Military Data

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Military Data

- Military Data as an estimate of the national state
- Military Operations (Offensive, Defensive, and Stability operations)
- Creating and executing operations at higher command levels
- Creating and executing operations at lower command levels
- The problem: time and space considerations by echelon
- The general approach for relating quality, utility and value:
  - Measure and predict performance and hence quality
  - Understand value as preference over value
  - Infer utility such that we may automatically emulate the information management decisions for intelligence collection and dissemination

- The Flowing Valued Information (FVI) project
  - “Understand” command intent
  - Value information as it contributes to meeting command intent
  - Flow information among network nodes to increase the value of information available for decision-making
Military Data as an Estimate of the National State

• The DIME on PMESII estimation problem
• DIME actions:
  – Diplomatic
  – Information
  – Military
  – Economic
• Affect the PMESII state:
  – Political
  – Military
  – Economic
  – Social
  – Infrastructure
  – Information
Creating and executing operations at higher command levels

Military Decision-Making Process (MDMP)
Creating and executing operations at lower command levels

1. Receive the mission.
2. Issue a warning order.
3. Make a tentative plan.
4. Initiate movement.
5. Reconnoiter.
6. Complete the plan.
7. Issue the complete order.
8. Supervise.

Figure 2-1. TOOLS OF THE TACTICIAN RELATIONSHIP

Relationship of Troop Leading Procedures (TLP) and Tools of the Tactician
The Problem: Time and space considerations by echelon*

<table>
<thead>
<tr>
<th>Time/Space</th>
<th>Planning</th>
<th>Execution</th>
<th>Re-planning</th>
<th>Time Horizon</th>
<th>Area of Operations</th>
<th>Area of Interest</th>
</tr>
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<tbody>
<tr>
<td>Army</td>
<td>Years/months</td>
<td>Months/weeks</td>
<td>Weeks</td>
<td>Weeks</td>
<td>National</td>
<td>Multi-national</td>
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<td>Corps</td>
<td>Months/weeks</td>
<td>Weeks</td>
<td>Week</td>
<td>Week</td>
<td>Nation/province</td>
<td>National</td>
</tr>
<tr>
<td>Division</td>
<td>Weeks</td>
<td>Week/ days</td>
<td>Days</td>
<td>Days</td>
<td>Province</td>
<td>Multi-provincial</td>
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<td>Days</td>
<td>Day</td>
<td>Day</td>
<td>Province/district</td>
<td>Provincial</td>
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<tr>
<td>Battalion</td>
<td>Day/hours</td>
<td>Day</td>
<td>Hours</td>
<td>Hours</td>
<td>District</td>
<td>Multiple districts</td>
</tr>
<tr>
<td>Company</td>
<td>Hours</td>
<td>Hours</td>
<td>Hour</td>
<td>Hour</td>
<td>Village</td>
<td>District</td>
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<tr>
<td>Platoon</td>
<td>Hour/minutes</td>
<td>Hour/minutes</td>
<td>Minutes</td>
<td>Minutes</td>
<td>Village/hamlet</td>
<td>Multiple villages</td>
</tr>
<tr>
<td>Squad</td>
<td>Minutes</td>
<td>Minutes</td>
<td>Minutes</td>
<td>Minutes</td>
<td>Hamlet</td>
<td>Village</td>
</tr>
</tbody>
</table>

* Deliberate planning process, multiple units
The general approach for relating quality, utility and value: 

- Measure and predict performance and hence quality
- Understand value as preference over value
- Infer utility such that we may automatically emulate the information management decisions for intelligence collection and dissemination

1 Joint work with Dr. David Thornley, Imperial College of London
Flowing Valued Information

Program Objectives: The complexities envisioned for future operations include activities in physical, information and social networks. Network services are expected to be a key enabler of future operations. However, there is currently no scientific basis for net-centric or net-enabled operations. The FVI project is developing a scientific basis for valuing information at the tactical level and applying that science to demonstrate technologies for flowing information among network nodes to increase the value of information available for command decisions.

Outcome: We are investigating creation of a capability for enabling message passing based on a “need to share” declaration by a local commander as a basis for bi-directional message traffic across a security boundary. We are applying the initial formal results for information sharing to an ongoing Cognitive Radio project with the French Ministry of Defense. The FVI project will (1) “understand” tactical operations through creating a computable model of command intent (2) value information according to command intent, and (3) flow information according to command intent.

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Dr. John James
COL Kevin Huggins
Dr. Michael Miller
Dr. Ray McGowan
Dr. Clifford O. Young

Funding:
6.1 Basic Research: Army Research Office
6.2 Technology Transition: TBD
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Flowing Valued Information Research Challenges

- Discover trust relations between entities distributed in time and space when the nodes are normally not connected in a communication network. Define and use Trust as a **Quality of Information (QoI)** metric.
- Dynamically chain together trust relations to establish the provenance (a “chain of trust”) among components which are normally not connected. Estimate the operational situation as a **Utility of Information (UoI)** metric.
- Prove that the trust policies of DoD for sharing information are satisfied by a system which shares information across a security boundary. For example, prove that a solution for enabling the network to respond to a commander’s declaration of an intent to share information X with user Y and group Z for period of time T in area A complies with DoD policy for information security and information sharing. Actual movement of information between nodes is accomplished to increase the **Value of Information (VoI)** available for command decisions to meet intent.
FVI Near-Term Objective

Capabilities Shortfalls Addressed: No capability exists to provide automation support to move information bi-directionally across a security barrier in support of a commander’s declaration of a “need to share” information with coalition partners who are not normally “on the net”.

Objective: Demonstrate feasibility of providing automation support of a commander’s declaration of a “need to share” designated information with designated individuals who are not normally “on the net”.

Deliverables: A prototype implementation of a capability to provide automation support of a commander’s declaration of a “need to share” designated information with designated individuals and/or groups over a selected interval of time and selected area of operations.

- National Military Academy of Afghanistan (NMAA) cadets gather multi-media data information using Android smart phones during inter-semester visits to Provincial Reconstruction Teams (PRTs)
- Data transferred to NMAA net from Android phones and to Mentor net at NMAA
- Transformation engine at NMAA provides interface to Internet for executing command information policies
- Transformation engine at USMA provides interface to USMA NIPRNET for command policies
- Android smart phones at USMA provide similar capability
Questions?