

Geospatially Enabling Battle Command: the Common Ground JCTD

Presentation to
EUCOM/AFRICOM S&T CONFERENCE

10 JUN 2009

Steven A. Grant, Ph.D.
International Research Office
US Army Engineer Research and Development Center
London, United Kingdom



Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 10 JUN 2009		2. REPORT TYPE		3. DATES COVERED 00-00-2009 to 00-00-2009	
4. TITLE AND SUBTITLE Geospatially Enabling Battle Command: the Common Ground JCTD				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) US Army Engineer Research and Development Center,International Research Office,London, United Kingdom,				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES See also ADM202744. Presented at the European Command and African Command Science and Technology Conference held in Stuttgart, Germany on 8-12 Jun 2009					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 20	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Background and Objective

- The Common Ground Program began in FY09 with both Joint Concept Technical Demonstration and Coalition Warfare Program funding.
- JFCOM is the Operation Manager lead.
- The NATO Consultation, Command and Control Agency (NC3A) [The Hague, Netherlands] is the deputy OM, TM, and XM.
- Given Common Ground's partnership with performers in EUCOM's AOR, ERDC, as the Technical Manager, believed that it is appropriate to offer to brief at this and subsequent conferences.



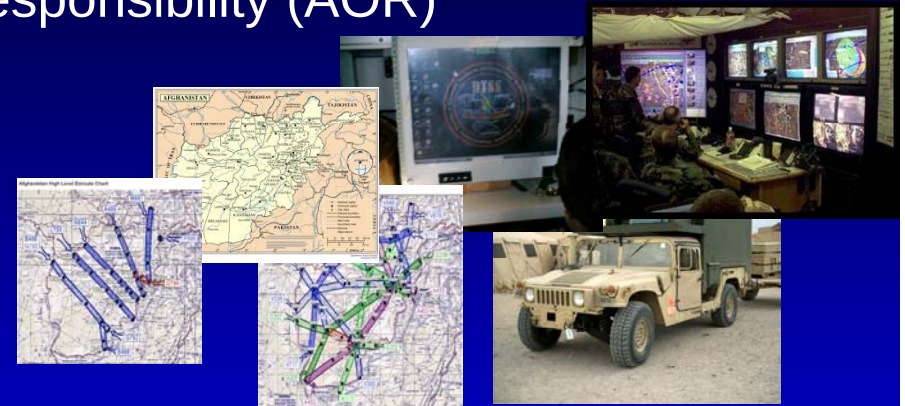
Outline

- Problem statement
- Operational objectives
- Enabling conditions
- Partners
- Current efforts in this AOR



Problem statement

- With increasing frequency, US, NATO, and Coalition nations are becoming global defense partners executing combined operations beyond the traditional North Atlantic and EUCOM Areas of Responsibility (AOR)
 - Afghanistan (ISAF)
 - Iraq (OIF)
 - Balkans (Kosovo and Bosnia)
 - Darfur
 - Mediterranean (Active Endeavor)
 - Horn of Africa
- These operations frequently result in ad-hoc, disjointed, and non-interoperable command and control (C2), simulation, and Geospatial Information Systems (GIS), yielding suboptimal effectiveness.



Three developments may enable solutions to these problems

- The maturation of analytic and network-enabling technology from Army investments,
- The broadening use of relevant commercial technologies, and
- The increasing acceptance of DoD, international, and open standards.



Army Investments

- Battle Management Language (BML) and Geospatially enabled BML (geoBML)
- Engineered Knowledge
- Tactical Spatial Objects (TSO)



Battle Management Language

- The unambiguous language used to command and control forces and equipment conducting military operations and to provide for situational awareness and a shared, common operational picture.



geoBML

- GeoBML extends BML into the geospatial domain to fulfill the need of moving from raw terrain data to information through recognition of potentially useful data products. The GeoBML concept was formulated as a means of harnessing the analytical power of Geographic Information Systems (GIS) and presenting this information to the Warfighter in terms that he can more easily apply to the battle-command process.



Tactical Spatial Objects

- Analytical geospatial objects extracted from terrain-feature data described in tactical terms of military aspects of terrain that directly supports the planning and execution of tactical military operations. TSOs are meant to be linked to military operational tasks taking into account the effects of terrain and weather thus turning raw data into knowledge about the battlefield. They are defined by subject matter experts (SMEs) in the operational domain and are grounded in military doctrine.



Engineered Knowledge

- Engineered Knowledge is the representation and organization of knowledge supporting Command and Control. The fundamental data and information that is used in Engineered Knowledge is readily available in manuals, doctrinal texts, training material and a multitude of other sources. Engineered Knowledge systems are developed to organize, integrated, and automate this information in a readily usable fashion for Decision Support.



Commercial developments

The adoption of ESRI GIS technology as an Enterprise License Agreement (ELA) capability for both the U.S., under Commercial Joint Mapping Tool Kit (CJMTK), and NATO under its Core Geographic Services (NCGS) represents a common framework to create a Coalition-wide Geospatial Service Oriented Architecture (GSOA).



Standards

- JC3IEDM: Joint Command, Control and Consultation Information Exchange Data Model (Multilateral Interoperability Programme)
- CJMTK: Commercial Joint Mapping Toolkit (NGA)
- NCGS: NATO Core Geographic Services (NC3A)

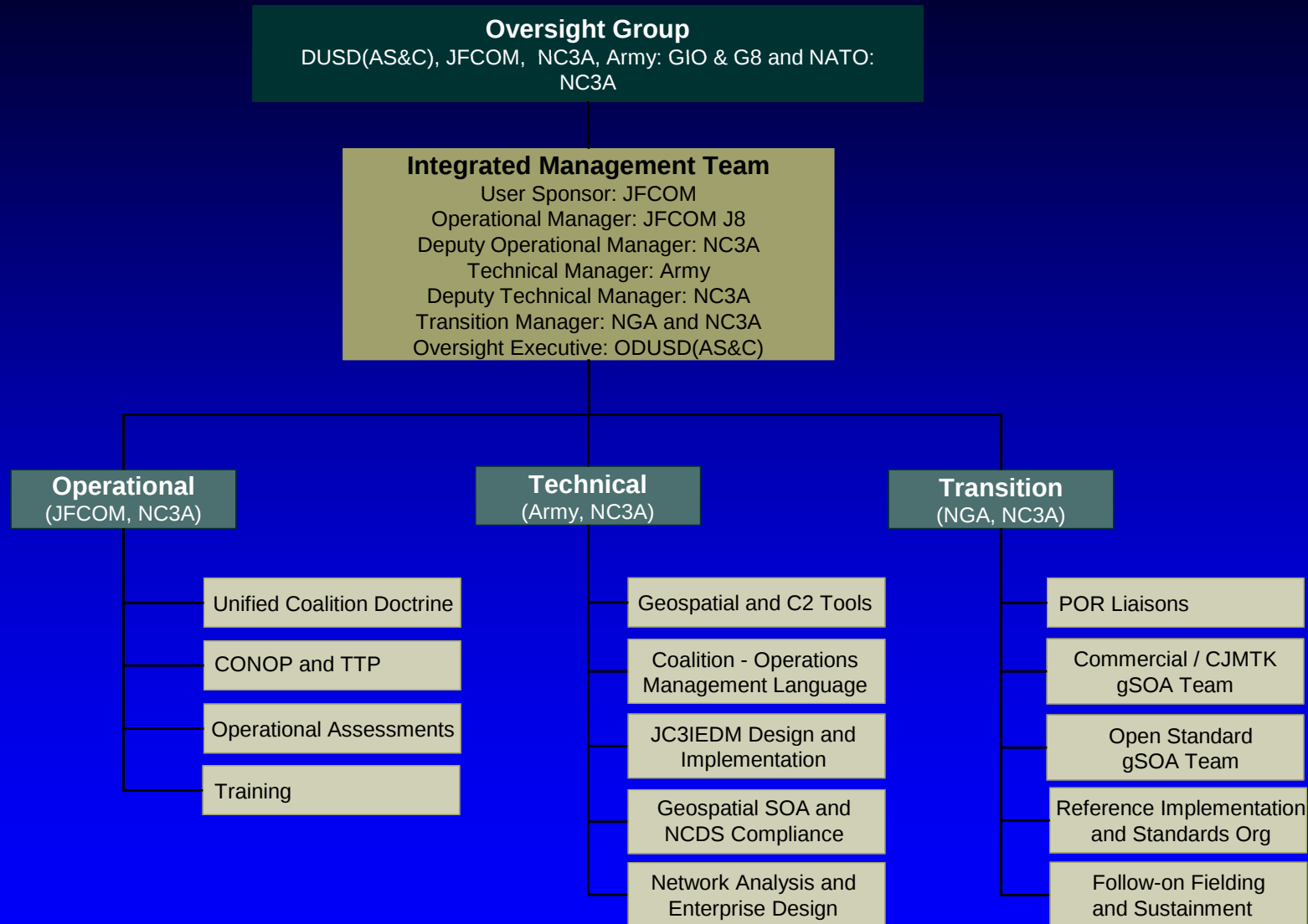


Objectives

1. Provide a common, shared, operational capability that creates actionable geospatial information and GEOINT, integrated within Battle Command (C4I) processes in support of ground combat operations
 - *Common Geospatial Tools across all domains (Provisioned: CJMTK ELA)*
2. Implement that operational capability in a manner that is easily understood and used by geospatial, C2, and intelligence operators
 - *US and NATO doctrinally founded TTPs and common information content*
 - *Cross domain effortGeospatial and Battle Command*
3. Provide the capability to Service, Joint and NATO forces in a framework optimizing adoption, accessibility, and interoperability.
 - *Architectural approach based upon standards (e.g., JC3IEDM and C2Core)*
4. Provide these services in a cost-efficient and sustainable manner.
 - *Enterprise License Agreement License and Maintenance*
 - *Open, internationally accepted standards*



Partners and Roles



Functionality requirements

- Joint:
 - JFCOM (J8) Determining COCOM JC2 Requirements
- Army:
 - Future Combat System Operational Requirements;
 - Distributed Common Ground System-Army (DCGS-A)
- NGA:
 - Commercial Joint Mapping Toolkit (CJMTK) Requirements
- NATO:
 - NATO Core Geographic Services Requirements



Concept of Operations

- Multi-national ground force, to include at least one US Brigade, under NATO control and two National forces supported by their individual C4I and geospatial systems.
- All C2 systems will have C4I-geospatial decision tools and analytic software services to support plan development, 2) the architectural components, a geo-extended JC3IEDM and OML that allows discovery of mission and task relevant C2 and actionable geospatial information products.
- Plans developed using geospatial information will be sent via the JC3IEDM to the simulation systems supporting the US and Nations.



Common Ground Architectural Foundation

- Based upon military, international, and COTS standards
 - US Army Data Model – Geospatial (ADM-(G))
 - NGA's NSG Feature Data Dictionary (NFDD)
 - Open Geospatial Consortium (e.g. GML, WFS, WMS)
 - ESRI geo-database
 -
 - Joint C3 Information Exchange Data Model (JC3IEDM) / STANAG 5525
 - UCORE and C2CORE data information exchange standards (US)
 - US JC3IEDM C2 Interoperability Group / Software Developers Kit (US)
 -
 - Network Centric Enterprise Services (Joint-Service) and DoD 8320.2
 - NATO Network Enterprise Capability (NNEC)
 - Army Enterprise Service Oriented Architecture Foundation (SOAF-A)
 -
- Geospatial SOA components for C4I
 - Common, shared Enterprise geospatial capabilities
 - US: NGA's Commercial Joint Mapping Toolkit (CJMTK)
 - NATO: Core Geographic Services (CGS)



Transition schedule consists of three spirals

- 2QFY10, 2QFY11, and 4QFY11
- Four categories of deliverables
 - Geo-analytic tools supporting C4ISR processes,
 - Architectural components associated with the C-OML, BML, geoBML and JC3IEDM extensions,
JFCCOM J8.
 - An integrated GSOA framework consistent with Network Centric Data Strategies, Network Centric Enterprise Services, and NATO Network Enabled Capability, and
 - Release of documentation to standards organizations (e.g., Multilateral Interoperability Programme and Open Geospatial Consortium)



Current issues in this AOR

- Agreements to permit collaboration
 - NC3A and its precursor organizations have been in existence for 50 years, yet the first MOA between the Army (SMDC) and NC3A was signed two weeks ago.
 - Fortunately, Common Ground technologies may be covered under a renegotiated geospatial MOU between DOD and NATO, which will be renegotiated shortly to allow for the exchange of geospatial technologies in NATO mission areas.
- Effort to make NATO generally aware of the potential value added by the Common Ground program as a means to speed and broaden the adoption of these technologies.
- Collaborate with (or initiate) appropriate NATO Research and Technical Organization working groups to facilitate technology transfer.
 - In particular, the Common Ground team is working closely with the NATO RTA Modeling and Simulation Group 048, entitled “Coalition Battle Management Language”



Conclusion

C2 and Geospatial Interoperability with coalition partners has been a longstanding problem. It is hoped that recent technological and commercial developments, coupled with coalition-based management for the life of the project could yield a rapid and durable way forward to resolving these issues.

