Chemical Biological Defense Program Science & Technology

"A Dynamic Balancing Act"

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Chemical Biological Defense Program (CBDP)
Joint Science & Technology Office (JSTO)

Defense Threat Reduction Agency (DTRA)
Chemical/Biological Technologies Directorate

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Asymmetric Warfare

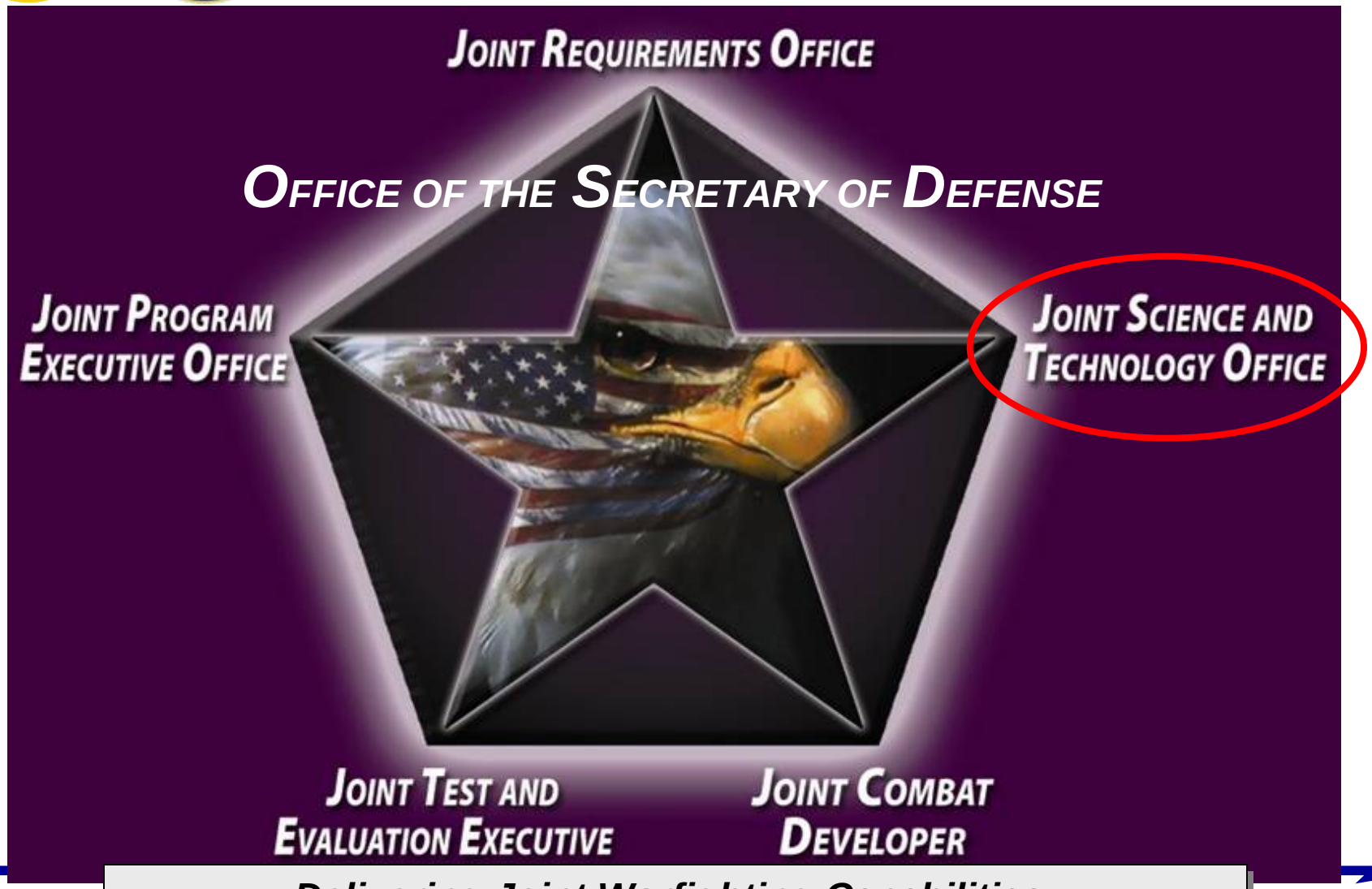
$4.5 Billion

The super carrier.
95,000 tons of diplomacy.
4.5 acres of sovereign U.S. territory anywhere, any time.

37 cents

Consequence of an attack against D.C.
100,000 dead, 125,000 infected
Economic cost = $26 Billion
(Kaufmann *et al.,* 1997)

We are the S&T Arm of the CBDP



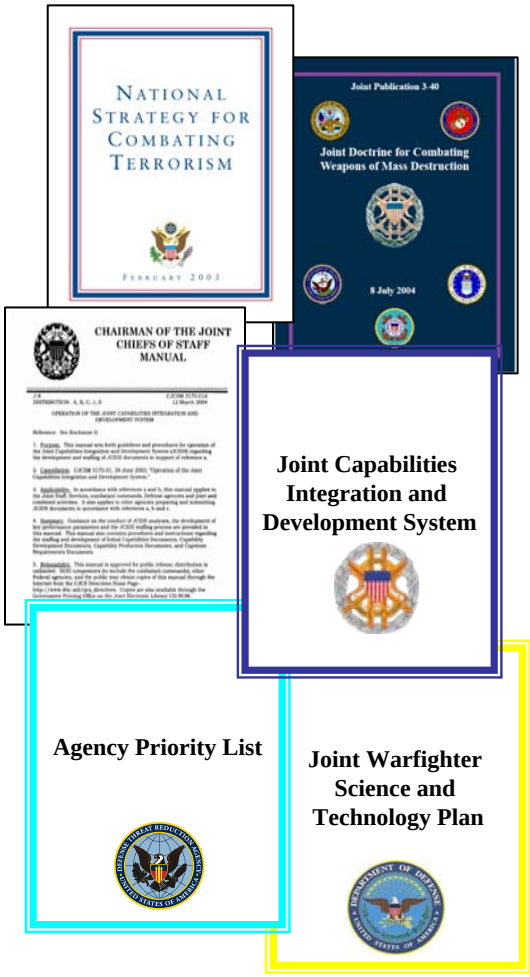
Delivering Joint Warfighting Capabilities

Program Drivers

Can be in tension with one another

Warfighter Requirements

Technology Advances



Policy Goals

Balancing the Warfighter's Needs

Current

Joint

Service Unique

Future

Meeting Deliberate and Urgent Requirements

The way we want to fight

Planned S&T

Future Orientation

Revolutionary

Deliberate

The fight we are in

Time Critical

Urgent Needs

Evolutionary

Want it NOW

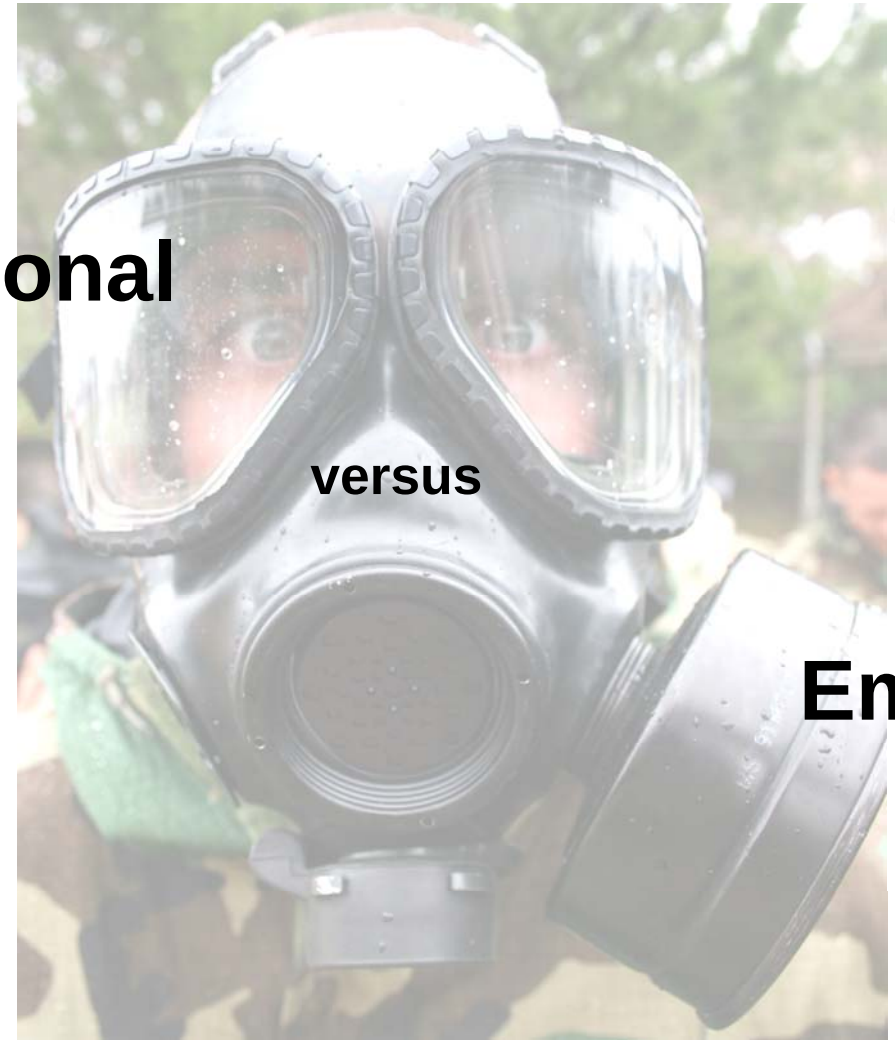
Limited by Current Technology

The Threat

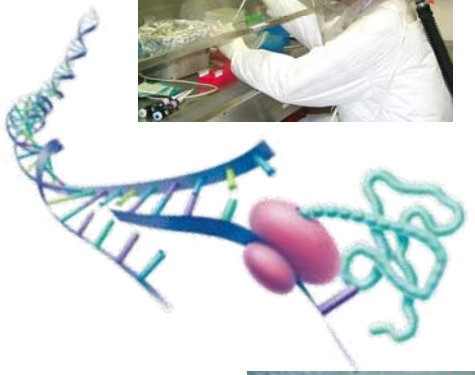
Traditional

Anthrax

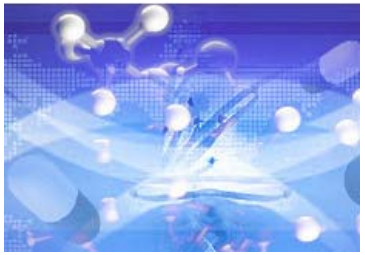
G **V**



versus



Emerging



CBW Agent Spectrum

CLEARLY CHEMICAL ← → **CLEARLY BIOLOGICAL**

CW

CLASSIC CHEMICAL

- BLOOD
- VESICANT
- NERVE
- PSYCHOLOGICAL INCAPACITANT
- CHOKING

EMERGING CHEMICAL

- PROTECTION DEFEATING
- PHYSICAL INCAPACITANT
- ENHANCERS

BW

BIOREGULATOR

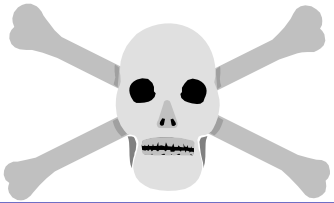
- PAIN
- SLEEP
- BLOOD PRESSURE
- MOOD

TOXIN

- PLANT
- BACTERIAL
- VENOM
- MARINE
- FUNGAL
- ALGAL

PATHOGEN

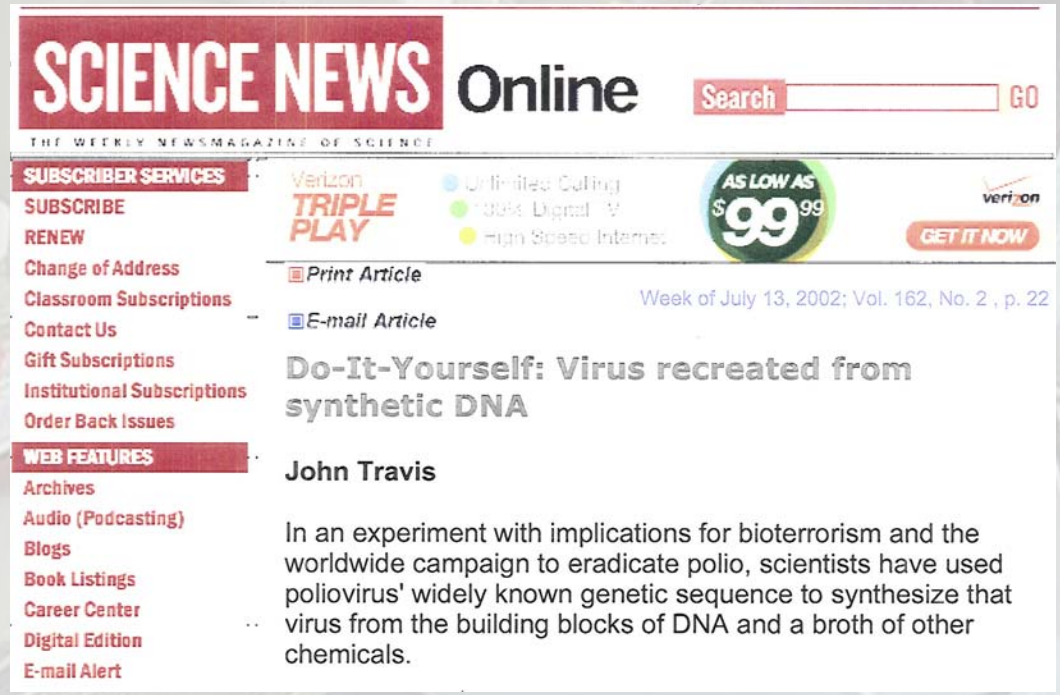
- BACTERIA
- VIRUSES
- RICKETTSIAE
- GENETIC ENGINEERED MICRO-ORGANISMS



MID-SPECTRUM

Emerging Threats

What is the next threat?



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Do-It-Yourself: Virus recreated from synthetic DNA

John Travis

In an experiment with implications for bioterrorism and the worldwide campaign to eradicate polio, scientists have used poliovirus' widely known genetic sequence to synthesize that virus from the building blocks of DNA and a broth of other chemicals.

How will they do it?

Weighting the Effort

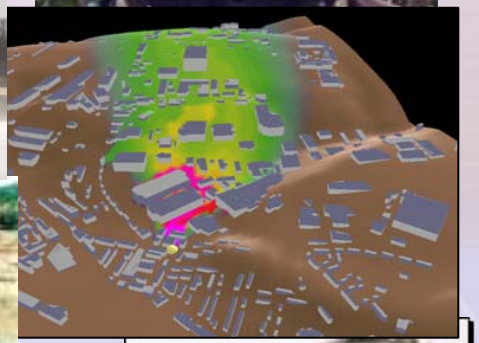
Definite challenges remain for the “old” agents

New challenges with emerging threats

The Solution Realm

Medical

Physical



Hardware and Software

Evolutionary


Impregnated suit and various masks


Placing pigeon in cage at trench entrance



Handheld decon unit & decon tank truck


Trench fan and entrance way


Suit, gloves, boots & various masks


Point & "standoff" detection


Handhel
various app
including tank


Shelters & filters

Transformational Countermeasure Technologies Initiative (TCTI)

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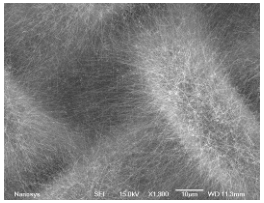
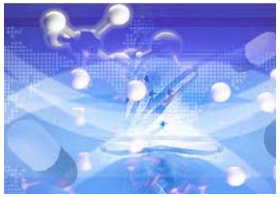
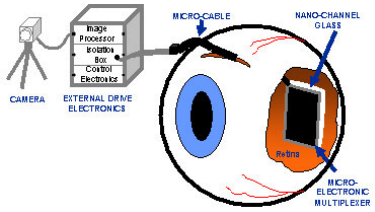
Basic Science Advances



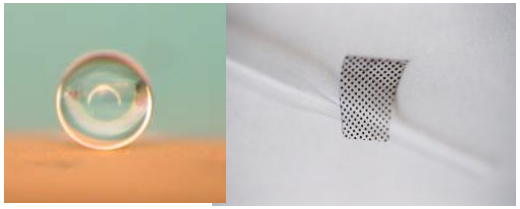
Nano-catalytic self-decon material



Bio-engineered Countermeasures



Meta-data information interface



Nano-scale protective coatings and fabrics

Integrated Cross-Cutting Technologies

- **Multi-threat defense**
- **Integral design concept**
- **Interactive digital multi-faceted data architecture**

Nanotechnology-Biotechnology-Information Technology-Cognitive Sciences (NBIC)

Broad Spectrum Applications

Future Combat Systems

- **Hierarchial systems of systems**
- **Non-intrusive; minimal logistics**

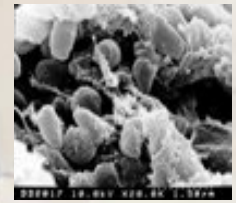
Consequence Management

Achieves An Integrated System Using Revolutionary Technologies While Maintaining the Highest Levels of Performance and Being Invisible to the User

Medical Countermeasures

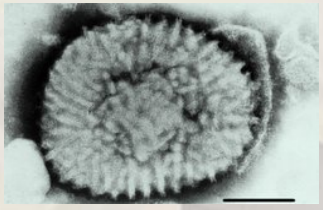
Traditional

Plague



Plague Vaccine

Smallpox



Antiviral for smallpox

Anthrax

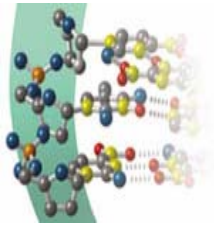
Anthrax Vaccine

Transformational Medical Technologies Initiative (TMTI)

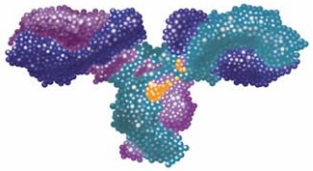
Transformational Medical Technologies Initiative (TMTI)

Scientific Thrust Areas

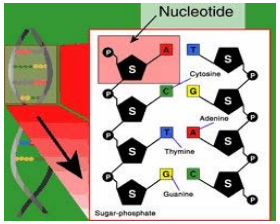
Genomic Identification



Small Molecule Discovery



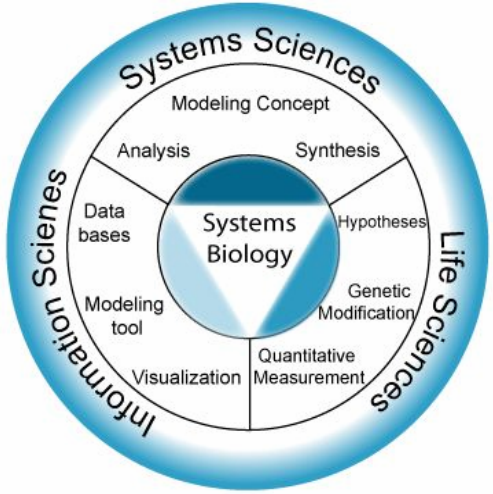
Protein Based Therapeutics



Nucleotide Therapeutics

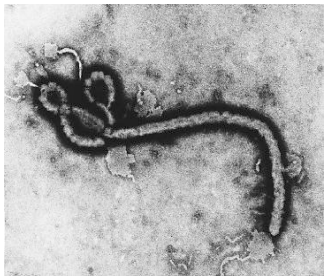
Human Immune Enhancement

Integrated Cross-Cutting Technologies



Microarray Technology
Bioinformatics
Proteomics
Genomics
siRNA

Deliverables



Broad Spectrum Treatments
- ***Hemorrhagic fever viruses***
- ***Intracellular bacterial pathogens***

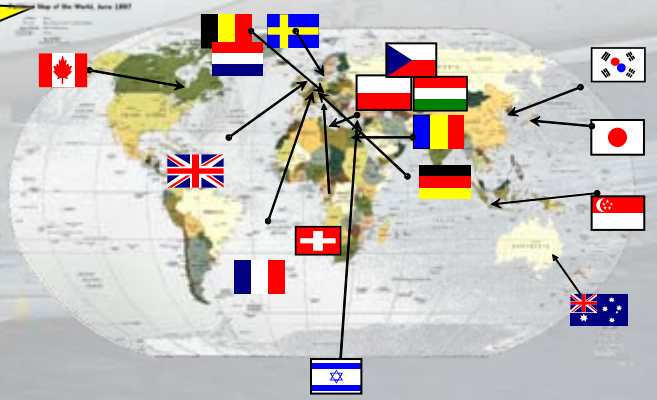
Genetic ID & Analysis

An Innovative Approach Using Revolutionary Technologies to Expedite the Development of Products to Counter Emerging Biological Threats

Collaboration

DoD

International



Interagency

Around the Globe

Multilateral

Bilateral

We have a diverse performer base

Other Gov't Agencies

Military Service Labs

National Labs

FFRDCs

Industry

International

At the End of the Day

- Combatant Commanders
- Services

ATSD(NCB) provides oversight

Joint Requirements Office (JRO)

Required Capabilities

JFOCS

Prioritized Needs

Test & Evaluation

S&T Gaps

Joint Science & Technology Office DTRA/CB

Mature Technologies

Joint Program Executive Office (JPEO)

Solutions

6.1-6.4

6.4-6.5, Procurement

Conclusions

"New ideas pass through three periods:

- ✓ *It can't be done.*
- ✓ *It probably can be done, but it's not worth doing.*
- ✓ *I knew it was a good idea all along !"*

— Arthur C. Clarke

Questions ?