



U.S. ARMY
RDECOM

Sensor, Data and Information Processing,
and Fusion for Situational Understanding

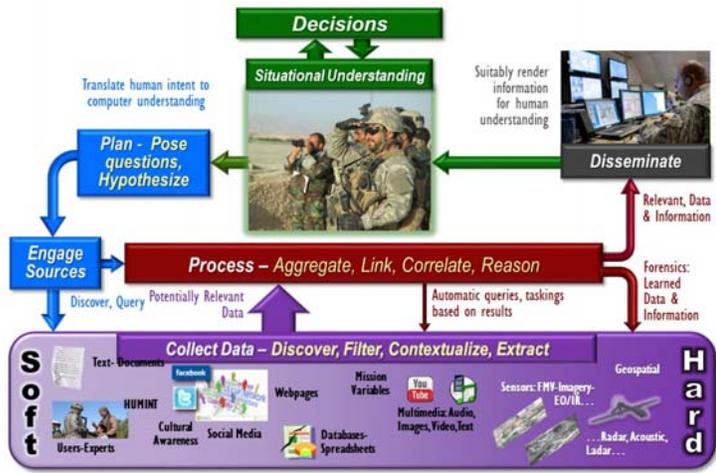


S&T Campaign: Information Sciences
Sensing and Effecting

Tien Pham, (301) 394-4282
tien.pham1.civ@mail.mil

Research Objective

- Perform basic and applied research with a holistic view to sensor, data, information processing and fusion for linking the physical sensors and data/information sources to users at the tactical edge.
- Focus research on relevant aspects such as distributed, disparate & multi-modal, dynamic, end-to-end information flow, constrained environment



Data & Information Collection Process for Situational Understanding

ARL Facilities & Capabilities Available to Support Collaborative Research

- Sensor Information Testbed for COLlaborative Research Enterprise (SITCORE)
- Access Open Standards for Unattended Sensors (OSUS) – networked sensing sensor integration laboratory (SIL)
- Network Science Research Laboratory (NSRL)
- Access to NS CTA & ITA Experimentation Facility and Open Campus guest researchers

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Access multi-modal signature database and baseline signal processing & fusion for advanced algorithm development
- Access to fielded ISR sensor assets for testing and implementing algorithms
- Access to military SME's to develop relevant use cases and operational context for research
- Participation in networked sensing and fusion related field experiments and technology demonstrations

Challenges

- Highly dynamic, complex, coalition, constrained and contested tactical environment
- Situation understanding involving multiple interacting actors in many dimensions (military, coalition, economic, social, political, etc.)
- Rapid growth in the volume and complexity (variety, velocity and veracity) of data and information
- Downward trend in number of military personnel

This block contains several key concepts and images:

- Model Complex Adaptive Systems**: Images of soldiers and conflict zones.
- Derive User Context and Information Goals**: Images of soldiers and a map.
- Enable Situational Understanding in Complex Operations**: Images of soldiers in a field.
- Contextualize Disparate Coalition Data Sources**: Images of various data sources like 'unstructured information', 'f', 't', 'THE WORLD NEWS', and 'TERRORIST ATTACK'.
- Optimize Distributed Data Sources & Services relevant to Mission Tasks**: Images of data sources and mission-related graphics.
- Low-level & High-level Integrated Fusion**: A diagram showing the flow from 'Images', 'Video', 'Audio', 'Text', and 'Sensors' through a fusion process to 'Distributed Analytics & Visualization', which includes 'BIG DATA' and network graphs.
- Distributed Analytics & Visualization**: A network graph with nodes labeled 'female' and 'mortar'.

Fundamental research underpinnings for enabling distributed analytics and deriving situational understanding for distributed forces operating at the tactical edge