Intelligent Information Management for the Battlefield

S&T Campaign: Information Sciences
System Intelligence and Intelligent Systems

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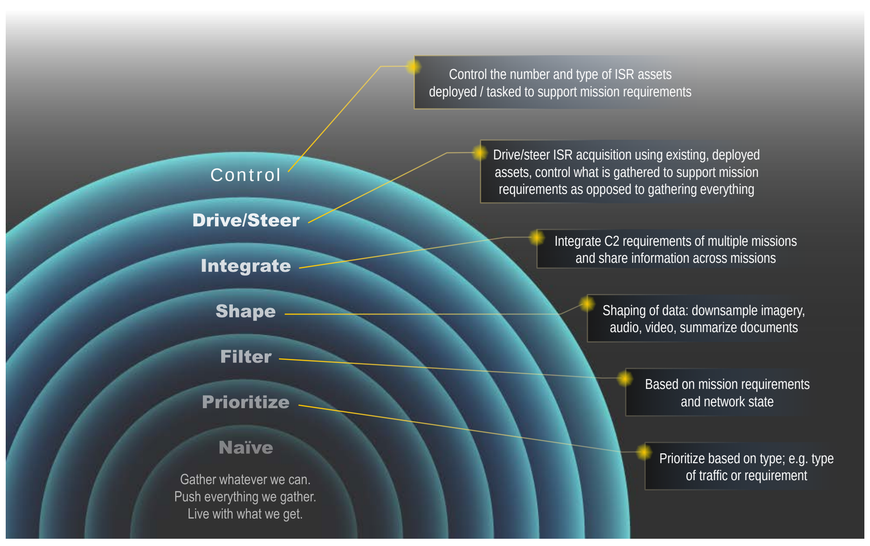
Research Objective

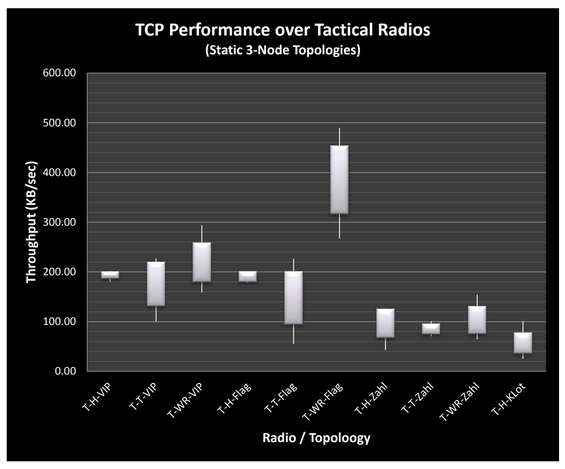
- Optimizing the information collection, processing, and dissemination workflow
- Modeling the context and information needs of disparate operators – dismounted soldiers, analysts, robots/agents
- Prioritizing information based on value to mission and consumer
- Adapting to and compensating for the vagaries of tactical network communications



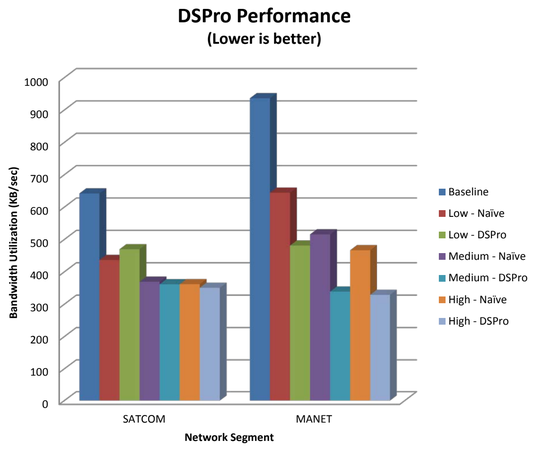
Converged Processing, Exploitation, and Dissemination Workflow

Challenges

- Modeling mission and commander's intent and inferring a consumer's context, which drive information needs and temporal constraints
- Determining value of unstructured information
- Determining and conveying information provenance to consumers
- Enabling consumers to determine confidence in information
- Operating at the tactical edge, which is an unstable, resource limited (power, computation, storage) environment with Disconnected, Intermittent, and Limited (DIL) Networks
- Integrating stove-piped systems and processes, which make it difficult to control / optimize across boundaries



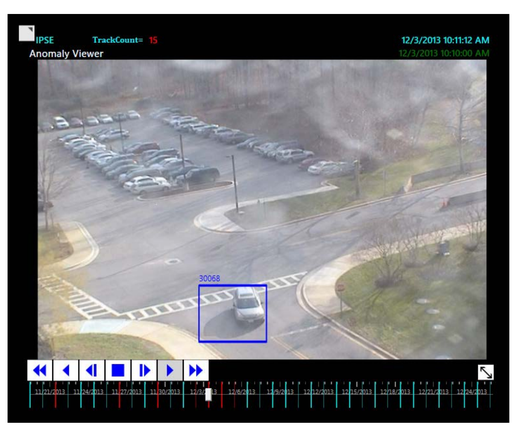
Observed Variability in Performance of Tactical Radios

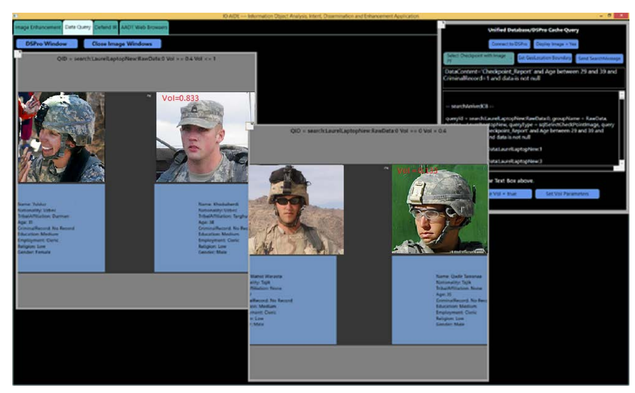


Performance Gains from Using VoI-based Information Dissemination

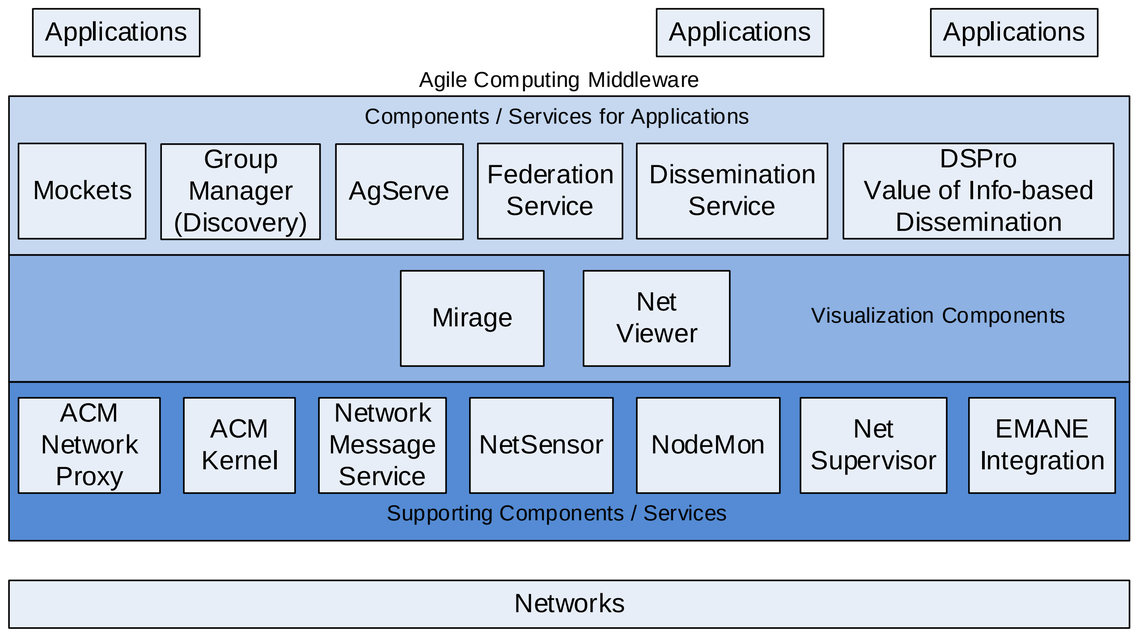
ARL Facilities and Capabilities Available to Support Collaborative Research

- Campus Sensor Network Testbed with live data feeds from a variety of sensors
- Emulated Experimentation Environment with large scale military-realistic scenarios
- IO-AIDE – An Information Management Framework for C2 Data Analysis





- Comprehensive Agile Computing Middleware Suite with many Open Source Components



Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Novel algorithms for determining information value
- Methods for experimentation with analysis algorithms and protocols
- Interfaces for information presentation
- Analyst participants for user studies on Value of Information (VoI)-enabled software
- Vignette designs for experiment scenarios
- Sensor datasets + ground truth information