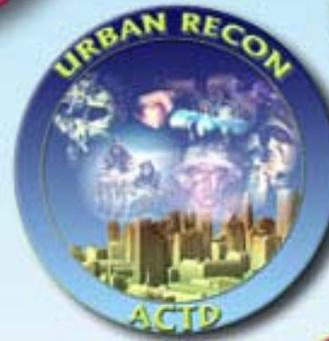


AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES	
			S	1	2
2. AMENDMENT/MODIFICATION NO. 0003	3. EFFECTIVE DATE 17-Jul-2003	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)	
6. ISSUED BY VBURG CONSOLIDATED CONTRACTING ALEXANDRIA OFFICE 7701 TELEGRAPH ROAD ALEXANDRIA VA 22315-3864	CODE DACA42	7. ADMINISTERED BY (If other than item 6) <b>See Item 6</b>		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)			X	9A. AMENDMENT OF SOLICITATION NO. DACA42-03-R-0023	
			X	9B. DATED (SEE ITEM 11) 12-Jun-2003	
				10A. MOD. OF CONTRACT/ORDER NO.	
				10B. DATED (SEE ITEM 13)	
CODE			FACILITY CODE		
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS					
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.					
12. ACCOUNTING AND APPROPRIATION DATA (If required)					
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.					
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.					
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).					
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:					
D. OTHER (Specify type of modification and authority)					
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.					
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)					
a. This is Amendment 0003 to Solicitation DACA42-03-R0023, Joint Precision Strike Demonstration (JPSD) Program.					
b. Date and time for receipt of proposals remain August 04, 2003, 4:00 pm local time.					
c. For information and proposal preparation purposes, this Amendment publishes the PowerPoint presentation provided at the JPSD Pre-Proposal Conference held on 15 July 2003.					
d. All other terms and conditions of the solicitation remain unchanged.					
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.					
15A. NAME AND TITLE OF SIGNER (Type or print)			16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
			TEL: _____ EMAIL: _____		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)		17-Jul-2003	

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**SUMMARY OF CHANGES**

(End of Summary of Changes)



## PRE-PROPOSAL BIDDERS CONFERENCE

Joint Precision Strike Demonstration  
Project Office (JPSD PO)  
10401 Totten Road, Bldg 399, Suite 325  
Fort Belvoir VA 22060  
(703)704-1940



# Agenda



0900 – Welcome / Intro.	Nilda Lugo
0915 – JPSD Overview	Michael Tolson
0930 – Command/ Control Progs	Andrew McHugh
1015 – Question Submission/Break	ALL
1030 – SMART/SBA	Juan Perez
1045 – Joint Tact Terrain Progs	Michael Hardaway
1120 – Discussion (Questions)	Lugo/Tolson
1200 – Adjourn	



# Administrative



## **All Questions Submitted by June 23, 2003 Were Answered in Writing as Part of Amendment 0002.**

- Additional Questions May be Submitted in Writing at the Break, And Will be Answered Today, If Possible. See Nilda Lugo for Cards to Submit Questions.
- Any Questions Not Answered Today Will be Answered in Writing as Part of an Amendment to the Solicitation.

### **Attendance List:**

- Please Sign the Attendance Roster and Verify That the Contact Information is Correct.



**DEC 1991** : Department of the Secretary of Defense Memo Identifies 7 Major Thrusts to Focus DoD S&T Program

- Precision Strike 1 of 7 Thrusts
- Joint Air/Land/Sea Precision Strike Demo Establish. Army Lead Service

**FEB 1992** : Lt Gen Cianciolo Tasked PEO-IEW to form Task Force

**FEB – JUN 1992** : JPSD Project Office Stood Up

**1992 – 1994** : Conducted a Series of Precision Strike Demos

**SEPT 1994** : IEC Becomes Operational

**OCT 1994** : OSD ACTD Concept Introduced

**DEC 1994**: JPSD's P/CMRL ACTD for USFK 1<sup>st</sup> OSD Approved ACTD

**MISSION** : To Improve and Demonstrate an Army Adverse Weather Day/Night Sensor-to-shooter Precision Strike Capability to Locate, Identify and Eliminate High Value Time Critical Targets and Assess Damage Within Tactically Meaningful Timelines

# Overall Joint Precision Strike Demonstration Program Schedule



**FY94    FY95    FY96    FY97    FY98    FY99    FY00    FY01    FY02    FY03    FY04    FY05    FY06    FY07    FY08**

**Surface to Surface Demo**  
 • Successful Demo  
 ER-ATAMCS

**Joint Intelligence Surveillance and Reconnaissance (JISR) ACTD**  
 • Allow Early Entry Force and JTF Commanders to Rapidly Access Data/Products, Visualize Battlespace and Make Correct Decisions

**Precision/Rapid Counter/MRL (CMRL) ACTD**  
 • Improved Div. Ability to Destroy 240/170s by 200%  
 • Introduced Theater Counterfire COP

**Theater Precision Strike Operations (TPSO) ACTD**  
 • Improved Capability to Plan/Execute Theater Counterfire/PS Operations  
 • Provided Theater Common Operating Picture  
 • Co-Hosted ADOCS on GCCS-A  
 • Established DOCC Baseline TTPs

**V Corps**  
 • TPSO / JCSE Functionality

**Rapid Terrain Visualization (RTV) ACTD**  
 • Generate Digital Topographic Data  
   - 20km by 20km - 18 Hrs  
   - 90km by 90km - 72 Hrs  
   - 300km by 300km - 12 Days  
 • S/W Used by TOPO Units, XVIII + III Corps

**RTV Follow On Support**

**CDHQ CENTCOM**

**Modeling and Simulation Based Acquisition (ACS/FCS/JVB/OF)**

**Joint Continuous Strike Environment (JCSE) ACTD**  
 • Focus Joint and Coalition Strike Assets to Execute Attack Against TSSTs

**New ACTDs**  
 TACTICAL IFSAR ACTD      TEBO ACTD (Proposed)  
 URBAN RECON ACTD

**Precision Strike Functions**

**ISR**  
 S to S Demo  
 CMRL ACTD  
 RTV ACTD  
 TACTICAL IFSAR ACTD  
 URBAN RECON ACTD  
 TEBO ACTD  
 MASINT ACTD

**Target Acquisition**  
 JISR ACTD  
 TPSO ACTD  
 RTV ACTD  
 TACTICAL IFSAR ACTD  
 URBAN RECON ACTD

**Strike Planning**  
 CMRL ACTD  
 TPSO ACTD  
 JCSE ACTD  
 TEBO ACTD  
 TACTICAL IFSAR ACTD  
 RTV ACTD  
 URBAN RECON ACTD

**Strike Execution**  
 CMRL ACTD  
 TPSO ACTD  
 JCSE ACTD  
 TEBO ACTD  
 TACTICAL IFSAR ACTD  
 URBAN RECON ACTD

**BDA**  
 JISR ACTD  
 TPSO ACTD  
 RTV ACTD  
 URBAN RECON ACTD  
 TACTICAL IFSAR ACTD



# JPSD



## Accomplished

- Surface to Surface Demo
- Precision/Counter Multiple Rocket Launcher (P/CMRL) ACTD
- Rapid Terrain Visualization (RTV) ACTD
- Joint Continuous Strike Environment (JCSE) ACTD

## Current

- Joint Intelligence Surveillance & Reconnaissance (JISR) ACTD
- Theater Precision Strike Operations (TPSO) ACTD
  - ADOCS Integration Effort
- Joint Virtual Battlespace (JVB)
- Aerial Common Sensor (ACS)
- CENTCOM Deployable Headquarters (CDHQ)
- Urban Reconnaissance ACTD
- Tactical IFSAR ACTD

## Future

- Theater Effects Based Operations (TEBO) ACTD

## Customer

JROC  
2ID  
XVIII ABC  
EUCOM  
  
CENTCOM  
USFK  
JCS USFK, JFCOM,  
CENTCOM,  
I Corps, III Corps  
V Corps, XVIII ABC,  
I + III MEF(USMC)  
1<sup>st</sup> & 7<sup>th</sup> AFs  
Army (PM FCS)  
Army (PM ACS)  
CENTCOM  
SOCOM  
Cbt Cdrs, NIMA  
  
USFK/PACOM



## Andrew McHugh

Joint Precision Strike Demonstration Project Office  
10401 Totten Road, Bldg 399, Room 336  
Fort Belvoir, VA 22060-5823  
Phone 703/704-1944  
Fax 703/704-2138  
Email: [andrew.mchugh@nvl.army.mil](mailto:andrew.mchugh@nvl.army.mil)

## MAJ Brent Thomas

Joint Precision Strike Demonstration Project Office  
10401 Totten Road, Bldg 399, Room 305  
Fort Belvoir, VA 22060-5823  
Phone 703/704-1527  
Fax 703/704-2138  
Email: [brent.thomas@nvl.army.mil](mailto:brent.thomas@nvl.army.mil)



- 21<sup>st</sup> Century Conflict Requires a Change From the Traditional, Attrition Approach to Effects Based Approach to Planning and Conducting Operations
- Combatant Commands are Aggressively Exploring the Effects Based Approach to Planning, Decision-Making, Executing and Assessing Operations
- Lessons Learned in Numerous Joint Exercises (UFL 01, 02, RSOI 02, COBRA GOLD 02, MC02) Demonstrate that Commanders and Staffs Lack the Tools Needed to Rapidly and Effectively Conduct EBO

*“CFC is aggressively executing the concept of Effects-Based Operations (EBO) throughout the Korean Theater for planning, decision-making, executing and assessing Joint and Combined operations”*

*Leon J. LaPorte, General, USA,  
Commander, UNC/CFC/USFK*

## Problem Statement

**Combatant Commanders Lack the Decision-aiding Technologies and Software Applications to Rapidly and Effectively Conduct Planning, Decision-making, Execution, and Dynamic and Predictive Assessment of Combined and Joint Effects-based Operations at the Strategic and Operational Levels**

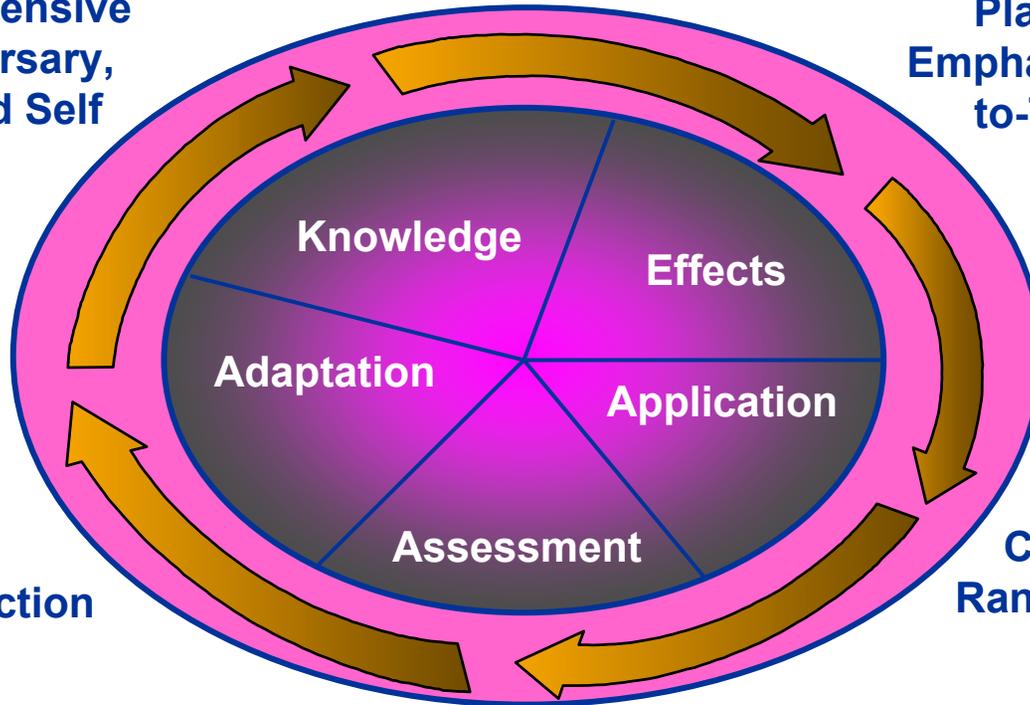
# Overview

## Effects-Based Operations Process



**Develop Comprehensive  
Insight Into Adversary,  
Environment and Self**

**Plan for Effects,  
Emphasizing Strategy-  
to-Task Linkage**



**Adjust  
Course of Action**

**Execute Plan,  
Considering Full  
Range of Capabilities**

**Assess Impact  
of Effects**

### Effects-based Operations (EBO)

Actions that change the state of a system to achieve directed policy aims using the integrated application of select instruments of power. These actions are planned, executed, assessed and adapted using a holistic understanding of the adversary and the battlespace.” (JFCOM, 9 Jan 03)



# TEBO ACTD Solution



Provide Decision-aiding Technologies and Software Applications Integrated Into Theater C4ISR Architecture that Aid **Effects Visualization**; Create a **Dynamic TTP Environment**; and Facilitate **Effects-based Planning, Decision-making, Execution and Assessment**.

Focus Area on:

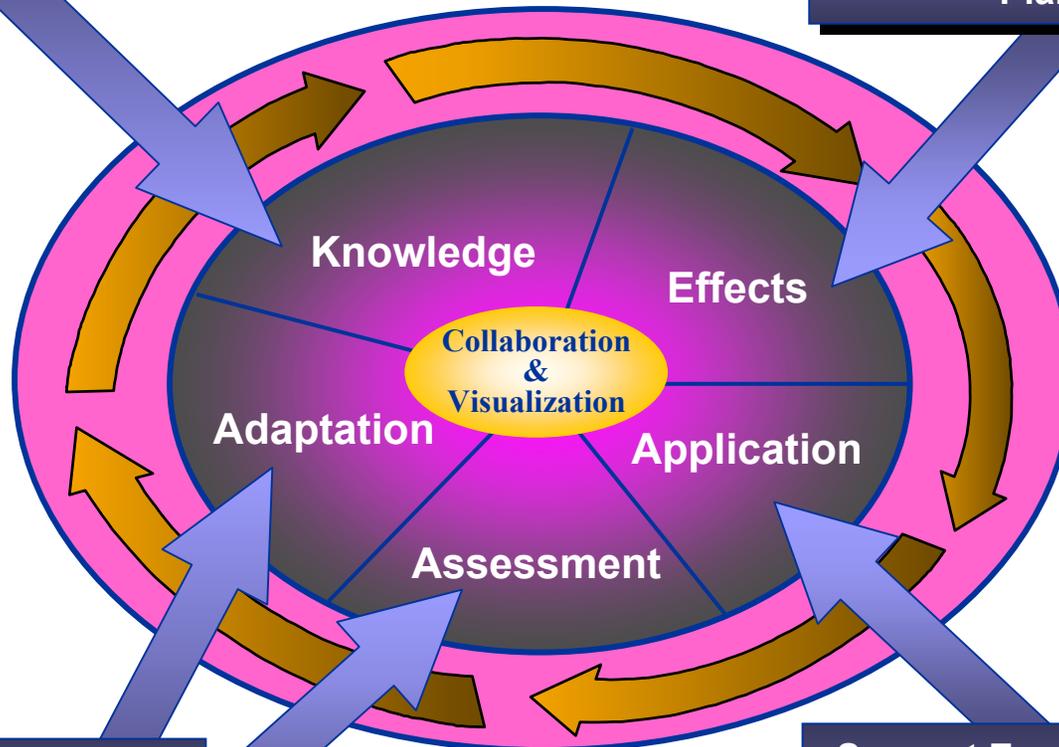
- **Developing a Comprehensive Knowledge Base** of the Adversary, Ourselves and Allies, and the Environment (Operational Net Assessment – ONA, Critical Capabilities and Vulnerabilities, Centers of Gravity and Nodal Analysis)
- **Facilitating Collaborative Effects-Based Campaign Planning** Within a Combined/Joint Environment
- **Supporting Execution** With Prioritization of Strategic and Operational Levels of Effort, Synchronization of Actions, and Battle Tracking
- **Dynamically Assessing and Predicting Progress** Toward the Desired End State by Analyzing Observed Direct and Indirect Effects to Help Adapt the Plan

# TEBO ACTD Solution EBO Process



Develop a Comprehensive Knowledge Base (ONA)

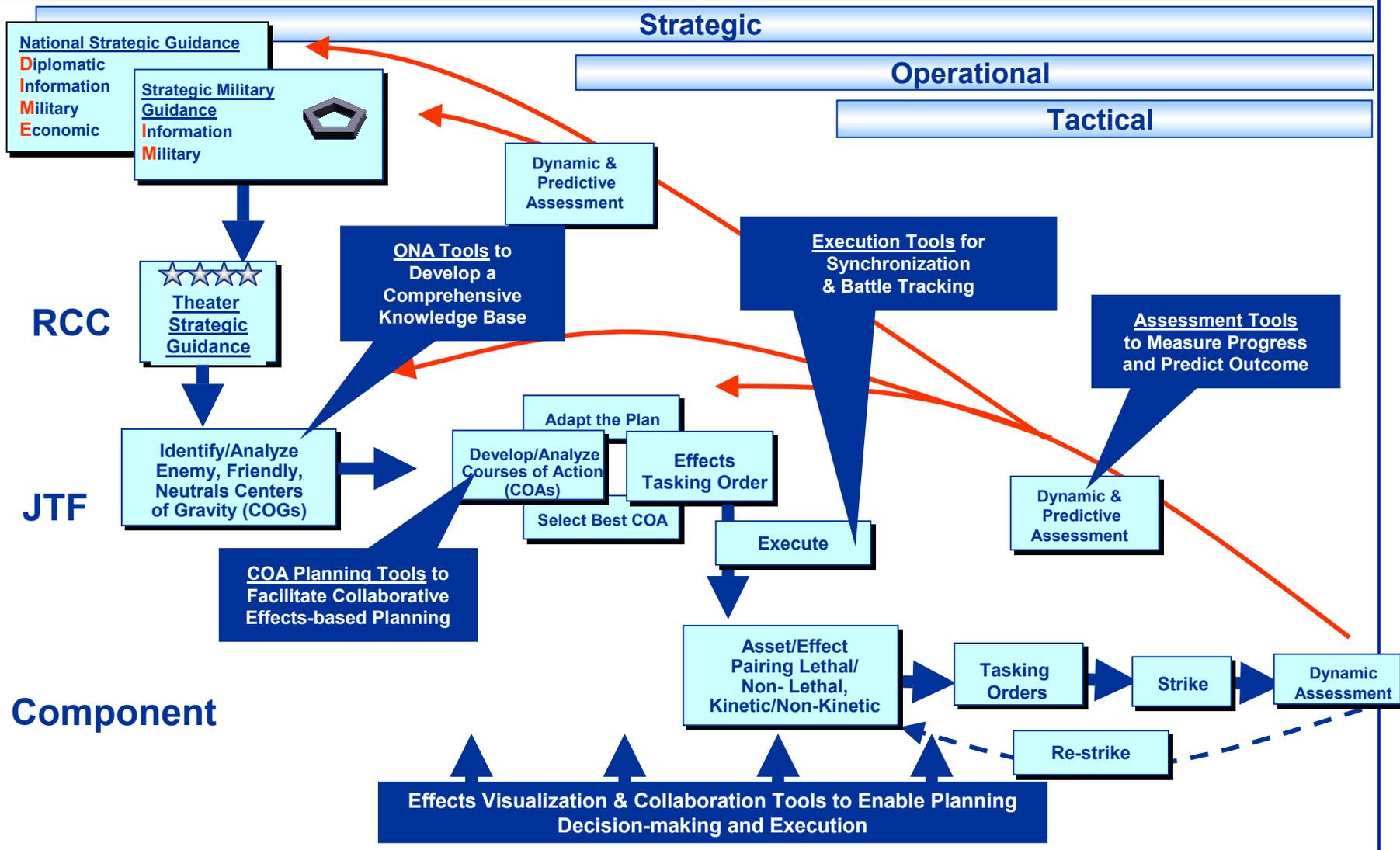
Facilitate Collaborative Effects-based Campaign Planning



Dynamically Assess and Predict Progress to Help Adapt the Plan

Support Execution of the Plan With Prioritization, Synchronization and Battle Tracking

# Concept of Operations Planning, Execution, Assessment, and Adapting



# Schedule Planning & Integration



FY04	FY05	FY06	FY07	FY08	FY09
<ul style="list-style-type: none"> <li>Publish ACTD Implementation Directive/ Management Plan</li> <li>Document CFC's EBO Baseline</li> <li>Develop &amp; Demonstrate Operational Net Assessment (ONA) Capabilities</li> <li>Document CFC EBO ACTD Capabilities</li> <li>Publish ACTD Implementation Plan</li> <li>Install Automated Data Collection Infrastructure In CFC</li> <li>Conduct EBO Experimentation at IEC</li> <li>Support CFC/JFCOM/Conduct Exercises/Experiments</li> </ul>	<ul style="list-style-type: none"> <li>Develop Joint EBO Segment of COP and Leverage Collaboration Tools</li> <li>Develop &amp; Demonstrate Course of Action (COA) Planning Capabilities</li> <li>Integrate ONA Capabilities Into CFC Architecture</li> <li>Develop &amp; Demonstrate EBO Execution Enabling Capabilities</li> <li>Develop &amp; Demonstrate Dynamic Assessment (DA) Capabilities</li> <li>Publish Interim MUA</li> </ul>	<ul style="list-style-type: none"> <li>Enhance Joint EBO Segment of COP and Collaboration Tools</li> <li>Integrate COA Planning Capabilities Into CFC Architecture</li> <li>Enhance &amp; Integrate ONA Capabilities Into CFC/ Combatant Command Architectures</li> <li>Integrate EBO Execution Enabling Capabilities Into CFC Architecture</li> <li>Integrate DA Capabilities Into CFC Architecture</li> </ul>	<ul style="list-style-type: none"> <li>Integrate Allies Into Combined/Joint EBO Segment of COP and Collaboration Tools</li> <li>Enhanced/Integrate COA Planning Capabilities Into CFC/ RCC Architectures</li> <li>Enhance/Transition ONA Capabilities Into POR</li> <li>Enhance/Integrate EBO Execution Enabling Capabilities Into CFC/RCC Architectures</li> <li>Enhance/Integrate DA Capabilities Into CFC Combatant Command Architectures</li> </ul>	<ul style="list-style-type: none"> <li>Enhance Combined/Joint EBO Segment of COP and Collaboration Tools</li> <li>Enhance/Transition COA Planning Capabilities Into POR</li> <li>Enhance/Transition EBO Execution Enabling Capabilities to POR</li> <li>Enhance/Transition DA Capabilities to POR</li> </ul>	<ul style="list-style-type: none"> <li>Enhance Combined/Joint EBO Segment of COP and Collaboration Tools</li> </ul> <div style="border: 1px solid black; padding: 10px; text-align: center; background-color: #e0f0ff;"> <p><b>Transition to Sustainment</b></p> </div> <ul style="list-style-type: none"> <li>Publish Final MUA</li> </ul>

Demo &	FY04	FY05	FY06	FY07	FY08	FY09
Lab Demo	▲	▲	▲	▲	▲	▲
USFK RSOI		▲	▲	▲	▲	▲
ULCHI Focus Lens	▲	▲	▲	▲	▲	▲
JFCOM/Other	▲	▲	▲	▲	▲	▲

**Schedule Risk: Low/Medium**  
Sufficient duration  
Risk arises from number of technologies to integrate

<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>
-------------	-------------	-------------	-------------	-------------	-------------



**TRL=6:**  
Influence Diagrams  
**Metrics:**  
Comprehensive Knowledge Base

**TRL=6:**  
Effects Network  
Relationship Visualization  
**Metrics:**  
Dynamics Assessment

**TRL=5:**  
COA Development and Analysis Tools  
**Metrics:**  
Effective – Base Campaign Planning

**TRL=6:**  
Effects to Assist Pairing  
**Metrics:**  
Execution Support

**TRL=7:**  
Influence Diagrams  
**Metrics:**  
Comprehensive Knowledge Base

**TRL=7:**  
COA Development and Analysis Tools  
**Metrics:**  
Effective – Base Campaign Planning

**TRL=7:**  
Effects to Assist Pairing  
**Metrics:**  
Execution Support

**TRL=7:**  
Effects Network  
Relationship Visualization  
**Metrics:**  
Dynamics Assessment



**Lead Service: U.S. Army**



**Sponsor: PACOM**



**User: CFC/USFK**



**Technical Manager: JPSSD**



**Operational Manager: JFCOM**



**Transition Manager: GCCS  
(DISA/JFCOM/JPSSD)**

## Participants/Technology Sources

**8th Army**  
**USAFK/7th AF**  
**USNFK /7th Fleet**  
**USMARFORK**  
**SOCKOR**  
**ROK Forces**

**PACOM**  
**STRATCOM**  
JIOC – Information Operations Navigator  
NEC  
**SOCOM**  
PSYOP module  
**CENTCOM**  
**JFCOM**  
J8/J9 – Technology, Concepts, TTPs  
JWAC – Technology, Models  
**SOUTHCOM**

**AFRL**  
EBO ATD  
**National Agencies**  
Technology, Models, Knowledge  
**DARPA**  
TIA Technologies  
**Industry**  
Technology, Models, Concepts



- **Knowledge Management/ONA Toolkit**
- **Campaign Planning Toolkit**
- **Execution Support Toolkit**
- **Dynamic and Predictive Assessment Toolkit**
- **Effects-based Visualization and Collaboration**
- **TEBO TTPs & TSPs**

## Value Added

- **Decide Faster**
- **Incorporate More Factors**
- **Understand/Predict Consequences**
- **Prepare for Unintended Consequences**



## **TEBO ACTD Delivers Software Applications and Concepts/TTPs to CFC/USFK and Other Combatant Commands and the Components Equipping Them to Effectively Execute EBO**

*“Theater Effects Based Operations (TEBO) ACTD Is Our Highest Priority for FY04...This Effort Provides an Ideal Opportunity to Integrate Theater Joint/Combined C4ISR and Sets the Path Towards Future Warfighting for the Entire Department of Defense.”*

*Leon J. LaPorte,  
General USA  
Cdr CFC/USFK*

### **Enablers for Success**

**JPSD’s Experience in Joint C4I tools  
TEBO Concepts Support Transformation  
High Level of Interest Expressed from Combatant Commands**



**ADOCS  
Joint Warfighting Application**



**15 July 2003**



Unclassified

# User Need Development Concept

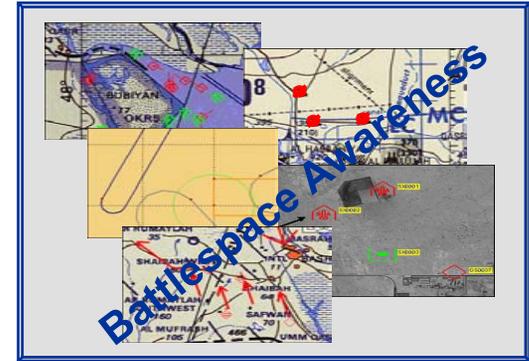


<b>Cross Functional Tools &amp; Managers</b>	Mission Managers	ATO Visualization		Time Sensitive Targeting		
	Joint Fires and Engagement		Kill Box Management		Predictive BDA	
	Airspace Command and Control			Battlespace Fires and Airspace Planning		
	3D Visualization	Air/Ground Deconfliction		ATO Planning and Execution		
<b>Joint Interoperability</b>						
<b>BFAs</b>	<b>Fires</b>	<b>Intelligence</b>	<b>Maneuver</b>	<b>Aviation</b>	<b>Missile Defense</b>	
<b>Systems of Record</b>	Fire Planning Inventory Fire Control Location Status	Fusion Correlation Databases Collection	Unit Locations Unit Status Logistics Battlefield	Msn Planning Logistics Airspace Mgt Status	Employment Envelopes Defense Ops. Prot. Zones	

***Joint Warfighter Applications to Cross Battlefield Functional Areas  
Providing the Same Information With Tools and Managers to  
All Joint and Combined Components and Government Agencies***

## Integrated Battlespace Information

- Single Unified Display Across Joint Systems
- Leverages Existing C4ISR Infrastructure
- Complementary not Competing



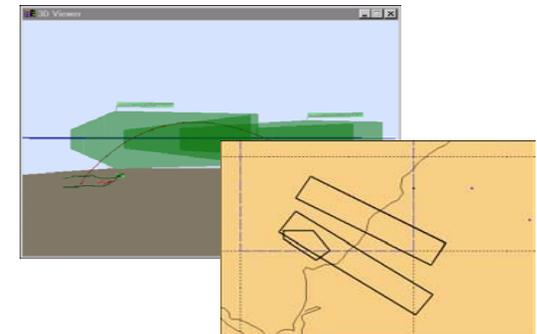
Mission Coordination: Time Sensitive Targets												
Tgt No	Description	Mission No	Acft	Call Sign	TST	NLT	TDD	AIR	NCA	CM	CA	PSD
AB0002	AN-2 AT AIRFIELD				Green	White	Green	Green	Green	Green	Green	BCC
AH0003	MOBILE SAM				Green	Green	Green	Green	Green	Red	Green	
AB0003	FIGHTERS AT AIRFLD				Green							
AH0026	AN-2 ON RUNWAY				Green							
AH0034	LARGE ASSY AREA	6666	2/F16C	FELON31	Green							
AC0001	AN-2 MIG				Green	BCC						
AH0046	SCUD CP				Green	BCC						
AH0049	ARTY CP				Green							
AB0029	SCUD BN	4500B	2/F4E	LIONS23	Green	Red	Green	Green	Green	Green	Green	

## Mission Managers

- Intra and Inter Component
- Across Functional Areas
- Horizontal and Vertical Coordination
- Distributed Collaboration

## Joint Tools

- Provide Users the Same Information
- Produce the Same Results
- Information in Seconds vice Minutes



- **Joint Force Battlespace Coordination**

- Airspace Deconfliction
- Fires and Airspace Planner
- ACO Visualization
- CSOF Mission Manager
- Time Sensitive Targets Manager
- Limited and Protected Targets
- Kill Box Management
- Joint Personnel Recovery Manager

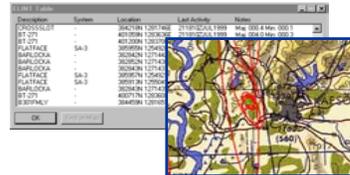
- **Targeting**

- Radar Exploitation
- ELINT Display and Analysis
- Digital Mapping and Imagery
- Terrain Analysis
- 3D Visualization
- Mensuration Request Manager

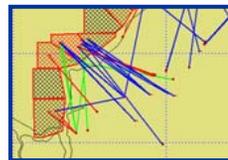
- **Time Sensitive Targeting**

- **Horizontal Coordination**
- Weapon Target Pairing
- Deconfliction – CLPTL, Coordination Measures

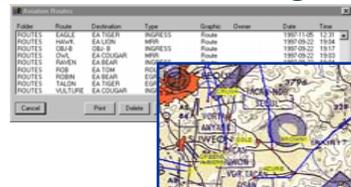
### Threat Evaluation



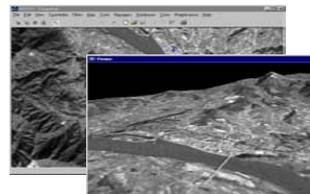
### Counterfire COP



### Route Planning



### Attack Position Analysis



- **Fires Management**

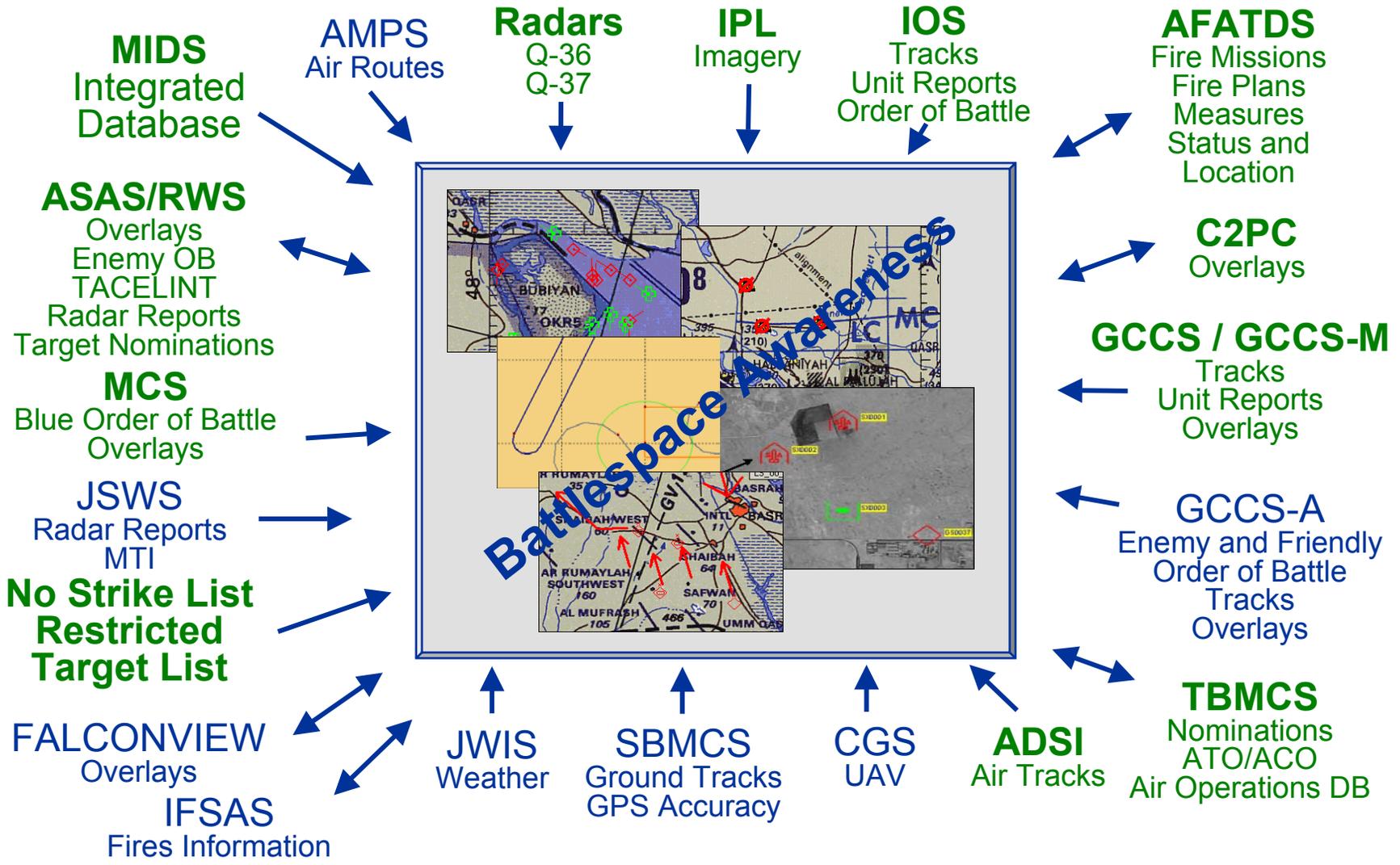
- Fire Mission Manager
- TLAM, TTLAM, and LASM Manager
- **Counterfire (Artillery) COP**
- Predictive BDA
- Coordination Measure Manager
- Weapons Location and Status

- **Air Tasking Order**

- Theater Integrated Database
- Mensuration Target Database
- ATO Planning Manager
- ATO Execution Manager
- ATO Change Request Manager
- **ATO Visualization**
- Close Air Support Manager
- XINT Mission Manager

- **Army Aviation**

- Aviation Route Planning and Management
- SEAD Planner
- Airspace Control Requests – A2C2





# OIF Contribution

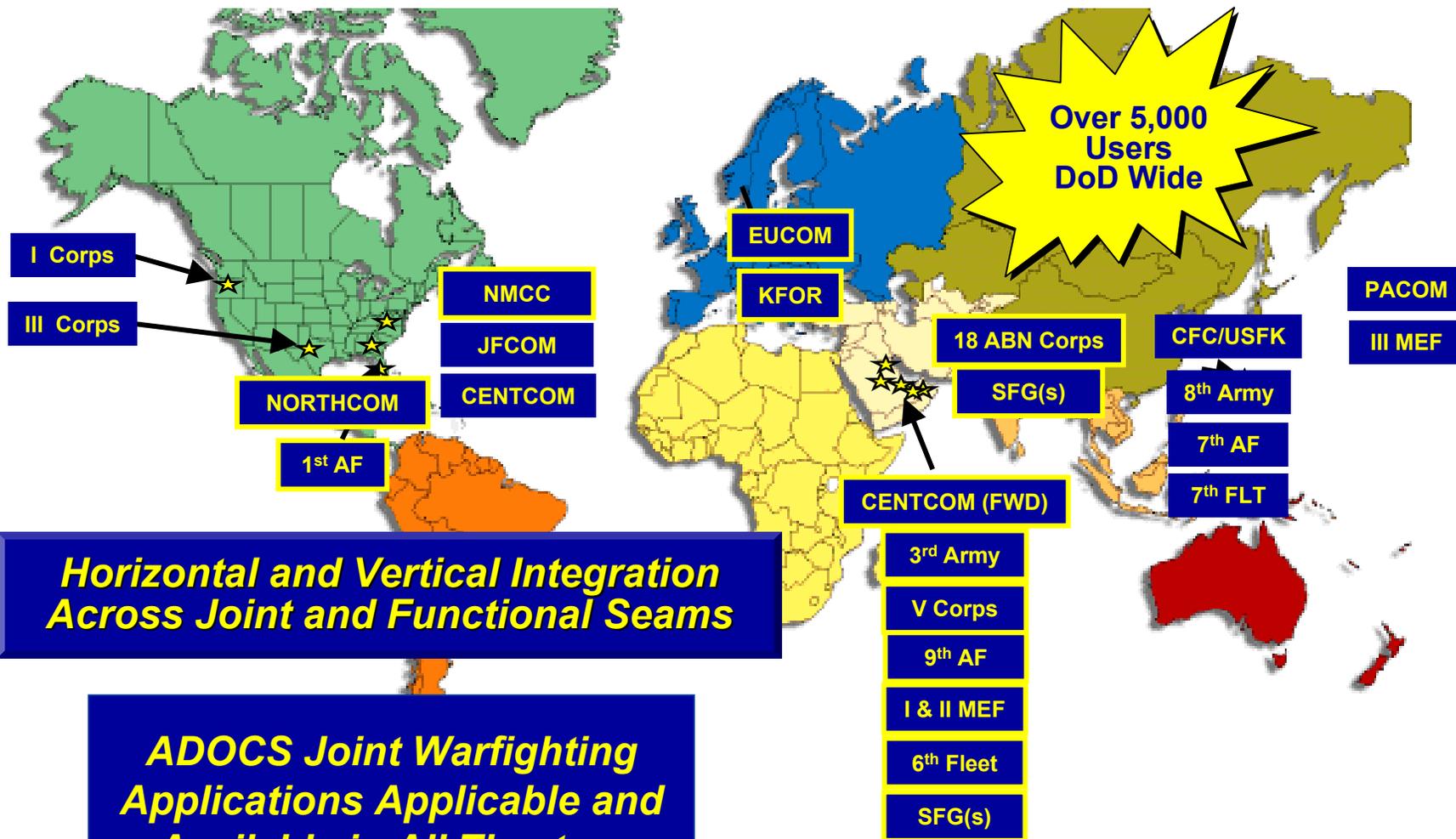


## Joint Command and Control Warfighting Application

### (ADOCS, Automated Deep Operations Coordination System)

- **Mission Management Software** Providing Horizontal and Vertical Integration Across Battlefield Functional Areas
- **Tactics, Techniques and Procedures (TTPs)** to support Joint Time Sensitive Targeting
- **Joint Interoperability**
  - Interfaces and shares data with over 50 systems
  - Provides Situational Awareness Vertical and Horizontal Across the Battlefield
- **Process Responsive to the User**
  - 12 Forward Deployed Field Support Engineers
  - 24/7 Help Desk for Reach Back Capability
  - Over 300 Software Enhancements after 1 Jan 03
- **Go to War Proven Capability** in Central and European Commands
  - 3000+ users in Operation Iraqi Freedom (Combatant Commanders, Joint Force Commanders, Army, Air Force, Marines, Navy, Special Operations, coalition Forces)
  - Used at Levels from Squadrons and Battery to National Command Center

# Expanded Joint Warfighting Accomplishments

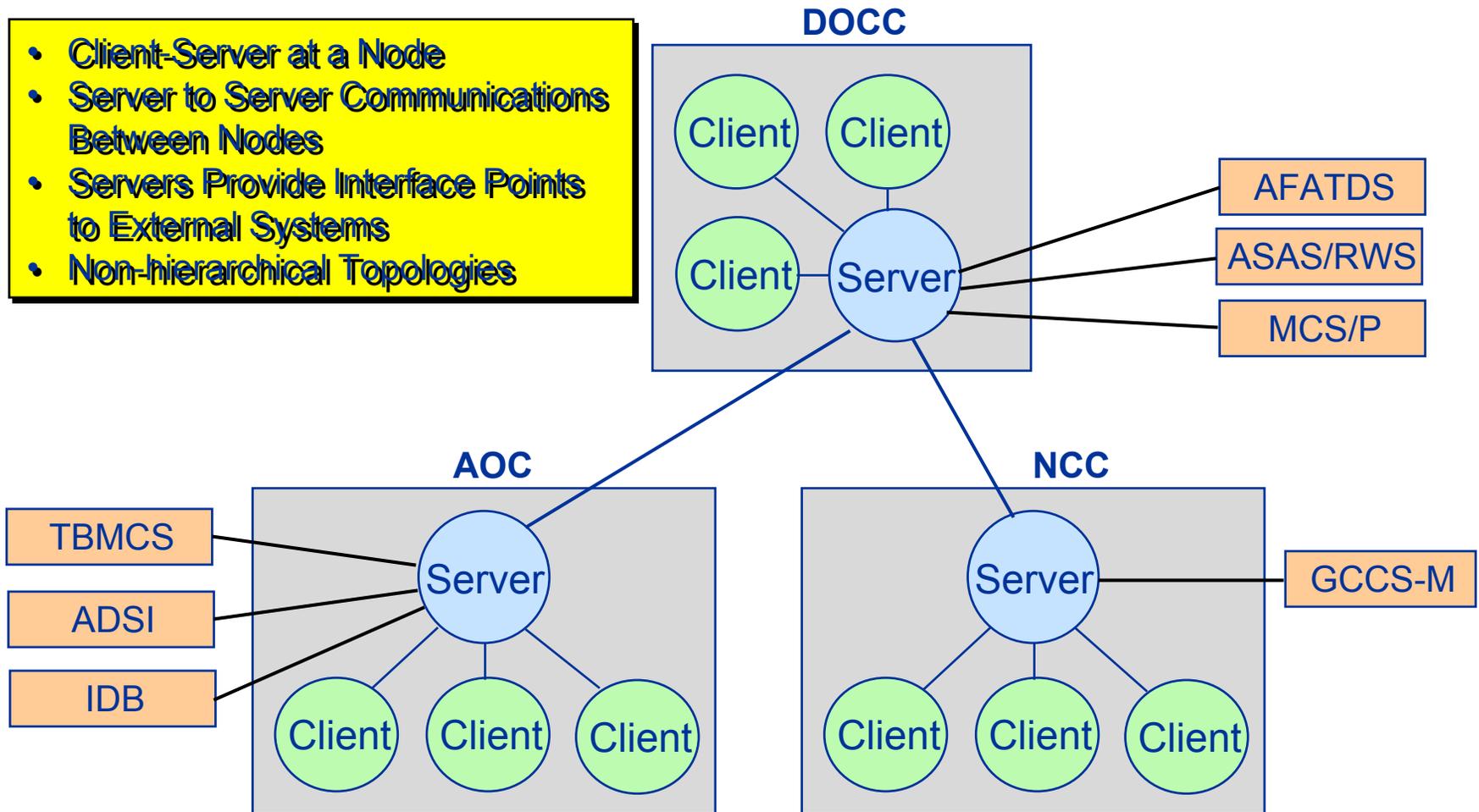


**Over 5,000 Users  
DoD Wide**

***Horizontal and Vertical Integration  
Across Joint and Functional Seams***

***ADOCs Joint Warfighting  
Applications Applicable and  
Available in All Theaters***

- Client-Server at a Node
- Server to Server Communications Between Nodes
- Servers Provide Interface Points to External Systems
- Non-hierarchical Topologies





# Software Architecture



- Windows: NT, 2000, and XP
- Government Owned
- No Proprietary Software
- No Licensing
- DII COE Level 5+ Compliant
- C++ ANSI Standard Programming Language
- Microsoft Foundation Classes
- Microsoft Visual Studio 6.0 Development Environment
- Object Based Design and Implementation
  - Object-Based Design From Inception
  - Segmented Infrastructure (e.g., Mapping, Communications, Tools)
  - Extensible Design

# Current System Interfaces



Information	System	Interface	Dir	Message
Airspace Control Order	TBMCS	File, SMTP	R	USMTF 98
Air Support Request	AFATDS	SMTP	R	USMTF D670
Air Tasking Order	TBMCS	File, SMTP	R	USMTF 98
ATO Mission Updates	TBMCS	TCP/IP	R	HTTP
ATO Mission Updates	TBMCS	FTP	R	Delimited Flat File
Artillery Locations and Status	AFATDS, Radars	Wire, Radio, TCP/IP	T-R	TACFIRE V10, VMF
Aviation Routes	AMPS	FTP	R	AMPS Mission Report
Aviation Routes	FalconView	File	R	3.01 Format
Battlefield Geometry	AFATDS, IFSAS	Wire, Radio, TCP/IP	T-R	TACFIRE V10, VMF
Battlefield Geometry	GCCS, GCCS-M	Serial, SMTP, TCP/IP	T	OTH Gold OVLY2
Battlefield Geometry	ASAS/RWS	SMTP	T-R	USMTF S201
Candidate Target List	TBMCS	File	T-R	SUDS
DMPI Database	MIDB	ODBC	R	N/A
Electronic Intelligence	ASAS/RWS	SMTP	R	USMTF S309
Fire Plan	AFATDS, Radars	Wire, Radio, TCP/IP	T-R	TACFIRE V10, VMF
Fires Mission and Adjustment	AFATDS, Radars	Wire, Radio, TCP/IP	T-R	TACFIRE V10, VMF
Imagery	5D and IPL	ODBC	R	NITF, Commercial
Integrated Database	MIDB	ODBC	R	N/A
Moving Target Indicators	JSWS	TCP/IP and UDP	R	NATO-EX
No Strike List	TBMCS	ODBC	R	N/A
No Strike List	Theater Specific	File	R	N/A
Overlay	ASAS/RWS	SMTP	T-R	N/A
Overlay	C2PC	SMTP	T-R	C2PC MGC Format
Overlay	GCCS, GCCS-M	Serial	T-R	OTH Gold OVLY2

# Current System Interfaces



Radar Locations and Status	AFATDS, Radars	Wire, Radio, TCP/IP	T-R	TACFIRE V10, VMF
Radar Reports	Q-36, Q-37	Wire, Radio	R	TACFIRE V10, VMF
Radar Reports - MT/SAR Derived	ASAS/RWS, JSWS	SMTP	R	RECCEXREP
Standard Configuration Load	TBMCS	FTP	R	Delimited Flat File
Target Nomination	ASAS/RWS	SMTP	R	TIDAT
Target Nomination	GISRSC, PTW, JTW	SMTP	R	ATI.ATR
Target Nomination	AFATDS, Radars	Wire, Radio, TCP/IP	T-R	TACFIRE V10, VMF
Text	GCCS, GCCS-M	Serial, SMTP, TCP/IP	T-R	OPNOTE
Text	AFATDS, ASAS	SMTP	T-R	USMTF S302
Threat Databases	FalconView	File	T-R	FalconView "Thr" Format
TLAM and TTLAM Routes	RPM	SMTP	R	N/A
TLAM Mission and Inventory	PC MDS	SMTP	R	USMTF
Tracks	GCCS 3.X, GCCS-M 3.	Serial, TCP/IP	T-R	OTH Gold Contact Report
Tracks	GCCS 4.X	TMS API	R	TMS API
Tracks	TBMCS	Serial, TCP/IP	T-R	OTH Gold Contact Report
Tracks	ADSI	TCP/IP	R	JCPI
Unit Locations	ASAS/RWS	SMTP	R	USMTF S309
Unit Locations	GCCS 3.X, GCCS-M 3.	Serial, TCP/IP	T-R	OTH Gold JUNIT
Unit Locations	GCCS 4.X	TMS API	R	TMS API
Unit Locations	IOS	ODBC	R	N/A
Unit Locations	MCS	SMTP	R	S507
Weather	JWIS	FTP	R	NITF



Information	Format	Description
Air Tasking Order	CSV, Overlay	Air tasking order missions
Airspace Control Order	CSV, Overlay	Air space control measures
Airspace Control Points	ASCII File	Control points for aviation routes
Airspace Control Requests	ASCII File	Army airspace control measures
Artillery Common Operational Picture	CSV	Enemy and friendly surface fires
ATO Execution Manager	CSV	ATO execution management (INT and XINT)
Candidate Target List Manager	CSV	Target submitted to Target Board for ATO
Coordination Measures	CSV, Overlay	Fire support coordination measures
DMPI Database	CSV, Overlay	Mensurated target database (from MIDB and ISDS)
Enemy Order of Battle	CSV, Overlay	Enemy unit locations
Engagement Zones	ASCII File	Engagement zones (aka kill boxes)
Friendly Order of Battle	CSV, Overlay	Friendly unit locations
Ground and Marine Fires Manager	CSV	Surface targets
ISR Manager	CSV	Target-sensor coordination database
Mission Planning Target Data	CSV, Overlay	Master Air Attack Plan - Pre-ATO
Modernized Integrated Database	CSV, Overlay	Facilities, units, and equipment database (MIDB/ISDS)
No Strike List	CSV, Overlay	Protected or restricted targets
SAR Manager	CSV	Combat Search and Rescue missions
Targets Manager	CSV	Air component missions

# What is ADOCS?



- ADOCS **Is** a...
  - Mission Management **Software Application** Providing Horizontal and Vertical Integration Across Battlefield Functional Areas
  - Go-to-War Capability in the Korean, CENTCOM and European Theaters
  - Rapidly Evolving Application Responding to User's Requirements (Combatant Commanders, Army, Navy, Air Force and Marine Corps)
  - Recognized Air Force Application - Personal Computer Intelligence, Information, and Integration (PCI3)
  - Baseline for the Naval Fires Control System (NFCS)
  - Core Application for Navy Exploration of Common Land Attack (LAWS)
- ADOCS **Is Not** a...
  - Replacement for any Army Battle Command System Component
  - Stand - Alone System
  - An Army Program



## Multiple Paths

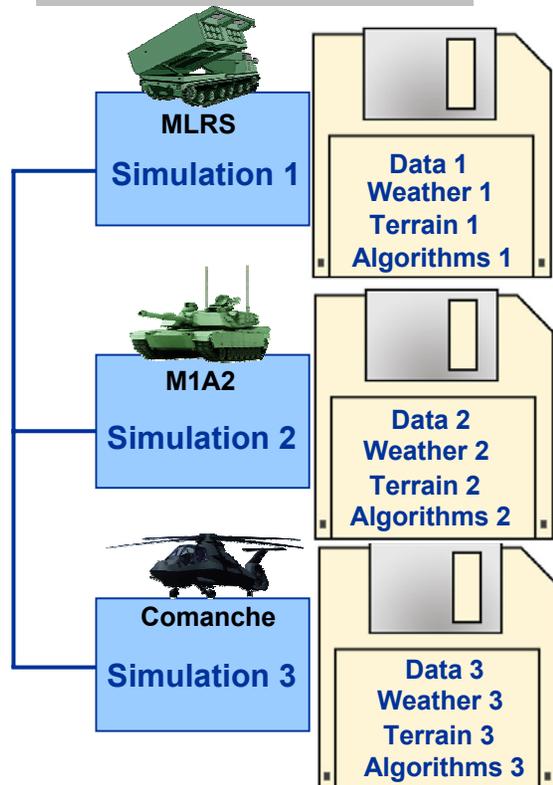
- Management Plan to Transition to AFATDS (Fire Support Client – Effects Management Tool (EMT) Client using ADOCS concepts)
- JFCOM DOTMLPF Following MC-02:
  - “Interim Fielding” of ADOCS as a Joint Time Sensitive Target Management Tool For Regional Combatant Commanders and Their Components.
  - Transition ADOCS JFI Capabilities to FIOP by end of FY04 remaining capabilities by end of FY06.
- 10 Dec 02 JROCM:
  - Endorsed Continued Support Until Migration Paths Are Fully Defined And Responsibilities Assigned
  - The J8 Will Work With OSD in the Upcoming Program and Budget Reviews to Identify a Source of Funding to Keep ADOCS **Modern and Useful**
  - DJC2 to Leverage ADOCS, FIOP, GCCS
- Joint Targeting Toolkit (JTT)

## Requirements, Concepts and Capabilities vs. Product and Process



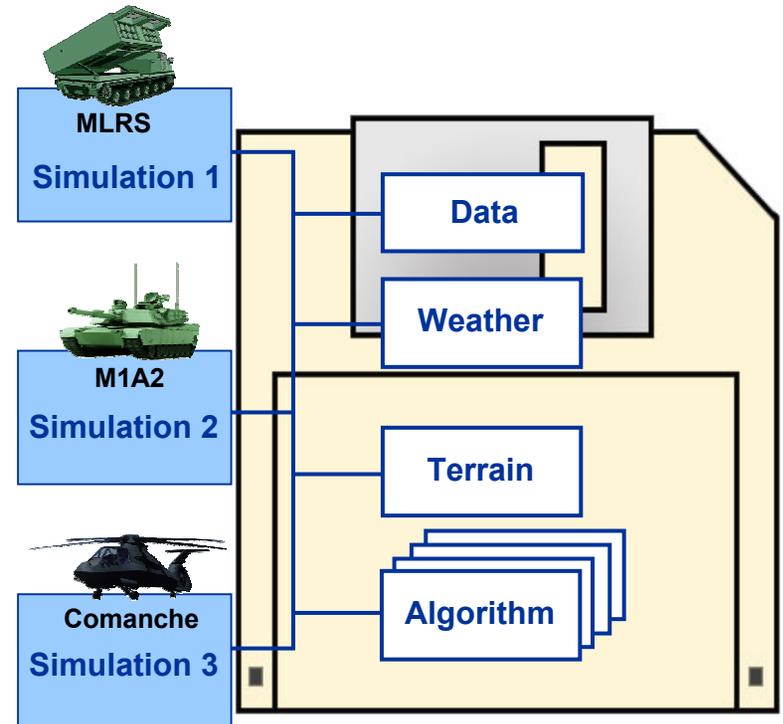
JPSD  
SMART/SBA

## Current Approach



**Precoordinate to Ensure Everything is as Consistent as Possible.  
Post Coordinate to Interpret Inconsistencies Between Models**

## JPSD SBA Approach



**All Simulations Use Consistent Data and Algorithms**



**Mission:** Design a Simulation Architecture and Build a Reference Implementation Using Standardized M&S Component Interfaces to Enable the Representation of Key Characteristics of Warfighting Systems.

**Objectives:** Provide Framework and Tools to Measure value of Different ways of Collecting, Managing, and Disseminating Information; Proposed Systems/ Systems-of-Systems and Different ways to Fight - TTPs

### Accomplishments:

- Integrated the M&S Federation used in the FCS C4ISR AoA Experiment Dec 02, Ft. Knox, KY
- Supported M&S Environment used in FCS LSI CAPSTONE Demo Mar 03, Ft. Knox, KY & Ft. Belvoir, VA
- Completed JVB Architecture Description, May 03

### Stakeholders:

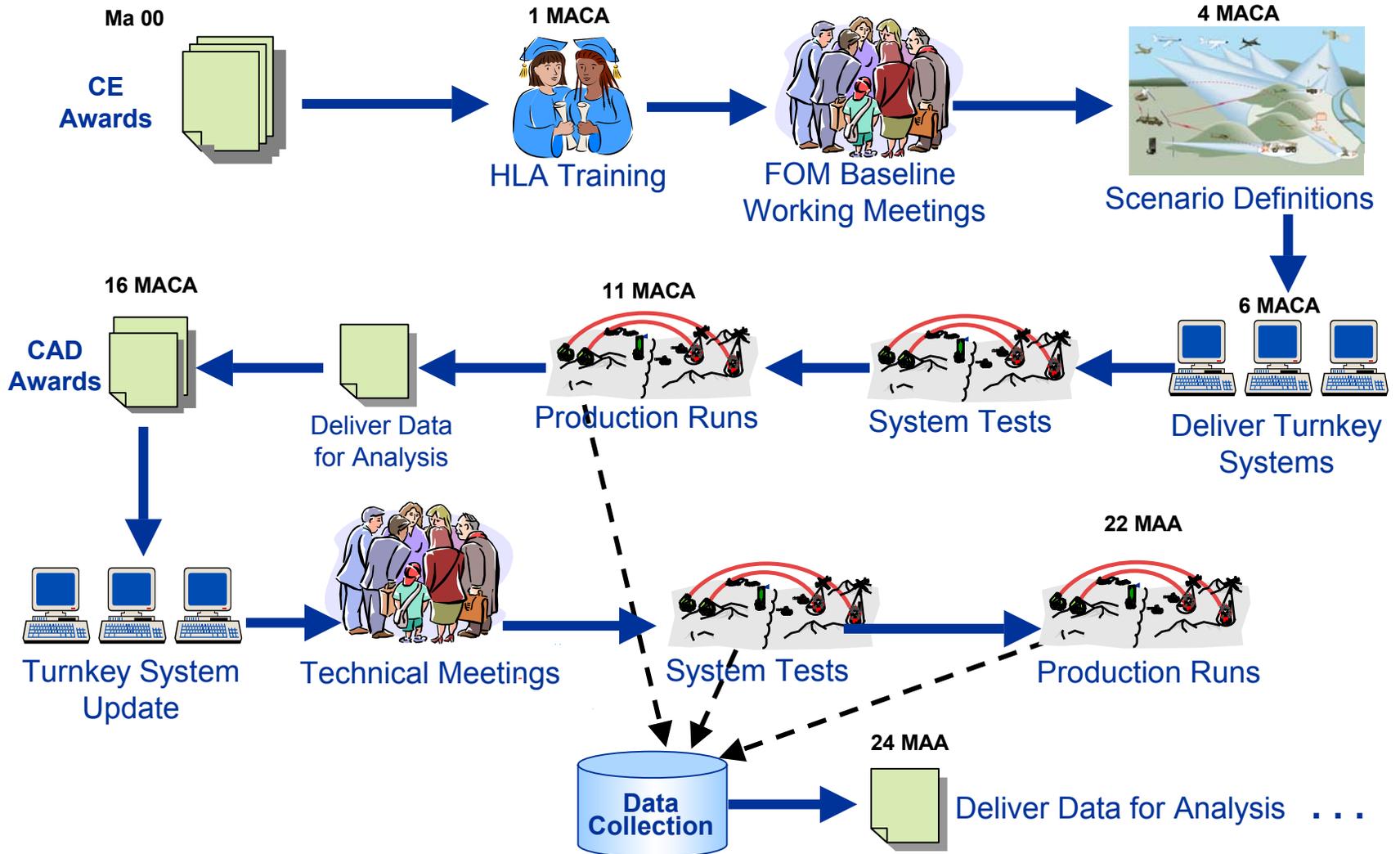
- PM-FCS, PM-ACS, PM-DCGS-A, AF-JSB, AMSO, RDE CMD

### Products:

- Architecture Description (Including Interface Spec and Common FOM)
- Framework Software
- MOE/MOP Development Tools
- Contractor Concepts Analysis Support Data

### Transition Candidates:

- Transitioned to RDE CMD – MATREX STO
- Tailorable for use by PMs in their SSPs



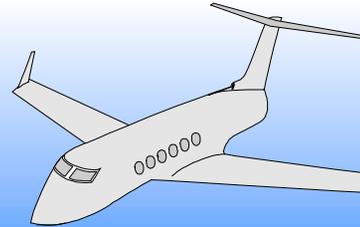


# ACS

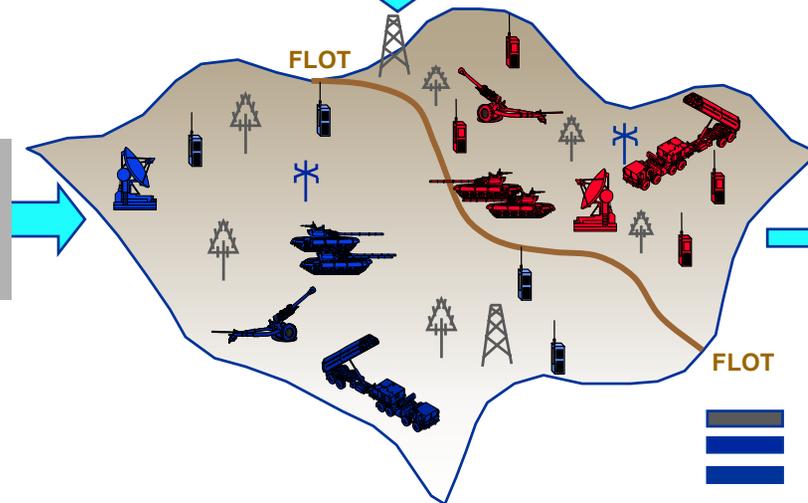
## Simulation Based Acquisition

Joint Precision Strike Demonstration Project Office

## ACS Contractor Operational Model



- S&IOE Scenarios
- IRs



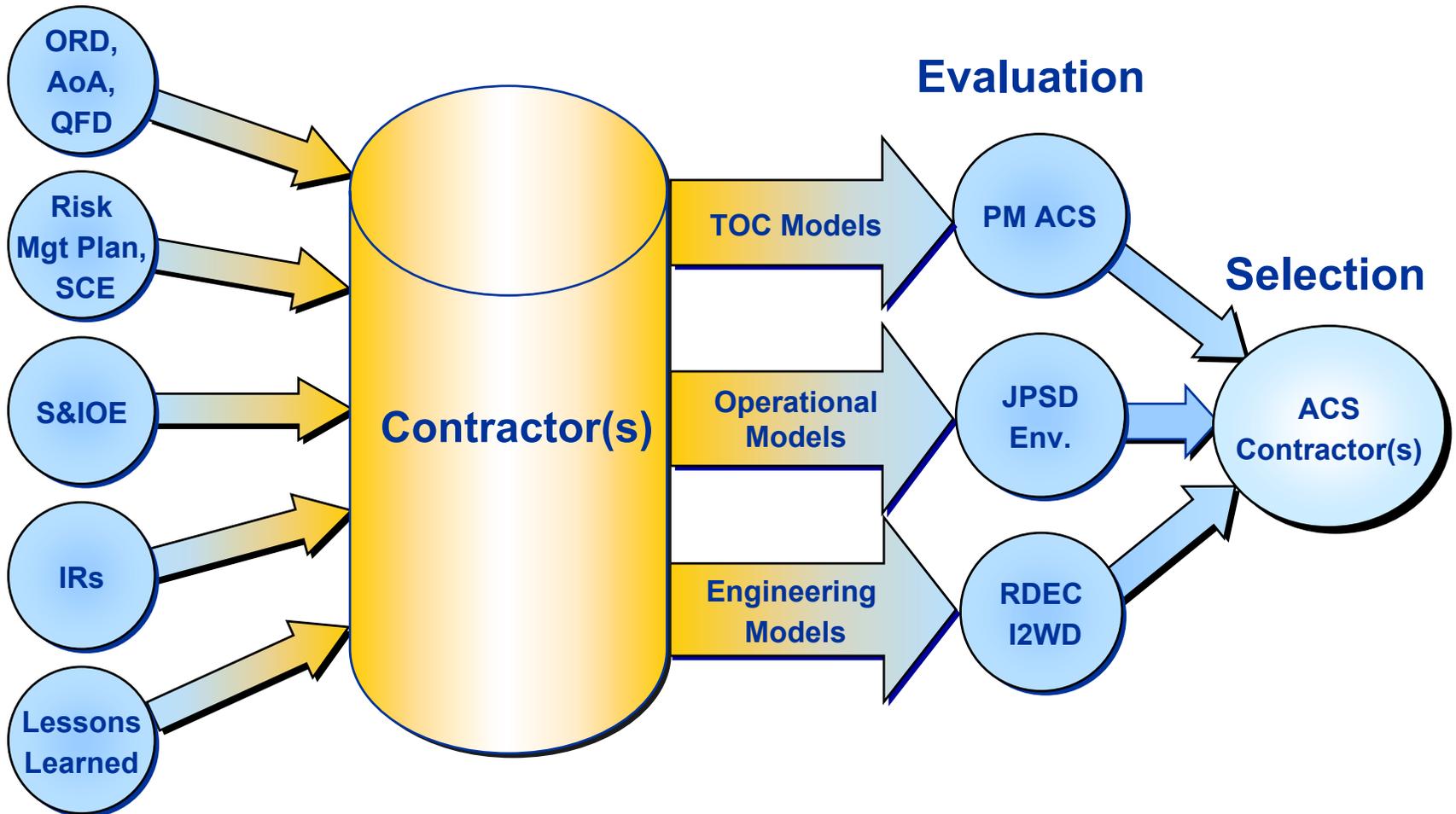
## Data Collection



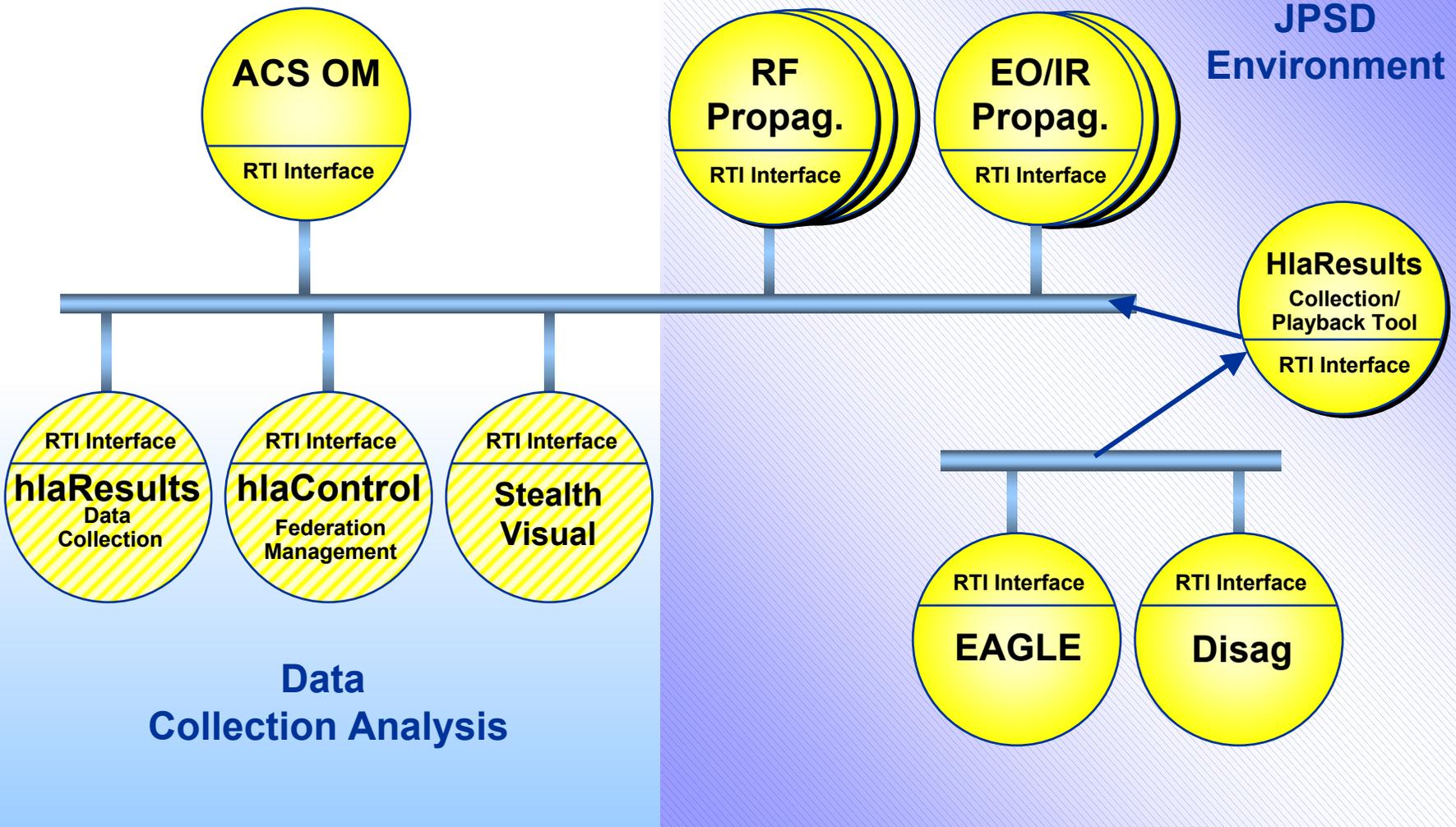
MOE 1-4

## JPSD Synthetic Environment

- SWA
- Balkans



# ACS Federation



# Operational MOE/MOPs Facilitated by JPSSD Environment



**MOE 1 - 4**

## Measure ACS System

- #1 Target Detections
- #2 Target Locations
- #3 Throughput Capability
- #4 Target Identified

- Enabled Communication and Evaluation of ACS Capabilities Using Graphical and Numerical Results From Operational Models
- Contractors Confirmed Sensor Model Behavior Through the Use of Calibration Scenarios
- Contractors Evaluated Design Trade Offs Between System Components
- Use of Operational Models Enabled Contractors and Government to Ascertain Credibility of Operational Concepts (e.g., The Number of Platforms, Flight Geometries, and Sensor Cross-cueing)

# **Joint Tactical Terrain Technologies (JT3)**

## **JPSD-PO**

**Rapid Terrain Visualization Program**  
**Tactical LIDAR Program**  
**Tactical IFSAR ACTD**  
**Urban Recon ACTD**



**Mike Hardaway, JT3 Technical Manager, (703) 704-2123, [mike.hardaway@nvl.army.mil](mailto:mike.hardaway@nvl.army.mil)**

***Rapid***

***Terrain***

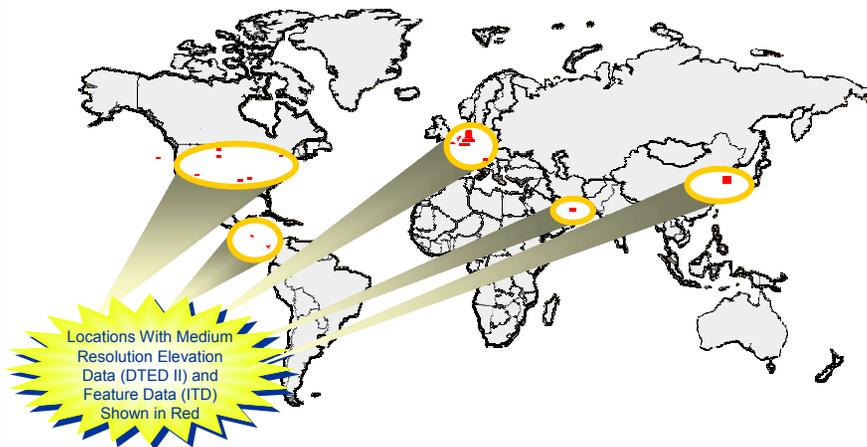
***Visualization***



# Rapid Terrain Visualization Improvements



## Problem



- High Resolution Terrain Elevation and Feature Data are not Available From Other Sources
- DoD Does not have the Capability to Rapidly Produce Them

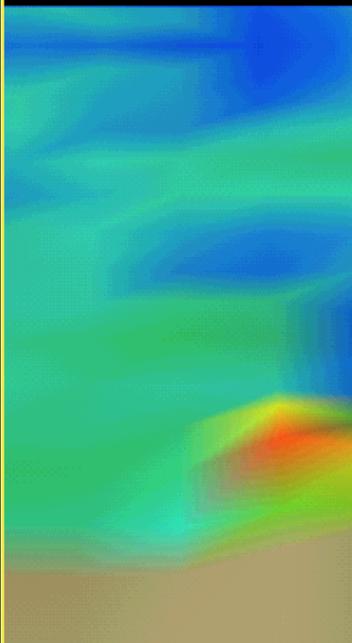
## Improvements

1. Reduced Timelines for Delivery of Digital Terrain Maps to Soldiers From **YEARS** to **DAYS** (Kosovo in ~ 2 Weeks)
2. Increased Resolution and Accuracy of Digital Terrain by Over **100%**
3. Provides **All Weather & Day/Night** Capability (Critical for Cloud Covered Regions)
4. Processes 4 Meter Resolution **Multi-Spectral Imagery (MSI)** for Image Maps and Extraction of Urban and Terrain Features
5. Provides Sub-foot Resolution **Synthetic Aperture Radar (SAR)** Imagery for Reconnaissance and Target Identification
6. Providing a Revolutionary Capability for **Urban Warfare, Disaster Relief** (Hurricanes, Floods, etc.) and **Drug Interdiction**
7. Delivering Digital Maps for Contingency Operations

# Resolution Comparison

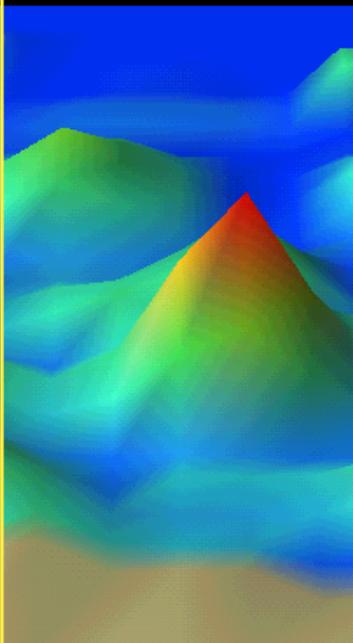


**Level I**  
(Current Archive)



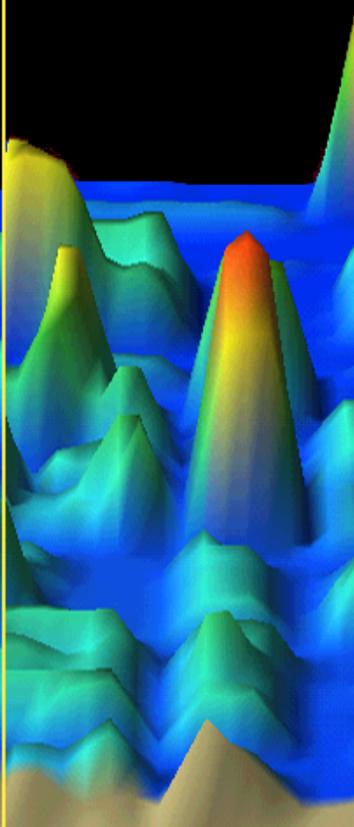
90 m spacing

**Level II**  
(SRTM)



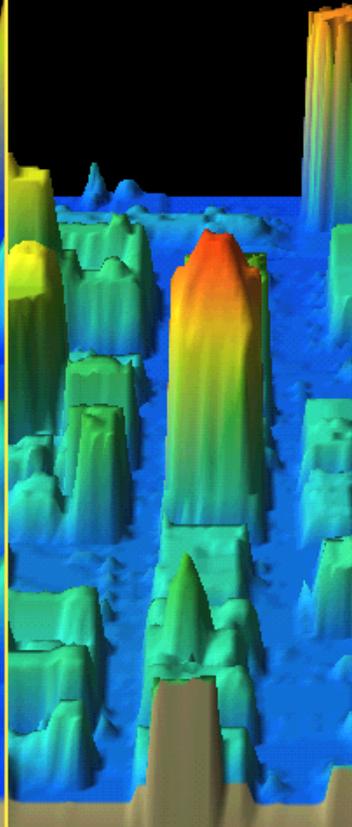
30 m spacing

**Level III**  
(RTV)



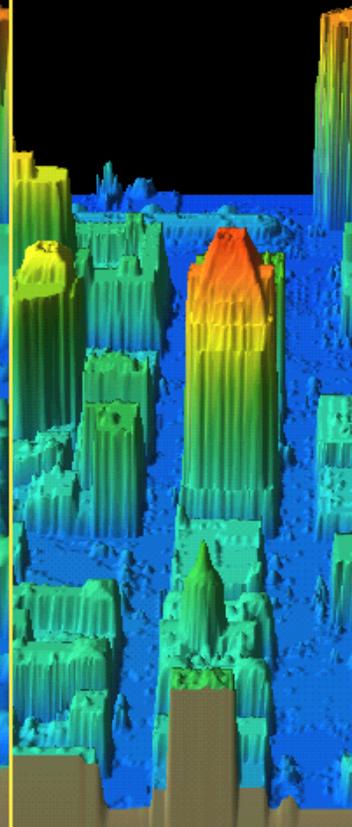
10 m spacing

**Level IV**  
(RTV)



3 m spacing

**Level V**  
(RTV)



1 m spacing

# RTV Data Collection Aircraft



LIDAR Workstation



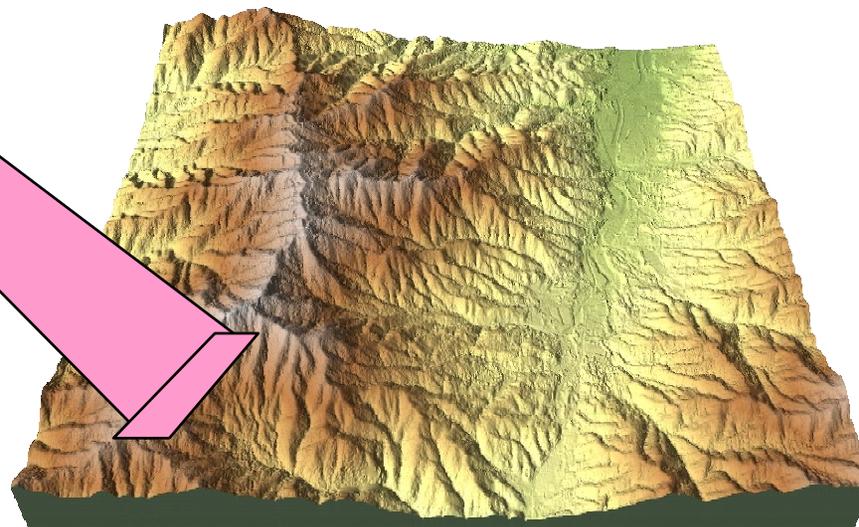
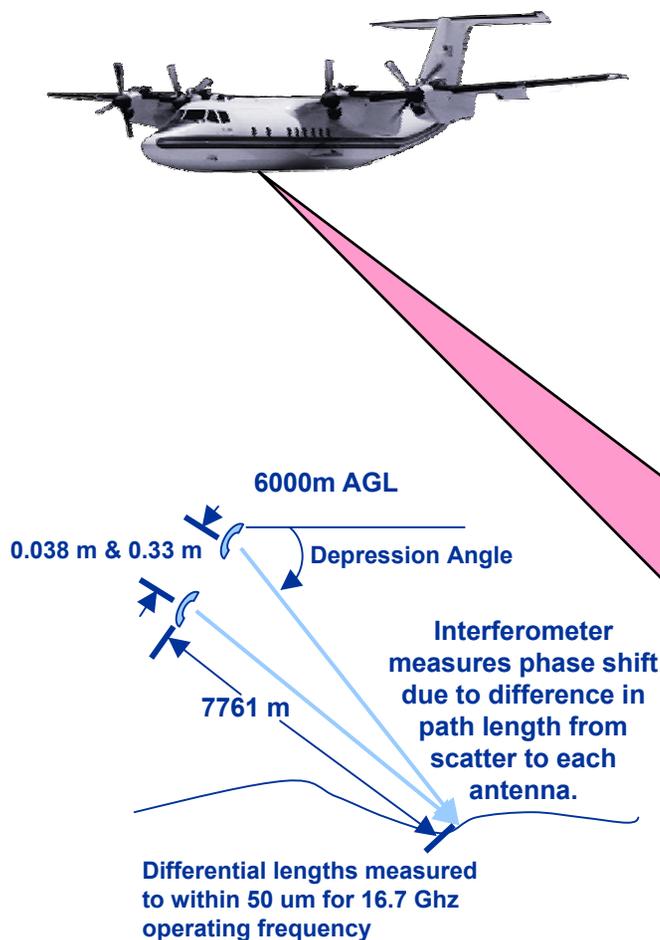
IFSAR Antennas



IFSAR Workstations

## Interferometric Synthetic Aperture Radar (IFSAR)

- All Weather, Day/Night Operations
- Operating Altitude: 18,000'
- Swath Width: 1300 meters
- **Real-Time ON-BOARD Processing**
- Elevation File Resolution - 3 Meters
- Orthorectified Image Resolution - 0.75 Meter
- Absolute Vertical and Horizontal Accuracy - ~2 Meters

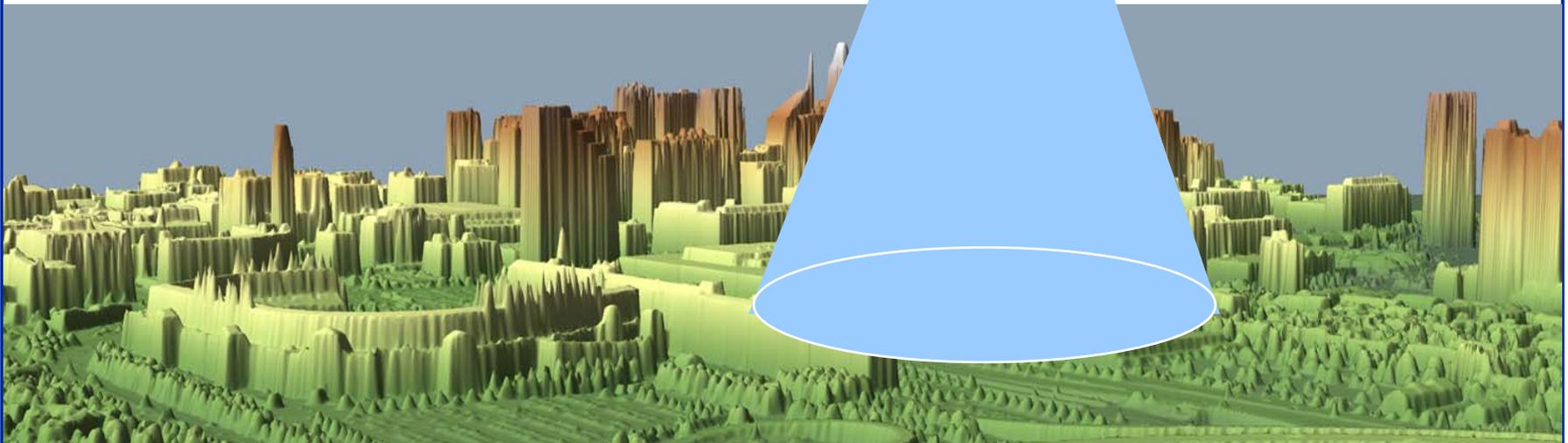
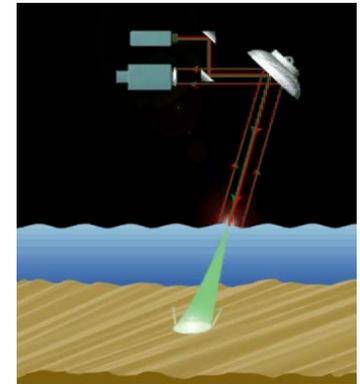


## Light Detection and Ranging (LIDAR)

- Day or Night Collection
- Requires Line of Sight (No Clouds)
- Altitude: 6000' AGL
- Swath Width: 540 Meters
- Resolution: 1 Meter
- Post Processing: 3 Hours : 1 Hour Collected
- Absolute Vertical Accuracy: 15-30 cm
- Absolute Horizontal Accuracy: 30-50 cm



**LIDAR**

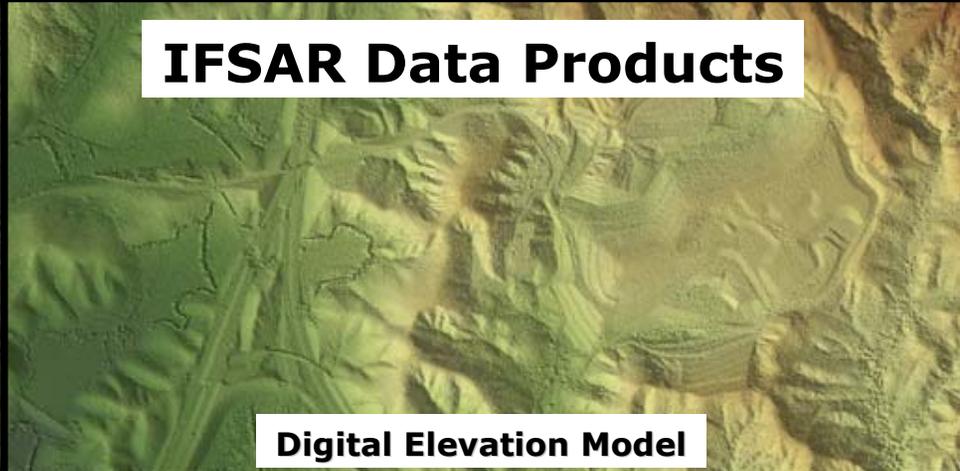


# LIDAR Data Products



Digital Elevation Model – First & Second Return

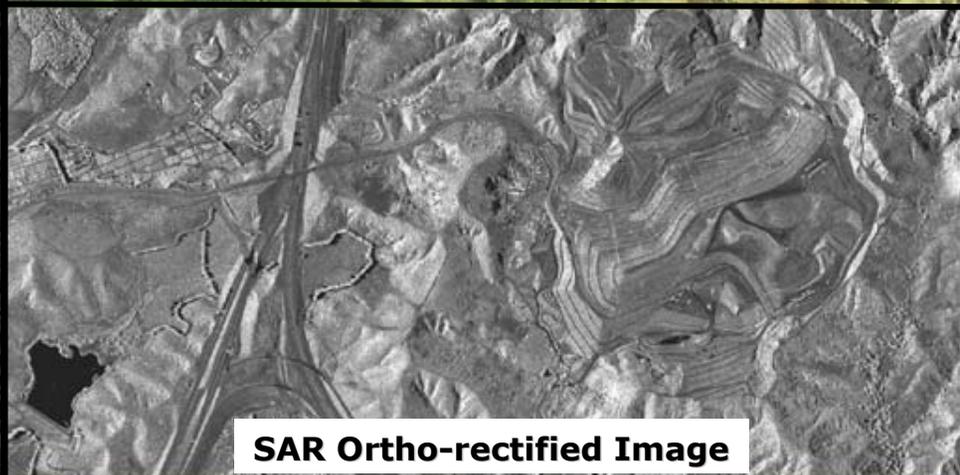
# IFSAR Data Products



Digital Elevation Model



Intensity Image



SAR Ortho-rectified Image



Blended Product



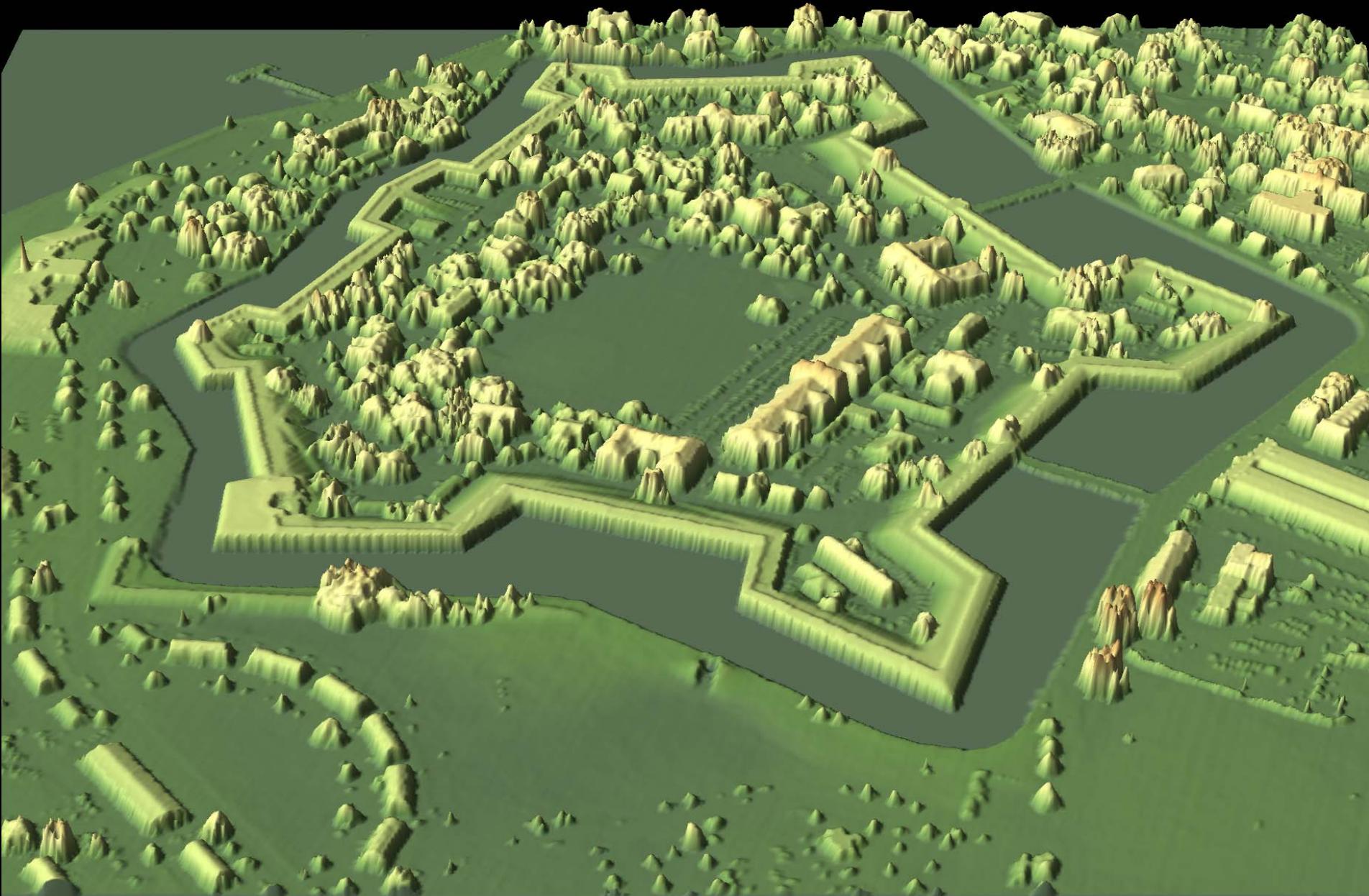
Blended Product



# Camp Pendleton, California

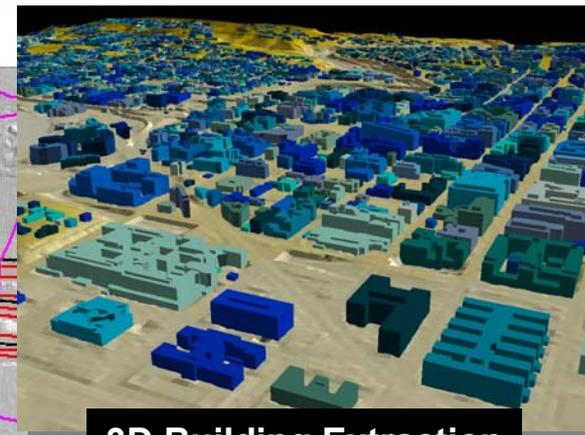
# Fort Monroe, VA

*Historic Fort*

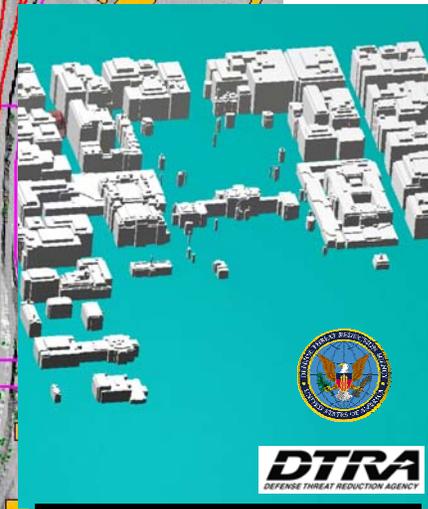


View1

- FFD Roads
- FFD Bridges
- FFD Railroads
- Digitized Roads
- Buildings
- Trees
- Intensity LIDAR Image
- Shaded Bare Earth DEM
- DEM
  - 31.882 - -27.031
  - 27.031 - -22.18
  - 22.18 - -17.328
  - 17.328 - -12.477
  - 12.477 - -7.626
  - 7.626 - -2.775
  - 2.775 - 2.077
  - 2.077 - 6.928
  - 6.928 - 11.779
  - No Data
- Shading
  - 0 - 31
  - 32 - 62
  - 63 - 94
  - 95 - 125
  - 126 - 156
  - 157 - 188
  - 189 - 219
  - 220 - 250
  - 251 - 282
  - No Data

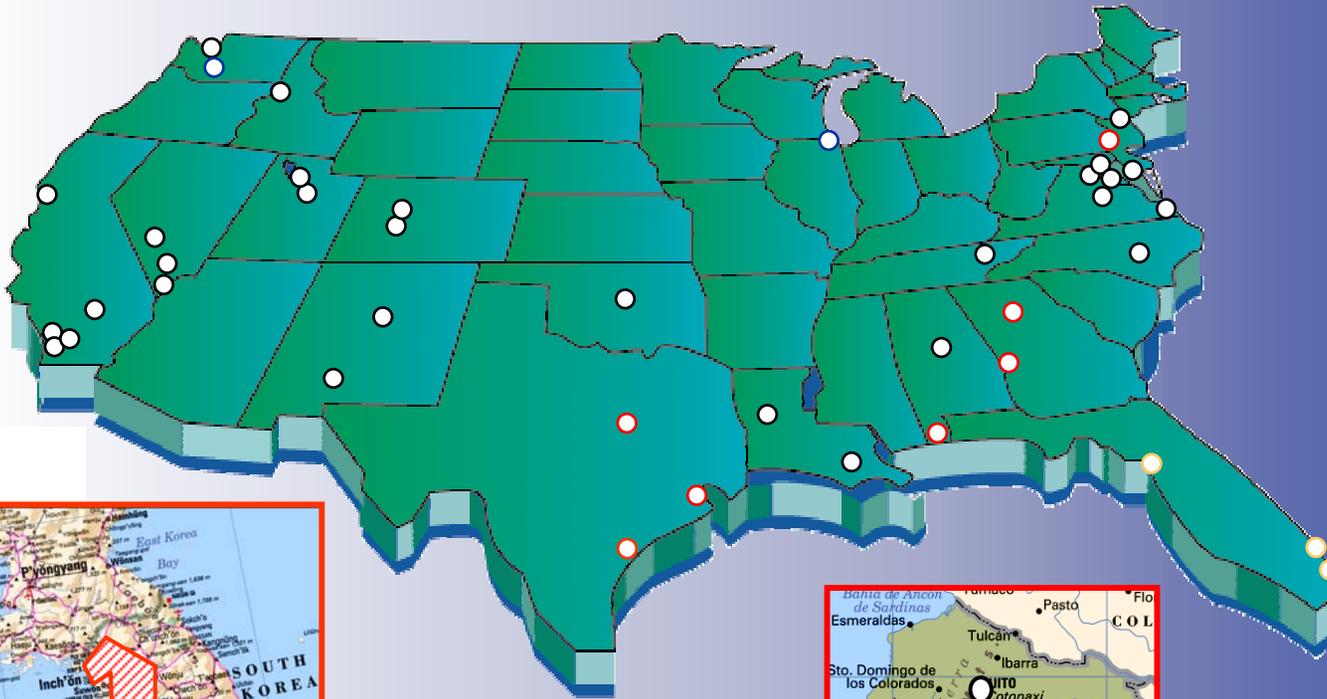


**3D Building Extraction**



**Chem-Bio Modeling**

# JT3 Mission Support



- Baltimore, MD
- Fort Belvoir, VA
- Fort Polk, LA
- Albuquerque, NM
- Salt Lake City / Park City, UT
- Fort A.P. Hill, VA
- Washington, D.C.
- Fort Bragg, NC
- Republic of Korea
- Manhattan, New York
- Oklahoma City, OK
- Las Vegas & Hoover Dam, NV
- Nellis AFB, NV
- New Orleans, LA
- Tidewater Region, VA
- Boise, ID
- Los Angeles, CA
- Camp Pendleton, CA
- Fort Irwin, NTC, CA
- China Lake, CA
- Redstone Arsenal, AL
- Knoxville, TN
- Fort Dix, NJ
- Republic of Ecuador
- San Francisco / Oakland, CA
- Seattle / Tacoma, WA
- Denver / Waterton, CO
- Chicago, IL
- White Sands Missile Range, NM
- Fort Devens, MA
- San Diego, CA
- Dominican Republic
- Fort Lewis / Yakima, WA
- Tampa Bay / St. Petersburg, FL
- Miami / Fort Lauderdale, FL
- Atlanta, GA
- Fort Benning, GA
- Houston / Corpus Christi, TX
- Dallas, TX



**Republic of Korea**  
**USFK**



**Dominican Republic**  
**JSOC / SOCOM**



**Republic of Ecuador**  
**SOUTHCOM**

○	Completed
●	In Process
●	Pending



# Tactical LIDAR Program



**“LIDAR From RTV Sensor Improves the Terrain Team’s Ability to Meet Mission-Planning Requirements Better Than CIB1 or 5. This Data Is Outstanding for Nearly Every Mission but Is Most Useful for MOUT or Urban Operations.”;  
JCF-AWE Final Report (May 2001)**

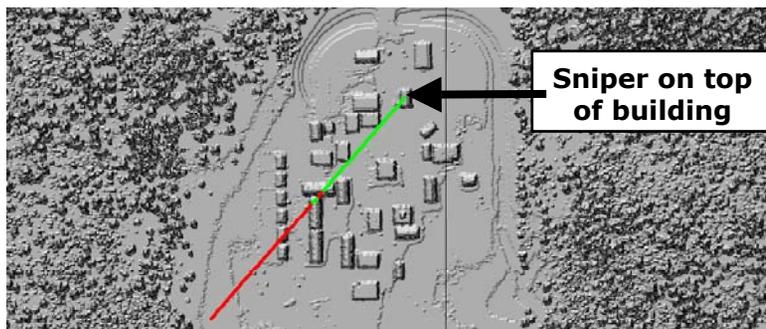
- **This Program Will:**

- **Migrate RTV LIDAR Sensor Technology to the Army Extended Range / Multipurpose Tactical UAV (ER/MP TUAV) and Conform to UAV Payload and Power Specifications**
- **Use the Hunter UAV as a surrogate platform until the ER/MP TUAV is available**
- **Conduct Integration and Test Flights**
- **Generate Associated Documentation and Training Materials**

**Fundamental Capability Needed for  
Army Transformation and the Objective Force**

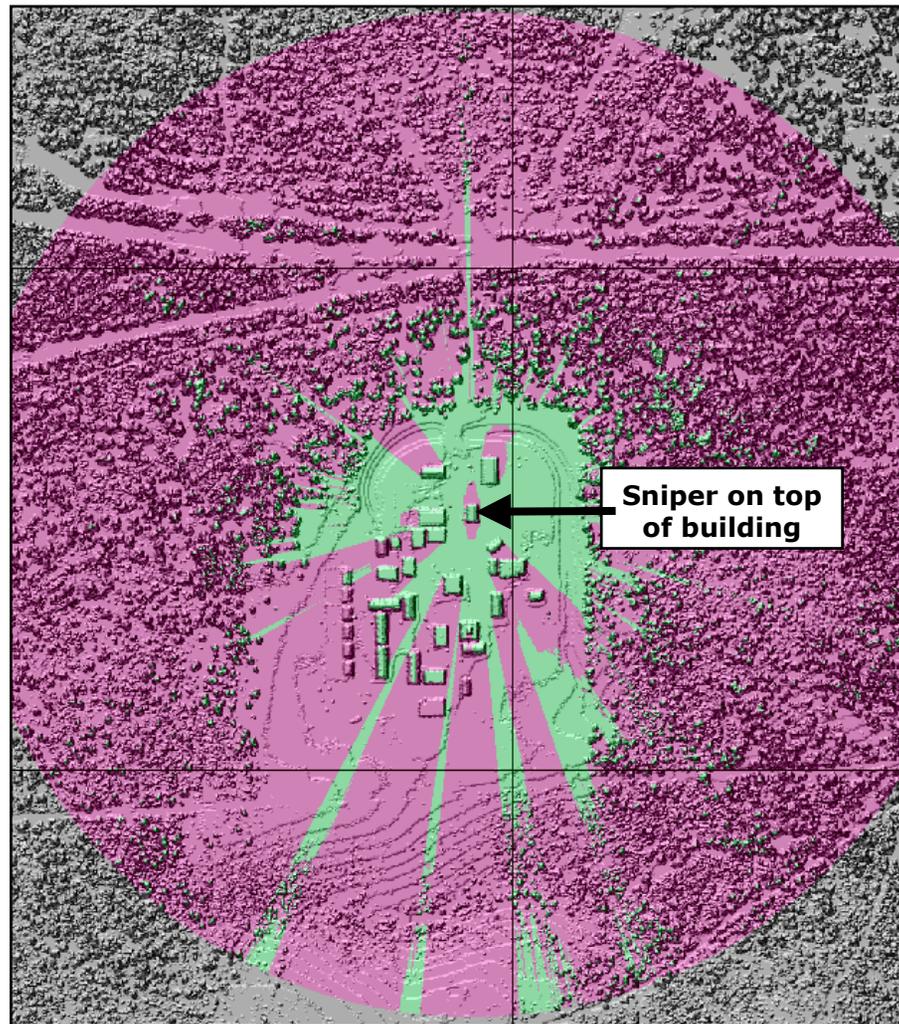
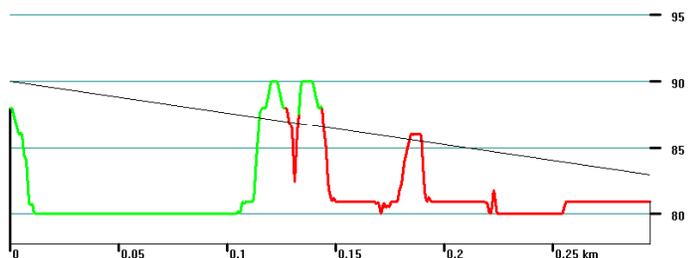
# Tactical Use of LIDAR

## Visualization / Weapons Fan / Line of Sight



N 35° 7.395' W 79° 9.733'

N 35° 7.277' W 79° 9.863' meters



# *Urban Recon (ACTD)*



## ***Within Hostile Urban Areas How Can We***

- Rapidly Collect Current 3-D Recon Data:
  - Below the Roofline?
  - Under the Canopy?
  - Inside Buildings?
- Use 3-D Data to Better:
  - Plan and Rehearse?
  - Execute, Monitor, and Geo-Locate?
- Outmaneuver the Enemy?



## ***Traditional Approach Would Take Months (Not Practical & Resolution Limited)***

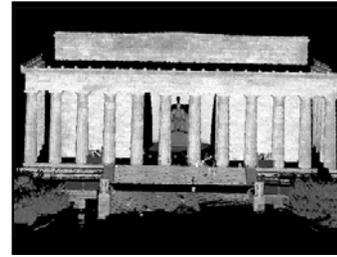
- Urban Recon ACTD to Provide Capability Within Hours



Classical Approach  
Multiple Origin Photographs



Laser Approach



3 Laser Setup  
700 m Standoff



2 Laser Setup  
300 m Standoff

# Urban Recon Basic Concept



1

Airborne Laser Recon  
(Oblique & Nadir)



## Mission Planning & Rehearsal

3



### 3-D Urban Visualization Urban Decision Aids

- \* Urban Mobility
- \* Cover & Concealment
- \* Perimeter Defense
- \* Vulnerability Assessment
- \* Obstacle Avoidance
- \* BDA
- \* etc.

+

## Live Situational Awareness

4



\* Dynamic 3-D DI Geo-locator

Integrate Airborne  
& Terrestrial Data



2

3-D Laser Imaging  
of Urban Setting



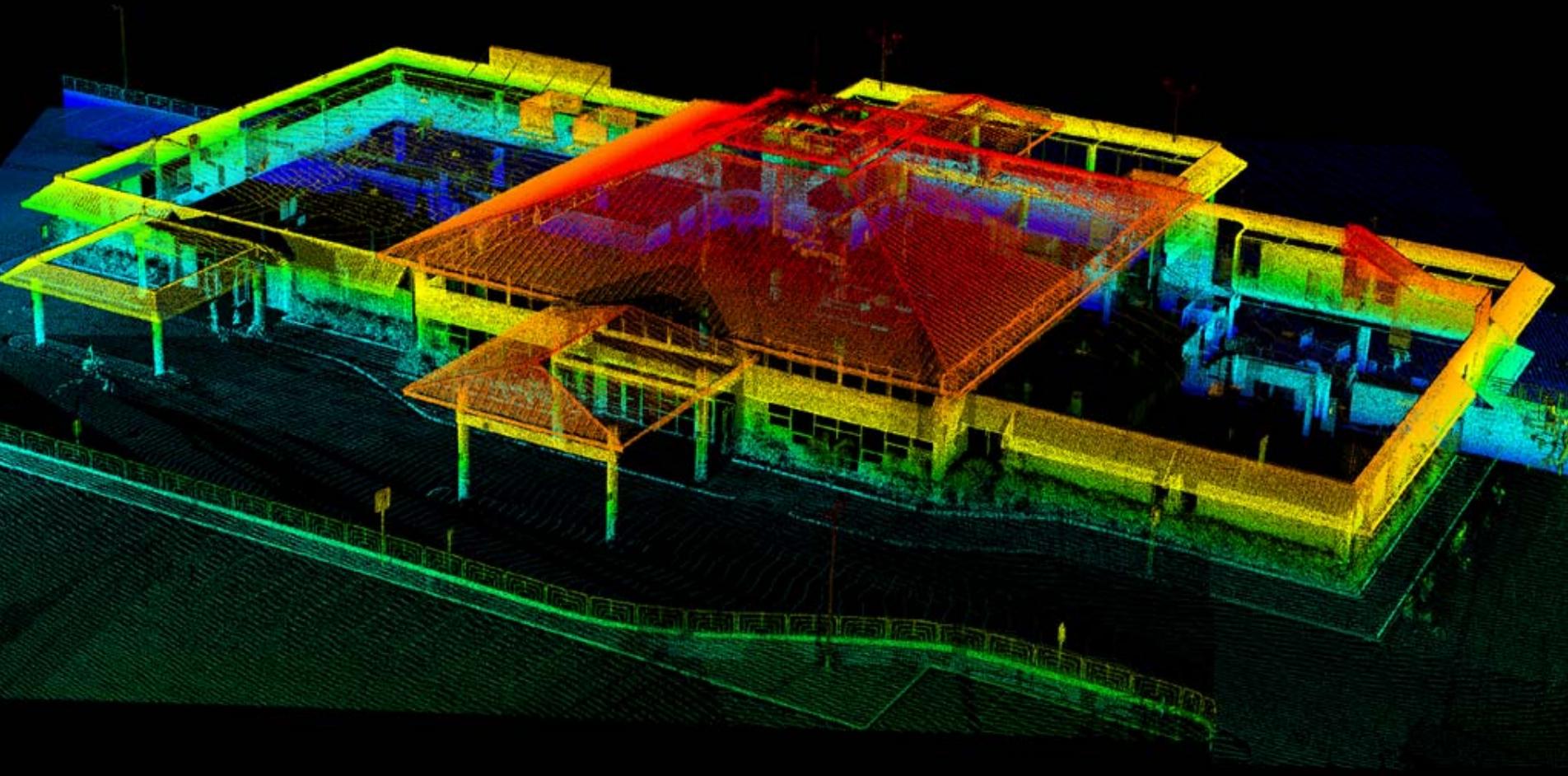
Terrestrial Laser  
(Mounted)



Terrestrial Laser  
(Dismounted)



# Terrestrial LIDAR - Dominican Republic



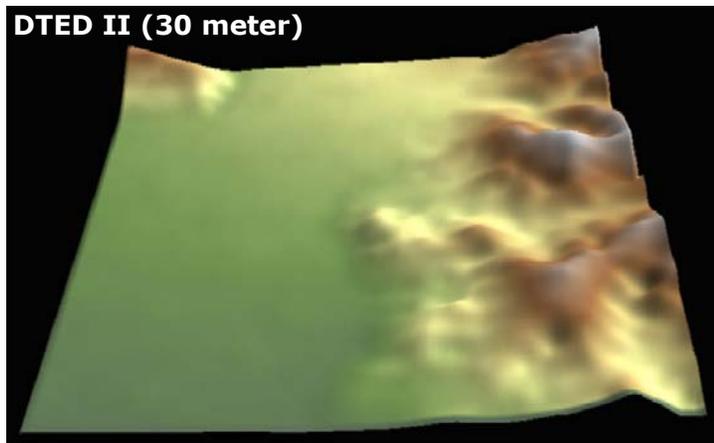
# TACTICAL IFSAR ACTD



# Problem Statement & Urgent Military Need



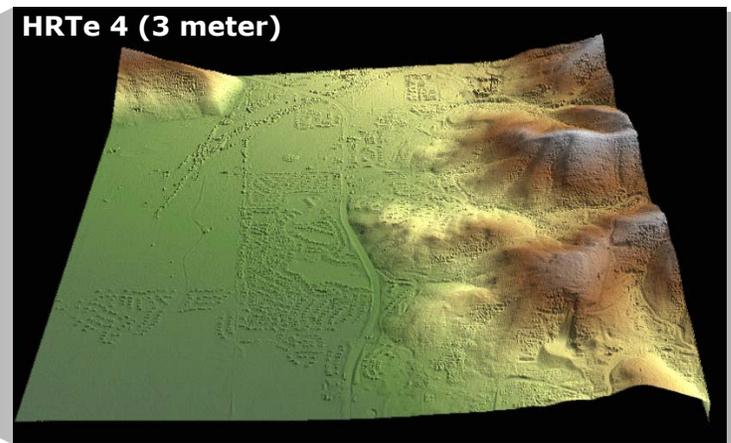
- U.S. Forces Do Not Have the Capability to Rapidly Collect High Resolution Terrain Elevation (**HRTe**) Data
  - Sources (U2, Global Hawk, Satellite) Cannot Produce the HRTe Required
- Operation Enduring Freedom Highlights the Need and Lethal Potential of Widely Available HRTe
  - Cave Detection, Precise Line of Sight, Landing Zone Predictions, Rapid Precision Targeting, Cross Country Mobility Assessment, 3D Fly-Throughs, Small Unit Mission Planning, Course of Action Analysis



*Best Available...*



**Tactical  
IFSAR**



*...Warfighter Deserves*

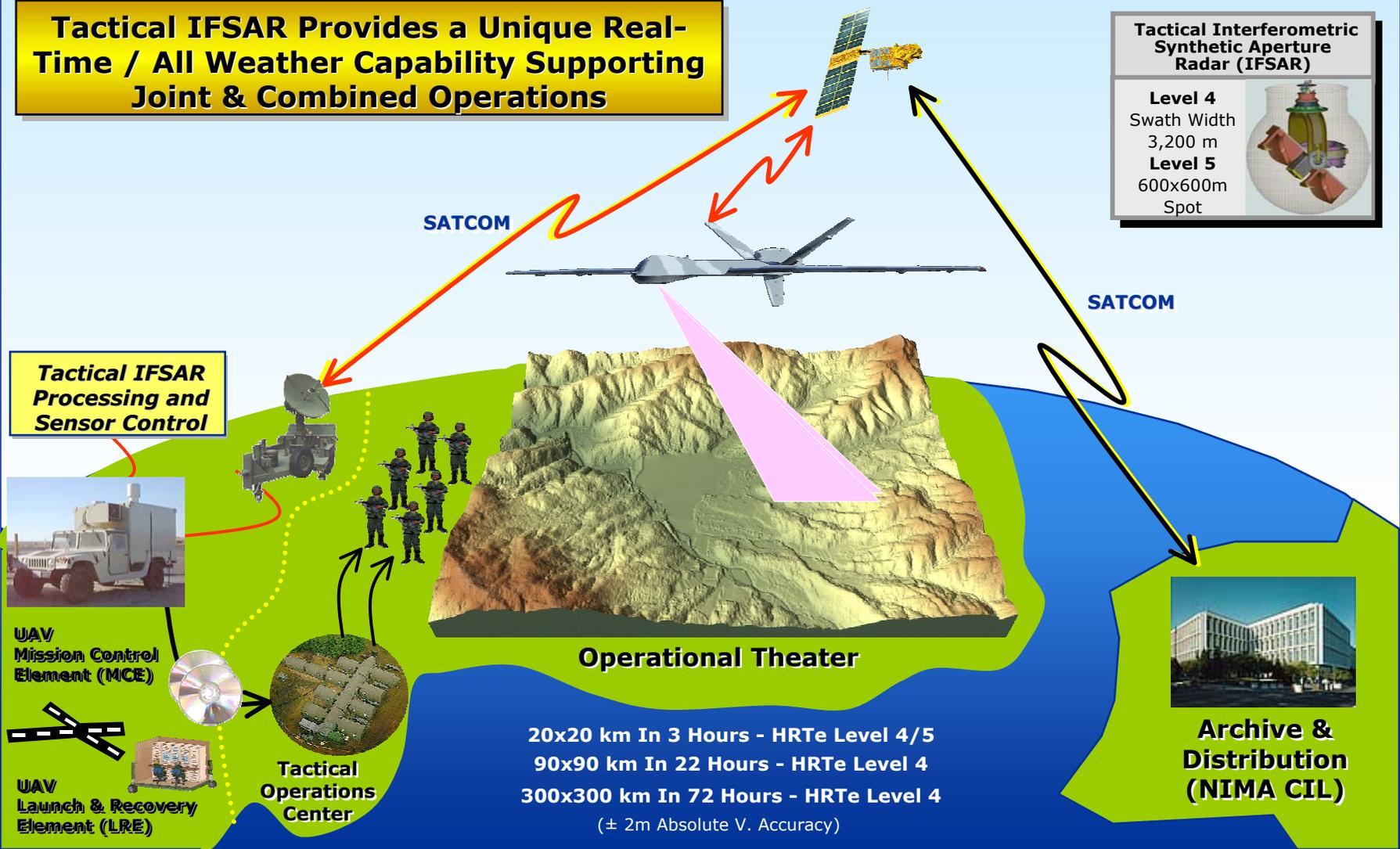
# Tactical IFSAR CONOPS



**Tactical IFSAR Provides a Unique Real-Time / All Weather Capability Supporting Joint & Combined Operations**

**Tactical Interferometric Synthetic Aperture Radar (IFSAR)**

<b>Level 4</b>	
Swath Width 3,200 m	
<b>Level 5</b>	
600x600m Spot	



**Operational Theater**

20x20 km In 3 Hours - HRTe Level 4/5  
 90x90 km In 22 Hours - HRTe Level 4  
 300x300 km In 72 Hours - HRTe Level 4  
 (± 2m Absolute V. Accuracy)



**Archive & Distribution (NIMA CIL)**

**RTV IFSAR**  
**Pope Air Force Base**



**3 meter resolution elevation**



**0.75 meter resolution ortho-image**

# Terrain Contributions to Precision Targeting



**Point and Click Coordinate**

**N 35°10' 12.98" / W 79° 1' 27.29"**

**Z = 30.2 m**

- **Supports Faster & More Accurate Targeting**
  - Allows Point and Click coordinate determination
  - Coordinates within 2-3 meters of actual
- **Supports Registration of Tactical Imagery**
  - Used to eliminate look angle and terrain induced errors
  - Provides a common foundation for the registration of all intelligence
- **Supports Precision Terrain Aided Navigation (PTAN) Weapons**
  - Alternate guidance when GPS is jammed
  - Can achieve GPS-guided accuracies
- **Results - Reduced Target Location and Weapon Delivery Error**
  - *Less Collateral Damage*
  - *Higher Probabilities of Kill*
  - *Reduced Theater Logistics*
  - *Increased Safety for Pilots*



## **JT3 Programs Will...**

- **Transition RTV Technologies to Operational Forces**
- **Support:**
  - **Improved Battlespace Visualization**
  - **Improved Mission Planning and Rehearsal**
  - **Autonomous Vehicle Navigation**
  - **Rapid and Accurate Target Location**
  - **Accurate Image Co-Registration**
  - **Precision Terrain Aided Navigation**

# **Joint Tactical Terrain Technologies (JT3)**

## **JPSD-PO**

**Rapid Terrain Visualization Program**  
**Tactical LIDAR Program**  
**Tactical IFSAR ACTD**  
**Urban Recon ACTD**



**Mike Hardaway, JT3 Technical Manager, (703) 704-2123, [mike.hardaway@nvl.army.mil](mailto:mike.hardaway@nvl.army.mil)**



# Wrap Up



Anticipated Amendment Release date: July 25, 2003

Proposal Due Date: August 04, 2003, 4:00 pm local time