FUTURE COMBAT SYSTEMS

FCS

One Team-The Army/Defense/Industry

NDIA Conference
"Reducing Technology Risk in Acquisition Programs"

BG Thomas Cole

Deputy Program Manager for Future Combat Systems
Brigade Combat Team Platform Integration

Dan Zanini

LSI Deputy Program Manager, Future Combat Systems
Senior Vice President, SAIC

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Agenda

FUTURE COMBAT SYSTEMS
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- FCS Program Overview
- Technology Development Process
- Current & Future FCS Technology Options
- Software Developmental
- Cross Command Collaboration Effort
- FCS Program Accomplishments
- FY07-08 Path Forward

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FCS Brigade Combat Team...

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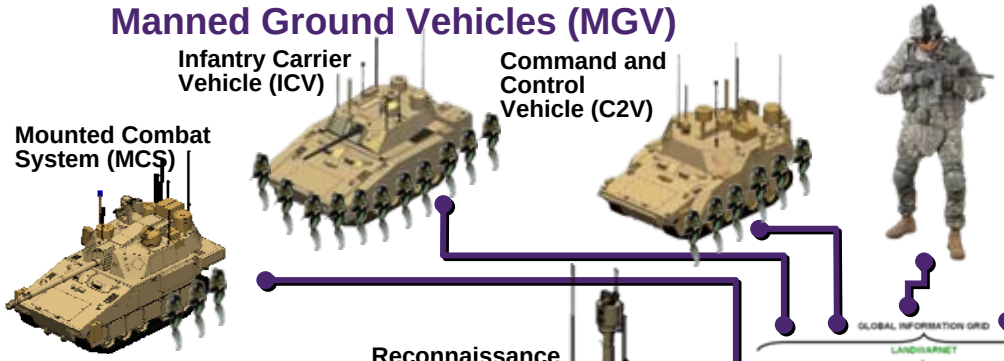
Manned Ground Vehicles (MGV)

Infantry Carrier Vehicle (ICV)

Command and Control Vehicle (C2V)

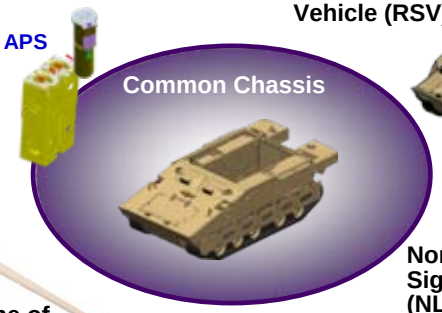
Mounted Combat System (MCS)



Reconnaissance And Surveillance Vehicle (RSV)

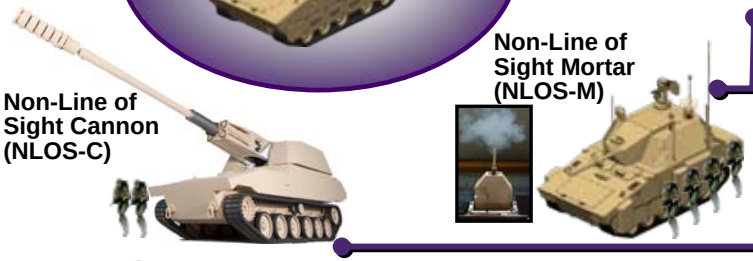
APS

Common Chassis



Non-Line of Sight Cannon (NLOS-C)

Non-Line of Sight Mortar (NLOS-M)

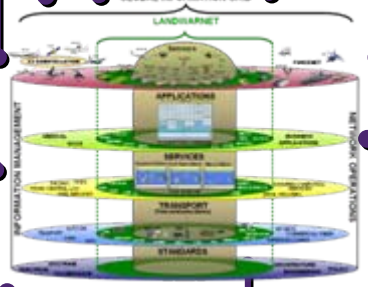


MRM

FCS Recovery and Maintenance Vehicle (FRMV)

Medical Vehicle Treatment (MV-T)

Medical Vehicle Evacuation (MV-E)



Unmanned Aerial Systems (UAS)

Class I UAV

Class IV UAV

Unattended Ground Systems (UGS)

T-UGS

U-UGS

Tactical and Urban Unattended Ground Sensors

Non-Line of Sight Launch System (NLOS-LS)

Unmanned Ground Vehicles (UGV)

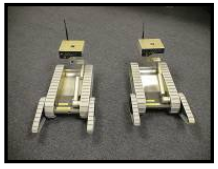
MULE-C

Multifunction Utility/ Logistics and Equipment Countermine and Transport

MULE-T

Armed Robotic Vehicle – Assault (Light) (ARV-A-L)

Small UGV (SUGV)



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Current to Future Force Through Technology Spin Outs

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FCS – System Development and Demonstration

Spin-out 1 FY 2008-10

Networked Sensors/ Shooters

- Limited Battle Command
- JTRS (GMR/HMS)
- Unattended ground sensors
- Non-line of sight launch systems

Spin-out 2 FY 2010-12

Systems/ Component

-APS
- Mast Mounted Sensor

Options:
- Small UGV
- Class 1 UAV

Spin-out 3 FY 2012-14

Network and Ground/ Air Vehicles

- ABCS to FCS Battle Command
- ARV-A-L
- Small UGV
- Class I UAV
- Class IV UAV

Core Program Delivery FY 2015

Joint Networked System of Systems

Fielding 6 current force BCTs/yr (76)

Current

Infantry Stryker Heavy

Future

Fielding 15 FCS BCTs

Infantry Stryker Heavy FCS

2004-2006

Lessons learned OIF and OEF

RAVEN Tactical UAV
Interceptor Body Armor (IBA)
Counter IED (Warlock, Duke)
Uparmored Vehicles (UAH, AoA)
Buffalo mine-clearing vehicle

2006-2010

- ARH (2009)
- LUH (2008)
- DCGS-A (V3) (2007)
- Excalibur (2007)

2010 and beyond

- WIN-T (2014)
- JTRS AMF (2011-12)
- JTRS (GMR/HMS)
- Apache Longbow Block III (2011)

Related Advanced Developments

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FCS (BCT) System-of-Systems Schedule

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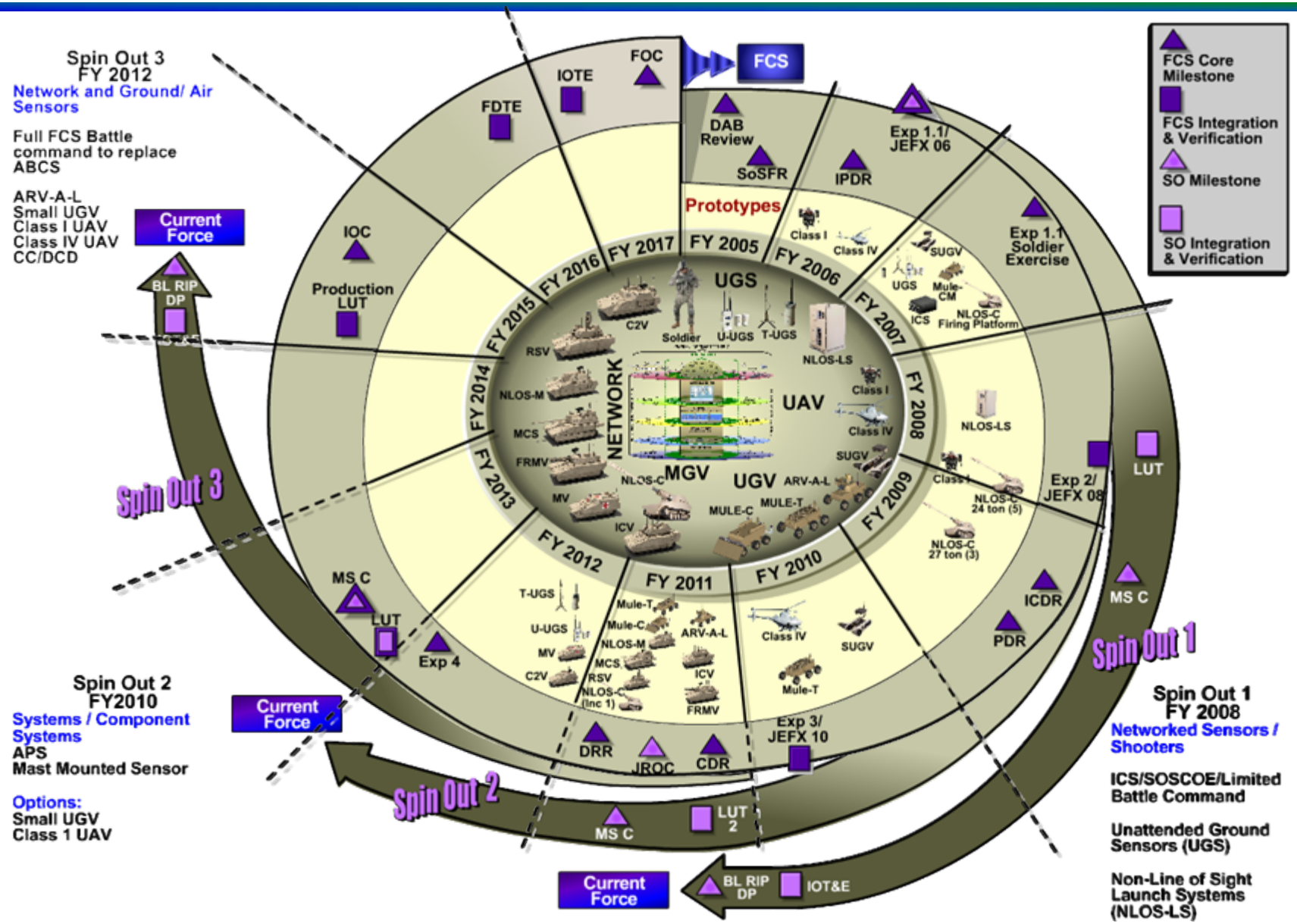

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Requirements Determination
A New Paradigm

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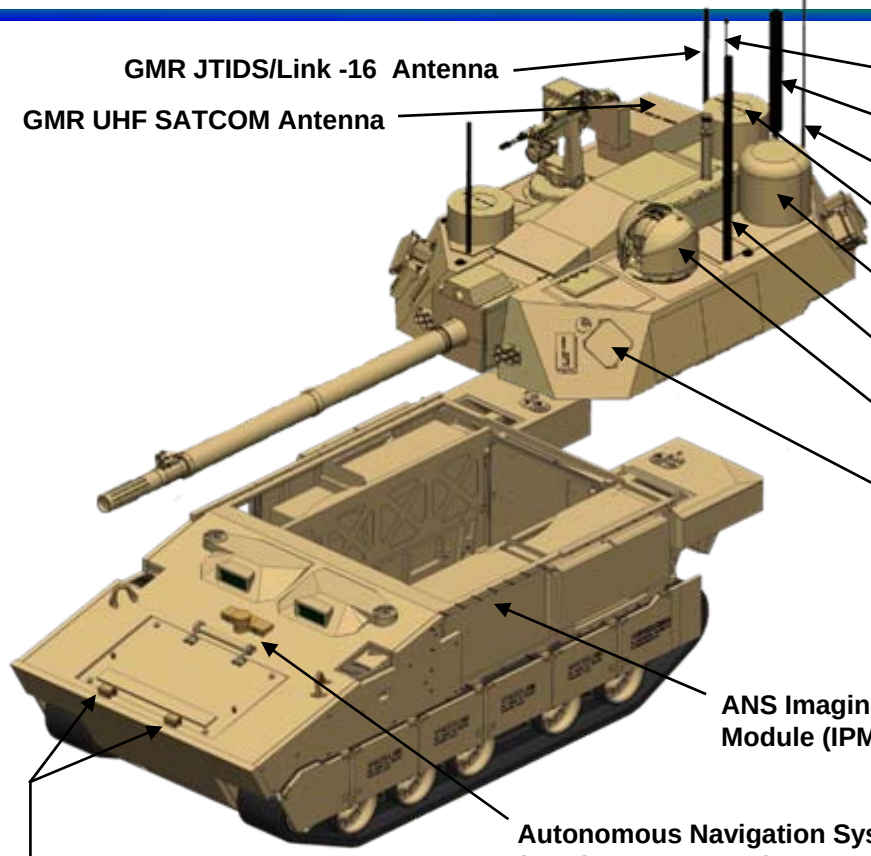

Concepts - Threat
Lessons Learned
Studies

ORD O&O

ORD O&O

ORD O&O

Develop new ways of thinking and operating

Tech Base

Build Solution

Develop and analyze multiple solutions from wide range of sources

Determine what is possible

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Concept and Technology Development Phase Modified for FCS SoS

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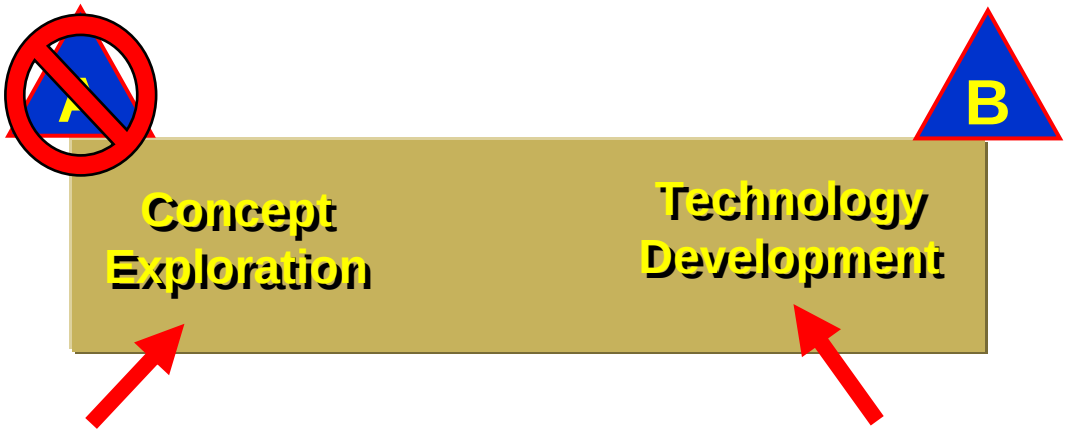

Concept Exploration

Enter: **Validated and approved Initial Capabilities Document.**

Activity: **Paper studies and Simulations of alternative solutions to the initial concept.**

Exit: **MDA selects preferred solution to be pursued.**

Technology Development

Enter: **Project manager understands solution as part of the integrated architecture and its DOTMLPF implications.**

Activity: **Technology development and critical demonstrations focused on Integrated Concepts tied to Spiral 1.**

Exit: **Affordable increment of systems as well as FCS SoS Critical Integrated concepts with military-useful capability identified and demonstrated in a virtual and relevant environment – normally can be developed for production within 5 years.**

Focus on Integrated Schedule, Master Plan and System of Systems Specification Development and Requirements Crosswalk

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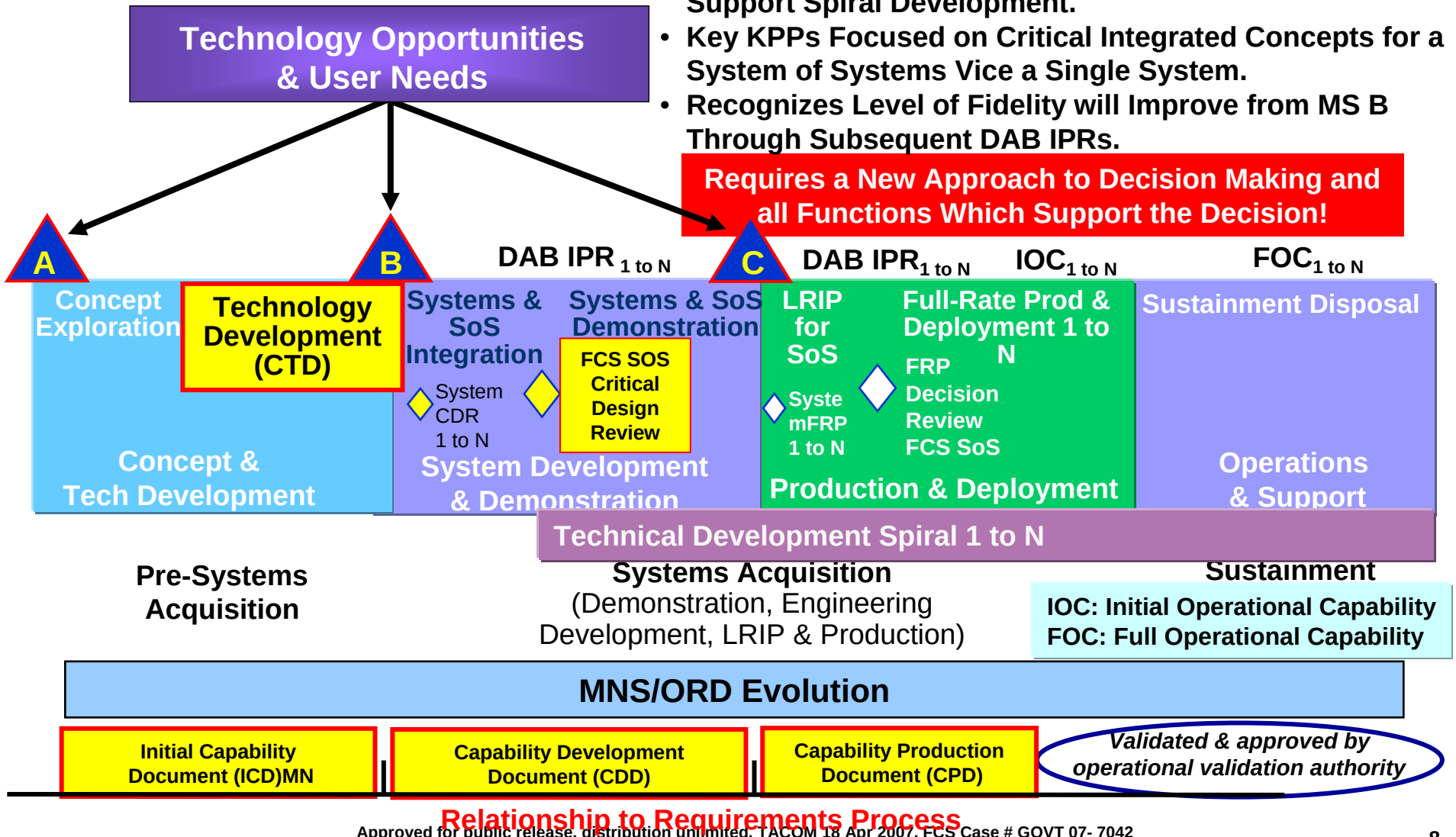
The 5000 Model (tailored for FCS)

FUTURE COMBAT SYSTEMS FCS One Team-The Army/Defense/Industry

(30 October 2002)

- **Recognizes a Spiral Decision Process is Required to Support Spiral Development.**
- **Key KPPs Focused on Critical Integrated Concepts for a System of Systems Vice a Single System.**
- **Recognizes Level of Fidelity will Improve from MS B Through Subsequent DAB IPRs.**



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Technical Approach
Network Centric Distributed Platforms

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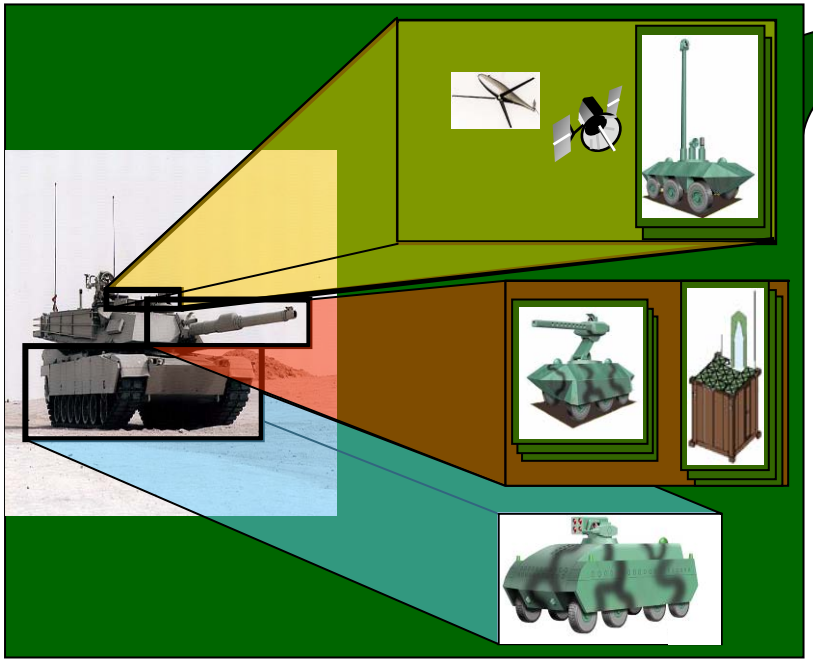
From This...



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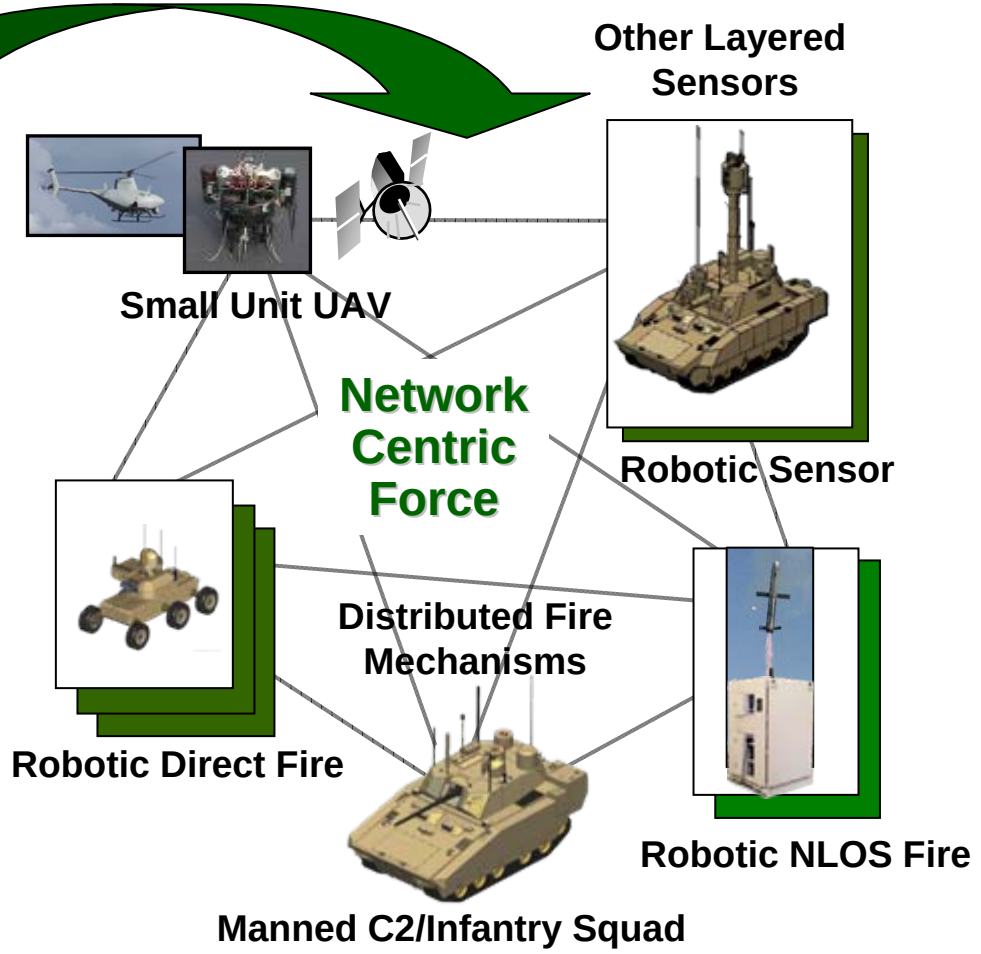

Exploit Battlefield Non-Linearities using Technology to Reduce the Size of Platforms and the Force

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Major Technology Challenges

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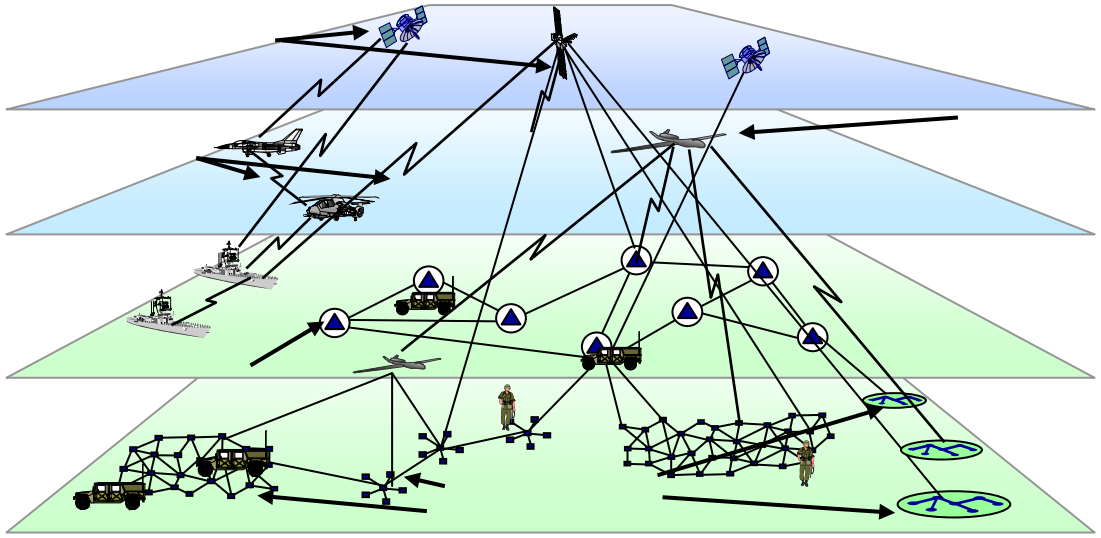
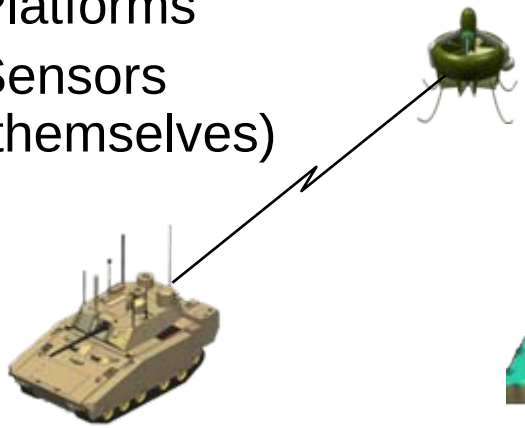
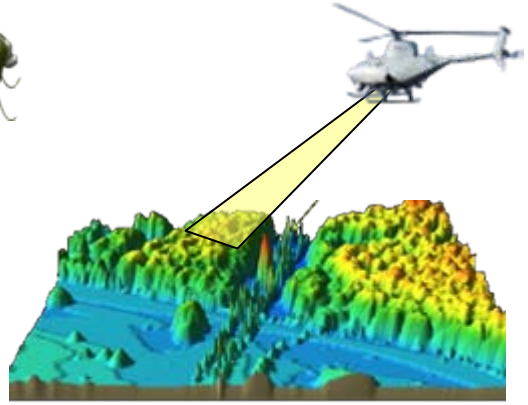
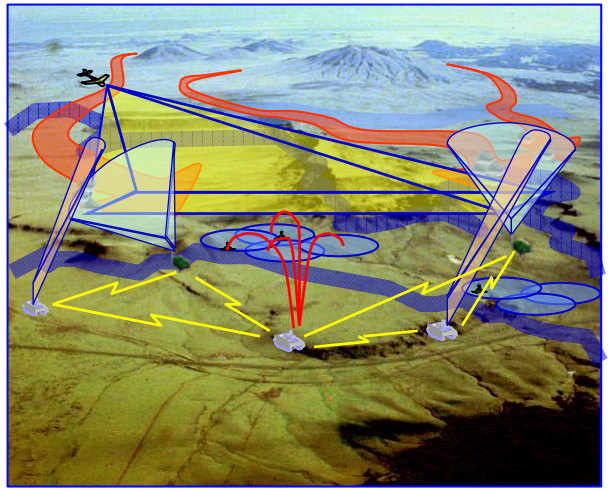
- **Robotics**
  - Behavior
- **Platforms**
  - Design & Mobility
- **C4ISR/T**
- **Beyond Line of Site Networked Fires**
- **Sensors**
  - Platforms
  - Sensors (themselves)









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Technologies for the Future Force

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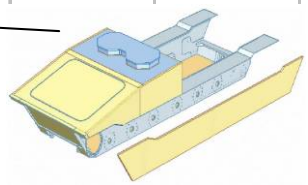
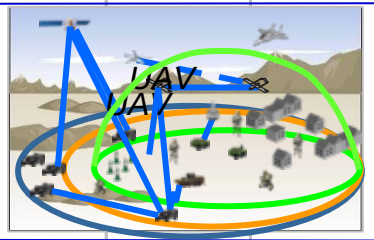
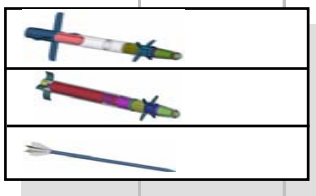
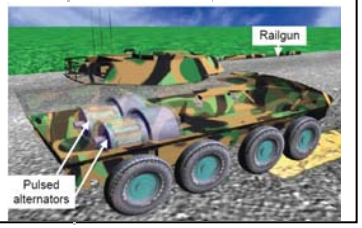
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Force Protection	Close Range →						KE APS On-The-Move Demo		
	APS Demo								
	Quick Kill Vertical Launch System			RPG, Enemy tank, ATGM		APS Cueing Sensor	Light weight Armor Protection		
Unmanned Systems	Unmanned Ground Vehicles					Unmanned Air Vehicles	Robotics Collaboration		
Network / Comms	Tactical Wireless Network Assurance						Network Enabled C2		
Lethality	BLOS Munition (MRM) And low cost accurate munitions for 120 mm						Long term: Rail Gun for lightweight and Common FCS chassis		

▲ = TRL 6









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Technologies For the Future Force

FUTURE COMBAT SYSTEMS
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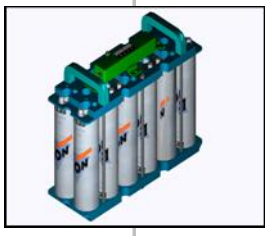
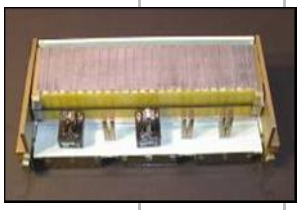
One Team-The Army/Defense/Industry

	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Mounted Soldier Interfaces									
Propulsion & P&E									
Sensors for Future Force									

Distribute Aperture Systems
Mounted Inside hatch
360 degree view

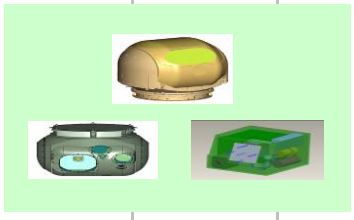
Hybrid electric Engine
Traction Drive Motor





Li-Ion battery module w/ distributed
DC/DC power converter

3rd Generation IR
FCS MREO FLIR



ARH ***Mini-LRAS3***

ARTEMIS - Foliage
penetrating radar for CL IV UAV

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Recent Significant Events

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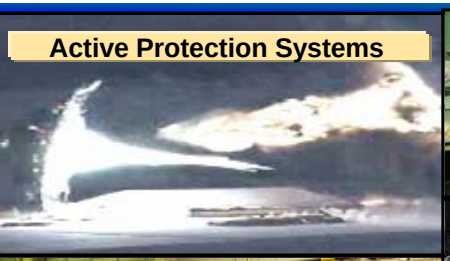

Active Protection Systems

ICS Mounted in Bradley

Experiment 1.1

Class I UAV

Class IV UAV

120 MM Cannon

JTRS GMR in M1151A1

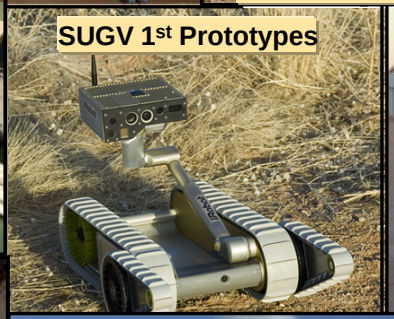
Unattended Ground Sensor

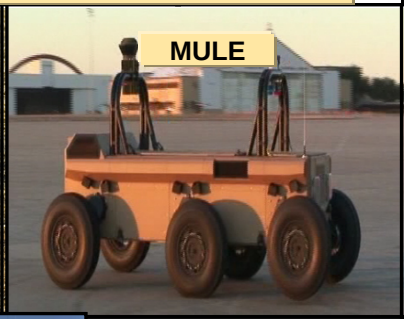
Centralized Controller

MV-E Litter Lift System

C2V Mock-up

Software Build 1 at SoSIL


SUGV 1st Prototypes


MULE

120 MM Breech Mortar

5L Diesel Engine

Traction Drive System

NLOS-C

NLOS-LS test

NLOS-LS Transport

Demonstrations and Technologies On Track

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Future Combat Systems SOS SW Acquisition Management

Edgar Dalrymple
Associate Director
Software & Distributed Systems

Tim Peters
Senior Program Director
Software & Distributed Systems

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Agenda

FUTURE COMBAT SYSTEMS
FCS
One Team-The Army/Defense/Industry

- Scope of FCS Software
- Program Management Complexity
- System and Software Description
- Software Developmental Phasing
- Architectural Concepts
- Integration Flow
- Risk
- Program Performance to Date
- Lessons Learned

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FCS SDD Contract Scope

FUTURE COMBAT SYSTEMS
FCS
One Team-The Army/Defense/Industry

- **Developmental Engineering for a new fleet of Manned Ground Combat Vehicle (HW & SW)**
- **Developmental Engineering for a new fleet of Unmanned Ground and Aerial Vehicles (HW & SW)**
- **Developmental Engineering for Distributed System (HW and SW)**
  - Networked integration of FCS systems
    - Sensors
    - Effectors
    - Maneuver Elements
  - Networked integration of existing and future Army/Joint Systems
  - Networked/Embedded training
  - Networked/Embedded prognostics/sustainment
- **Development and Integration of Tactical and Strategic Networks**
- **Development of new Army Organizational Structures (Brigade Combat Team) and Tactics, Techniques and Procedures**
- **Development of Modeling and Simulation Environment to support Simulation Based Acquisition (including Operational Test)**
- **Incremental fielding of products to current forces (Spin Outs)**

Fixed Cost and Schedule

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Concurrent Engineering Complexity

FUTURE COMBAT SYSTEMS
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- Operational Concept Development
- Force Effectiveness Modeling
- Tactics, Techniques and Procedures Development
- Operational Architecture Development
- Technology Maturation
- Engineering Process Coordination and Alignment
- SoS Requirements Development
- Platform Requirements Development
- Distributed Systems Requirements Development
- Operational Software Development
- Platform Simulation Development
- Other Models and Simulations (terrain, Red Forces) Acquisition and Integration
- Technical and Operational Test Planning and Execution
- Production planning
- Simultaneous Contract Modification and Execution

All Activities are Currently Ongoing

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All Systems Include Software & Radios

FUTURE COMBAT SYSTEMS FCS One Team-The Army/Defense/Industry

Manned Systems

C2V
- ***Common - MGV***
- C2V Mission
- C2V Trainer

MCS
- ***Common - MGV***
- MCS Mission
- MCS Trainer

RSV
- ***Common - MGV***
- RSV Mission
- RSV Trainer

ICV
- ***Common - MGV***
- ICV Mission
- ICV Trainer

MV
- ***Common - MGV***
- MV Mission
- MV Trainer

NLOS-C
- ***Common - MGV***
- NLOS-C Mission
- NLOS-C Trainer

NLOS-M
- ***Common - MGV***
- NLOS-M Mission
- NLOS-M Trainer

FRMV
- ***Common - MGV***
- FRMV Mission
- FRMV Trainer

Unmanned Ground Vehicles

MULE-CM
- ***Common - UGV***
- SU, PPS, L1F, SDM
- PS-MRS
- Embedded Training
- ANS, VMS
- UGV Countermine
- MULE-CM Mission

SUGV
- ***Common - UGV***
- SUGV Mission

MULE-T
- ***Common - UGV***
- SU, PPS, L1F, SDM
- PS-MRS
- Embedded Training
- ANS, VMS
- MULE-T Mission

ARV-AL
- ***Common - UGV***
- SU, PPS, L1F, SDM
- PS-MRS
- Embedded Training
- ANS, VMS
- ARV-AL Mission

Unmanned Air Vehicles

Class IV
- SOSCOE
- NMS
- Air Sensors
- BCME, SDM
- PS-MRS
- Class IV Mission
- JTRS
- HNW

Class I
- SOSCOE
- NMS
- Air Sensors
- Class I Mission
- JTRS

Unattended Sensors

UGS
- SOSCOE
- UGS Mission
- JTRS

War Fighter Systems

CC
- SOSCOE
- SU, PPS, BCME, WMIS, L1F, SDM
- NMS
- PS-MRS, LDSS
- Embedded Training
- JTRS

Unattended Munitions

NLOS-LS
- SOSCOE
- NMS
- CLU Mission
- JTRS

Common – MGV includes:
- SOSCOE
- SU, PPS, BCME, WMIS, L1F, SDM
- Ground Sensors
- NMS
- PS-MRS, LDSS, IETM
- Embedded Training
- MGV Common: Crew Stations, VMS, Core Vetronics, Powertrain, Traction/Suspension, Chassis Aux System, NBC, ECS, Active Protection, Countermeasures, Defensive Armament, Signature Management, MGV
- Embedded Training
- ANS, JTRS, MC4

Common - UGV includes:
- SOSCOE
- BCME
- Ground Sensors
- NMS
- JTRS

C2V, MCS, RSV, ICV, MV Only:
- WIN-T PoP (w/HNW) or HNW (only)

- SOSCOE
- C2
- ISR
- Network
- Logistics
- Training
- MGV
- UGV&ANS
- UAV
- Comp Pgm

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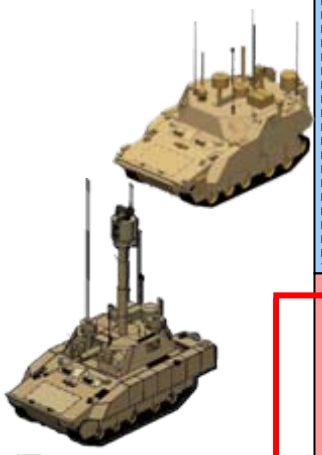
Preliminary Type I ICS SW Deployment: C2V, RSV

FUTURE COMBAT SYSTEMS FCS
One Team-The Army/Defense/Industry



WIN-T S U
NDL S U
JTRS S U

TS Enclave

External L3 Switch
Firewall/NIDS
Internal L2 Switch
HAIPE
ICS Type I LRU1 (2)

(6) SPRM's
SOSCOE
Situation Understanding
Sensor Data Management
Warfighter Machine Interface
Planning and Preparation
Network Management

Cross Domain Guard

Secret Enclave

External L3 Switch
Firewall/NIDS
Internal L2 Switch
ICS Type I LRU1 (2)

(6) SPRM's
SOSCOE
Situation Understanding
Level 1 Fusion
Network Management
Planning and Preparation
Sensor Data Management
Mission Execution
Embedded Training Common Components*
Hit Avoidance Training Proxy
Warfighter Machine Interface
Signature Mgmt

NIU/RIU
CAN
Firewire
Embedded Controllers

SOSCOE
Ground Sensors

SOSCOE
Hit Avoidance

Cross Domain Guard

USI Enclave

External L3 Switch
Firewall/NIDS
Internal L2 Switch
ICS Type I LRU1 (2)

(4) SPRM's
SOSCOE
Situation Understanding
PS-MRS
IETM
Planning and Preparation
Logistics Data Mgmt
Mission Execution
Logistics Decision Support
Level 1 Fusion
Network Management
Sensor Data Management
Embedded Training Common Components*
Warfighter Machine Interface

(4) SPRM's for Vehicle
SOSCOE
Traction/ Suspension
Chassis Aux
Defensive Armament
Crew Stations
NBC
Signature Mgmt
Vehicle Mgmt
ECS
MGV Variant
Core Vetronics
Hit Avoidance Controller Proxy
MGV Variant Trainer
PowerTrain

NIU/RIU
CAN
Firewire
Embedded Controllers

Autonomous Navigation

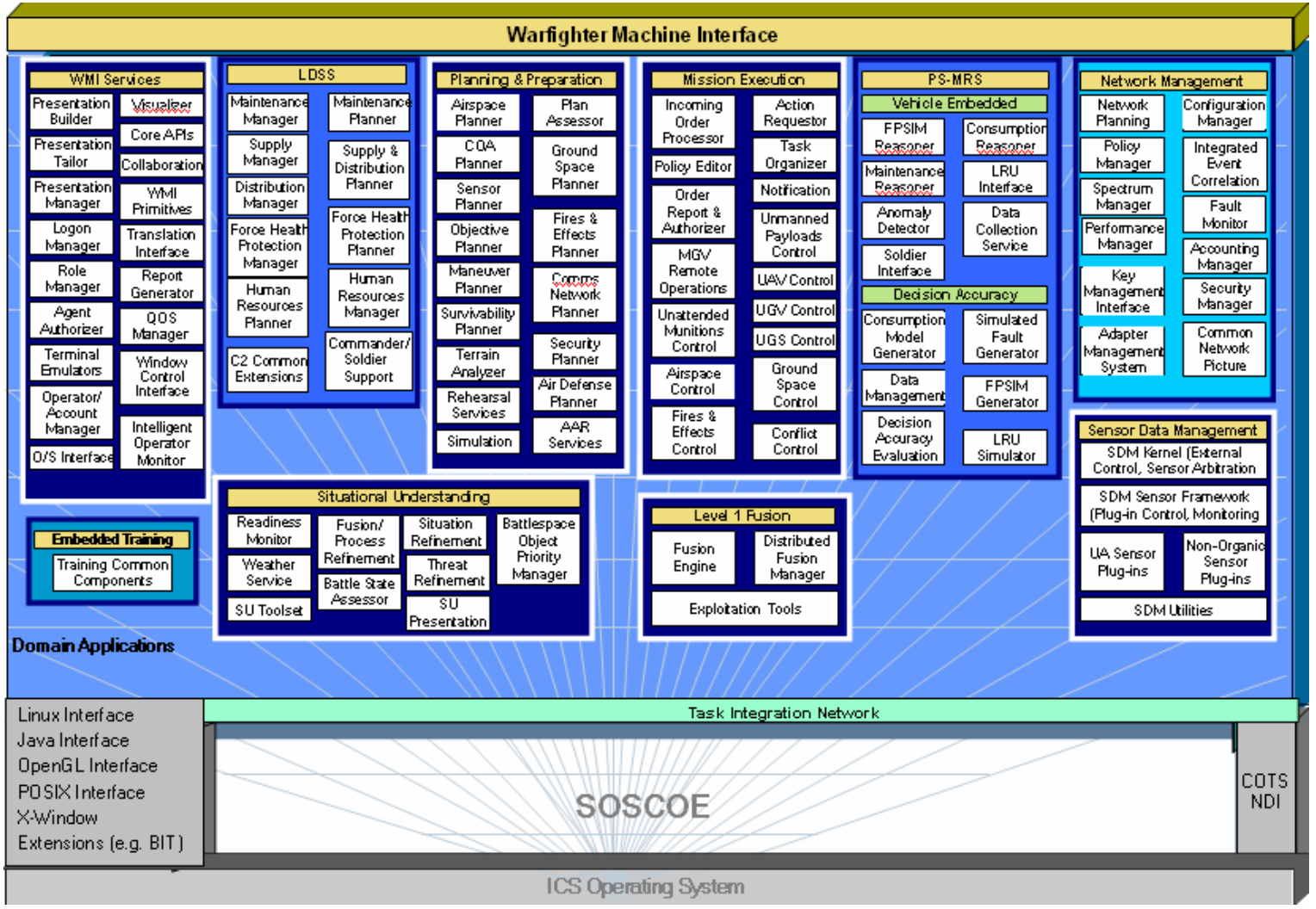
SOSCOE
Ground Sensors

- SOSCOE
- C2
- ISR
- Network
- Logistics
- Training
- MGV
- UGV&ANS
- USI Ethernet
- Secret Ethernet
- TS Ethernet
- * Includes ETESS

SPRM = Small Processing Resource Module
HAIPE = High Assurance Internet Protocol Encryptor

Common Infrastructure and Application Services

FUTURE COMBAT SYSTEMS FCS One Team-The Army/Defense/Industry



Battle Command Software is Deployed to all FCS Platforms

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100 Software Subsystems in FCS

FUTURE COMBAT SYSTEMS
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SOSCOE	ICS	Air Sensor Integrator		Mule (3)	ICV variant	Crew stations (WMI)	Active Protection	**Battle Command SW**
DCD Controller	Network Management Services	Logistics Data Mgmt Svcs	SoS Simulation	SUGV (2)	MEV variant	Vehicle Mgmt System	Counter Measures	SOSCOE
Situation understanding	Comm Emulators / Simulators	Logistics Decision Support	UAV Class I	ARV (5)	NLOS-C variant	Core Vetronics	Defensive Armament	Command & Control
Planning and Preparation Services	Air Sensors (7)	PDAVS	UAV Class II	Autonomous navigation (2)	NLOS-M variant	Powertrain	Signature Mgmt	ISR
Mission Execution	U-UGS	PS – MRS	UAV Class III	UGV Countermine	MCS variant	Traction/ Suspension	MGV Variant Trainers (9)	Network
Warfighter Machine Interface	T-UGS	Integrated elect tech manual	UAV Class IV	Embedded Training Enablers	C2V variant	Chassis Aux System	MGV Embedded Training	Logistics
Level 1 Fusion	Ground Sensor Integrator	Network SIL	UAV AiTR	UGV Trainers (4)	RSV variant	NBC		Training
Sensor Data Mgmt.	Ground Sensors (12)	ISN Integration Software		UAV Trainers (5)	FMRV variant	ECS		**Simulation, Infrastructure & SIL SW**
								Platform SW
								MGV
								UGV & ANS
								UAV

Best of Industry Teams Develop 80% of FCS Software

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FCS Software Overview

FUTURE COMBAT SYSTEMS
FCS
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FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
					PDR		CDR		MS C		IOC		IOTE
				SO 1 LUT	IV2 LUT		IV 3 LUT		IV 4 LUT		PD LUT		
					SO1 MS C								

Build 0 – Complete

Build 1

- Build 1
- SOSCOE
- Initial Battle Command Systems
- Platform Simulations
- NLOS-C Firing Platform
- UGS-T/U, IMS, NLOS-LS Prototypes
- Vehicle VMS SW
- FSE
- TCC, PS-MRS, LDSS

Build 2

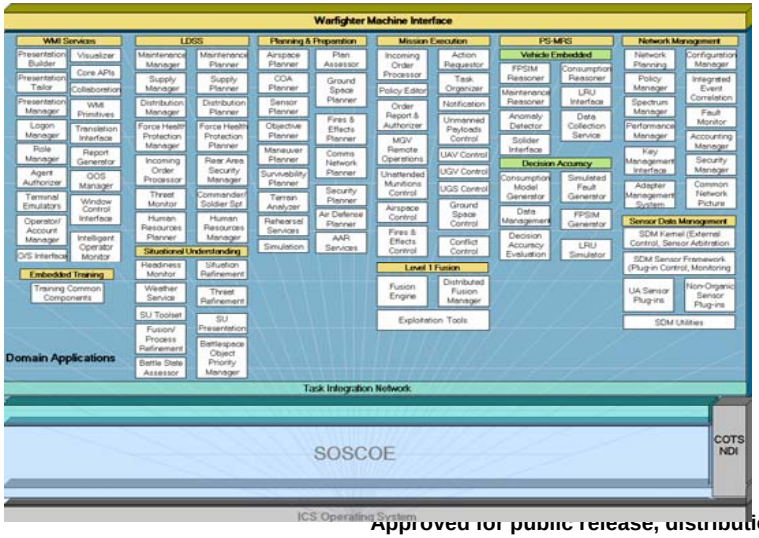
- Build 2
- SOSCOE
- Battle Command System
- UAV/UGV Simulations
- UGS Full Functionality
- SUGV, UAV Class I and IV Prototypes
- Vehicle VMS SW
- FSE
- TCC, PS-MRS, LDSS

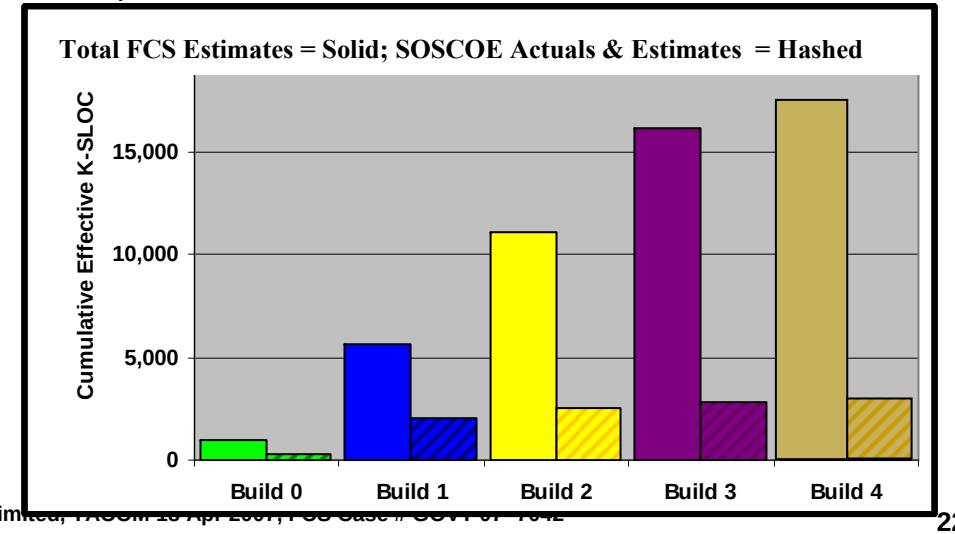
Build 3

- Build 3
- SOSCOE
- Battle Command Maturation
- Autonomous Navigation
- All MGV/UGV/UGS Prototypes
- Embedded Training
- PS-MRS, LDSS

Build 4

- Build 4
- FBCT Full Functionality





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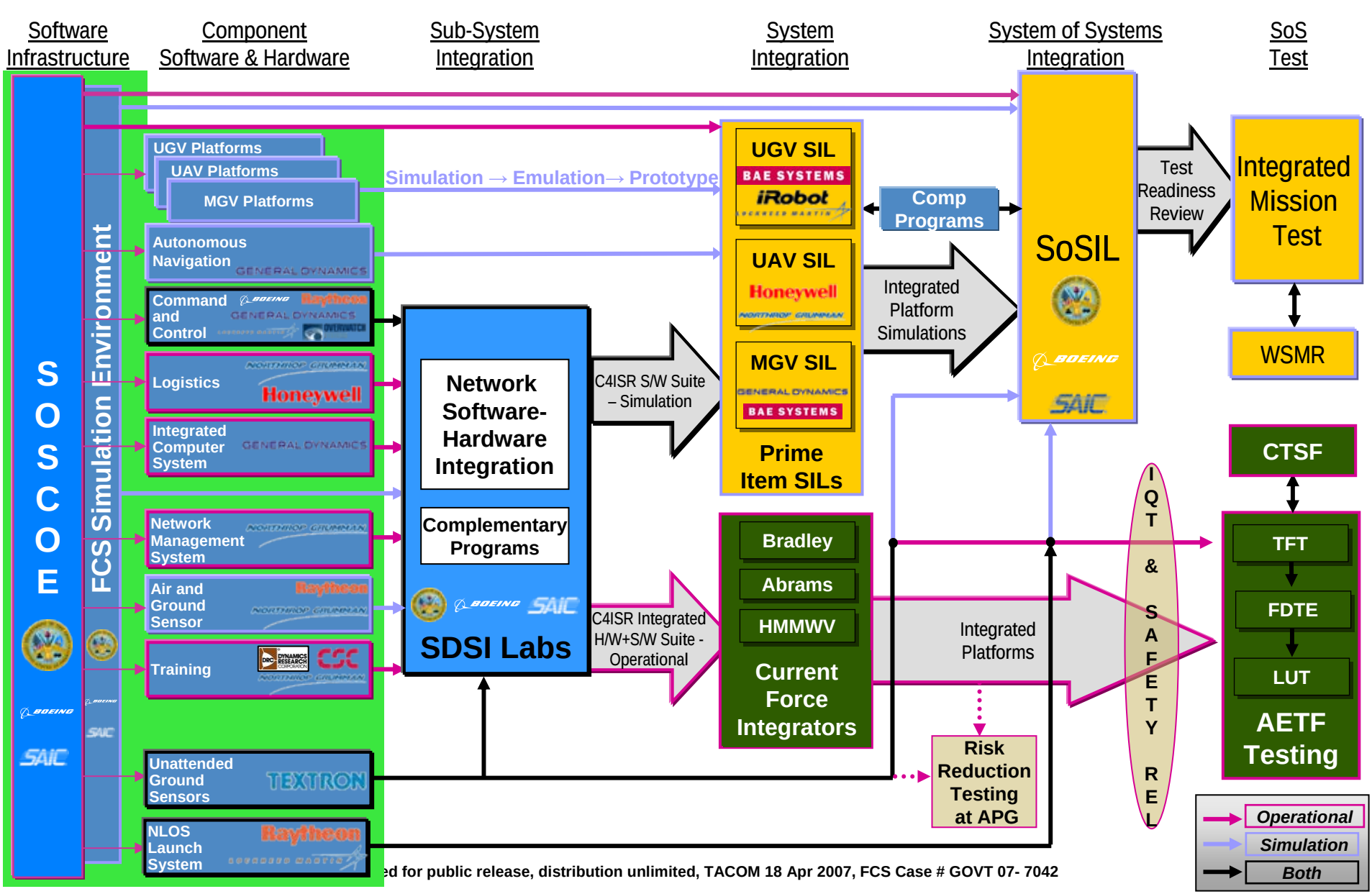
Software and Hardware Integration Flow

FUTURE COMBAT SYSTEMS FCS One Team-The Army/Defense/Industry



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Performance to Date

FUTURE COMBAT SYSTEMS
FCS
One Team-The Army/Defense/Industry

- **Two Major SOSCOE builds (1.0.5.0 and 1.0.8.0) developed and delivered on time**
- **OTPs delivered 5M SLOC to LSI on 1 March 2007**
  - B1F to Spin Out Limited User Test
- **Conducted Experiment 1.1**
  - Live soldiers
  - UGS and SUGV prototype HW and SW
  - Distributed COP
- **Conducted Integrated Mission Test 0**
  - Demonstrated initial M&S capabilities
  - Integrated platform simulations, GFX models, and FCS Simulation Environment
- **Fired live rounds with Pre-production prototype Cannon using operational SW**

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Cross-Command Collaboration Effort (3CE)

Phil Zimmerman

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Distributed SoSIL

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FCS
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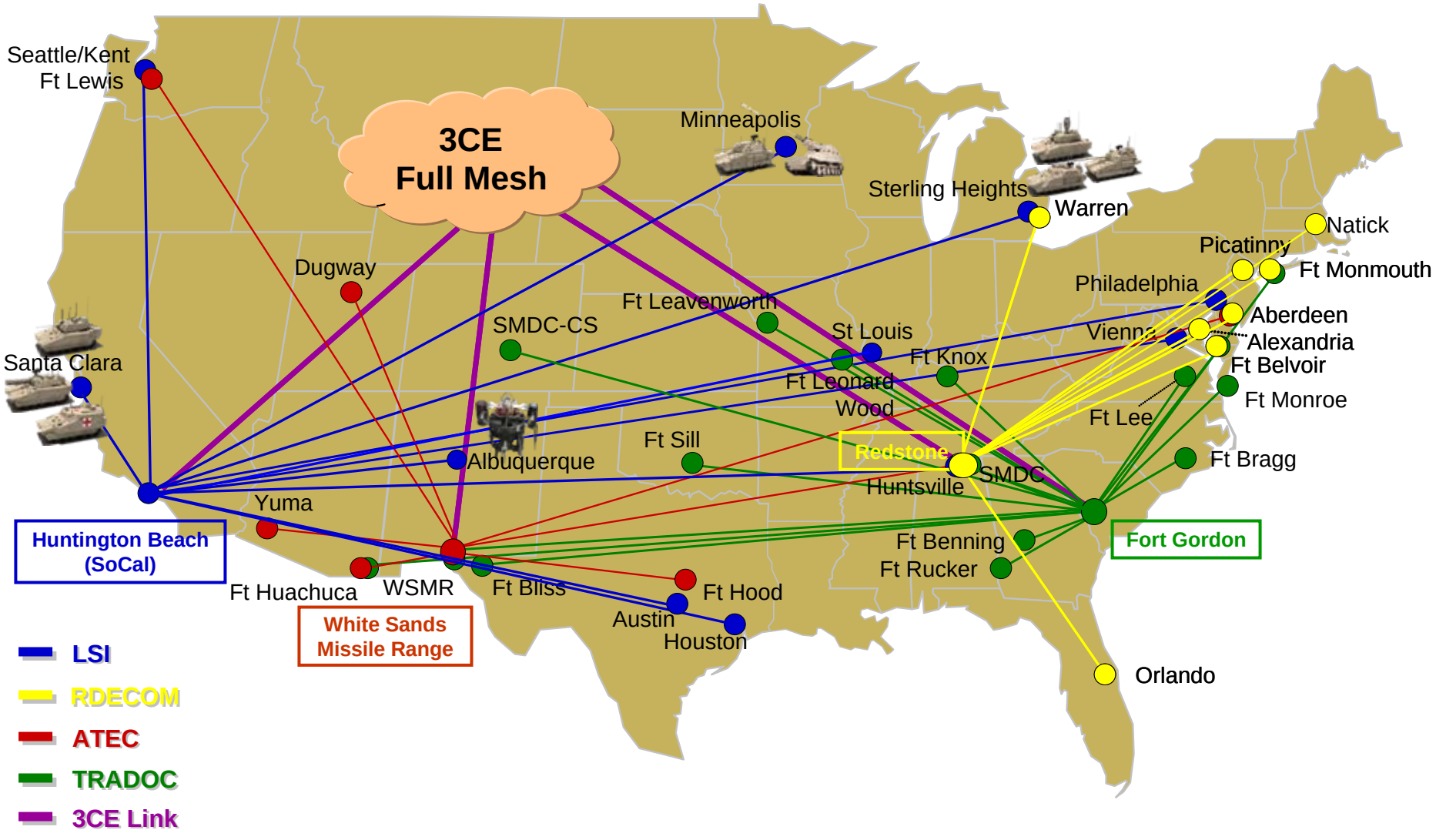

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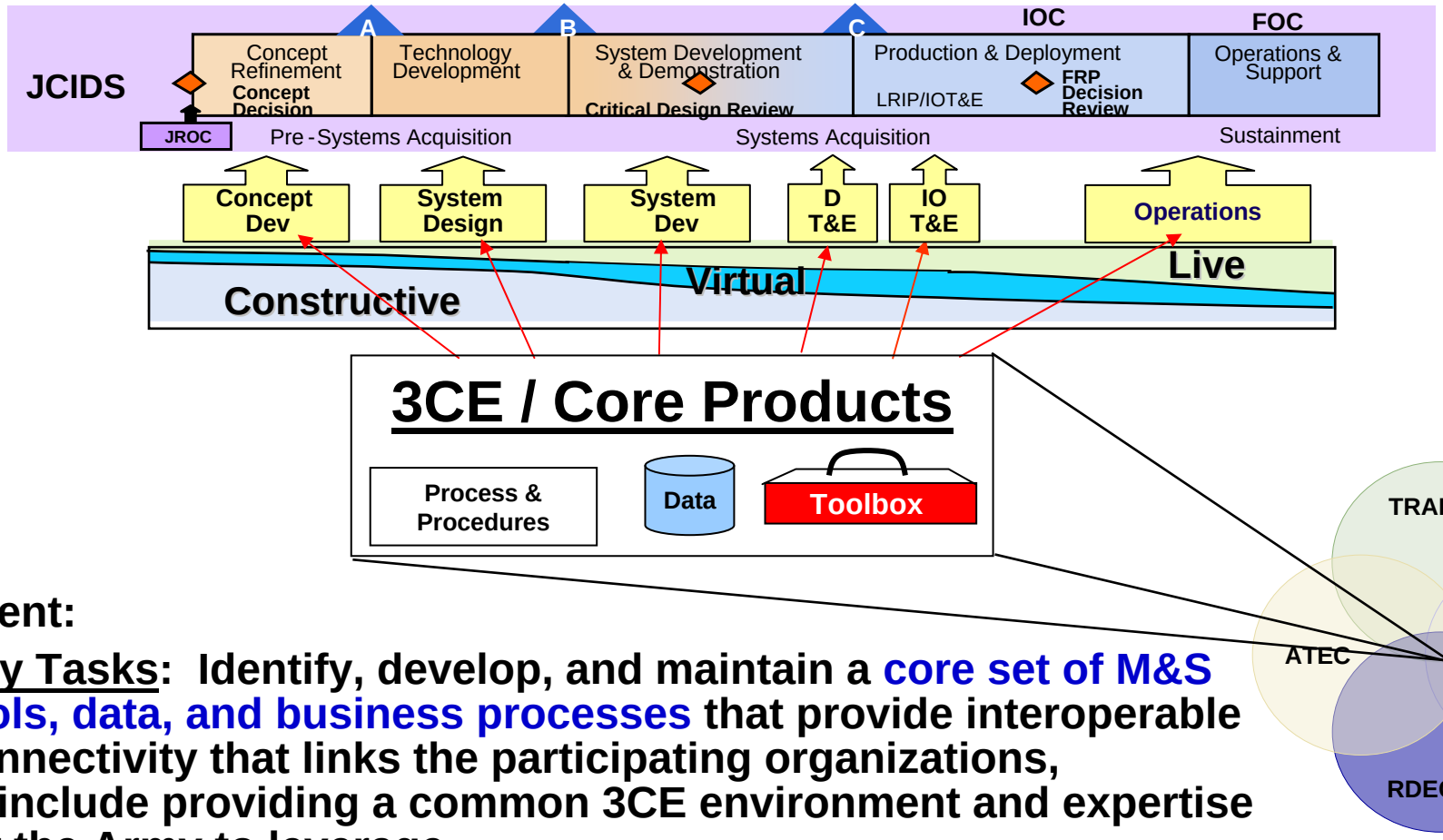
3CE Mission and Intent

Mission: Develop a cross command Army M&S and data environment for design, development, integration, and testing of capabilities, systems, and prototypes.



Intent:

Key Tasks: Identify, develop, and maintain a **core set of M&S tools, data, and business processes** that provide interoperable connectivity that links the participating organizations, to include providing a common 3CE environment and expertise for the Army to leverage.

End State: A 3CE **environment that meets the common requirements** of all three commands and Program of Record to conduct distributed DOTMLPF development.

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Benefits of 3CE to…

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The Army

- Provides consistent representation through common tools and data IAW established standards and best practices.
- Provides the capability to leverage a single event for multiple purposes.
- Provides and develops environment capabilities that are traceable to user needs and design requirements.
- Enhances current M&S capabilities and reuse.
- Provides a leave behind capability to support future SoS acquisition programs.

ATEC

- Provides a consistent environment for M-T-M
- Reduces preparation time for a test
- Provides reusable and consistent metrics from development to test
- Enhances training proficiency on test equipment

RDECOM

- Enables consistent data from field tests
- Reduces the number of data requests
- Enables leveraging operational capabilities for engineering and performance tests

TRADOC

- Enables VV&A to test standards for M-T-M
- Reduces time to obtain characteristic data from the program
- Leverages multiple events for training
- Provides a single environment for analysis, test, and training

Program

- Provides a single POC for GFX selection
- Leverages command events for multiple purposes
- Reduces the M&S and data coordination requirements
- Reduces funding for duplicative M&S efforts

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Roles of 3CE

FUTURE COMBAT SYSTEMS
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3CE will:

- Support FCS program acquisition decisions.
- Enable EBCT mission readiness.
- Assess current capabilities to satisfy requirements; identify potential M&S solution providers and capability gaps.
- Integrate and configuration manage capabilities that are common across commands into the Bliss-WSMR LVC environment.
- Provide a means to collaborate cross-command and cross-domain capabilities.
- Establish and share a set of standards, best practices, and expertise.
- Provide a leave-behind capability for future analytic, training, and testing support to acquisition programs.

3CE will not:

- Replace a command's unique mission roles and responsibilities.
- Replace a command's unique M&S capabilities.
- Replace a command's unique data capabilities.
- Impose 3CE capabilities on command unique missions.
- Operate, maintain, or manage a command's distributed network.

As the integrator of an environment, 3CE focuses on common and consistent capabilities to enable cross command collaboration, synergy, and reusability.

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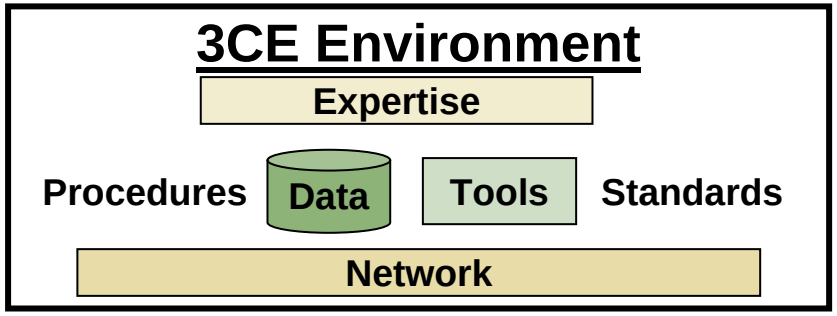
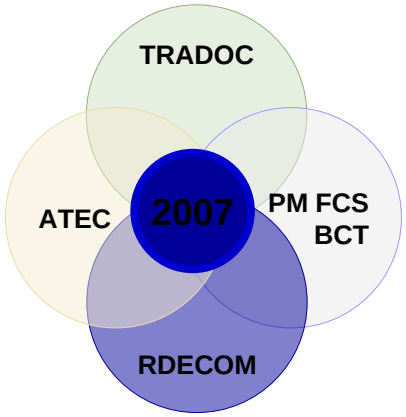
Scope of Current Effort



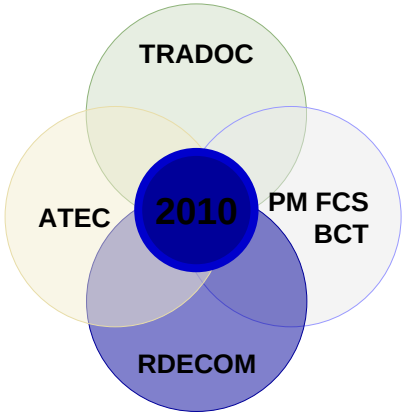
A maturing 3CE environment … to endstate

Near-Term



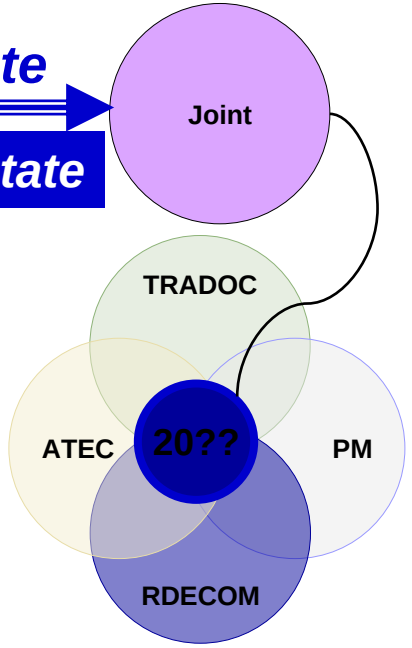
Execution Year Goal
Demonstrate and provide an initial environment as a proof of principle for potential users.

Mid-Term



Interim Goal
Provide an environment for users at Bliss-WSMR to support FCS Core and Spinout activities.

Endstate



End State
An M&S and data environment for design, development, integration, and test of SoS acquisitions.

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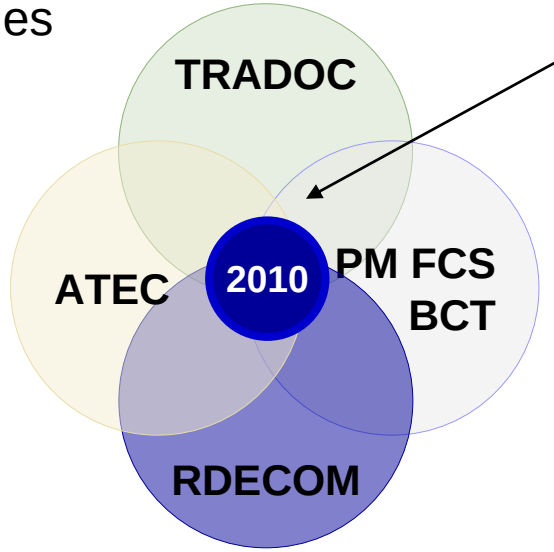
The 2010 3CE Environment

- **Environment Context**
  - Support to EBCT activities at Bliss-WSMR.
  - Focused on common needs and required linkages
  - Established by 2010
- **Environment Components:**
  - Network
    - Persistent
    - Secure
    - Controlled Access
    - Performance/Characteristics
  - Tools
    - M&S
    - Analytic
    - Collaboration
  - Data
    - Characteristics and Performance
    - Operational
    - Terrain and Weather
  - Processes and standards

Focus of support for the 3CE environment



Activities	Users			
	Analysis		Test	Training
	SO2 FDTE	M-T-M	SO2 TFT	Mission
	Core Program	SO3	SO2 LUT	SO1 IOT/SO2
			SO1 IOT	Core Program

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Summary

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FCS
One Team-The Army/Defense/Industry

As the integrator of an environment, 3CE focuses on common and consistent capabilities to enable cross command collaboration, synergy, and reusability …

- Provides consistent representation through common tools and data IAW established standards and best practices.
- Provides the capability to leverage a single event for multiple purposes.
- Provides and develops environment capabilities that are traceable to user needs and design requirements.
- Enhances current M&S capabilities and reuse.
- Provides a leave behind capability to support future SoS acquisition programs.

By 2010, 3CE will have an instantiation of this capability to support user activities at Bliss-WSMR …

- Provides a core federation with supporting functional, interoperability, event management, and data collection and analysis tools.
- Provides an accessible knowledge repository that provides the processes, procedures, standards, and expertise to leverage 3CE capabilities.
- Provides a persistent and secure network that enables collaboration and interoperability across the commands and the LSI.

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3CE Support to FCS

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- **Working group lead for 3 parts of SO1 infrastructure**
  - M&S
  - Instrumentation
  - Data collection and Analysis
- **Responsible for technical integration of SO1 infrastructure**
  - Above 3 groups + Comms, Instrumentation, Threat
- **Provide infrastructure to support LSI distributed events**
  - Conduct
  - Capabilities
  - Lessons learned
- **Provide advisory for needed M&S capabilities**
  - Single face to the customer
- **LSI participates on equal basis with other advisory council members**
- **Covers acquisition lifecycle activities**

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Experiment 1.1 Objectives and Description

FUTURE COMBAT SYSTEMS FCS One Team-The Army/Defense/Industry

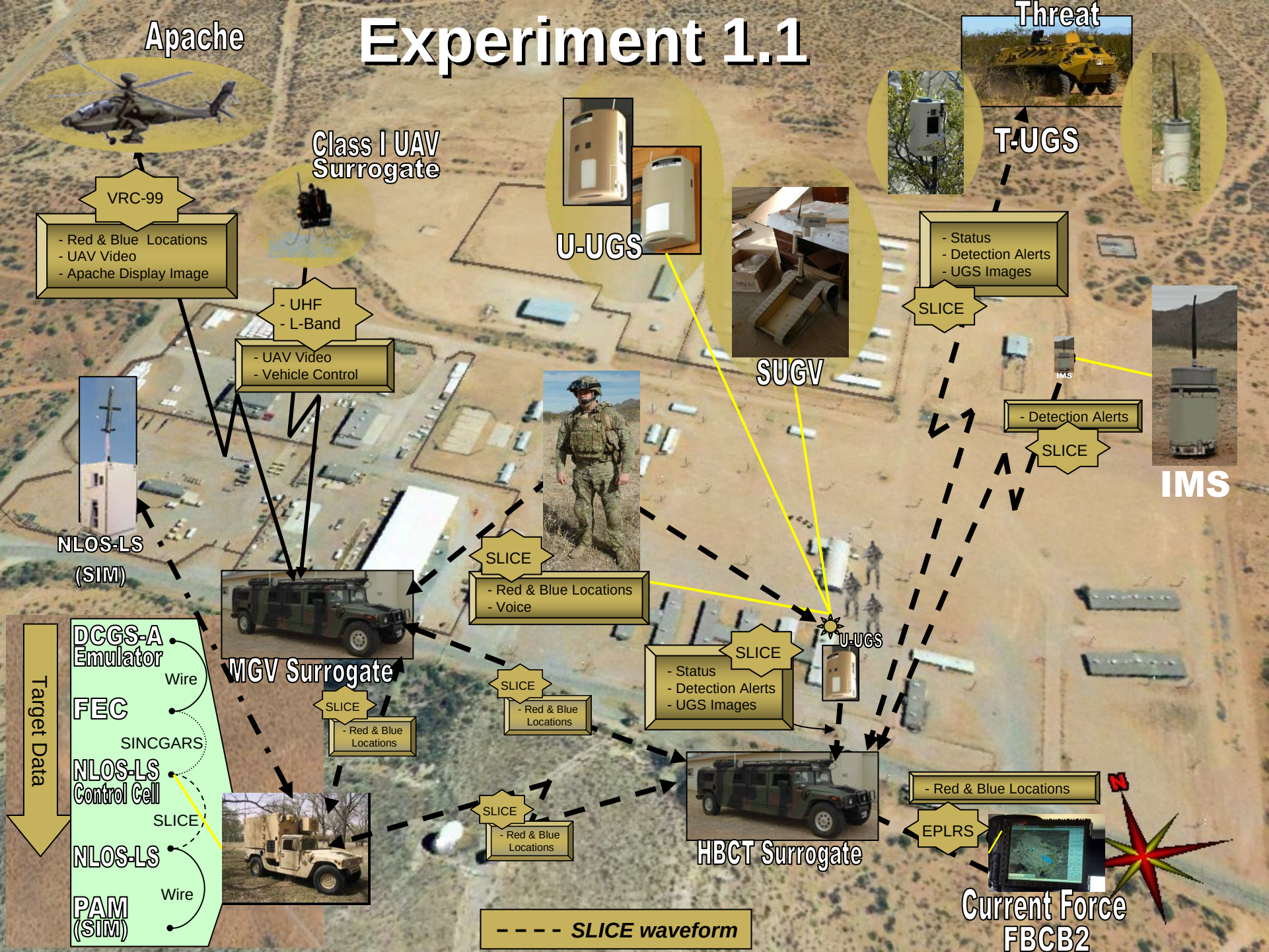
- **Objective – Network and Spin Out 1 risk reduction and early hands-on feedback from Soldiers**
  - Engineering (material) risk reduction
  - Early input into Doctrine, Organization and Training
- **5 Key Objective Areas**
  - Network communications
  - Distributed fusion management
  - FCS interoperability
  - Information assurance
  - Progress and maturity of selected technologies

Supporting One Team Partners

BOEING SAIC From Science to Solutions
GENERAL DYNAMICS Honeywell iRobot LOCKHEED MARTIN OVERWATCH SYSTEMS ORINCON DEFENSE TEXTRON Raytheon

Phase 1 Engineering Lab Experiment	Phase 2 Engineering Field Experiment WSMR, NM / Ft Bliss, TX	Phase 3 Tactical Field Demo WSMR, NM / Ft Bliss TX
C4ISR Lab - Huntington Beach, CA • Hardware/Software Integration • Systems Interoperability • Mission Thread Checkout • Interoperability Sub-experiments **SE2L – Ft Monmouth, NJ** • PKI/CDG/IDS Sub-Experiments **SoSIL - Huntington Beach, CA** • DFM Sub-Experiments	• Integration (RF and range infrastructure) • Dry Runs • Four Sub-experiments 1. Radios and QOS, 2. DFM 3. Interop, 4. Progress & Maturity 13 Soldier Observers	**Phase 3A** • Soldier Orientation and Training • Soldier Prep/Rehearsals • INF PLT Collective Training Sim & Live • Live Task Loading Sub-Experiment **Phase 3B** • VIPs onsite 36 Soldier Participants
Jul – Oct 06	***Sep – mid Dec 06***	***Jan – early Feb 07***

Multi-purpose/multi-venue – technical, doctrinal and training impact


Experiment 1.1
Apache
Threat
Class I UAV Surrogate
T-UGS
U-UGS
SUGV
VRC-99
- Red & Blue Locations
- UAV Video
- Apache Display Image
- UHF
- L-Band
- UAV Video
- Vehicle Control
- Status
- Detection Alerts
- UGS Images
SLICE
- Detection Alerts
SLICE
IMS
NLOS-LS
(SIM)
SLICE
- Red & Blue Locations
- Voice
MGV Surrogate
U-UGS
SLICE
- Status
- Detection Alerts
- UGS Images
SLICE
- Red & Blue Locations
SLICE
- Red & Blue Locations
SLICE
- Red & Blue Locations
HBCT Surrogate
- Red & Blue Locations
EPLRS
Current Force
FBCB2
Target Data
DCGS-A Emulator
Wire
FEC
SINCGARS
NLOS-LS Control Cell
SLICE
NLOS-LS
Wire
PAM
(SIM)
- - - - SLICE waveform

FY07 Objectives

FUTURE COMBAT SYSTEMS
FCS
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FY06 Q4 | FY07 Q1 | Q2 | Q3 | Q4 | FY08

Program Reviews
ICT | QFR | QFR | AROC (T) | JCB | DAB IPR | JROC | EM1

Design Reviews
NLOS-C DR3 | UGS PDR | Class I PDR | SUGV PDR | UGV PDR

IP1
Phase 1 Engineering Lab Experiment SoSIL Huntington Beach, CA
Phase 2 Engineering Field Experiment WSMR, NM
Experiment 1.1
Phase 3 Tactical Field Demo WSMR, NM

X
AETF
Unit Designation

IV1 / IMT
Dry Runs | IMT

Network Test and Verification
- NLOS-LS, UGS IQT
- Bradley, Abrams, HMMWV Developmental test with A/B kits

Network Lab Integration and Testing
SO 1 & Current Systems Integration
CLU Qual Test

SO1 & Early Hardware Prototypes
UGS | ICS | FBCB2 | APS | NLOS-Cannon Firing Platform Testing @ YPG | UGS | ICS | GMR | ASTAMIDS | CL IV | NLOS-LS

Test & Evaluation
NLOS-Cannon / NLOS-M Firing Platform Testing
CL I & CL IV Component Test
MULE Engineering Evaluation unit testing

Software Builds
SOSCOE Build 1.8
Initial LDSS and PSMRS Prototypes
Battle Command Build 1 final
SoS Framework (S2F) Build 1.0 Available
JEFX-08 Develop HW & SW
SOSCOE Build 2.0

FY08 Objectives

FUTURE COMBAT SYSTEMS
FCS
One Team-The Army/Defense/Industry

FY07 | Q4 | FY08 | Q1 | Q2 | Q3 | Q4 | FY09

Program Reviews
EM 1
DAB (T)
SoS PDR

Design Reviews
ANS PDR
MGV PDR
UGV PDR
CL I CDR
SUGV CDR
CL IV PDR
ANS CDR

SO 1 & Current Systems Integration
Robotic Convoy Phase 1
Robotic Convoy Phase 2
CC SWIT, Class I UAV integration
IV1 / IMT
Dry Runs | IMT
CC version 1 EDM to SOSIL

IP1
IP2
Exp 2.1 (JEFX 08) Spiral #2
Exp 2.1 (JEFX 08) Spiral #3
Exp 2.1 (JEFX 08) MAINEX
CLU Qual Test

SO1
CCTT TNG
New Equipment Tng
S01 Test Prep
B-Kitted CFVs
Log Demo
TFT / FDTE / S01 LUT
S01 FDTE
S01 PT
S01 TFT

Core Hardware Prototype
UGS
CL IV
NLOS-LS
NLOS-LS
P1
NLOS-Cannon
P3
P4
P5
120mm Cannon Test Fire

NLOS-C/ NLOS-M Firing Platform
MCS Firing Fix
MV Mission Equipt Bench test
FMRV Wench & Crane

Test & Evaluation
CL I & CL IV Component Test
GSTAMIDS Prototype Testing

Software Builds
TSP Individual
NLOS-LS TADSS
SOSCOE Build 2.0
AutoNav SIM
BCT SW Build 1
IMI & L 3 IETMs
BC SW Build 2
SOSCOE Build 2.5

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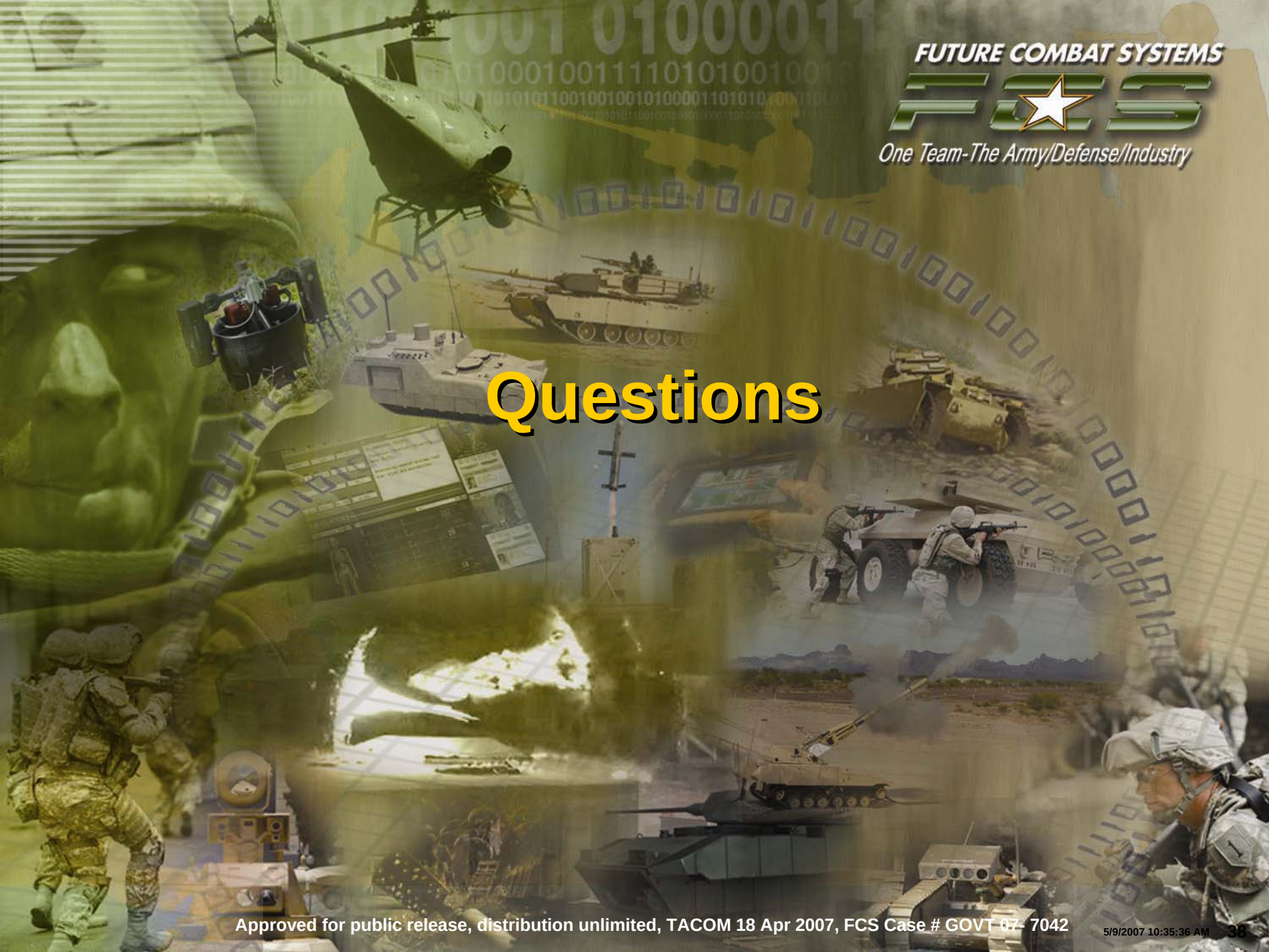

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