

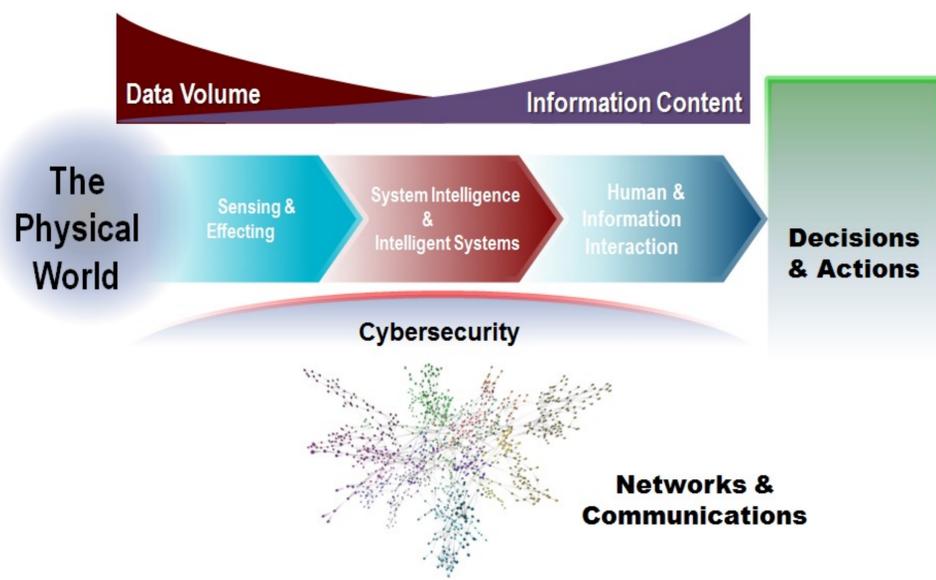


S&T Campaign: Information Sciences *Sensing and Effecting*

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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 in 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 complex block contains several interconnected diagrams and images. On the left, a section titled 'Model Complex Adaptive Systems' and 'Derive User Context and Information Goals' includes images of military operations and a 'TERRORIST ATTACK' newspaper clipping. Below this is 'Contextualize Disparate Coalition Data Sources' and 'Optimize Distributed Data Sources & Services relevant to Mission Tasks'. On the right, a section titled 'Enable Situational Understanding in Complex Operations' shows images of soldiers. At the bottom right, a 'Low-level & High-level Integrated Fusion' diagram shows data streams for 'Images multi-spectral', 'Video', 'Audio', 'Text', and 'Sensors' being processed into a networked visualization with labels like 'female' and 'mortar'. A 'Distributed Analytics & Visualization' section is also present. A yellow banner at the bottom reads: 'Fundamental research underpinnings for enabling distributed analytics and deriving situational understanding for distributed forces operating at the tactical edge'.