Advanced Concept Technology Demonstration (ACTD) FY05 Candidate

Medical Situational Awareness in the Theater (MSAT)
[formerly titled Force Health Protection]

28 January 2004
Breakfast Club Briefing

Advanced Concept Technology Demonstration (ACTD) FY05 Candidate

Medical Situational Awareness in the Theater (MSAT)

Lead Agency: OSD-HA, Deployment Health Support Dir
Technical Manager: USA Medical Res. & Materiel Cmd.
   Lead Investigator: Naval Health Research Center
Operational Manager: PACOM Surgeon
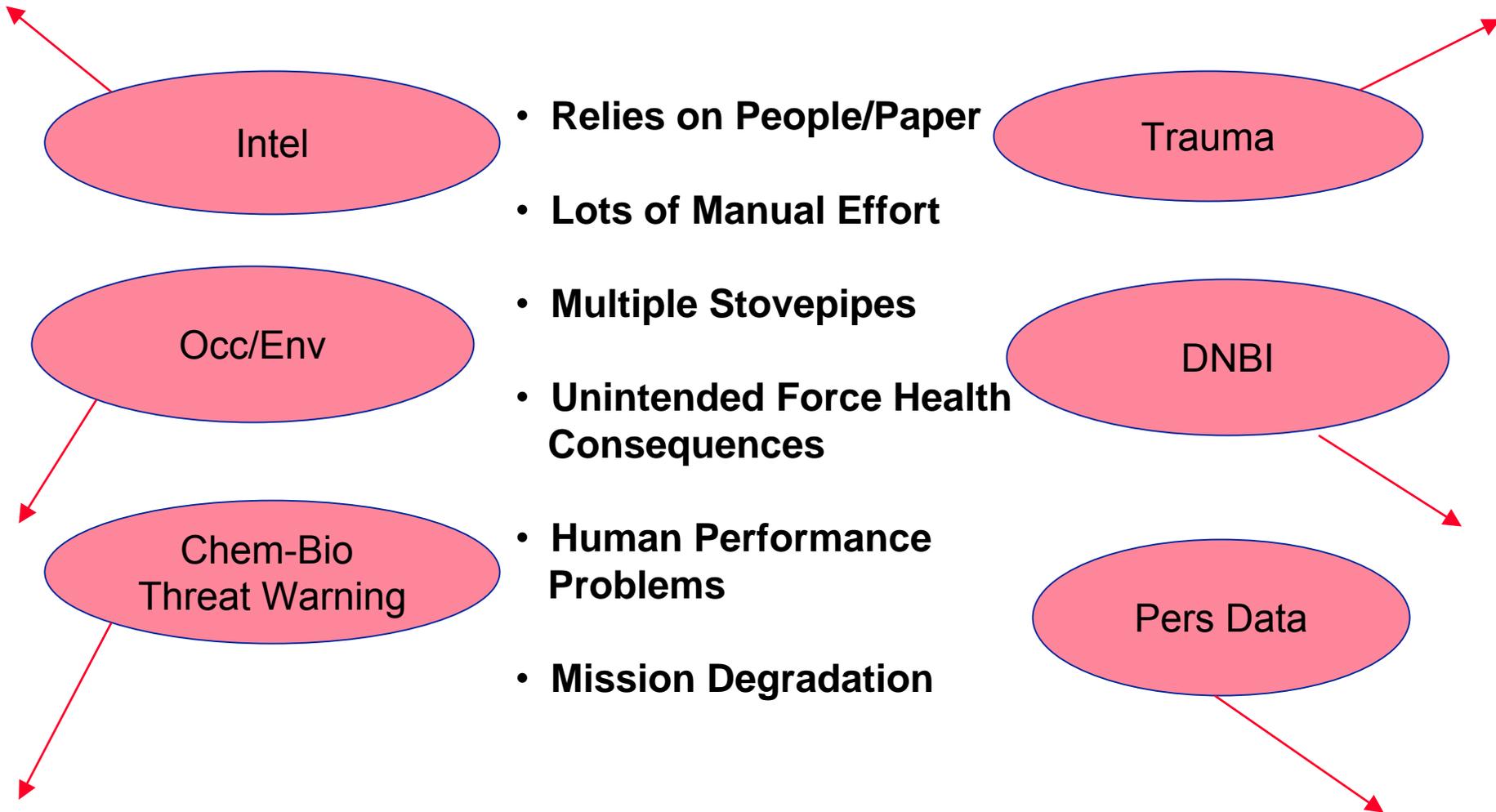**Transition Manager: HA-PEO JMIS**

Joint Warfighting Problem

Functional Area Analysis (FAA)

- *Combatant Commanders lack timely, complete, actionable health information for operational decision-making thereby putting troops at unnecessary risk of illness or injury and jeopardizing force strength and morale.*

- *Current stovepipe info systems require intensive human manipulation and do not provide timely trend analysis or immediate warning alerts that identify risks.*

Current CONOPS Overview

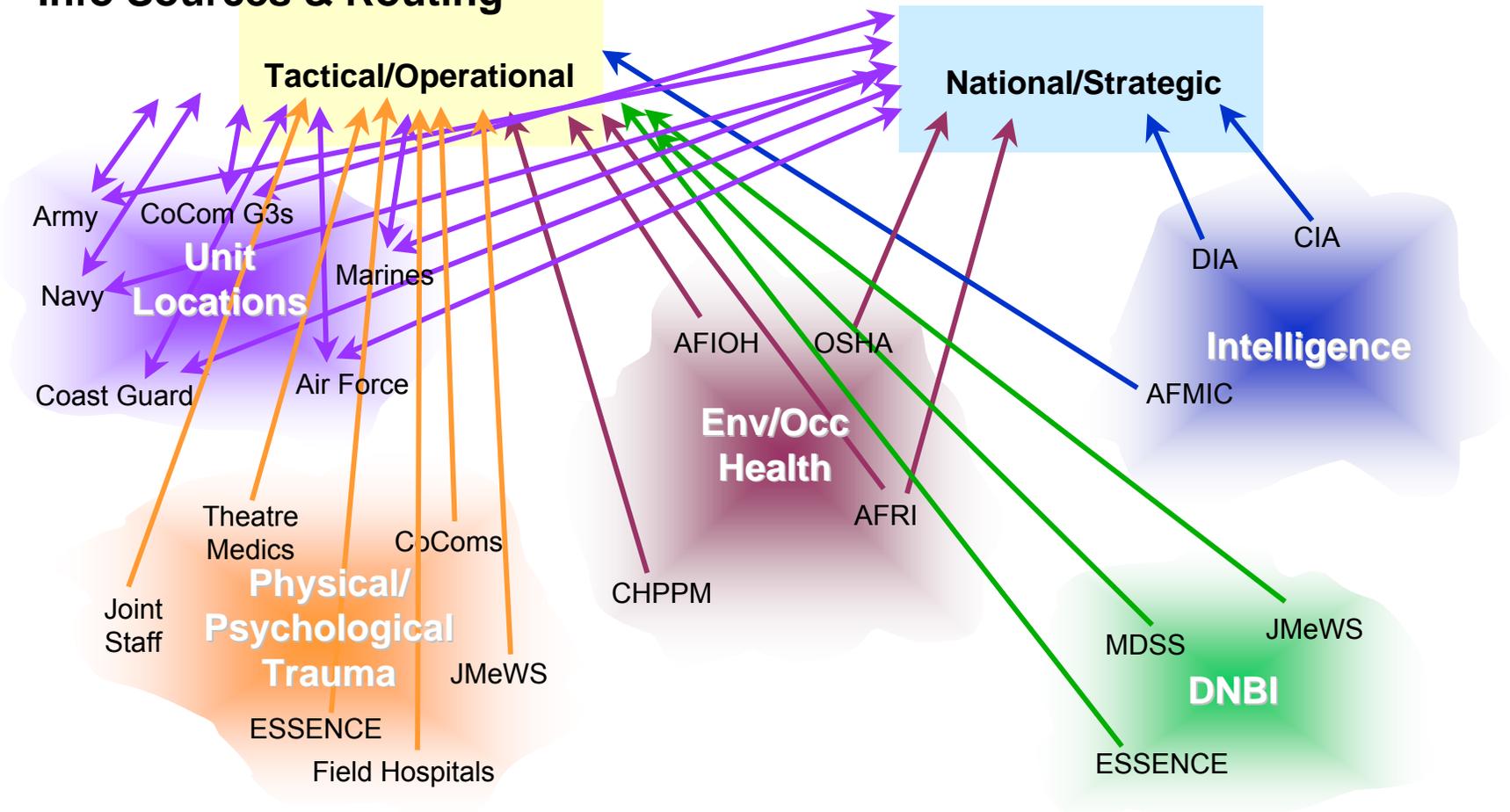*Current data domains do not connect, reducing data value*

Intel

Trauma

Occ/Env

DNBI

Chem-Bio Threat Warning

Pers Data

- **Relies on People/Paper**

- **Lots of Manual Effort**

- **Multiple Stovepipes**

- **Unintended Force Health Consequences**

- **Human Performance Problems**

- **Mission Degradation**

Current CONOPS Overview

Info Sources & Routing

Tactical/Operational

National/Strategic

Army
CoCom G3s
Unit Locations
Marines
Navy
Coast Guard
Air Force

Theatre Medics
CoComs
Physical/ Psychological Trauma
Joint Staff
JMeWS
ESSENCE
Field Hospitals

AFIOH
OSHA
Env/Occ Health
AFRI
CHPPM

DIA
CIA
Intelligence
AFMIC

MDSS
JMeWS
DNBI
ESSENCE

Impossible task to sort, understand, and generate actionable knowledge w/in operational timeframes

Recent Health Threats in Operations

- **Incidents of Disease**
  - Malaria (Liberia, Somalia)
  - Leishmaniasis (Iraq)
  - Dengue fever (East Timor)

- **Occupational/Environmental Concerns**
  - Risk of heat illnesses/injuries (DS/DS, Iraq)
  - Lead exposure (Kosovo)
  - Carbon Monoxide (Kuwait)
  - HUMVEE trauma (Afghanistan, Iraq)
  - Head and neck trauma (Iraq)
  - Combat stress (Iraq)

JCIDS Analysis Process

- **Functional Area Analysis:**
  - **Task:** Provide medical situational awareness.

- **Functional Needs Analysis:**
  - **Capability Gap:** Inability to provide real-time health risk information to operational decision-makers – which contributes to degraded mission performance and sustainability through diminished human performance, illness, injury, and death.

- **Functional Solution Analysis:**
  - **Solution Approach:** *Fuse* current and emerging technologies and apply *artificial intelligence* and computerized *decision support systems* to transform collected, scattered data into timely, actionable information and knowledge.

Advanced Concept Solution

Proposed ACTD deliverables:

- Front-end connectivities and data capture technologies from sensor and software applications to increase data sources for enhanced availability and timeliness

- Adaptable communication capabilities consistent with DoD platforms, information assurance and security standards, and enterprise architecture

- Fusion technology to establish relational database(s) within a reliable, retrievable data repository

- Artificial intelligence and decision support tools which utilize scientifically-based medical guidelines and health risk criteria to turn data into actionable knowledge

Potential Technology Contributors

DoD Software Applications (Key sources of available data)

- **Defense Occupational & Environmental Health Readiness System (DOEHRS)**
- **Defense Medical Surveillance System (DMSS)**
- **Global Command and Control System (GCCS)**
- **Global Expeditionary Medical System (GEMS)**
- **Shipboard Automated Medical System (SAMS)**
- **Defense Integrated Military Human Resources System (DIMHRS)**
- **Transportation Command Regulating & Command & Control Evacuating System (TRAC2ES)**
- **Joint Medical Workstation (JMEWS)**
- **Comprehensive Health Care System II – Theater (CHCS2-T)**
- **Medical Common Operating Picture (MEDCOP)**
- **Joint Biological Agent Identification and Diagnostic System (JBAIDS)**
- **Joint Warning and Reporting Network (JWARN)**

Potential Contributors (Con't)

Commercial Technologies

- **Gemini / Modernized Integrated Database**
- **Fusion Applications (SAP style applications)**
- **Artificial Intelligence "ware"**
- **Web-enabling Technology**
- **Sensor & Point of Use Data Capture technologies**
- **Technologies for capturing and analyzing physiological changes**
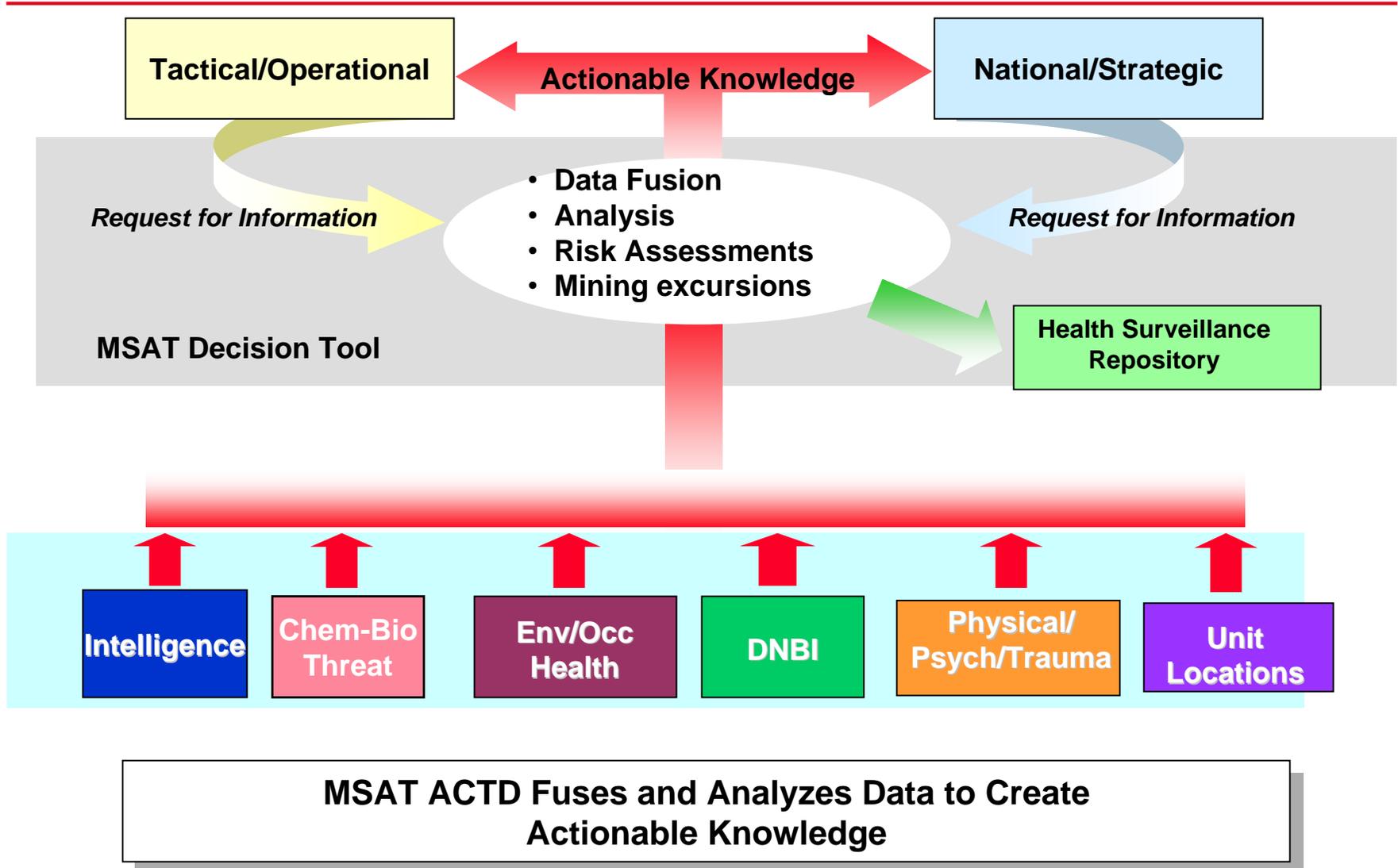
Technology Players

- **Lead Technical Manager: USAMRMC**

- **Lead Investigator: Naval Health Research Center (NHRC)**

- **US Army Research, Development and Engineering Command (RDECOM)**
  - **CECOM/STRICOM**

- **Space and Naval Warfare Systems Command (SPAWARS)**

- **Multiple PEO potential players**
  - **PEO Joint Chem-Bio Defense (PEO JCBD)**
  - **PEO Enterprise Information Systems (PEO EIS)**
  - **PEO Joint Medical Information Systems (PEO JMIS)**

ACTD CONOPS Overview

Tactical/Operational ← **Actionable Knowledge** → **National/Strategic**

Request for Information

- Data Fusion
- Analysis
- Risk Assessments
- Mining excursions

Request for Information

MSAT Decision Tool

Health Surveillance Repository

Intelligence | **Chem-Bio Threat** | **Env/Occ Health** | **DNBI** | **Physical/ Psych/Trauma** | **Unit Locations**

MSAT ACTD Fuses and Analyzes Data to Create Actionable Knowledge

ACTD CONOPS Overview FY05 ACTD Candidate

Net Centric Initiatives

Joint Tactical Radio Systems
Provides IP based, self managed, BLOS, mobile data and voice communication services

GIG Bandwidth Expansion
Provides ubiquitous, secure, robust optical IP foundation network

TCA SATCOM
Incorporates mobile/tactical users and global intelligence via optical cross links and EHF IP links

Net-Centric Enterprise Services
Provides information and data services to all GIG users

Information Assurance
Enables trusted computer, network, and data services to all GIG users

Horizontal Fusion
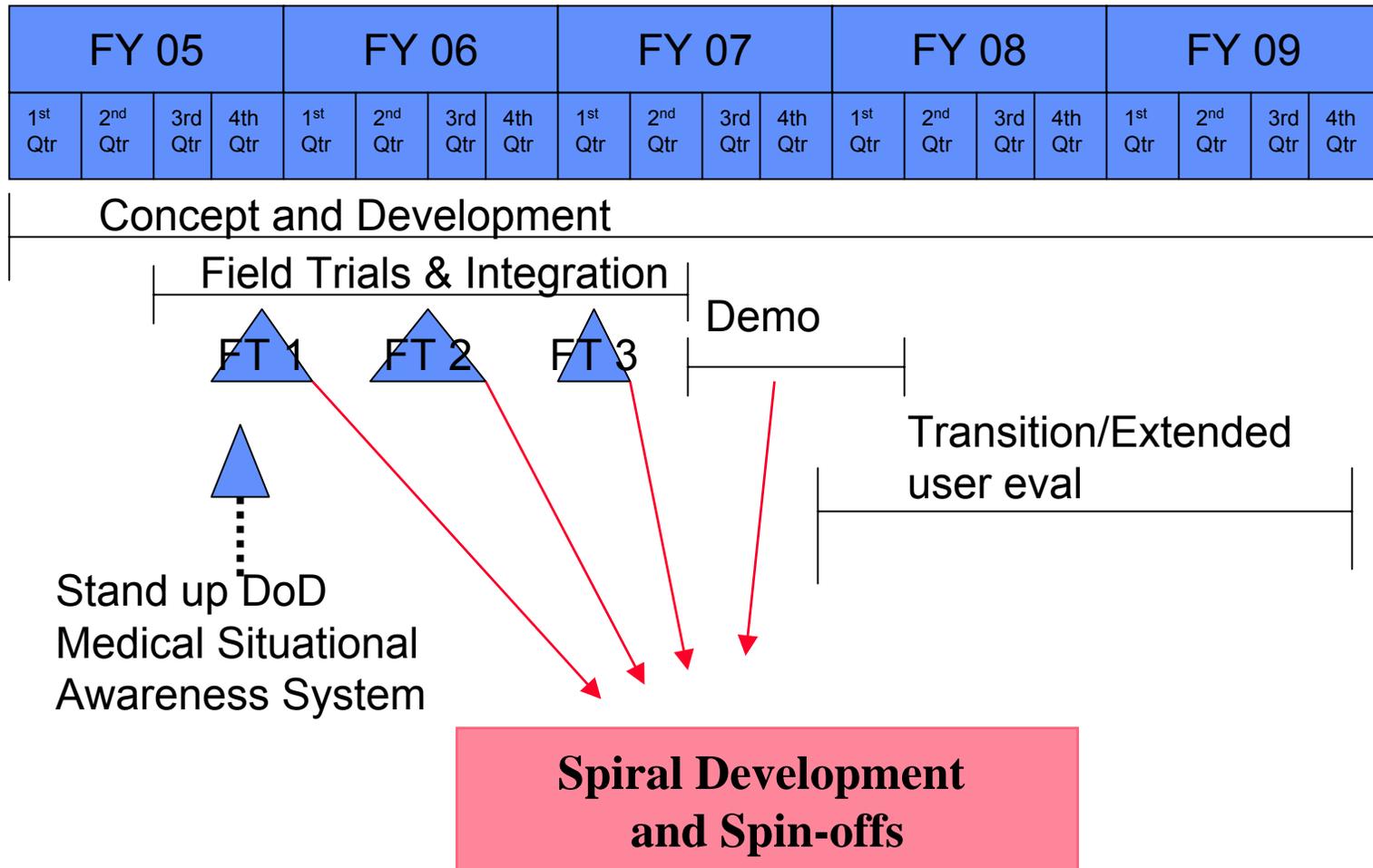*Means/tools to enable the smart pull and fusion of data by users*

Key Components of Net Centric GIG Infrastructure

Foundation → Provides an approach to manage, operate, and change the culture

Communications → Provides a comprehensive terrestrial and space network

Computing → Provides services to exploit the network and support applications

Applications → Provides tools needed for a capabilities based total force

Data Mgmt → Ensures all data is discoverable and understandable

Info Assurance → Protects the data and the network

Align Medical into DISA Architecture of Net-Centric Global Information Grid

Demonstration Plan/Schedule

FY 05				FY 06				FY 07				FY 08				FY 09			
1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr

Concept and Development

Field Trials & Integration

FT 1   FT 2   FT 3   Demo

Transition/Extended user eval

Stand up DoD Medical Situational Awareness System

Spiral Development and Spin-offs

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Transition Strategy

- **ACTD will use spiral development to introduce and assess capabilities**

- **Feasible technologies will be spun off for early field operational evaluation and implementation**

- **Successful technologies and operation concepts may be transitioned early to acquisition program of record for adoption and force structure fielding**

- **At conclusion, final recommendations on military utility will be provided to Combatant and Medical commanders in the theater**

- **The targeted program of record is the HA-PEO Joint Medical Information System (JMIS)**

Residuals for Extended User Evaluation

- **Products with Military Utility will remain for COCOM usage**
  - Sustainment funding and support mechanisms will ensure operational capability remains throughout the extended user period

- **Continued refinements of the Medical Situational Awareness System**

- **Continued ability to populate the DoD Health Surveillance Repository and share data with emerging user base**

- **Capability to verify and adjust physiologically-based models which form the backbone of decision systems**

- **Availability of data for multiple longitudinal analyses (epidemiological analysis of long-term health outcomes, new doctrine, enhanced training regimens, etc.)**

Funding Sources

Source	FY05	FY06	FY07	FY08	FY09	Total
ASC	$4M	$3M	$1M	$2M	$2M	$12M
DHP	$1M	$10M	$10M	$9M	$8M	$38M
Total	$5M	$13M	$11M	$11M	$10M	$50M

Task Funding

Task	FY05	FY06	FY07	FY08	FY09	Total
Concept and Development	$3M	$3M	$1M	$1M	$1M	$9M
FT1	$2M	$4M				$6M
FT2		$5M	$1M			$6M
FT3			$5M	$1M		$6M
Demo			$3M	$4M		$7M
User/Evaluation		$1M	$1M	$5M	$9M	$16M
Totals	$5M	$13M	$11M	$11M	$10M	$50M

Advanced Concept Goals

Actionable medical knowledge can have a significant impact !!

- Acts as a force multiplier by reducing attrition rates
- OPTEMPO enhancer — optimized health and performance of warfighters
- Morale booster

Medical Situational Awareness ACTD provides:

- Warfighters with the right info when needed
- Data repository supporting longitudinal medical health of service members