



Chemical and Biological Technology for the Joint Warfighter

COL Benjamin Hagar

Joint Science & Technology Office

CBDP

&

Chemical and Biological Technologies Directorate

Defense Threat Reduction Agency

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Making the World Safer



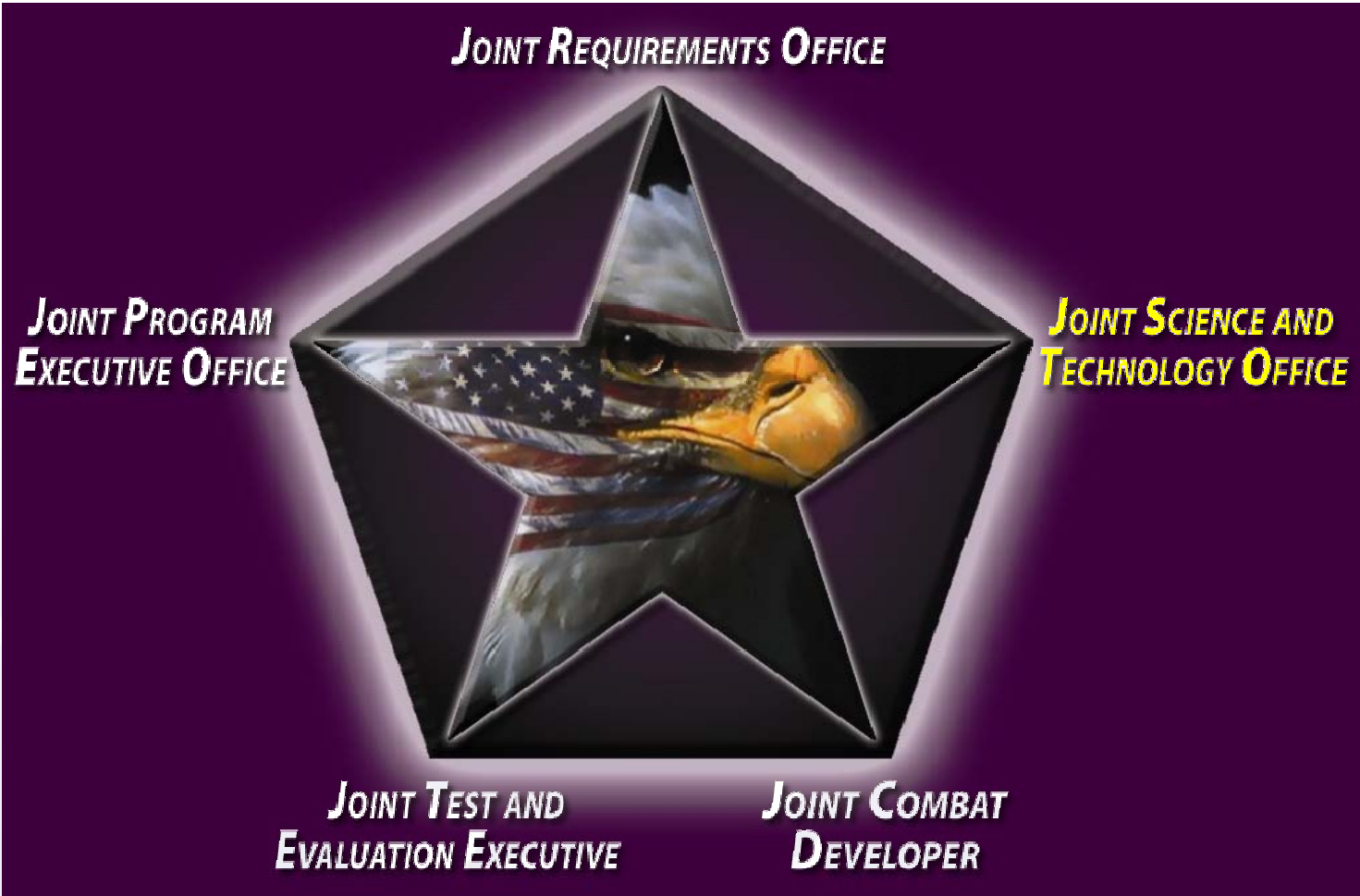
Outline

- Vision and principles
- Program requirements
- Budget
- Technical program
- Technology transition





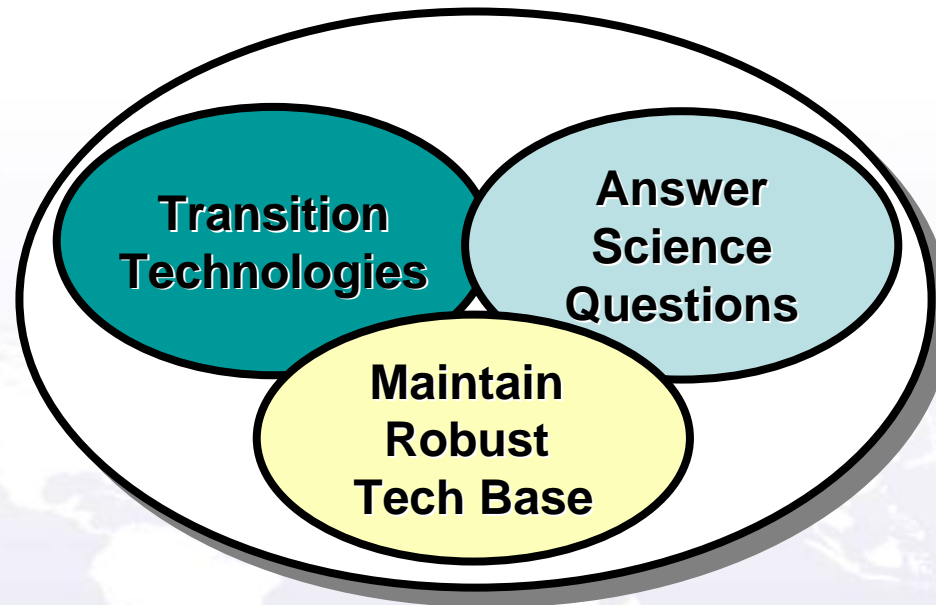
JSTO manages and executes the S&T component of the program





Vision

Develop and sustain a robust, agile, and flexible science and technology program to support chemical and biological defense capability needs





CBDP S&T is...

- **Technically challenging**
 - Exceedingly high customer expectations
 - No "silver bullet" solutions

- **Scientifically diverse**
 - Numerous and disparate disciplines
 - Distinct chemical and biological solutions





JSTO manages by capability areas

Medical Science & Technology

Pretreatments

Therapeutics

Diagnostics

Emerging Threats

Applied Technology

Physical Science & Technology

Detection

Protection

Decontamination

Modeling & Simulation

Threat Agent Science

CAPOs empowered to make program decisions





We reach out to the best-in-class performers



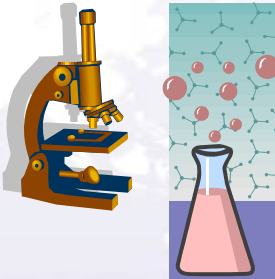
Academia



Industry



FFRDCs



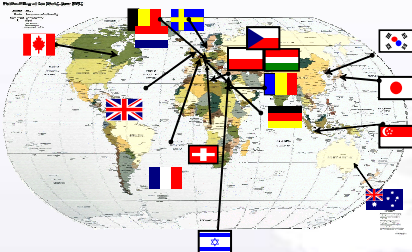
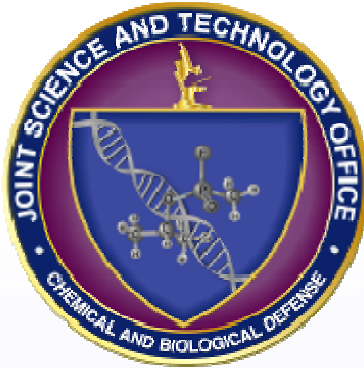
Service Labs/Agencies



National Labs



We leverage the efforts of others



International Partners



Making the World Safer



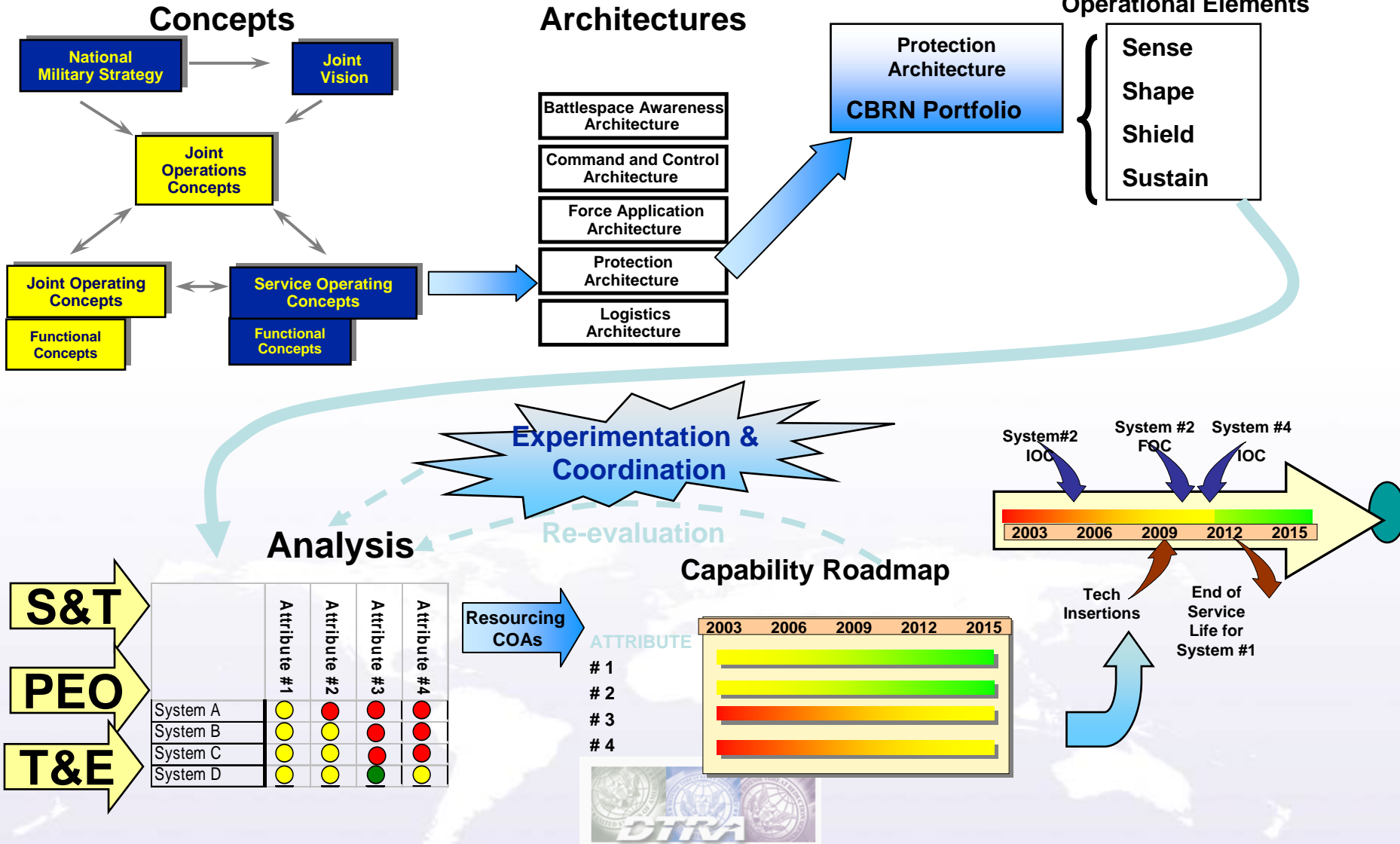
Joint Functional Concepts

- **Battlespace Awareness**
- **Command and Control**
- Force Application
- Protection
- Logistics





The JRO conducted a baseline capability assessment





7 of the Top 10 BCA gaps are **SHAPE**

NUMBER	OPsL ATTRIBUTE	CORE CAPABILITY	GAP or SHORTFALL
1	SENSE	STAND-OFF DETECTION - BIO	NO CAPABILITY, ONLY DEVELOPMENTAL
2	SHAPE	INTEGRATED EARLY WARNING	LACK OF A BACKBONE
3	SHAPE	INTEGRATED EARLY WARNING	LIMITED SENSOR INTERFACE AND INTEROPERABILITY
4	SHAPE	INTEGRATED EARLY WARNING	LACK OF SELECTIVE ALARMING
5	SHAPE	BATTLE SPACE ANALYSIS	LIMITED ALGORITHM TO SUPPORT ANALYSIS (V,V,&A)
6	SHAPE	BATTLE SPACE ANALYSIS	LACK OF ANALYSIS TOOLS
7	SENSE	STAND-OFF DETECTION - CHEM	LACK OF RANGE
8	SHAPE	BATTLESPACE MANAGEMENT	NO AUTOMATED DECISION TOOLS
9	SHAPE	BATTLESPACE MANAGEMENT	LIMITED INTERFACE W/ COP
10	SENSE	STAND-OFF DETECTION - CHEM	LIMITED ABILITY TO DETECT AND IDENTIFY
11	SHIELD	EXPEDITIONARY COLLECTIVE PROTECTION	INTEGRATION LIMITATIONS (SIZE, POWER, WEIGHT)
12	SUSTAIN	INDIVIDUAL DECON	INADEQUATE PROCESSING RATE FOR THOROUGH DECON
13	SUSTAIN	INDIVIDUAL DECON	LACK OF EFFECTIVENESS FOR CHEM (NTAs) and BIO (ANTHRAX)
14	SHIELD	MEDICAL PROPHYLAXES	LACK OF MULTI-VALENT VACCINES
15	SHIELD	MEDICAL PROPHYLAXES	LACK OF PROPHYLAXES FOR CHEMICAL WARFARE AGENTS
16	SHIELD	MEDICAL PROPHYLAXES	LACK OF "ON-LABEL" FDA APPROVAL FOR RAD PROPHYLAXES
17	SUSTAIN	EQUIPMENT DECON	DECONTAMINANTS AND APPLICATORS DEGRADE SENSITIVE EQUIPMENT
18	SUSTAIN	EQUIPMENT DECON	DECONTAMINANTS AND APPLICATORS DEGRADE EQUIPMENT
19	SHIELD	RESPIRATORY & OCULAR PROTECTION	LIMITED PROTECTION AGAINST TICs
20	SENSE	POINT DETECTION - BIO	LACK OF DETECTORS THAT ARE SMALL AND ACCURATE (SIZE, WT, ACCURACY)
21	SENSE	POINT DETECTION - BIO	HIGH OPERATING COSTS OF CURRENT DETECTORS
22	SUSTAIN	MEDICAL THERAPEUTICS	LIMITED ANTI-VIRAL/ ANTI-TOXIN DEVELOPMENT
23	SUSTAIN	EQUIPMENT DECON	INADEQUATE PROCESSING RATE FOR THOROUGH DECON
24	SUSTAIN	MEDICAL THERAPEUTICS	LACK OF "ON-LABEL" FDA APPROVAL FOR CBRN THERAPEUTICS
25	SHIELD	EXPEDITIONARY COLLECTIVE PROTECTION	QUANTITY
26	SHIELD	PERCUTANEOUS	LIMITED DUSTY AGENTS PROTECTION
27	SHIELD	PERCUTANEOUS PROTECTION	HEAT BURDEN
28	SENSE	NBC RECON	LIMITED SENSOR INTEGRATION
29	SHIELD	RESPIRATORY & OCULAR PROTECTION	QUANTITY
30	SENSE	POINT DETECTION - CHEM	QUANTITY
31	SENSE	POINT DETECTION - CHEM	LIMITED DETECTION OF SOLIDS AND LIQUIDS
32	SHIELD	PERCUTANEOUS PROTECTION	QUANTITY OF JSLIST
33	SENSE	POINT DETECTION - CHEM	LIMITED DETECTION OF NTAs/ TICs
34	SUSTAIN	FIXED SITE DECON	DECONTAMINANTS AND APPLICATORS DEGRADE EQUIPMENT, FACILITIES, AND MATERIAL
35	SUSTAIN	DIAGNOSTICS	LACK OF PORTABILITY FORWARD
36	SUSTAIN	DIAGNOSTICS	LACK OF FDA APPROVAL
37	SENSE	POINT DETECTION - RAD	QUANTITY
38	SUSTAIN	DIAGNOSTICS	NEED FOR REAGENT REGISTRY VERIFICATION
39	SUSTAIN	FIXED SITE DECON	INABILITY TO DECONTAMINATE INTERIORS OF FACILITIES AND LARGE AREAS





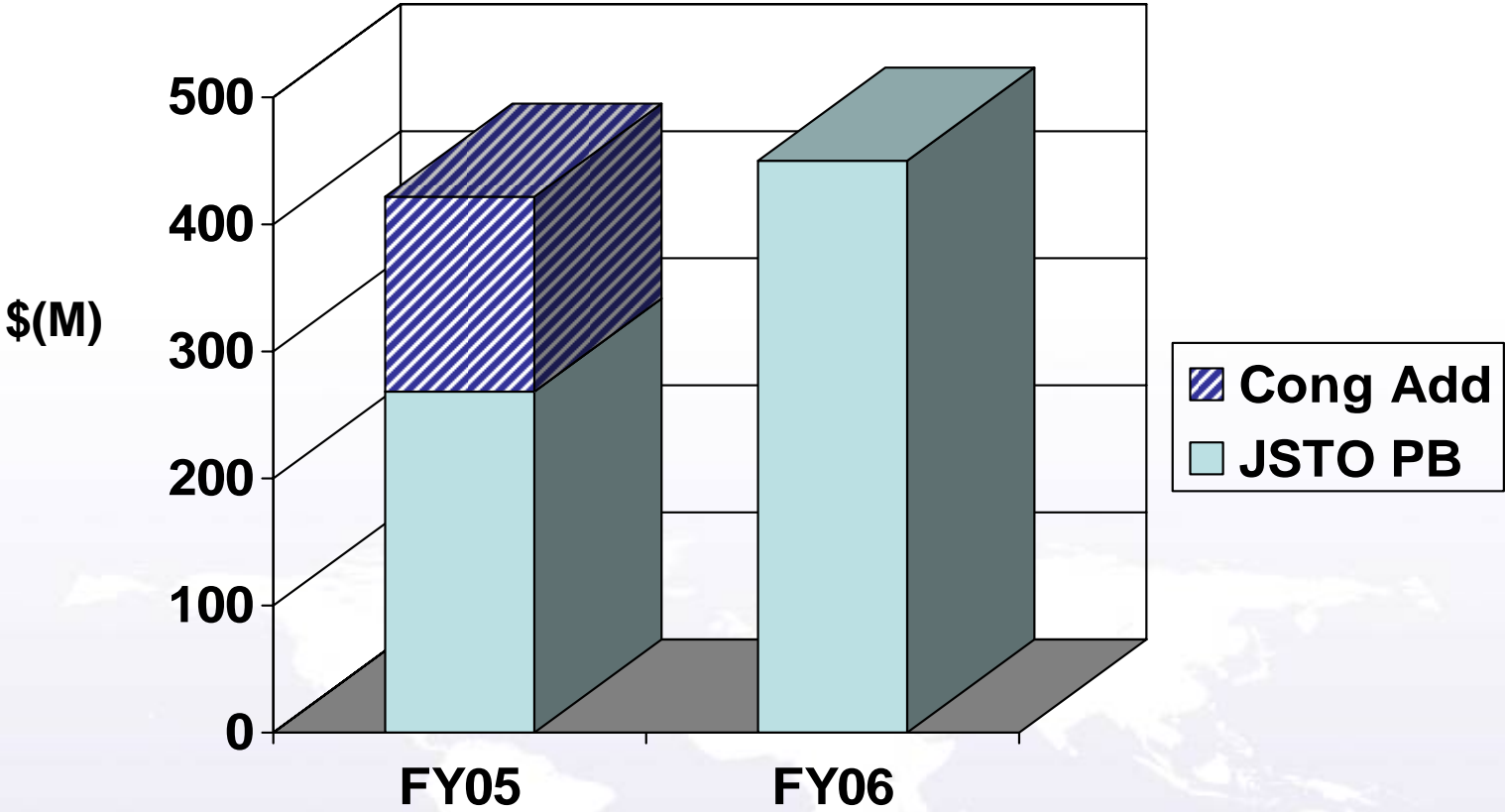
Enhanced Planning Process Guidance (EPP) Guidance

- **Combating the Proliferation of Weapons of Mass Destruction (WMD) is a SECDEF Top-10 Priority**
- **SPG Guidance: Develop Funding Options to Reduce Risk for:**
 - **Chem-Bio Defense Program: Address the Chemical, Biological, Radiological, Nuclear Defense Program (CBRNDP) Capability Gaps Identified in the Baseline Capabilities Assessment (BCA)**
 - **Combating WMD Operations: Identify Executive Agents for New Missions (Interdiction and Elimination)**
 - **WMD Infrastructure: Address Intellectual and Physical Infrastructure Recapitalization for Medical and Non-medical Laboratories and Key WMD Testing and Evaluation (T&E) Facilities**





President's budget request reflects significant increase to S&T





EPP and JSTO Initiative Impacts on M&S/B Capability Area

- **More Than a Three-fold Increase in Resources Committed to S&T for Shape**
- **Significant Focus on Technology Transition to JPEO**
 - Over 22 TTAs currently in work between JPM-IS and M&S/B
- **Extension of M&S/B S&T activities beyond direct support to JPM-IS:**
 - Stand-Up of a T&E Modeling and Simulation Thrust Area to support DT/OT for entire Program
 - Initiatives to apply Systems Engineering approaches to enhance decision making capability across program; e.g., Decision Support Thrust Area





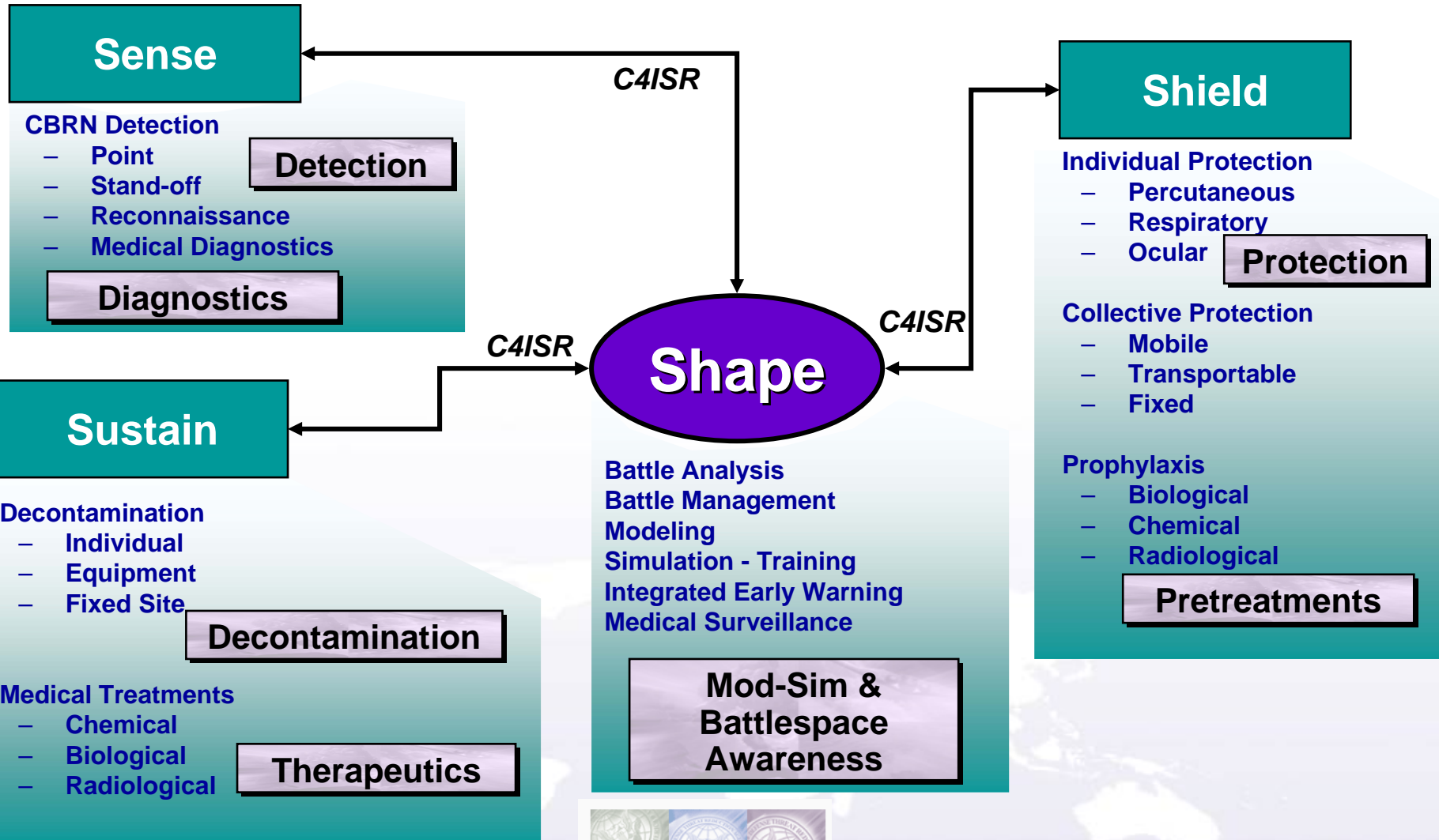
Other Changes for M&S/B Thrust Area

- **Revitalizing the Basic Research effort in 2006 for the M&S/B Capability Area including four new proposed 6.1 projects.**
- **Focus on technology push initiatives:**
 - **Sensor Data Fusion**
 - **S&T Data Backbone**
- **Extend search for revolutionary (vice evolutionary) approaches**
 - **Participation in experimentation**
 - **Interaction with other Capability Areas, including Medical**
 - **Fostering more participants in the M&S/B S&T projects (i.e., academia, non-DoD, industry, ally S&T establishment)**





Shape is Central to CBRN Defense Operational Elements





M&S/B Capability Area Capitalizes on Leveraging Opportunities Wherever Possible

- Past efforts in developing CBD battle management system (RestOps and PortWarn) are being directly leveraged by the S&T program to support JWARN
- Previous work at ECBC is being tapped to help a virtual prototyping capability for Decision Support
- Previous achievements by the former DTRA/TD Directorate are directly aiding birth of new operational systems:
 - HPAC to JEM
 - CATS to JOEF
- Threat Science Capability Area is directly contributing to expansion of JEM capabilities via leveraging the Agent Fate Program into the Secondary Effects Module





We have formalized the transition process

- Technology transition agreements
- Quarterly reviews
- Technology transition evaluation

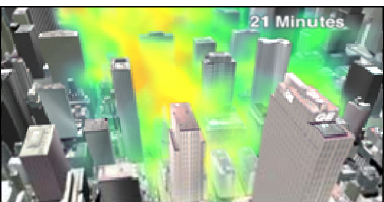
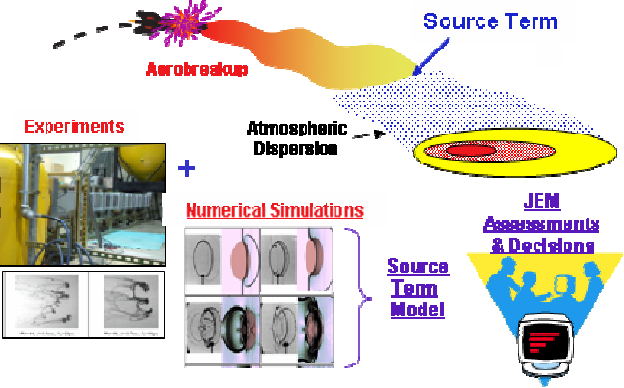


STAFFS Transition to JOEF is a seminal example for the CBDP.



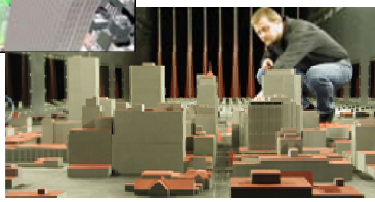


Example of S&T Alignment with Materiel Developer



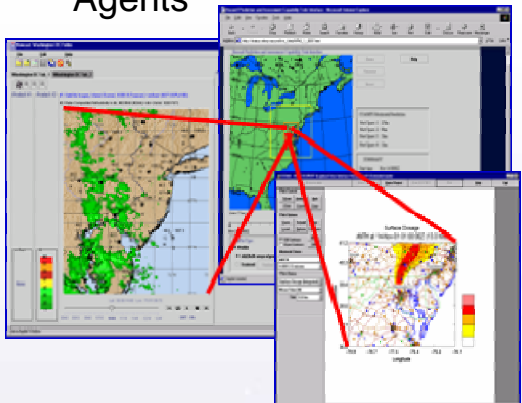
NRL CFD Simulation of contaminant release in NYC

University of Hamburg
Urban Wind Tunnel
Oklahoma City Layout



BA05MSB007 - Release and Atmospheric Dispersal of Liquid Agents

BA06MSB003 – Benchmark for Computational Modeling of Urban Flows

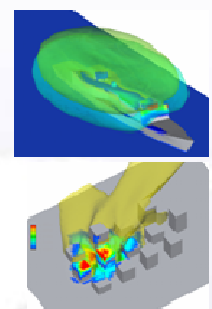
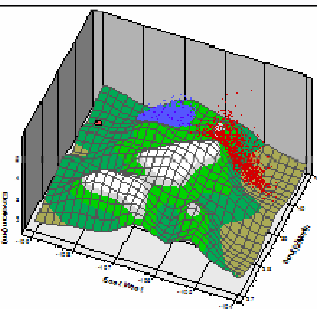


- Continuous, high-resolution meteorological data fusion.
- Blended with multi-scale meteorological forecast data.
- Automatically updated web CB effects product.

BA04MSB001 - (DTO CB.62): Hazard Prediction with Nowcasting

Atmospheric Transport

Ship/Urban Transport



BA04MSB003 - (DTO CB.55): Chemical and Biological Hazard Environmental Prediction

Joint Effects Model (JEM)

Improved source term models and real time meteorological data are integrated with high resolution turbulence models; model elements are verified and validated



Future Challenges and Initiatives for the Program

- Challenges:
 - Rapid obsolescence of IT systems
 - Lack of well defined metric for determining best investments
 - Rapid incorporation of advanced threat agent information
 - Maintaining a focus on the warfighter/end user
- Initiatives:
 - Near-term examples
 - Sensor Data Fusion Program
 - Significant focus on accelerated transition process, e.g., Agent Fate goes to the JEM Secondary Effects Module
 - Development of the Multivariate Decision Support Tool by UNM
 - Far-Term
 - Future focus will be to develop a scientific data backbone for use by the S&T, developer, and warfighter community
 - Launching initiative to integrate biological and medical modeling efforts

