

Systems Perspective on Information Systems

October 25, 2005

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What We Do Every Day

- Support Current Operations
- Improve Current Systems
- Build the Future



Thoughtful Predictions

“I think there is a world market for maybe five computers.”

**— Thomas Watson
Chairman of IBM, 1943**

**“Computers in the future may weigh
no more than 1.5 tons.”**

**— *Popular Mechanics*
“Forecasting the Relentless March of Science”, 1949**

**“Who in their right mind would ever need
more than 640k of RAM!”**

— Bill Gates, 1981

Overview

- **Why We Are Here**

- **Operational Perspective**

- **Developing Joint Warfighting Capabilities**



Why We Are Here

Vaccines

Treatments

Diagnostics

Chemical & Biological Agent Detection

Individual Protection

Collective Protection

Decontamination

Weapons of Mass Destruction – Civil Support

Installation/ Force Protection

**Information
Systems**

Total Life Cycle Management



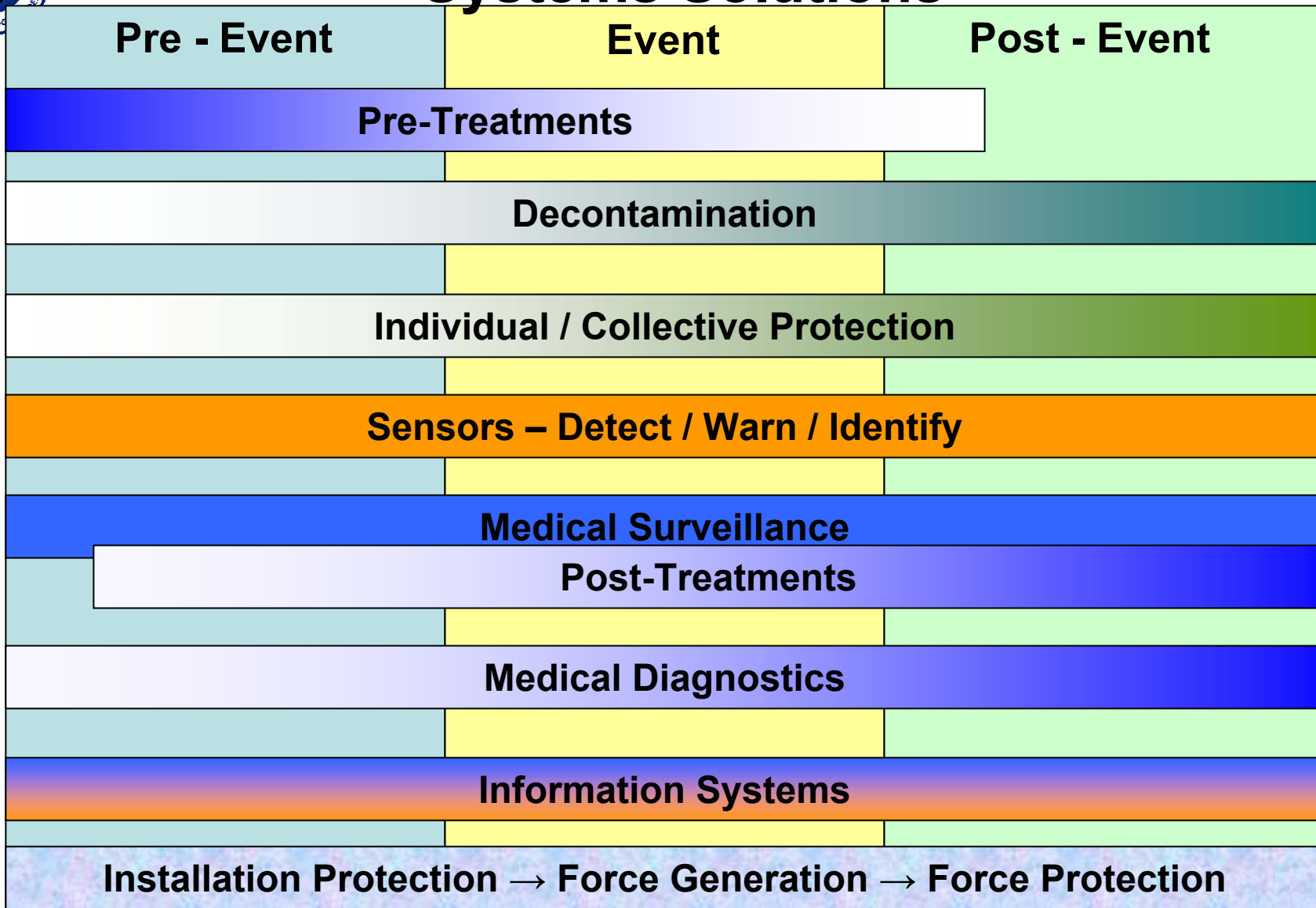
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Where We Are Going



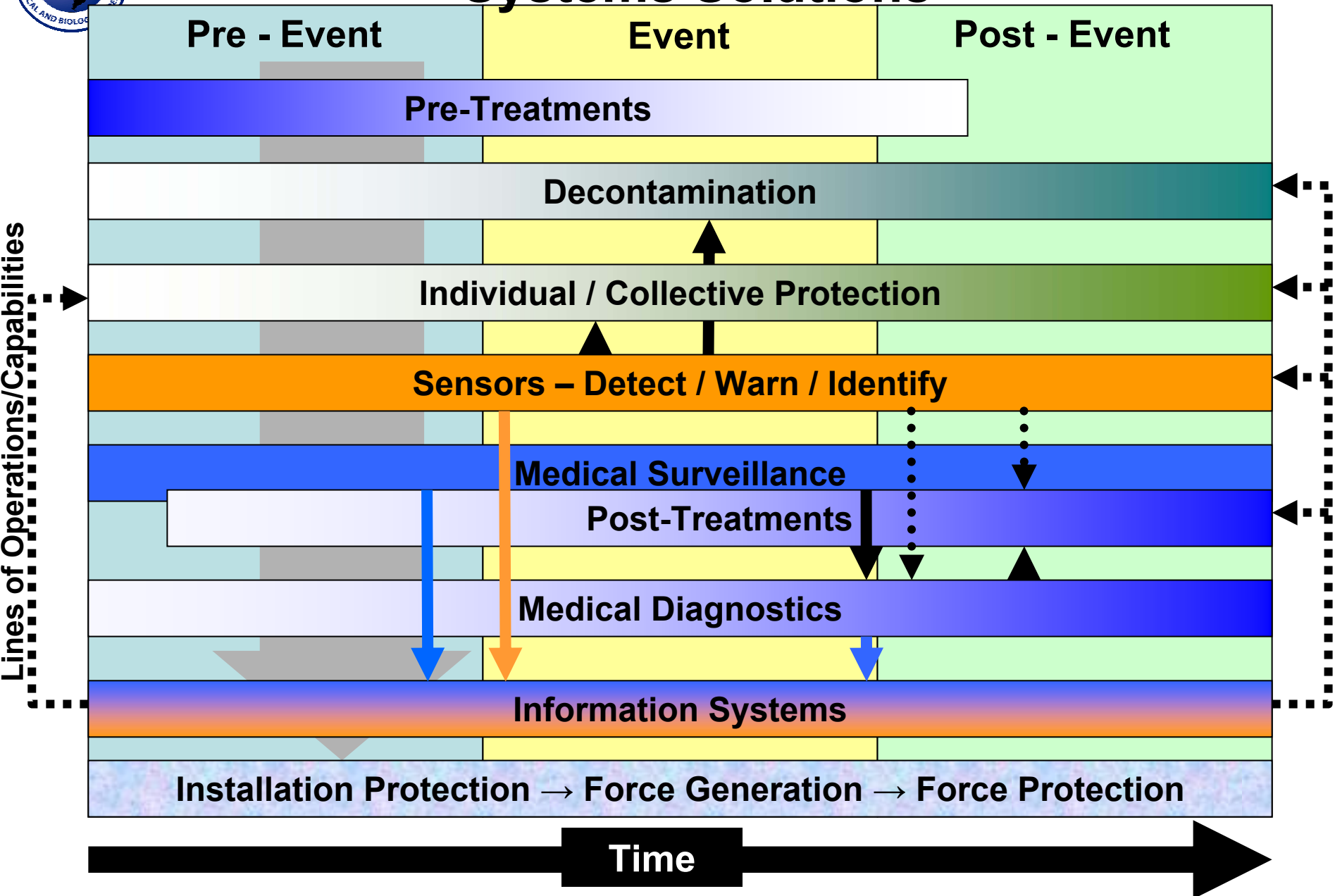
Systems Solutions

Lines of Operations/Capabilities





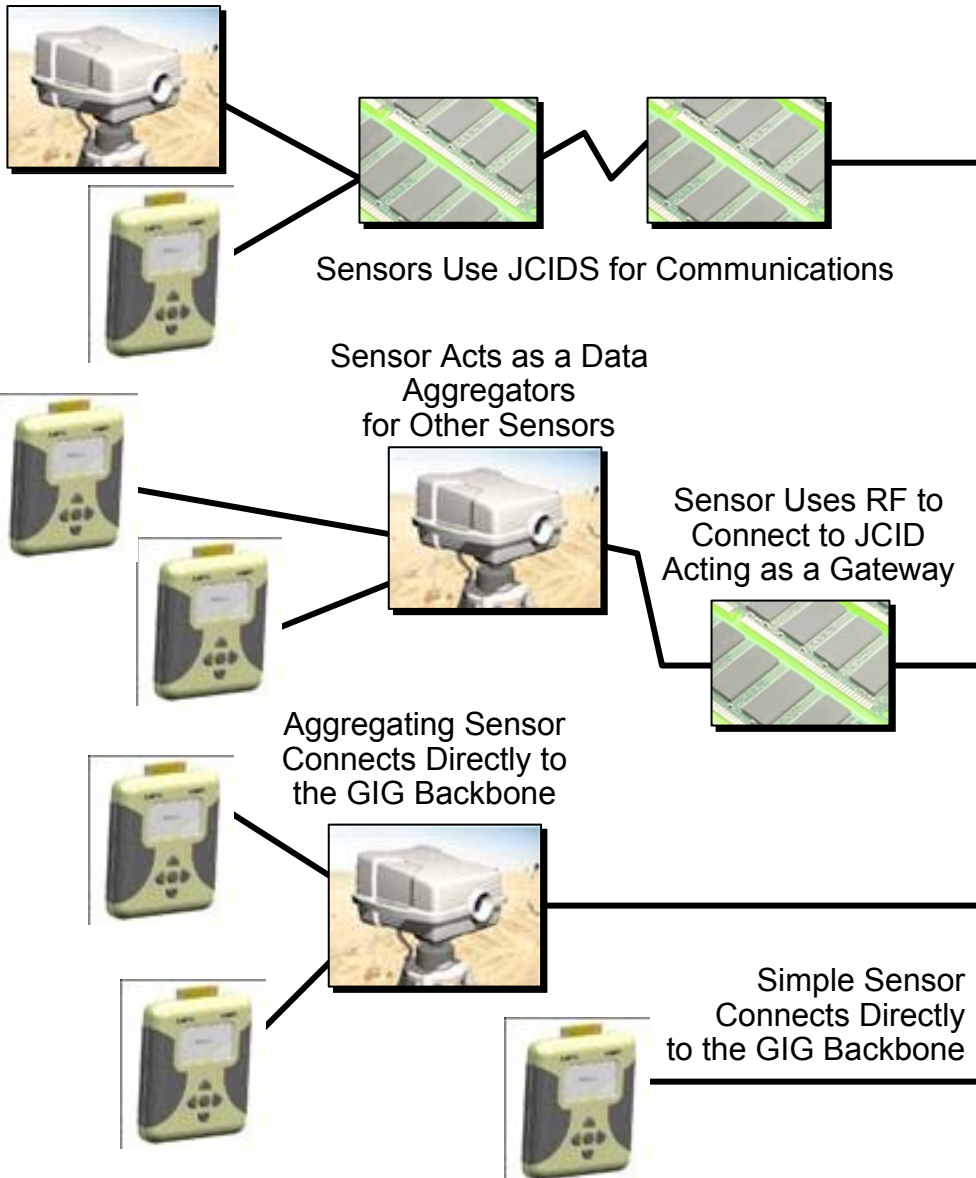
Systems Solutions



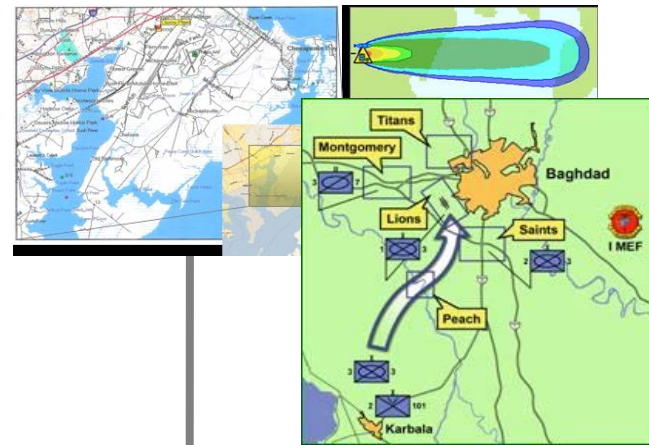


Migrating the Interface Data Aggregation and Network Connectivity

2006

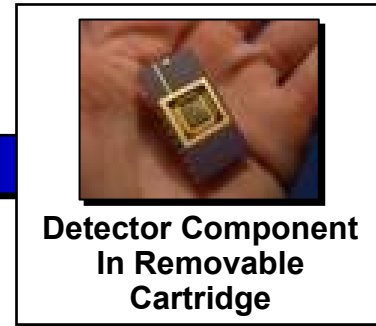


GIG Message Bus Backbone





Modularity Vision – A Plug & Play CB System



Two Key Parts:

- Multipurpose Interchangeable Detectors
- Common Interface and Communication System

- Common Mechanical I/F
- Common Signal I/F
- Common Power I/F
- Common Comms Protocols

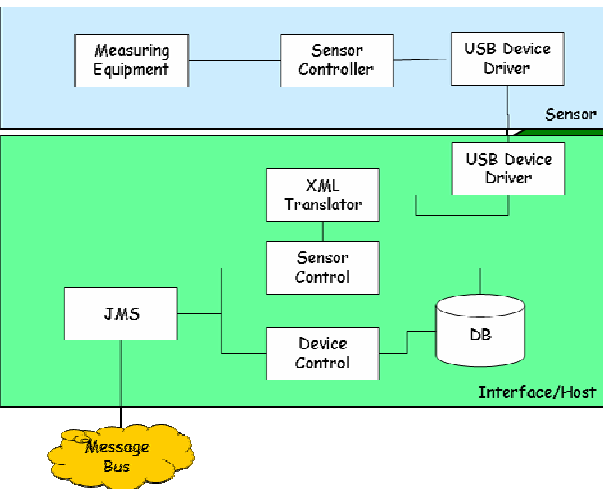


Sensor Architecture Evolution

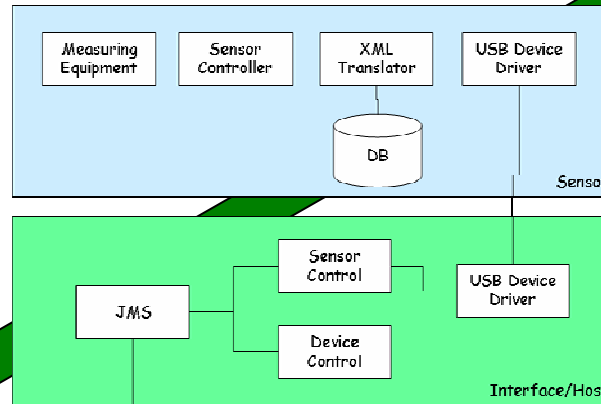
Enabling Technologies

- Serial Port Sensors
- Wired/ Wireless Ethernet
- Message Bus Infrastructure
- Open XML Messaging
- Power Over USB
- Power Over Ethernet

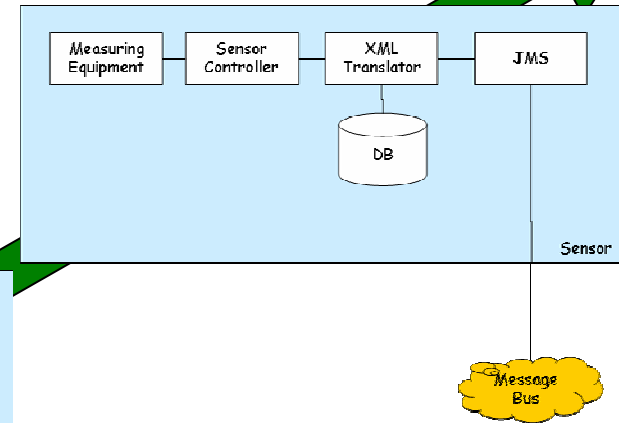
Near Term



Mid Term



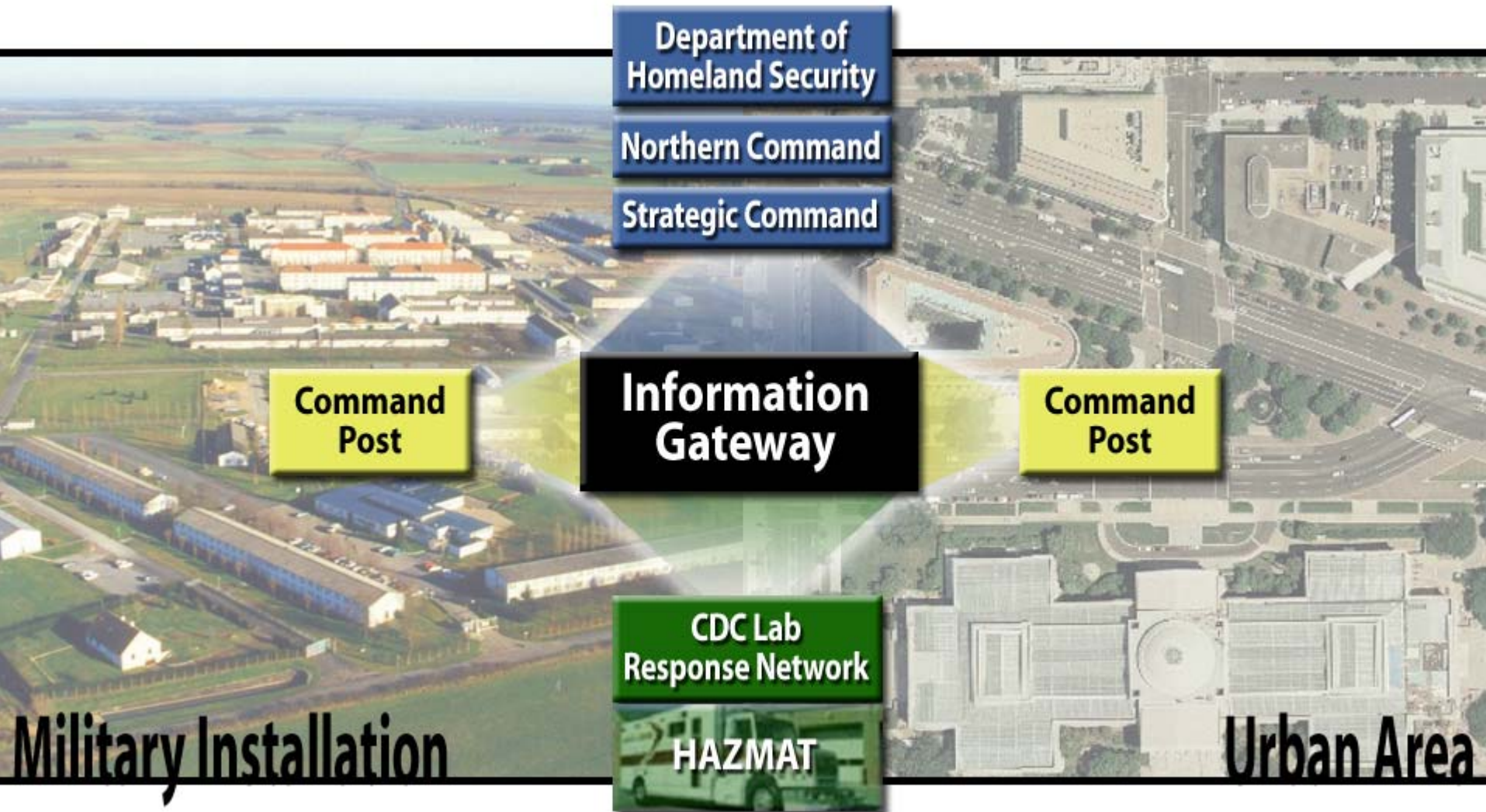
Far Term



Most Necessary Enabling Technologies are Commercially Available



Civil-Military Network Integration

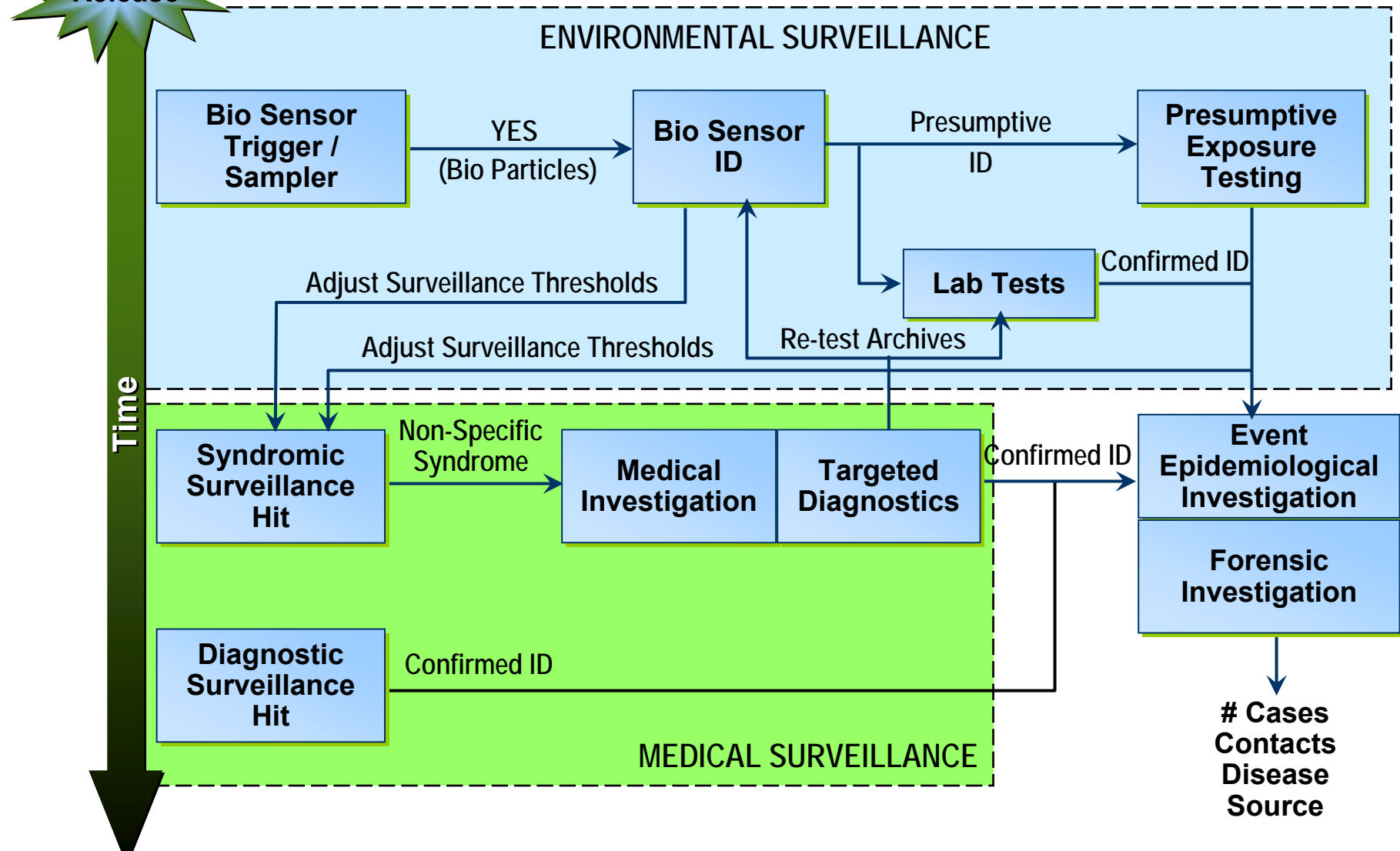




Responding to Bio Attacks

- **Organizing Principle is Spatio-Temporal**
- **Must Determine Where and When . . .**
 - **People/ Objects/ Facilities Exposed: Direct/ Secondary**
 - **People/ Objects/ Facilities Treated and Tested**
- **Speed is Critical Factor**
- **Data must be Geographically and Temporally Referenced**
 - **People/ Samples/ Objects**
- **Actions and Responses Vary Geographically**
 - **Proximity to Agent Source at Time of Release**
 - **Known Transmission Locations/ Paths (through agent transport or infected carriers); Spatio-Temporal Intersections**

Integrated Bio Surveillance Architecture





Integration of Multiple Disciplines

CONOPS

- Team Formation and Setup
- Sampling Protocols
- Standards and Metrics
- Coordination and Reporting

MODELS

Met/Dispersion
 HVAC
 People Movement
 Agent/Disease Effects
 Mission
 Treatments
 Meteorology

EI TEAM

- Medical (CDC): Treatments/Examinations
- HVAC/ Meteorology Experts
- HAZMAT Responders
- Site/ Facility Manager: Facility info
- Mission Expert: Impact and Contact Information
- Environmental Experts
- Forensics Investigators

DATA INPUTS

Cases / Medical Records
 Sensors
 Casualties
 Deaths
 Treatments
 Meteorology
 Responder Locations

BACKGROUND DATA

Aerial Imagery
 GIS Data
 Critical Sites
 Treatment Centers
 Supply Centers
 Transit Stations

Rapid
 Spatio-Temporal
 Common Picture

INVESTIGATION TASKS

Interviews
 Sample/Test: Location, Person, Clothing, Effects
 Cordon/ Quarantine
 Coordinate Treatments/
 Transport/ Decon
 Coordinate Resources
 Collect Forensics

Automated Event Epidemiological
 Investigation Decision Support Tool



Developing Joint Warfighting Capabilities





Where We're Going

- **Start with Net Centricity In Mind**
- **Start with Accredited Information Assurance Solutions**
- **Common Infrastructure for CBRN Sensors**
 - Bus/ Services Architecture
 - CBRN Modules

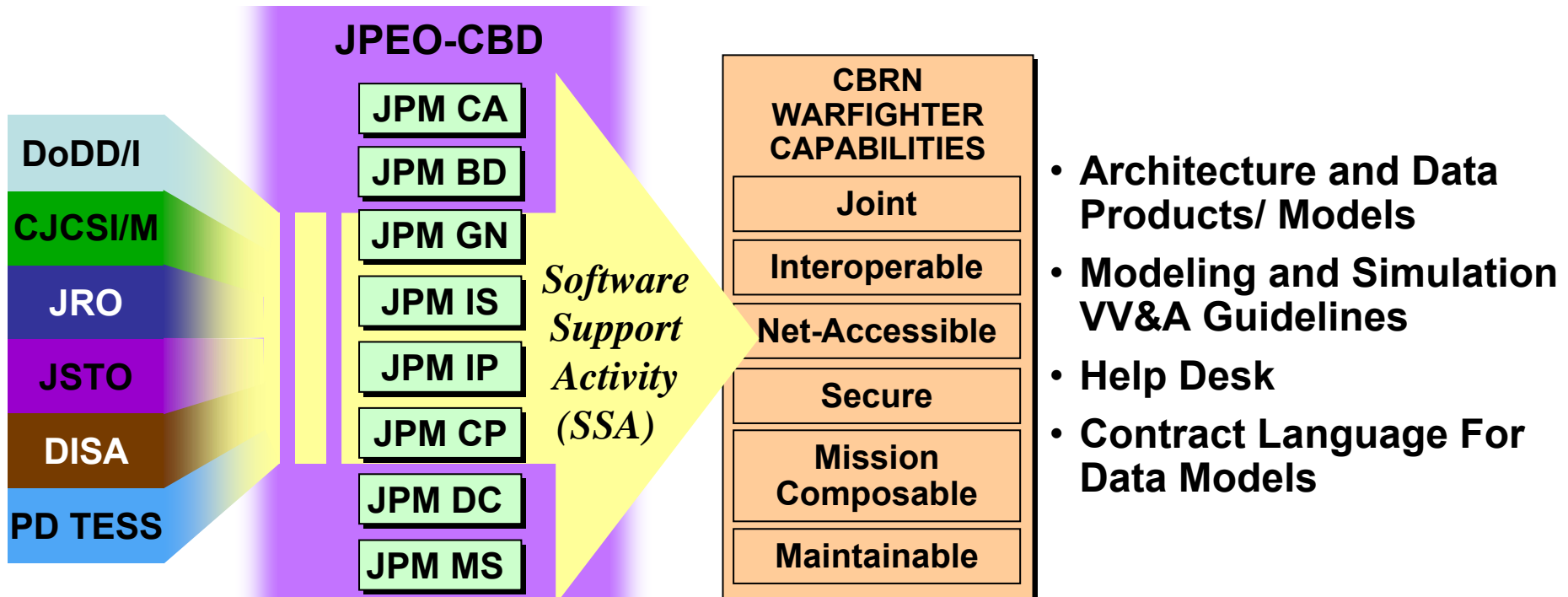
“Systems” From Modules



Making It Happen Software Support Activity

Born August 2004

CBRN-SSA VISION



SSA WORKS TO REALIZE THE VISION OF NET-CENTRIC WARFARE - FULFILLS JPEO-CBD RESPONSIBILITIES REGARDING INFORMATION ASSURANCE, DATA MANAGEMENT, and VV&A

The logo for the Joint Program Executive Office for Chemical and Biological Defense (JPEO CBD) is circular. It features a globe in the center with the acronym 'JPEO CBD' overlaid. The text 'JOINT PROGRAM EXECUTIVE OFFICE' is written along the top inner edge, and 'CHEMICAL AND BIOLOGICAL DEFENSE' is written along the bottom inner edge.

Collectively How We Make It Work!

- Common, Open Standards and Architectures
- Accredited, Verified and Validated Software
- Technology Transition Agreements Between S&T and Advanced Development
- Lifecycle Modeling and Simulation Strategies
- Information Assurance In All Activities



What Information Systems Must Do

- **Work Within**
 - **External Systems Applications to Higher Levels of Integration**
 - **Integrated Systems Vice Platforms**
 - **Systems of Systems**
 - **Families of Systems**



Challenge: Make It Work!

- **Co-Evolution in Organization and Processes**
 - **Services**
 - **Combatant Commands**
 - **Civil-Military Integration**
- **Expanding Mission Space Relevant to U.S. National Security**

Services Undergoing Dramatic Changes



Questions/ Discussion

Colonel: This is the most fantastic story I've ever heard!

Pilot: And every word of it's true, too.

Colonel: That's the fantastic part of it!

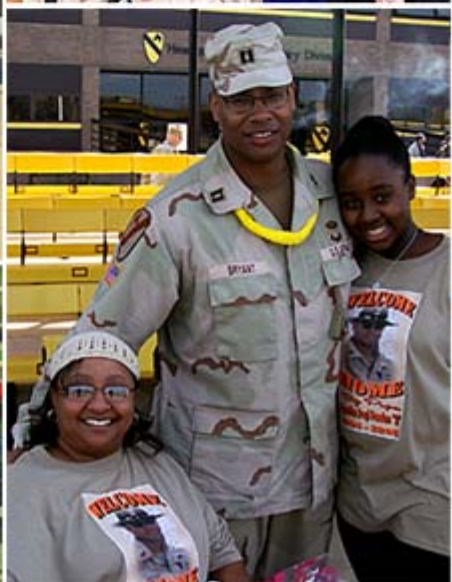
-- *Plan 9 From Outer Space*,
1959



The Reason for Our Success...



... Our People



Joint Program Executive Office



Chemical and Biological Defense