Meeting C4ISR Requirements: Implementing and Exploiting Technology Solutions

- Stephen P. Welby
  - Deputy Director, DARPA/IXO
  - +01.703.696.2323
  - swelby@darpa.mil
### Technology For C4KISR

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Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18
Some of the New Challenges

Wide Spectrum of Targets
Opponents will take advantage of delays or shortcomings in quick reaction targeting capabilities to shelter their weapon systems.

Diverse Battlefields
- Complex
- Urbanized

New Rules of Engagement
- Precise, high-confidence target identification
- Minimal inadvertent collateral damage / undesired effects
C4KISR Changes Needed

- You can’t put at risk or attack specific, ROE-restricted targets if you can’t find them
  - Novel sensors for new targets, environments, and functions
  - Sensor exploitation with precision target identification and birth-to-death tracking

- You can’t kill mobile targets by “rapid decisive actions” if your command systems are too slow
  - Dynamic command and control
  - Advanced weapon seekers, guidance and communications

- You can’t get synergy if you can’t share information
  - Integration among information systems
  - Collaboration among people and machines

We need to develop new transformational capabilities to find, precisely identify, track, attack, and \textit{kill} targets.
Vision: A Ubiquitous C4KISR Web
Vision: A C4KISR Paradigm Shift

Building a Bridge across the Technical Divide

Current Paradigms

New Paradigm

Ubiquitous multi-discipline sensor networks

Sensors for any target, any environment, any location

Sensors for precise target identification

Multi-sensor data exploitation

Continuous target localization and tracking

Dynamic planning and assessment aids

Highly automated execution monitoring and BDA

Predictive battlespace awareness

Continuous, dynamic, synchronized, networked, seamless interaction between sensors, exploiters, planners and killers to create virtual sensor to shooter links

Multiple targets

Distributed sensing

Seamless integration

Precise identification

Actionable information

Continuous assessment

Multiple confirmed kills
Some Science and Technology Goals

- **Search/Find**
  - Any target, terrain, weather
  - High Pd, low FAR

- **Plan & Control**
  - Synchronized mission plans
  - Continual update
  - Collaboration

- **Assess Global Situation**
  - Consistent picture
  - Predictions
  - Effects-based target nomination

- **Track/Watch**
  - 99.99% PID
  - Include new types and variants

- **Identify**
  - Automated target – weapon pairing and ROE evaluation

- **Decide To Engage**
  - ID from decision through strike
  - ROEs met

- **Engage Target**
  - In-flight updates
  - Low cost all weather seekers

- **Maintain ID**
  - 99.99% PID
  - Include new types and variants

- **Assess Engagement**
  - Automated confirmation of kill

- **Responsive products**
  - Fast configuration
  - Rapid technology insertion
  - Adequate communications

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Summary

- We must adapt and transform C4ISR to counter new threats
- We must put the “Kill” into C4ISR systems
- May require painful paradigm shifts
  - Networked ISR (sensors and processing)
  - Merging of C2 and ISR
- DARPA IXO thrusts include:
  - Find and attack any ground target, anytime on any battlefield
    - With precise identification complying with ROEs
  - Agile and dynamic joint operations
  - Hold dismounts at risk