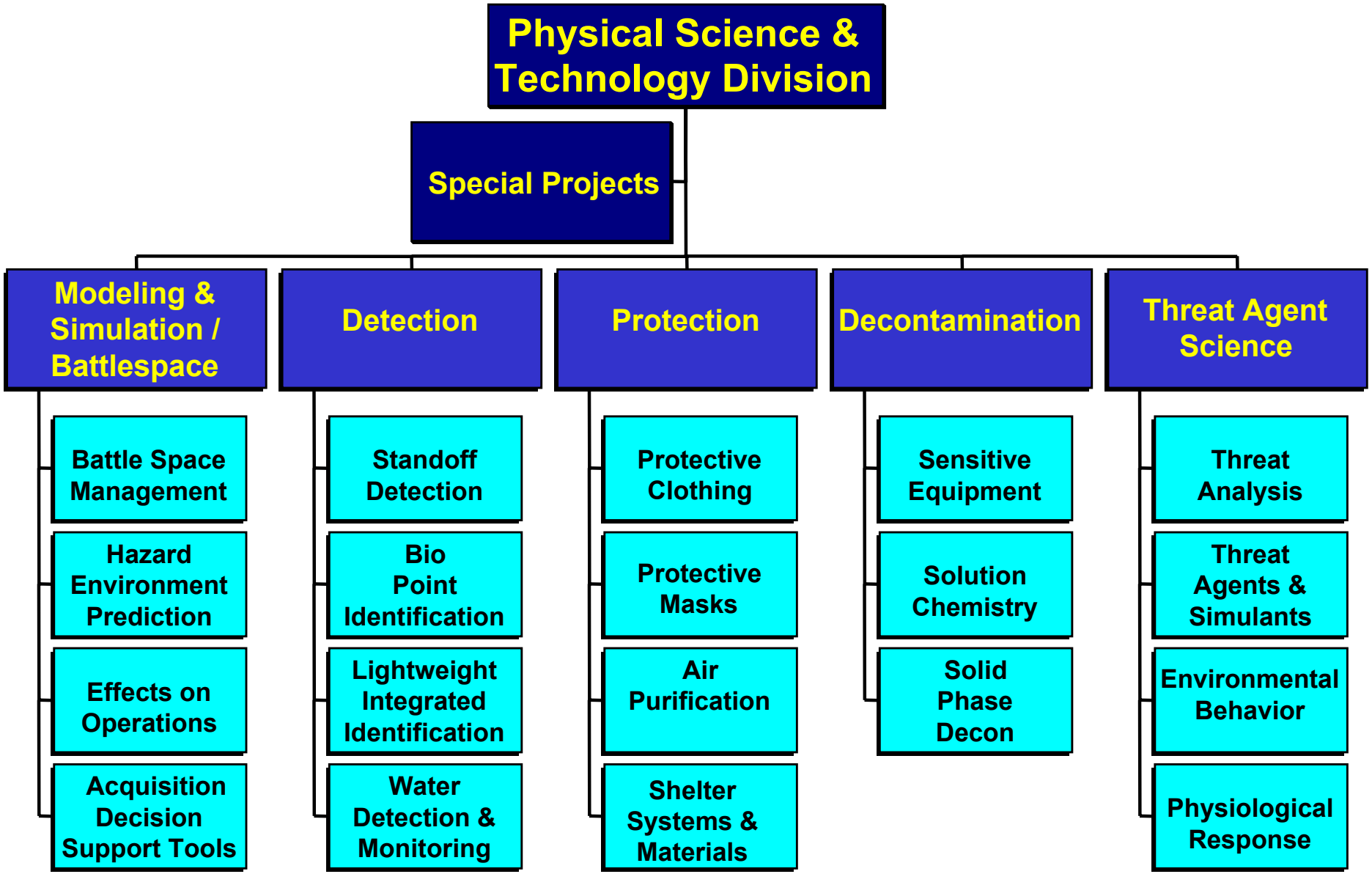
DTRA

# Collective Protection Science and Technology Program

## Introduction

- Program Overview
- Requirements, Technical Challenges and Transition
- Example FY05 Project Summaries
- FY06 Project Outlook

# CBD Capability Areas



# Collective Protection Area Investment Rationale

**Rationale For Investment:**

- **The Warfighter Cannot Always Avoid a CBRN or Toxic Industrial Chemical (TIC) Contaminated Environment, Yet Assigned Mission Must Be Performed at Near-Normal Operational Tempo in That Environment.**

**Statement Of Objectives:**

- **Collective Protection Provides a Protective Toxic Free Area for Warfighters Operating in Transportable Shelters, Ground Vehicles, Ships, Aircraft and Fixed Sites.**

# Collective Protection Area

## Program Goals

**Develop Technologies for Advanced Adsorbents, Filters, Next-Generation Air Purification and Advanced Shelter Materials and Systems for Transportable, Mobile, and Fixed Site Collective Protection Applications.**

- **Enhance Protection**
  - Counter Current and Potential CBRN Agents and Toxic Industrial Materials
  - Protect Personnel and Critical Resources
- **Preserve Operational Tempo**
  - Allow Personnel to Sustain Safe, Near-Normal Operations Without Being Encumbered by Individual Protection Equipment
- **Improve Logistics (Weight, Cube, Life, Power, Maintenance, Etc.)**
  - Enhance Regenerable and Reusable Filter Materials Reducing Frequency of Filter Changes or Eliminate Entirely
  - Enhance Shelter Materials, Air Locks, Closures/Seals, and Structures
  - Provide Modularity and Interchangeability of Air Purification and Shelter Components

# Requirements and Program Direction

Pervasive Deficiencies

Combatant Commanders Requirements

Special Ops Requirements

CP Areas for Capability Enhancement

***Services/ Combatant Commanders/ Joint Staff Evaluation***

NBC Defense Functional Capabilities

- *NBC Battle Management*
- *Contamination Avoidance*
- *Individual Protection*
- *Restoration Capability*
- ***Collective Protection***

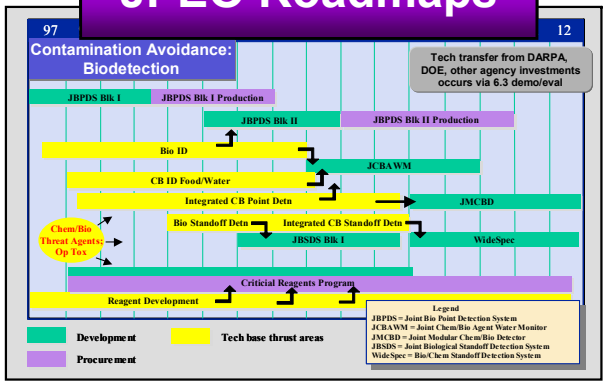
POM Funding

NBCDB Priority Lists

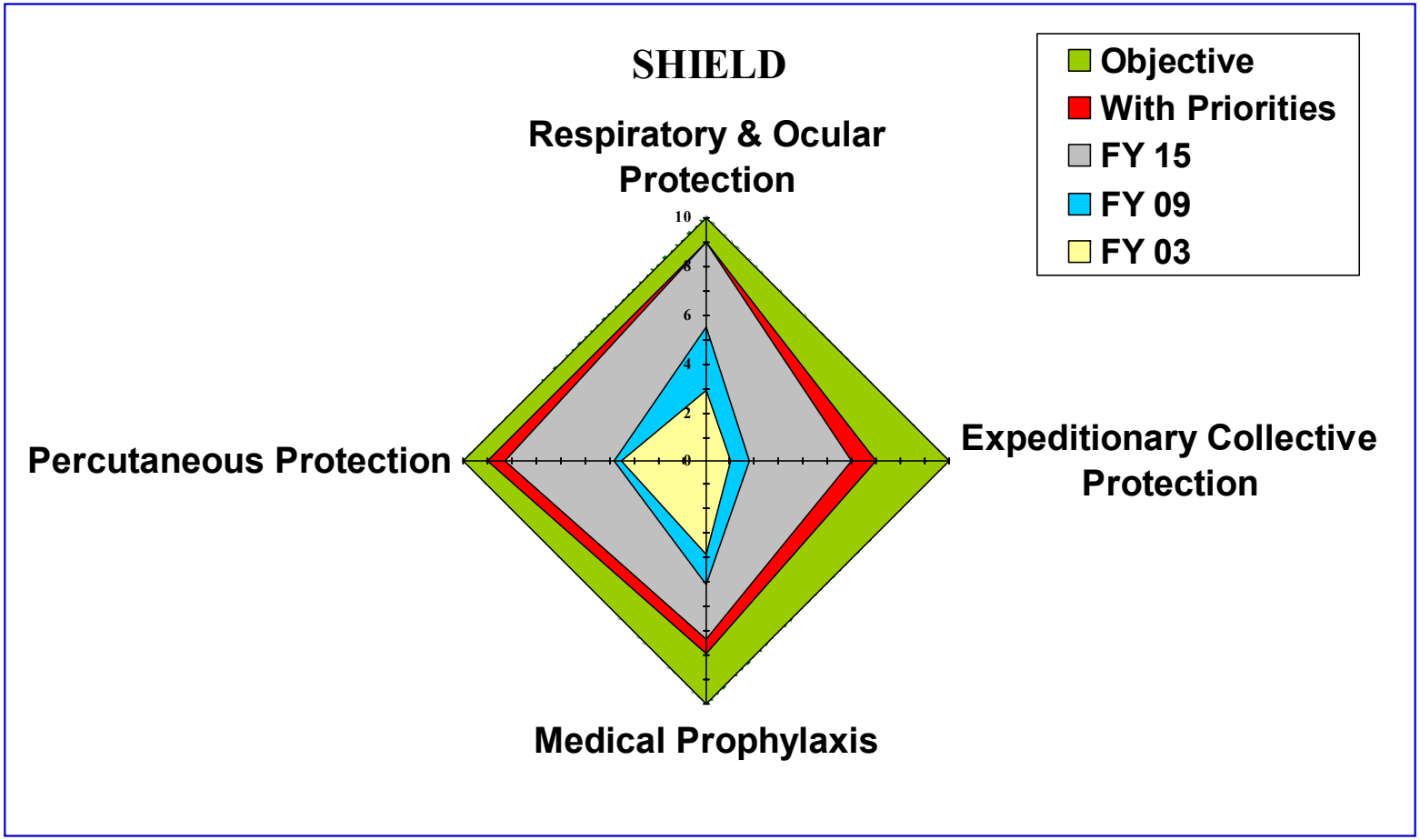
JRO Joint FOCs

Development Programs Ranking

JPEO Roadmaps



# Expeditionary Collective Protection Gaps

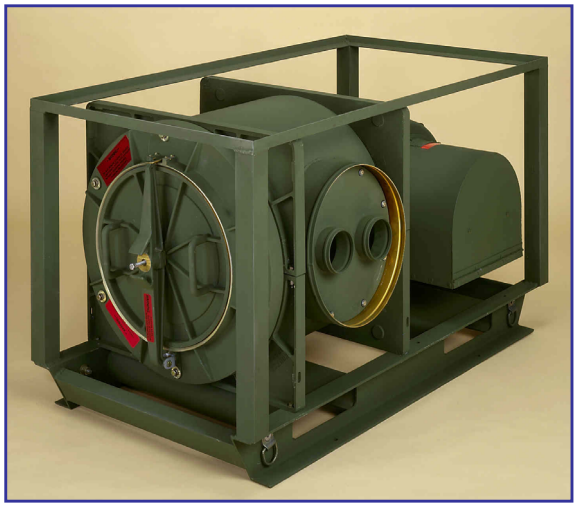



**# 11 Priority Out of 39 Capability Gaps**

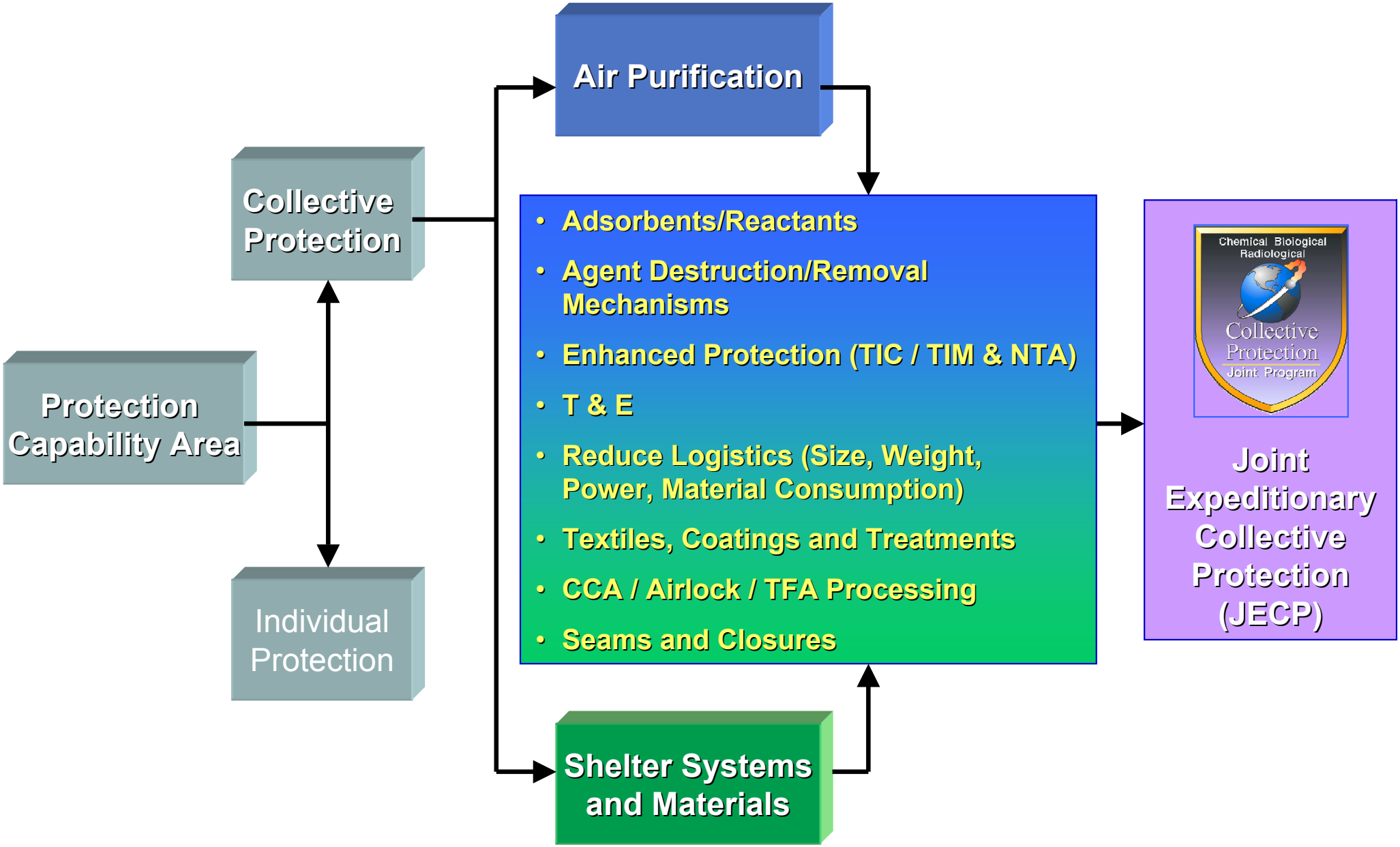
- **Reduced Size, Weight and Power Requirements**
- Insufficient Quantities Account for Bulk of Overall Transportable CP Gap
- Hospitals and Most Amphibious Ships Lack CP Capability

# Joint Expeditionary Collective Protection (JECP) Initial Capabilities Document (ICD)

- ICD Calls for a Number of Material Solutions That May Be Addressed by the S&T Program
- Collective Protection S&T Program is Aligned to the Collective Protection Acquisition Program's Technology Readiness Evaluation Milestones
- Collective Protection S&T Program is Facilitating Test and Evaluation by Development of Test Apparatus and Methodology



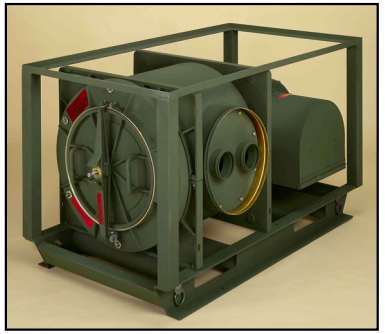
# Protection Capability Area
# Collective Protection

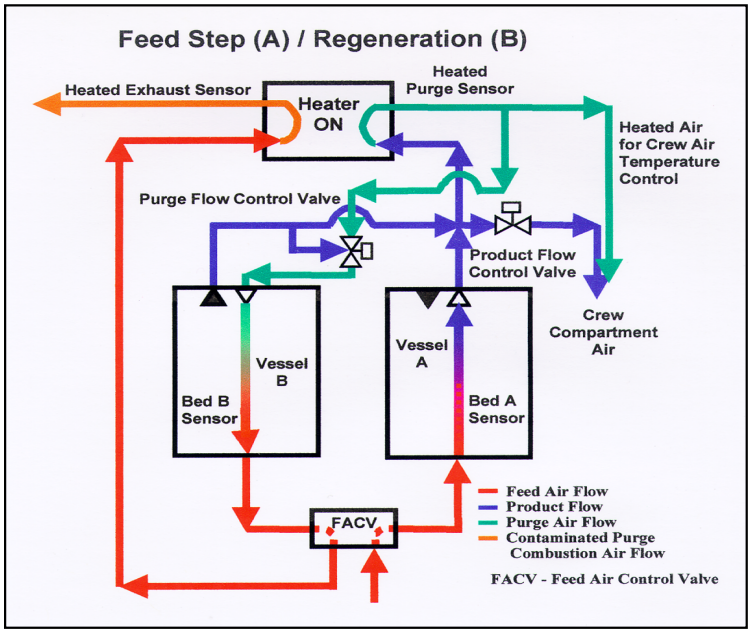


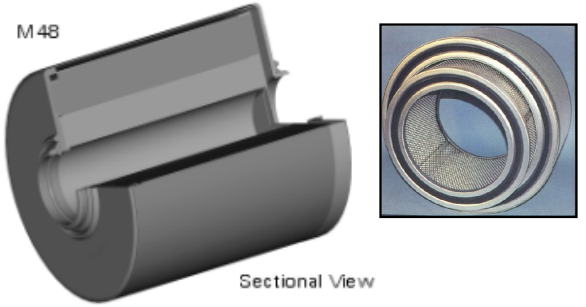
# Air Purification Operational Context

**Advanced Air Purification Systems Having Wide Platform Applicability with Improved Breadth of Protection Against Aerosols, Particulates and Gases.**

**RLI Providing Improved User Confidence and Safety and Reduced Logistics.**



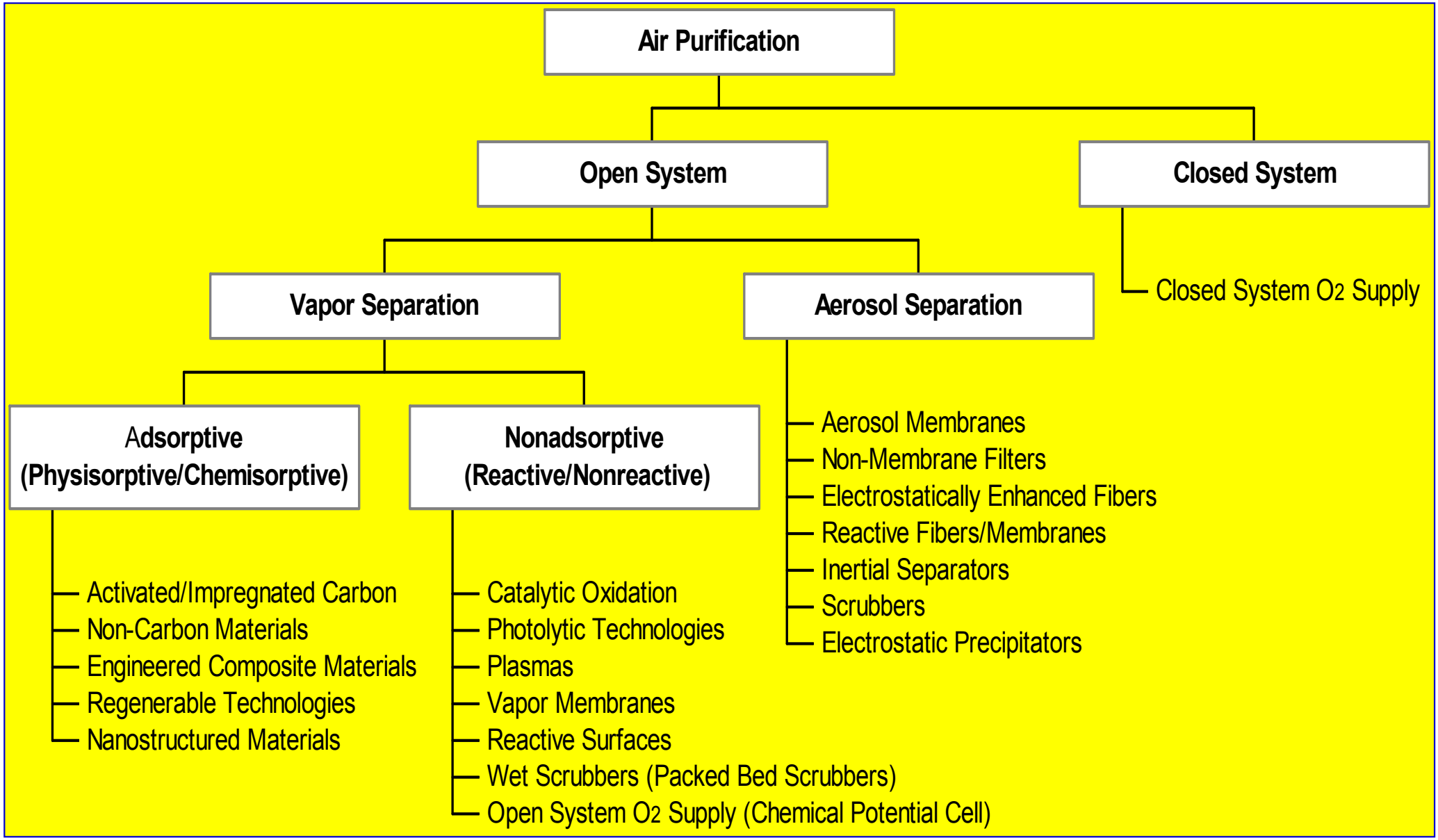



**Advanced Air Purification Systems with Improved O&M, Reduced Weight and Cube, and Improved System Integration.**

**Advanced Filter Systems with Reduced Pressure Drop.**

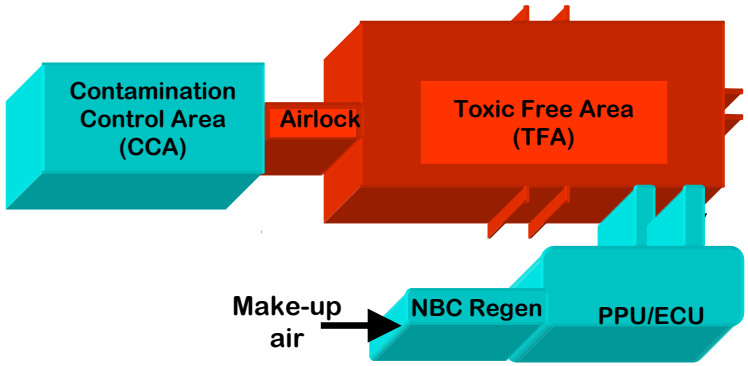
# Potential Air Purification Technologies



# Shelter Systems & Materials Operational Context

Advanced Shelter Materials and Systems Having Wide Platform Applicability with Improved Breadth of Protection Against Aerosols, Particulates and Gases.

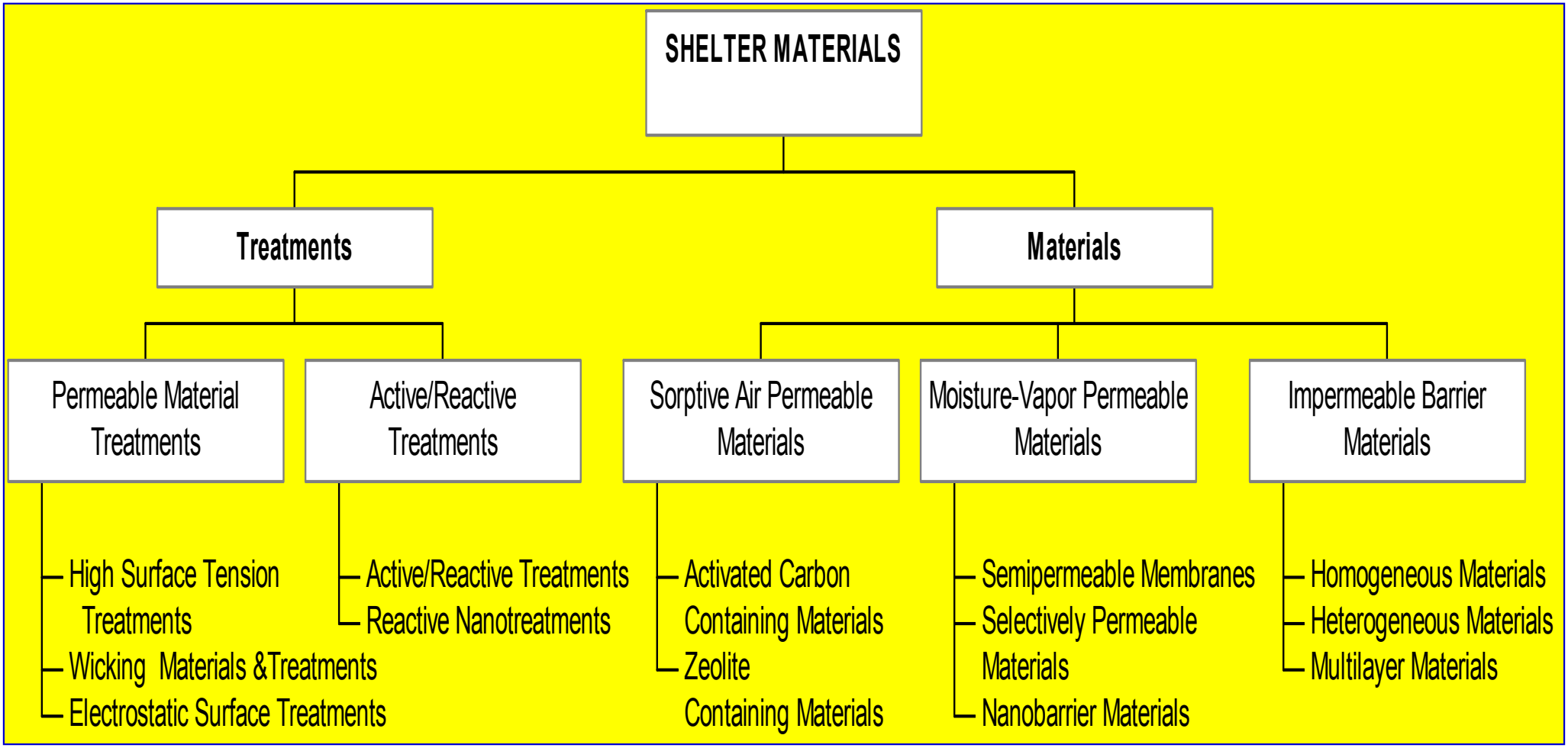
Improved Safety by New Textiles, Self Decontaminating Materials, Hermetic Sealing and Seaming Technologies



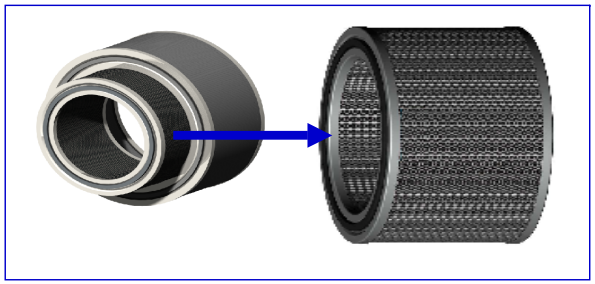

Advanced Shelter Materials and Systems with Improved O&M, Reduced Weight and Cube, and Improved System Integration.

Improved Airlocks with Enhanced Threat Removal and Reduced Dwell Time Allowing Greater Safety and Throughput.

# Potential Shelter Materials



# Collective Protection Area
# FY05 Taxonomy



## Collective Protection

### Air Purification Thrust (~ 66%)

- Advanced Adsorbents
- Advanced Regenerative Filter
- Evaluation of Electrically Enhanced Filter
- Advanced Air Purification Model (DTO)
- Residual Life Indicator
- HEPA Pollutant Susceptibility
- 6.3 Technology Transition Efforts
- Congressional Efforts

### Shelters Thrust (~ 34%)

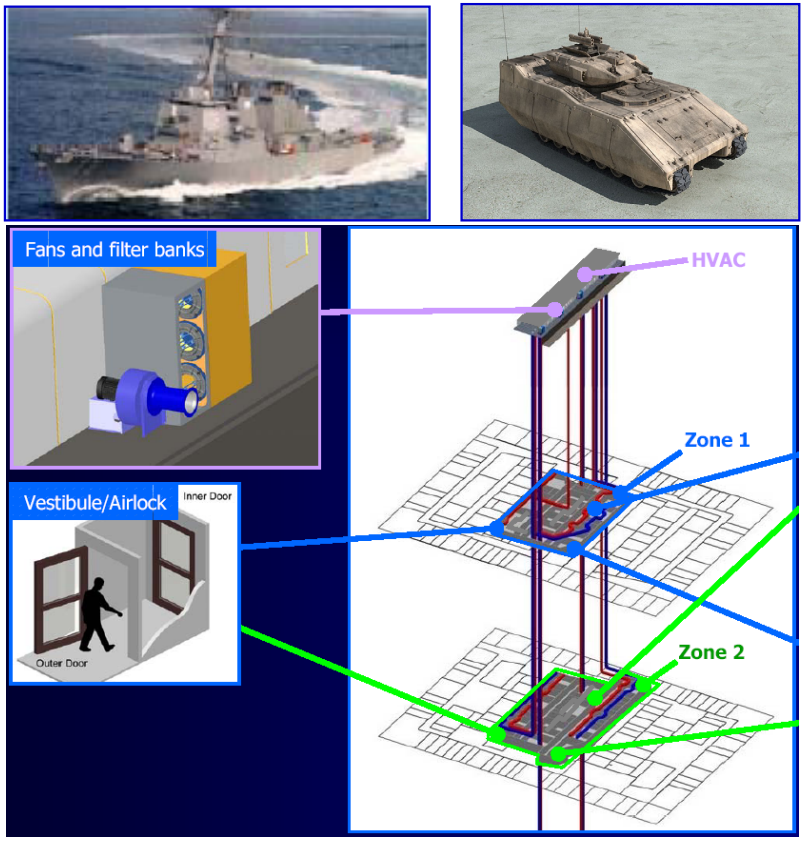
- Integrated Shelter Systems (CCA/PE, CB Textiles, Reactive Materials, Closures/Seams)
- Expedient COLPRO Coatings
- BAA (Seaming Technology)
- Congressional Efforts

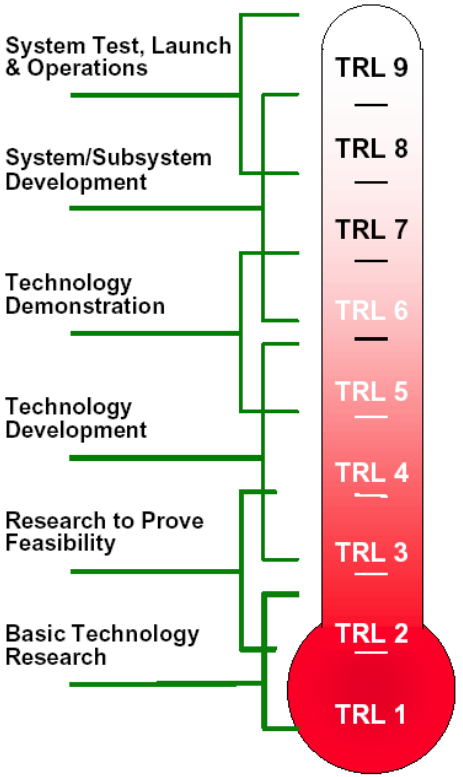
# Advanced Air Purification (AAP) System Model
## (DTO - CB.61)

**Objective:**
**Develop a Model, Database, and Design Concepts for Advanced Air Purification Systems to Increased and Broaden Protection (NTA & TICs), Reduced System Weight, Power, Size and Reduced Logistics Burden.**

**Provide Definition of Standard AAP Test Methods and Performance Criteria**

**Creation of an Expert System Tool Which Provides: Optimization, Trade-Off Analysis and System Assessment of AAP Systems.**

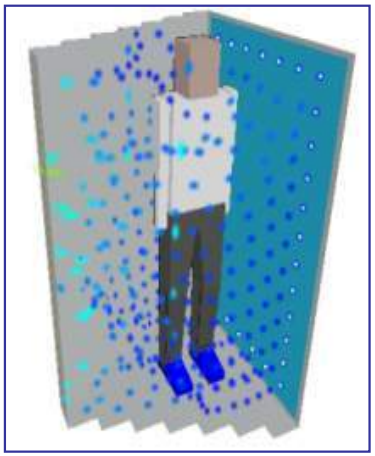


# Integrated Collective Protection Shelter Systems

**Objective: Advance Technology in Critical Areas:**

- **Next Generation Airlocks: Reduce Dwell Time, Increase Entry/Exit Rate, and Ease of Use**
- **CB Closures: Explore New Materials and Configurations for Providing Hermetic Seals Offering CB Resistance, Strength and Durability, and Ease of Use**
- **CB Barriers: Develop Low Cost, Lightweight, CB Resistant Materials Suitable for COLPRO Systems as well as General Purpose Tentage**



# Expedient Encapsulation

## Objective:

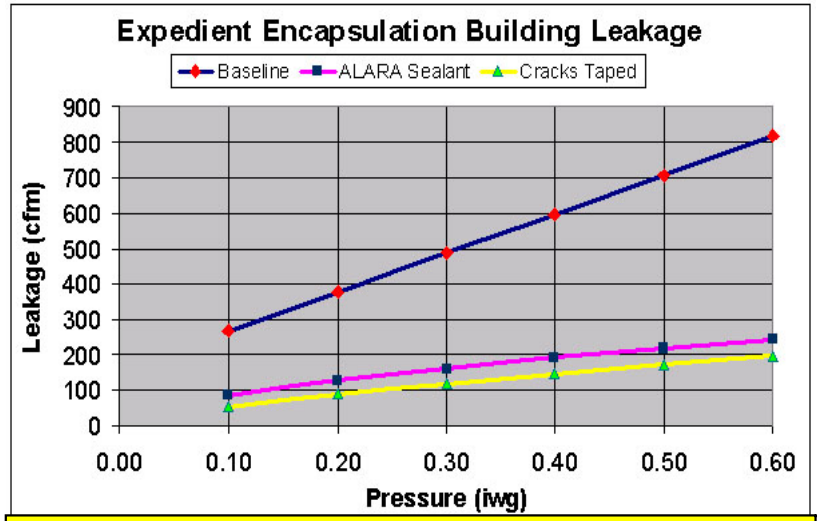
- Evaluate the Sealant Performance of Various Non-Toxic Strippable Coatings for Effective Application to Interior Structures
- Develop Enhanced Material with Additional Functionality

## Need:

- Encapsulation Technologies are Proposed to Prevent or Reduce Exposures from CBRN Threats, as well as Protect Critical Equipment
- Addresses the Number One Prioritized Material Solution Identified by the JECP ICD Calling for a Structures Kit for Existing Structures

**To Supplement Liner Approaches**

Applying Coating to Paneling and Ceiling Tiles




Baseline and Sealed Building Leakage

# FY06 Project Outlook

## Approximately 300% Funding Increase for Collective Protection S&T (6.1 - 6.3) Program

**New Efforts Anticipated by Technology Areas**

- 1 - Adsorbents
- 3 - Chemical and Aerosol/Particulate Filters
- 2 - Regenerative or Other Air Purification Mechanisms
- 3 - Reactive, Antimicrobial, and Catalytic Materials
- 3 - CCA/Airlock
- 1 - Textiles and Shelter Materials
- 2 - Coatings

# Summary

**The Collective Protection Tech Base Program will:**

- **Develop Collective Protection Technologies Against NBC Agents and Toxic Industrial Materials**
- **Improve Logistics by Reducing or Eliminating Filters and Minimizing Weight and Cube of Systems**
- **Improved Survivability, Decontaminability, and Deployability of Collective Protection Systems**

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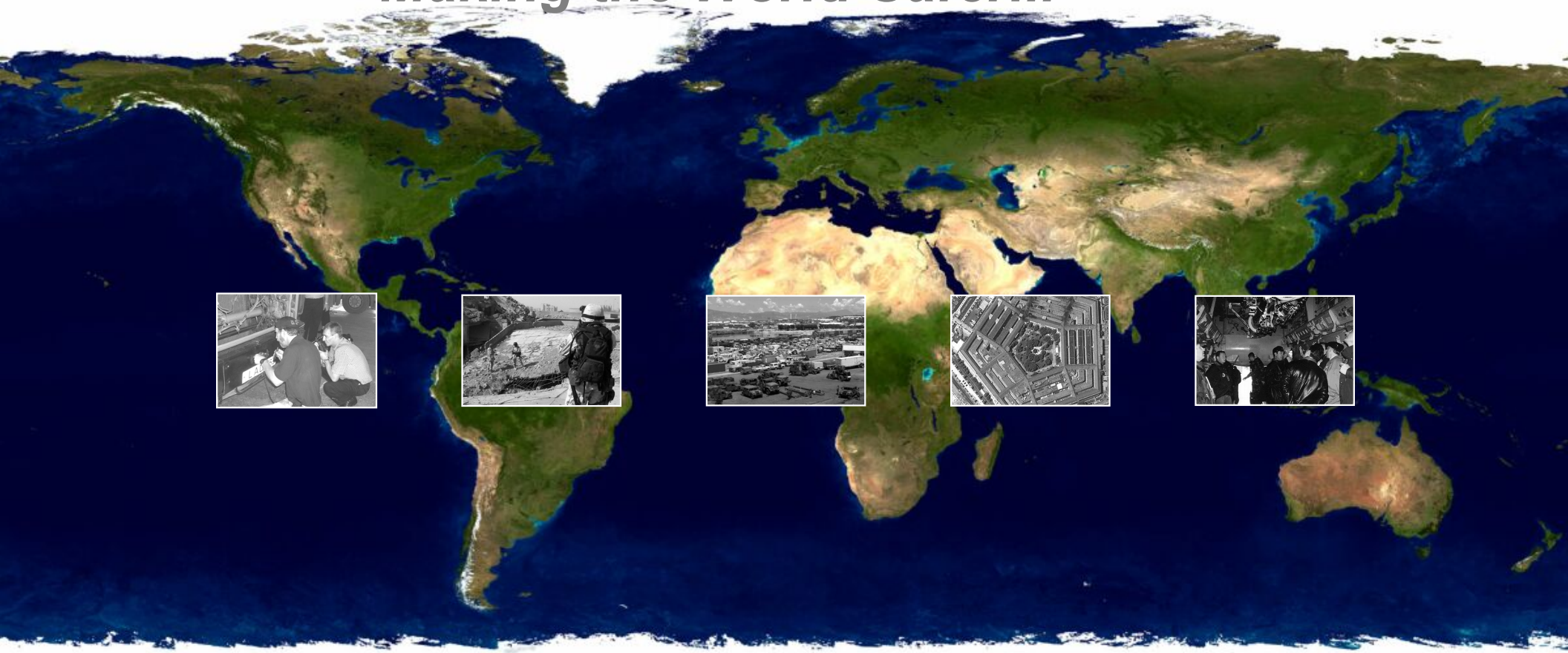
*Making the World Safer...*



***...by reducing the threat of weapons of mass destruction***