

At a Glance

What is it?

■ This initiative lays the scientific foundation to extend the concept of autonomy to groups of heterogeneous platforms, on and off-board sensors, databases and human insight and expertise on which they depend.

How does it work?

- This initiative expands the mathematical, logical and statistical frameworks that have led to successful platform-level autonomy to include group dynamics.
- Enlarge the domain of interest to include adversaries command, control and social and logistics networks
- Develop new techniques for autonomous reasoning, decision-making and resource allocation and scheduling by emphasizing agility and flexibility to address missions, concepts of operations and data sources

What will it accomplish?

- Meet new mission requirements by reconfiguring tools that support a command cell to meet emerging requirements, constraints and opportunities
- Increase the speed of response and reduce latency by accessing mission-relevant data from sensors, human sources and national databases through efficient protocols.
- Lower cost and decrease manpower needs through the use of information-level tasking reducing the scope of low-level data manipulation functions currently carried out by humans.

Point of Contact

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Information remains a key element of U.S. technological superiority. The communications and computing infrastructure supports information sharing and processing. The time has come to increase the sophistication of mission applications by transforming and exploiting abundant data leading to enhanced mission effectiveness.



Insurgents are highly motivated to change tactics frequently. Currently through the dedication, insight and energy of our operational forces we are able to prevail. Autonomous platforms are gaining acceptance as part of the Navy's active force structure. They provide benefits in terms of cost, capability and risk. However, our automated support systems have tended to lag behind in deployment to the fleet—often due to delays in defining formal requirements and performance metrics for development, test, evaluation and installation process.

Autonomous platform developers have overcome this barrier by blending human supervisory control with highly technical computational tools. Humans provide mission context while automated tools add capability by using advanced mathematics to solve subordinate optimization, signal processing and estimation problems. The value of this combination of expertise has been demonstrated in real urban combat operations and Intelligence, Surveillance, and Reconnaissance support for the forces on the move.

This initiative expands this concept for support of small, elite and agile organizations. It preserves the authority of command staff, but lays technical foundations to address a broad new class of problems. Targets expand from physical vehicles and structures to include the social, logistics and communication networks that tie them together. Collaboration expands to include national sources and databases, with complex information sharing policies. Automated learning keeps assumptions and models up to date as opponents' capabilities and tactics evolve. Semantic integration methods tie together platform-specific tools to achieve synergistic behavior.

Key to success in this effort is a carefully managed partnership with a JIATF-South, one of the most elite counter-terrorism organizations in the country. They provide scenarios and test data. Products of this program will be integrated into their systems after thorough operational field test and evaluation.

Research challenges and Opportunities:

- Validating models of human elements of adversaries networks
- Correlating, fusing, and analyzing data obtained from human sources such as text and speech
- Deriving networked platform-level goals from mission-oriented objectives in a robust and flexible architecture and framework
- Integrating complex tools developed into an effective, efficient enterprise