



Strengthening the R&E Enterprise

17 April 2012

Al Shaffer

**Principal Deputy Assistant Secretary of Defense for
Research and Engineering**



DOD S&T Budget Alignment with the State of the Union Address 2012



“The defining issue of our time is how to keep [the] American promise alive... [To do so we] move forward... [with] an economy built on American manufacturing, American energy, skills for American workers, and a renewal of American values”

DOD is a leader in some of the top technology areas considered to have the greatest impact on the retention and future growth of manufacturing in the USA (President’s Council of Advisors 2011 Report)

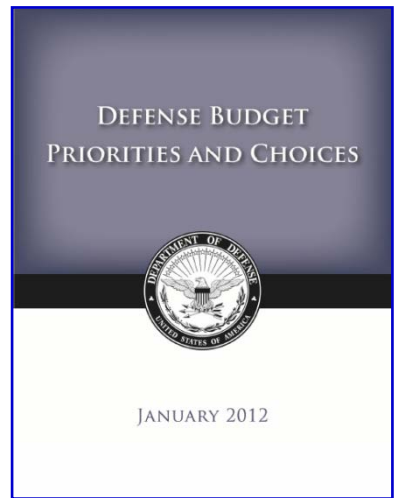
- *“To prepare for the jobs of tomorrow, our commitment to skills and education has to start earlier”*
 - DOD S&T Budget includes Advance Training Technologies and National Defense Education Program
- *“Innovation demands basic research”*
 - Basic Research funding grew slightly as compared to previous President Budgets for FY 2011 and FY 2012
- *“Nowhere is the promise of innovation greater than in American-made energy... The Department of Defense, working with us, the world’s largest consumer of energy, will make one of the largest commitments to clean energy in history – with the Navy purchasing enough capacity to power a quarter of a million homes a year.”*
 - DOD S&T Budget includes research and development for Clean Energy programs



Key Elements of Defense Strategic Guidance



- The military will be smaller and leaner, but it will be agile, flexible, ready and technologically advanced.
- Rebalance our global posture and presence to emphasize Asia-Pacific and the Middle East.
- Build innovative partnerships and strengthen key alliances and partnerships elsewhere in the world.
- Ensure that we can quickly confront and defeat aggression from any adversary – anytime, anywhere.
- Protect and prioritize key investments in technology and new capabilities, as well as our capacity to grow, adapt and mobilize as needed.





Department Strategic Guidance



Guidance

SUSTAINING U.S. GLOBAL LEADERSHIP: PRIORITIES FOR 21ST CENTURY DEFENSE

JANUARY 2012

DEFENSE BUDGET PRIORITIES AND CHOICES

JANUARY 2012

Primary Missions

- Defend the Homeland and Provide Support to Civil Authorities
- Counter Terrorism and Irregular Warfare
- Conduct Stability and Counterinsurgency Operations
- Provide a Stabilizing Presence
- Deter and Defeat Aggression
- Project Power Despite Anti-Access / Area Denial Challenges
- Counter Weapons of Mass Destruction
- Operate Effectively in Cyberspace and Space
- Conduct Humanitarian, Disaster, Relief and Other Operations
- Maintain a Safe, Secure and Effective Nuclear Deterrent

S&T Focus Areas

DoD S&T Priorities

SECDEF Guidance

Complex Threats

- Electronic Warfare / Electronic Protection
- Cyber Science and Technology
- Counter Weapons of Mass Destruction

Force Multipliers

- Engineered Resilient Systems
- Data-to-Decisions
- Human Systems
- Autonomy

- **Counter AA/AD capabilities**
- **Low-cost, agile, flexible small-footprint operations**
- **Integrated partnership capabilities**
- **Humanitarian, Disaster, Relief and Other Operations**
- **Safe, Secure and Effective Nuclear Deterrent**



The Anti-Access & Area Denial (A2AD) Challenge



- The Department sees A2AD as an expanding global challenge
- A2AD is the development of capacity by our adversaries to degrade US/Allied capabilities and prevent freedom of movement





Anti-Access/ Area Denial Current S&T Priorities



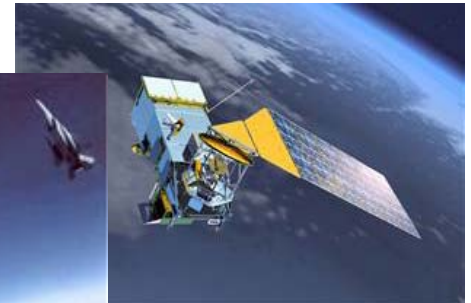
1. Electronic Attack / Electronic Protection



2. Cyber Capabilities



3. Space / Counter Space



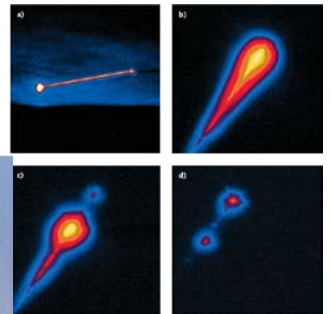
4. Counter Missile / Missile Defense



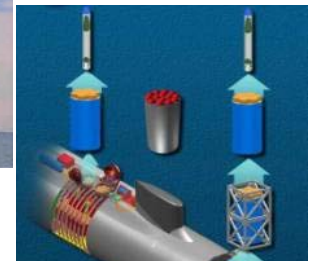
5. Surface to Surface Ship Missiles



6. Undersea Warfare



7. Hypersonic Technology





DoD S&T Priorities



Complex Threats

Electronic Warfare / Electronic Protection

Cyber Science and Technology

Counter Weapons of Mass Destruction

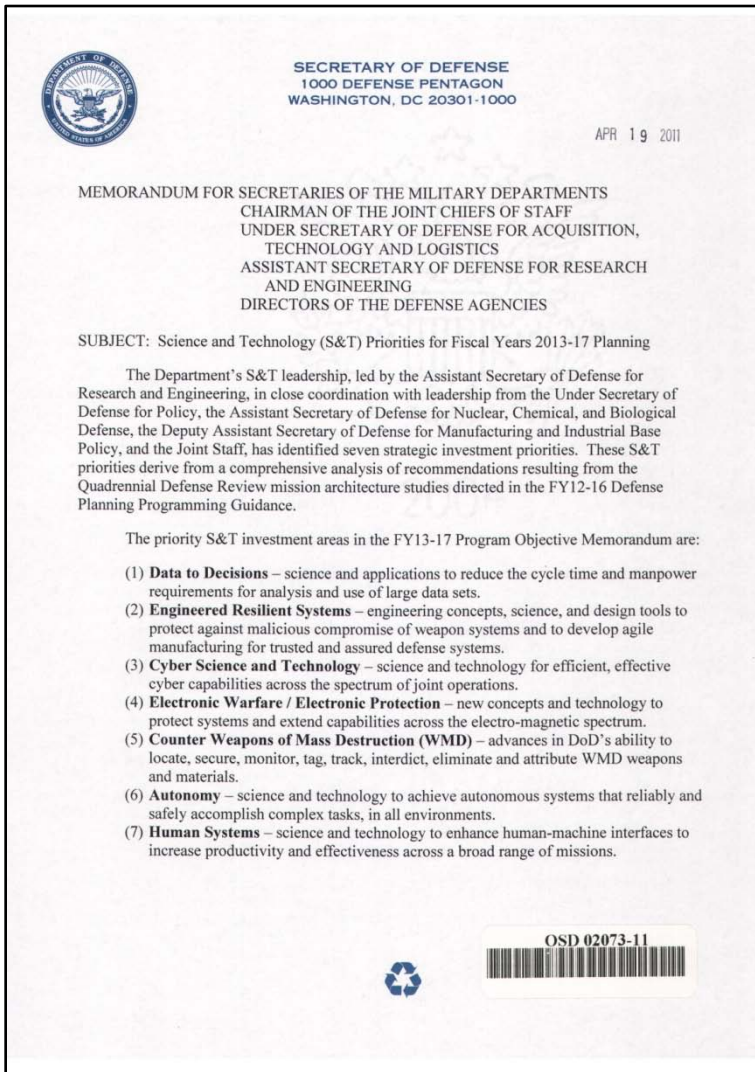
Force Multipliers

Engineered Resilient Systems

Data-to-Decisions

Human Systems

Autonomy





D2D Technology Assessment



- Moderately Mature
- Driven by IT Industry

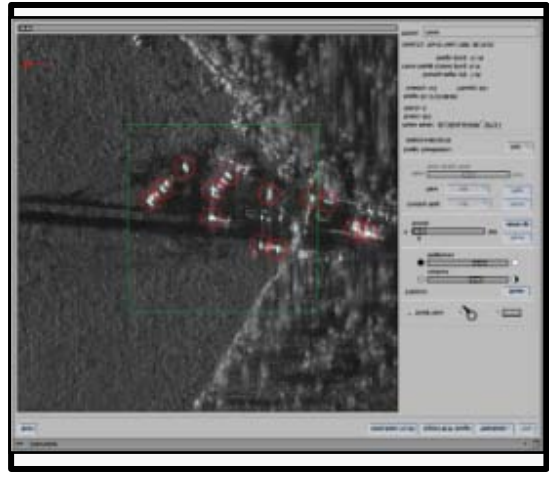
- Immature
- Driven by Defense

- Moderately Mature
- Driven by IT Industry

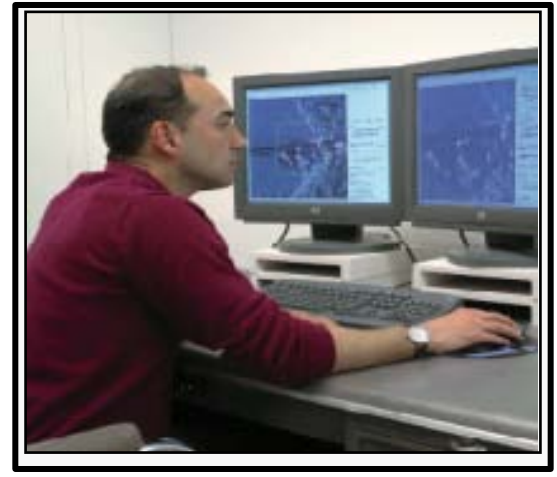
Data Management Layer



Analytics Layer



User Interface Layer



Current assessment is that unstructured data analytics is the most challenging and critical component of D2D

ASD D2D program intends to provide representative data of various types that have associated ground truth to support development and evaluation of algorithms and systems in a SOA to be made available



Cyber: Architecture for S&T Investments



Enhance United States
National Security & Economic Prosperity

Cyberspace is
the new domain
of warfare

Need for
active
defenses

Ensure the
safety of critical
infrastructure

Collective
defense

Keep the
technological
advantage

Resiliency

Agility

Mission Assurance

Foundations of Trust

Foundational
DoD S&T
Thrusts

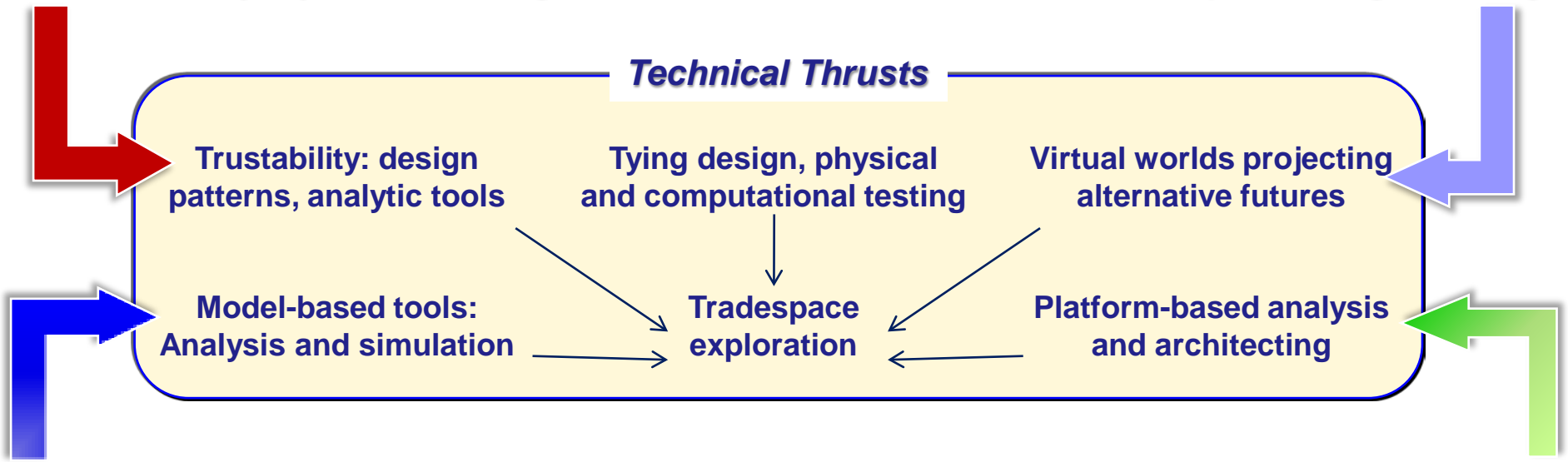


Engineered Resilient Systems Complex Systems Design



Trustworthy Systems Design

Conceptual Engineering




Model Based Engineering

Platform Based Engineering

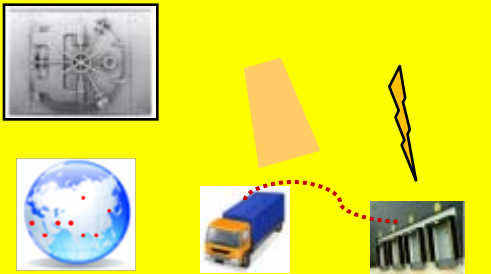




Scope of CWMD Challenge Problem



Reduce & Secure



Locate & Monitor

Track



Interdict / Defeat



Tactical Warning

Characterization \ Decision-Making



Hardening




Medical Pretreatment

Challenge Problem




Medical Treatment



Forensics \ Attribution



Consequence Management



Restoration

Systems Performance Goals

- Broad Area Search
- Persistent Monitoring
- Tagging and Tracking

Technical Challenges

- Systems Integration
- Activity Recognition
- Advanced Signature Detection & Tracking
- Advanced Radiation Detection



Human Systems Overall Scope

System Interfaces

- Strategic Decisionmaking
- Tactical Decision Support
- Autonomous vehicle control
- Cyber Operations & Trust
- Adaptive Planning



Personnel & Training

- Adaptive, tailored instruction
- Live, Virtual, Constructive simulation
- Realistic immersive training
- Train Partner State Forces



Social & Cultural Understanding

- Information sharing w/ partners
- Cultural situation awareness
- Cultural & language expertise
- Social Network Analysis
- Cultural impact of actions



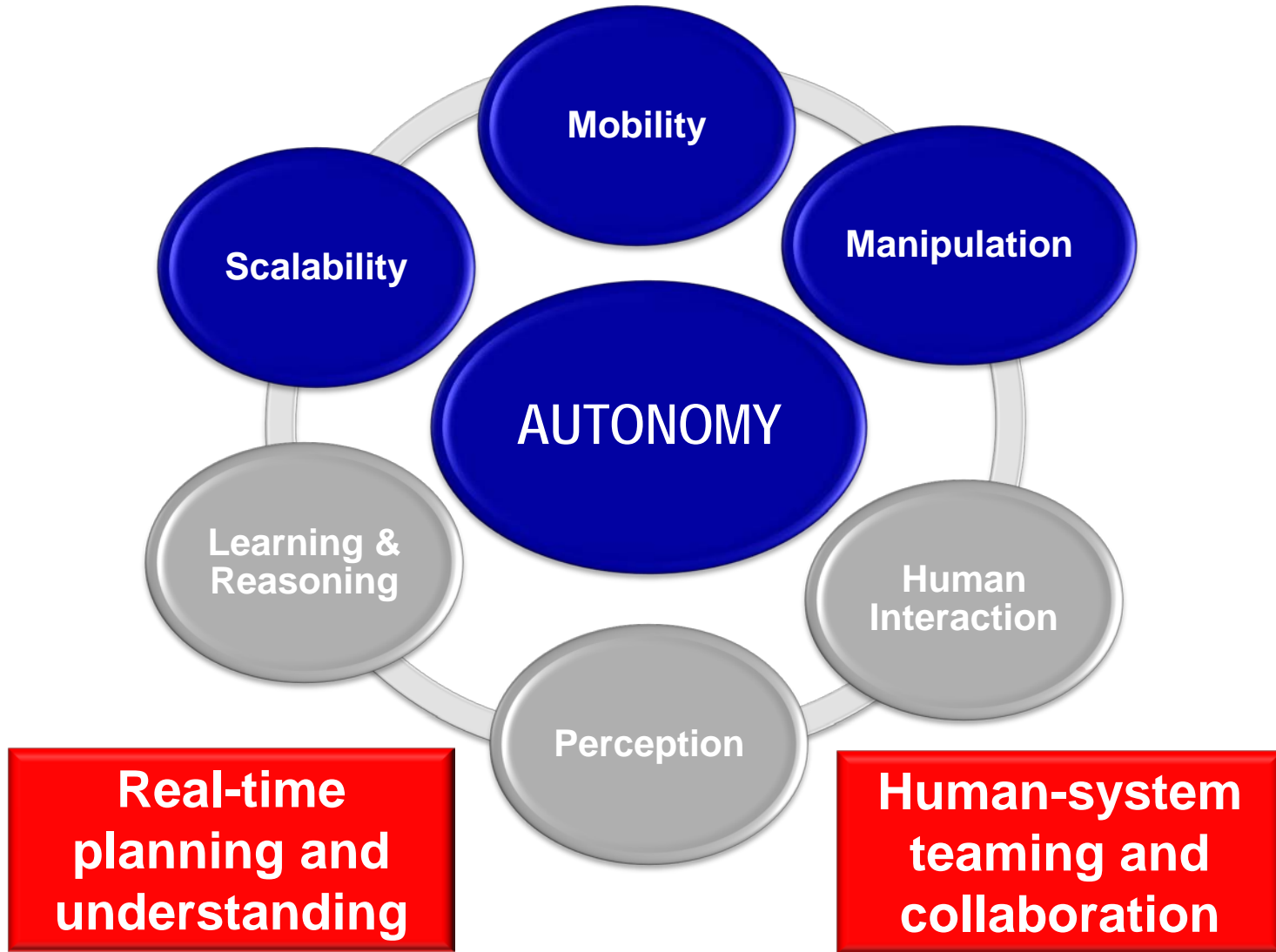
Protection & Sustainment

- Extreme environment protection
- Physical Performance Enhancement
- Autonomous augmentation
- Physical Aiding
- Extended Combat Rations



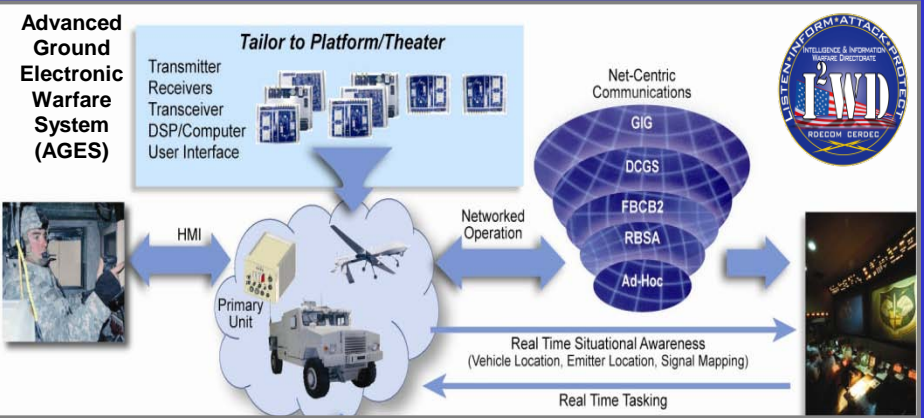
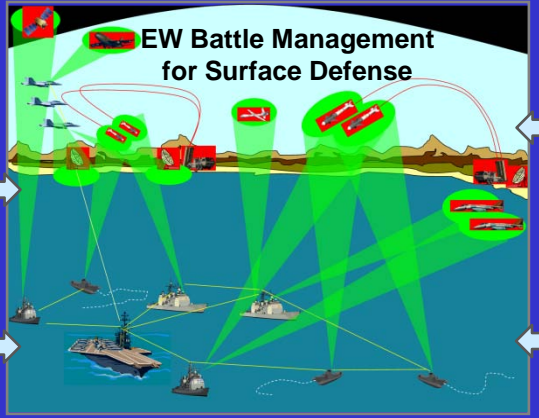


Autonomy





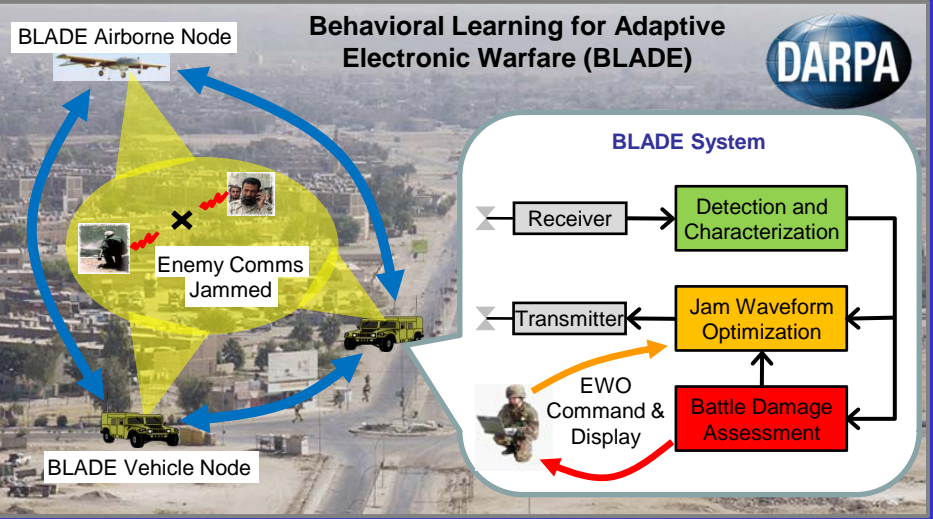
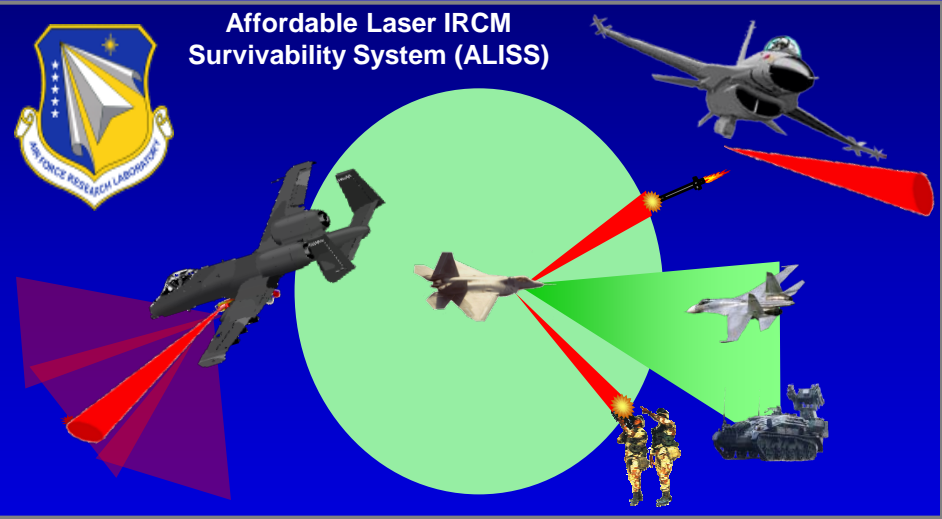
Electronic Warfare / Electronic Protection



New capabilities to dominate the electromagnetic spectrum



Affordable Laser ICRM Survivability System (ALISS)

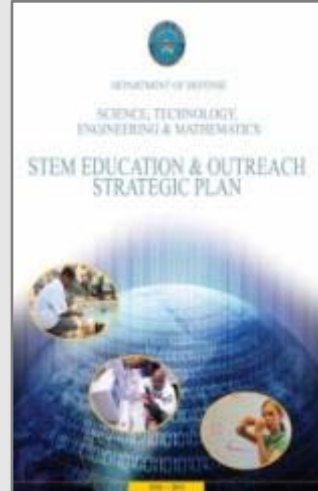




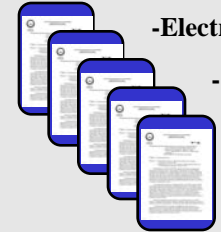
Assistant Secretary of Defense Research and Engineering Imperatives



1. Accelerate delivery of technical capabilities to win the current fight.
2. Prepare for an uncertain future.
3. Reduce the cost, acquisition time and risk of our major defense acquisition programs.
4. Develop world class science, technology, engineering, and mathematics capabilities for the DoD and the Nation.



Fast Track Studies



- Electronic Warfare
- Computer Science
- Cyber Operations
- Energy & Water
- Rapid Capability Tool Kit

Task Forces



Helo Survivability



Base Protection



Tag, Track, Locate



C-IED SIG Support



QDR Missions Architectures



DEFENSE INNOVATION MARKETPLACE



And Other DoD Agencies

- HOME
- INDUSTRY RESOURCES
- FAQs
- NEWS
- ABOUT IR&D
- CONTACT US



Connecting Industry with Government Customers

The Defense Innovation Marketplace is a centralized online platform that gives the defense industrial base the opportunity to securely showcase their Independent Research & Development (IR&D) projects to more Department of Defense customers than previously possible.

The Marketplace provides opportunities for customers to connect with industry and discover their innovative technology projects that can be leveraged for current and future Defense programs.

CONNECT to the key Science & Technology organizations within the Department by clicking on the logos above.

COMPLY with the new Defense Federal Acquisition Regulation Supplement (DFARS) Rule.



Government Users

Find Details about Industry's Innovation Projects [here](#)



Industry Users

Market Your Innovation to DoD Customers [here](#)



Industry Resources

Find useful Department information [here](#)



Summary



- **Defense S&T is supported even with budget challenges facing DoD**
- **DoD S&T reorienting to face tomorrows challenges**
 - Anti Access/ Area Denial
 - Priority S&T areas
- **Industry is large part of the picture**