



RELIANCE 21

Operating Principles

*Bringing Together the DoD
Science and Technology Enterprise*

JANUARY 2014



Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE JAN 2014		2. REPORT TYPE		3. DATES COVERED 00-00-2014 to 00-00-2014	
4. TITLE AND SUBTITLE Reliance 21			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ASDR&E, Washington, DC, 20301			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 23	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



What is Reliance 21?

Reliance 21 is the overarching framework of the Department of Defense's (DoD) Science and Technology (S&T) joint planning and coordination process. The goal of Reliance 21 is to ensure that the DoD S&T community provides solutions and advice to the Department's senior-level decision makers, warfighters, Congress, and other stakeholders in the most effective and efficient manner possible. This is achieved through an ecosystem and infrastructure that enables information sharing, alignment of effort, coordination of priorities, and support for scientists and engineers across the Department.

Reliance 21 has roots that go back several decades, and has been continually renewed and refreshed to ensure relevance as circumstances have evolved. This emphasis on coordinated research planning is a key strength of DoD's S&T Enterprise.

The strength of Reliance 21 is demonstrated in the cross-cutting collaborative teams that provide strategic and technical leadership of the S&T workforce.

There are three principal reasons that the Department engages in S&T:

- 1) *Mitigate existing or emerging threats*
- 2) *Generate affordability in the systems the Department acquires and operates*
- 3) *Develop technology based surprise for our adversaries*

Reliance 21 is the construct to balance and ensure a coordinated response to address these three areas.

Why do we need Reliance 21?

In this challenging budgetary environment, the Department's S&T leadership is further strengthening coordination and efficiency through a streamlined Reliance 21 framework to ensure the utmost value from investments in science and technology.

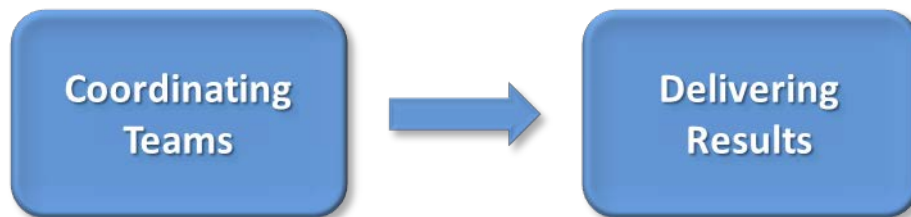
Reliance 21 ensures a collective understanding of the priorities, requirements, and opportunities of the DoD organizations that manage critical S&T resources. It is effective in continuously improving support to the warfighter, by propagating and coordinating an understanding of military capability gaps and defense needs throughout the S&T community. DoD S&T communities use Reliance 21 to coordinate and align S&T efforts against capability gaps, and jointly communicate their responses, exploiting synergies and potentially developing new opportunities.

Purpose of this document

This document describes how the S&T leadership plans to coordinate, collaborate, and communicate strategic goals, objectives, and requirements across the Department. It will also define the technical framework and explain the expected output and outcome for all participants. This document provides the DoD S&T workforce with a basic understanding of where their work fits in to the overall Enterprise, and to build awareness of the processes and tools available to them to foster collaboration with their peers. This document also informs warfighters about how and when to connect with the S&T communities to ensure that their needs are being addressed. Finally, it will serve to improve the understanding of DoD S&T processes for external partners and stakeholders.

This is a living document that will be periodically updated to remain aligned with the Department's S&T strategy, policy and priorities.

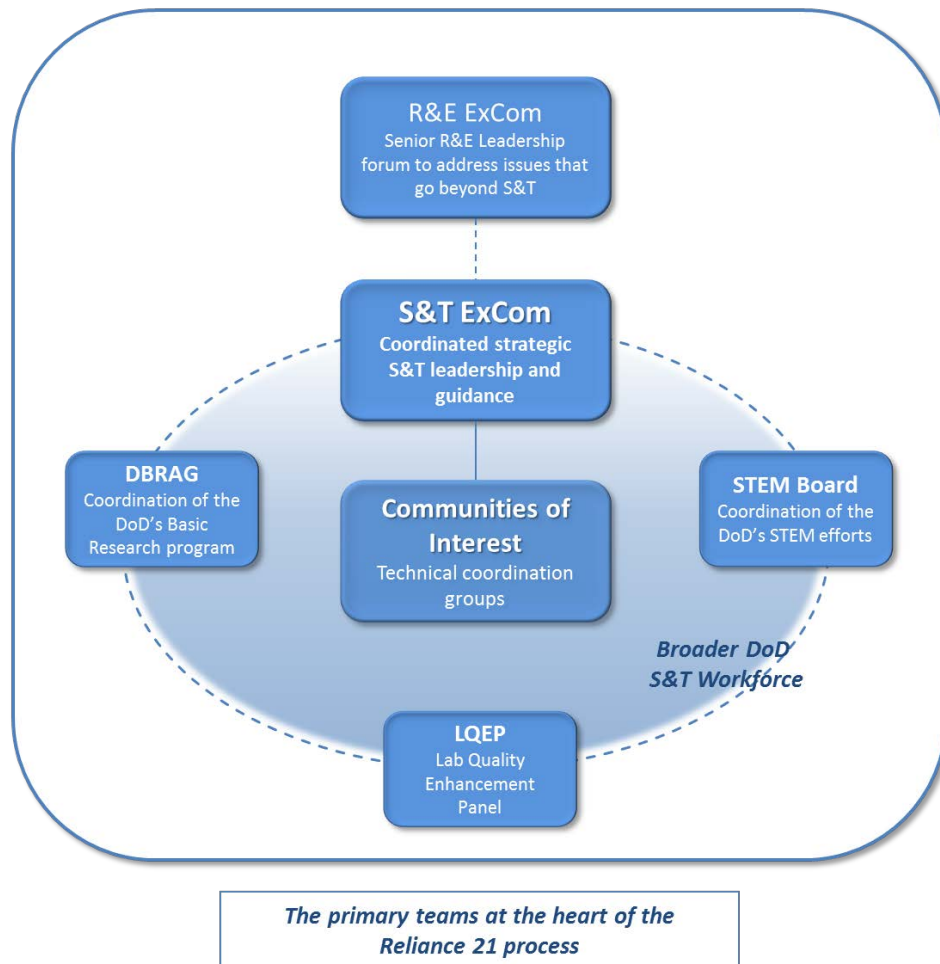
The first section of the document describes the various groups that form the ecosystem of Reliance 21, how they work and what they will achieve. The primary elements are the **S&T Executive Committee (ExCom)**, that provides leadership for the whole S&T enterprise and the **Communities of Interest (COIs)** - the engines that deliver results.



The second part of the document describes the events during the year that drive the key outputs of the Reliance 21 process. The first event is the **S&T Strategic Overview** meeting where the S&T leadership meets to discuss their organizations' priorities, portfolio content, and strategic direction. The other major activities are the **COI Portfolio Reviews** where capability and technical goals are presented and recommendations for the next planning cycle are derived.

Additional details of the process and participants are given in the Annexes to the main document, including the Knowledge Management Infrastructure that supports them.

Coordinating Teams in Reliance 21



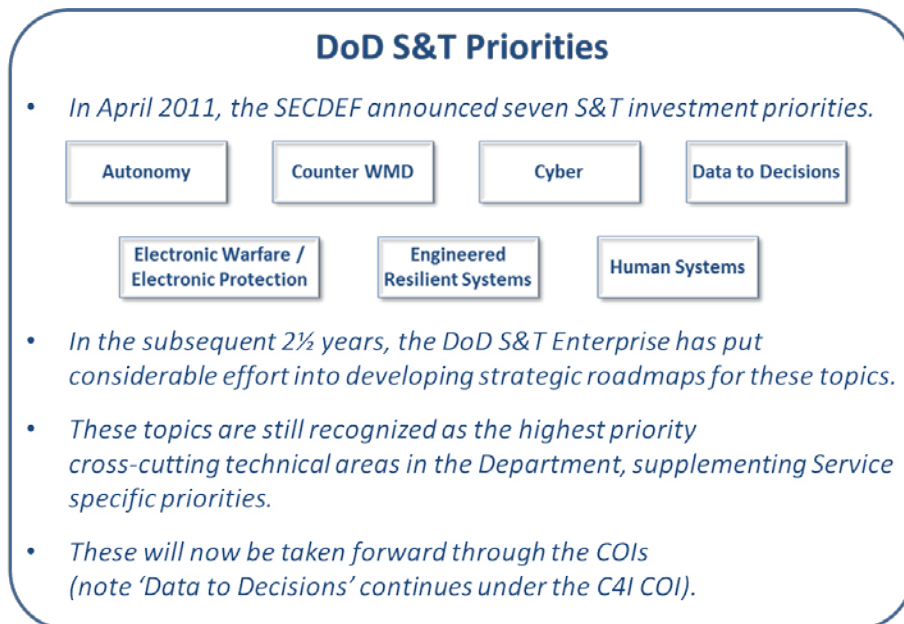
Reliance 21 Operating Principles

Each COI has a Charter endorsed by the S&T Execs, confirming the responsibility of the COI Lead and the Steering Group and their commitment of time and resources.

COI Steering Group. The COI Steering Group is responsible for developing strategic roadmaps for the scope of S&T activities within the COI, with concrete and measurable goals. Members should represent their Service position in terms of budgeting, planning, and programming S&T investments, and provide timely feedback to their respective Service S&T Executive on funding allocation recommendations.

The Steering Group members should articulate how their Service S&T POM submissions address Combatant Command (COCOM) needs, capability gaps, and S&T needs identified by the COI and provide rationale for any shortfalls in funding needed to support capability gaps.

COI Technical Sub-Groups. The COI Steering Group determines the appropriate framework of technical sub-groups to support COI activities and objectives, and capture and report COI related investment information. The Steering Group also identifies subject matter experts, as appropriate, with the necessary breadth and depth of expertise to participate in the technical sub-groups and coordinate activities in that sub-area. These experts are expected to facilitate coordination and information sharing within the COI and across the S&T enterprise, and will identify any additional experts needed for specific COI thrust areas or specific technical activities.



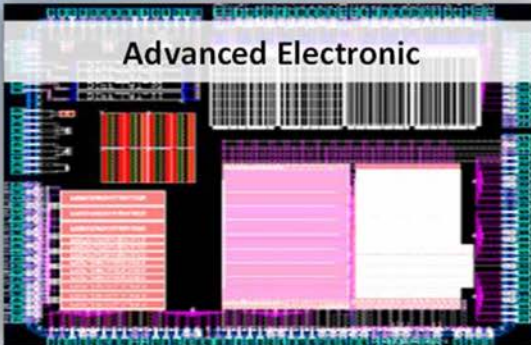
COI Successes

Air Platforms



- Identified a gap in certification of composite aircraft structures, spurring research investment at AFRL and NASA to accelerate certification of bonded composites

Advanced Electronic



- Delivered a report to Congress including a detailed overview of the Department's investment and future strategy for electronics

ASBREM



- Awarded a DoD-sponsored Small Business Technology Transfer (STTR) contract to develop a powered prosthetic device for lower limb amputees called, the Powerfoot. (Now called the BiOM) To date, approximately 500 BiOM have been acquired by the DoD and the VA

Autonomy



- Established the Autonomy Research Pilot Initiative and awarded seven programs totaling \$45M over three years for DoD Labs to mature autonomy technologies

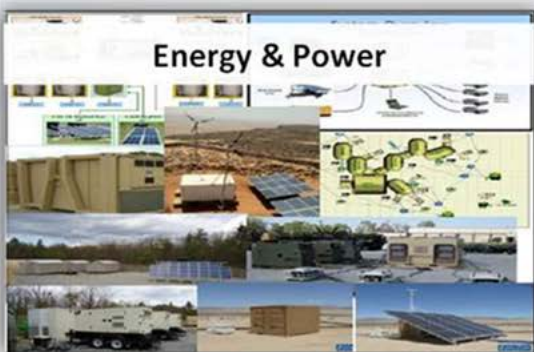
COI Successes



- Collaborated with MIT / Lincoln Labs to deploy new “moving target” cyber defenses to PACOM Terminal Fury exercises



- Launched a major analysis of future game-changing, advanced components for EW (program known as ACE)



- Collaboratively developing scalable hybrid energy storage modules with the Advanced Research Projects Agency (Energy)

Delivering Results Through Reliance 21

S&T Strategic Overview

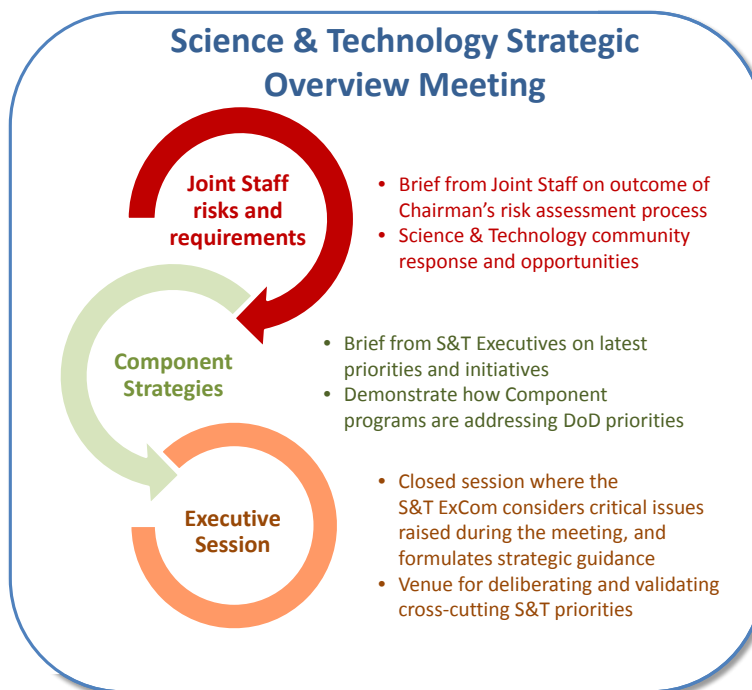
The S&T Strategic Overview is an annual two day event, during which the S&T ExCom shares information on programs and priorities and discusses the Department's S&T budget request and out-year investments.

It is a central element of the Department's process for ensuring S&T alignment with corporate directions and priorities. This meeting fosters awareness and joint planning among senior S&T leadership, contributing significantly to the effectiveness and efficiency of DoD's S&T investment.

The S&T ExCom uses the Strategic Overview discussion to identify critical capability gaps and cross-cutting opportunities for further assessment, which may influence POM planning and investment strategies in each Component. This activity is conducted in close coordination with the future requirements specialists of the Joint Staff, including a review of the outcomes from the Chairman's Capability Gap and Risk Assessment.

This is a senior Department level meeting with representation from a wide range of DoD S&T organizations and invited participants from across Government. The meeting attendees benefit from hearing about the Department's priorities and initiatives first hand, and the ability to interact with senior leadership.

The Strategic Overview Meeting is held in the second quarter of each fiscal year, in conjunction with the release of the President's Budget Request (PBR) for the upcoming financial year. This enables the Components to share detailed information on their planned programs. The coordination and review of S&T priorities also informs the work in each Component developing the S&T Program Objective Memorandum (POM) for the subsequent year. Later in the planning cycle, following resolution of POM decisions, the S&T Executives will brief major changes to their programs and strategies to ASD(R&E) and each other.



Annex: Summary of topics / scope of COIs

- **Advanced Electronics:**

Electronics technologies that are key enablers for:

- Radio Frequency (RF) Components for sensing, transmission, communication;
- Electro-optics: infrared (EO/IR) sensing, transmission, communication, display components
- Nanoelectronics & Microelectronics: mixed signal, digital processing, emerging architectures ;
- Electronics Integration: packaging, reliability
- Electronic Materials

- **Air Platforms:**

- Fixed Wing Vehicles
- Rotary Wing Vehicles/Future Vertical Lift
- Gas Turbine Engines
- High-Speed/Hypersonics
- Aircraft Power and Thermal Management
- Unmanned Aircraft Systems (UAS)

- **Autonomy:**

The COI addresses four technical challenges:

- Human/Autonomous System Interaction and Collaboration
- Scalable teaming of Autonomous Systems
- Machine Perception, Reasoning and Intelligence
- Test, Evaluation, Validation, and Verification

- **Biomedical (ASBREM: Armed Services Biomedical Research Evaluation and Management):**

- Biomedical Informatics, Computational Biology, Simulation & Training
- Health Information Systems & Technology
- Combat Casualty Care
- Military Infectious Diseases & Biological Countermeasures
- Environmental Toxicology & Chemical Countermeasures
- Medical Radiological Defense
- Military Operational Medicine
- Clinical & Rehabilitative Medicine

- **Command, Control, Comms, Computers, and Intelligence (C4I):**

Thrust areas include:

- HCI for Decision Making
- Synthesis / Analytics / Decision Tools
- Information Collection / Management
- Advanced Computing / SW Development
- Networks and Communications

- **Counter IED:**

The C-IED COI will develop a blended and efficient approach to support the objective of defeating IEDs and their threat to national security objectives.

- **Counter Weapons of Mass Destruction (WMD):**

The CWMD COI is focused on:

- Enhancing C-WMD capabilities under combined threats, by assessing various combinations of threats and developing new capabilities, or enhancing existing capabilities, to respond to these scenarios.
- Expand the use of current and planned capabilities to address non-proliferation efforts. For example deploying data analytical models across various WMD scenarios; expanding countering mechanisms to CB threats.
- Predicting possible new threats and developing new capabilities to respond to these threats.

- **Cyber Security:**

Thrust areas include:

- Cyber Maneuver
- Cyber Situational Awareness
- Recovery & Reconstitution
- Science of Cyber Security
- Secure Mobility
- Security of Embedded & Weapons Systems

- **Electronic Warfare/Electronic Protection:**

The COI is organized around six technical challenges:

- Cognitive, Adaptive Capabilities
- Coordinated / Distributed / Network-Enabled Systems
- Preemptive / Proactive Effects (real-time sensing, assessment and optimization of EA effectiveness)
- Broadband / Multispectral Systems
- Modular / Open / Software-Configurable Architectures
- Advanced EP Techniques & Technology

- **Energy and Power Technologies:**

Energy and power technologies to enhance operational effectiveness and accelerate fielding of critical military platforms and weapons. The primary focus areas include:

- Power generation / energy conversion;
- Energy storage;
- Power distribution and control;
- Thermal transport and control;
- Electromechanical conversion.

- **Engineered Resilient Systems (ERS):**

ERS is a cross-cutting initiative that seeks to transform engineering environments so that warfighting systems are more resilient and affordable across the acquisition lifecycle. ERS is concerned with developing an integrated suite of modern computational modeling and simulation capabilities and systems engineering tools, which align with acquisition and operational business processes. ERS focus areas include infrastructure, information, design, tradespace analytics and decision support tools, and knowledge environments. The objectives are to increase the speed of system development, improve the effectiveness of fielded systems, and minimize life-cycle costs. Resultant tools and procedures seek to produce more complete and robust requirements against many more alternative mission contexts very early in the design process, or pre-Milestone A, for more deeply informed acquisition decisions. Manufacturability of a proposed design is explicitly considered from both engineering and cost perspectives, prior to design commitment.

- **Ground and Sea Platforms:**

- Design and Integration
- Survivability
- Mobility
- Modularity
- Maintainability
- Unmanned Platforms

- **Human Systems:**

- Personnel, Training, and Leader Development
 - Force Management & Modeling; Selection & Classification; Theory Of Learning; Adaptive, Tailored Instruction; Live, Virtual, Constructive Simulations; Realistic Immersive Training; Training Methods, Technology, & Media; Education & Training Strategies; Innovative Leader Development
- System Interfaces and Cognitive Processing:
 - Human-Machine Interfaces; Human Cognitive Process Modeling; Decision-Making Models; Human State Modeling; Applied Neuroscience; Trust
- Protection, Sustainment, and Physical Performance:
 - Extreme Environment Protection; Combat Clothing & Protective Equipment; Extended Combat Rations & Field Feeding Equipment; Physical Aiding; Performance Enhancement; Vehicle Escape & Crash Safety; Survival & Rescue; Aerial Delivery; Warrior-System Integration
- Social, Cultural, & Behavioral Understanding:
 - Cultural Situational Awareness; Socio-Cultural Models & Synthetic Entities For Socio-Cultural Data In Denied Areas; Social Network Analysis; Building Partnerships

- **Materials & Manufacturing Processes:**

The COI includes the following thrust areas:

- Materials and processes for Civil Engineering
- M&P for the Individual Warfighter
- M&P for Power and Energy
- M&P for Propulsion and Extreme Environment Materials
- M&P for Readiness
- M&P for Sensors, Electronics and Photonics
- M&P for Structures and Protection
- Corrosion

The Materials & Processes COI is also involved in various related DoD, National and International working groups, including for Laser Hardened Materials, Low Observables, Metamaterials, Nanotechnology, and Materials Genome.

- **Sensors and Processing:**

Physics-based maritime, ground, air-borne, and space-borne sensing capabilities to include:

- Electro-optic and infrared (EO/IR) sensors
- Radio Frequency (RF) sensors
- Acoustic, magnetic, seismic sensors, etc.
- Special purpose sensors including: nuclear, chemical, biological
- Sensor processing

- **Space:**

- Taxonomy TBD (note: due to issues with classification, the Space COI will not operate in the same open manner as the other COIs)

- **Weapons Technologies:**

Thrust areas include:

- Ordnance
- Guidance/Navigation & Control
- Propulsion
- Modeling, Simulation & Test Infrastructure
- Integrated Guided Weapon Demonstrators
- Undersea Weapons
- High Energy Lasers
- RF Weapons

Annex: Reliance 21 Participants

Assistant Secretary of Defense, Research & Engineering - ASD(R&E)

ASD(R&E) is the Chief Technology Officer for the DoD and provides management oversight for the Department's R&E Portfolio. ASD(R&E) chairs the S&T ExCom.

OASD(R&E) Staff

OASD(R&E) Staff serve an important role in working with all the DoD S&T Components to ensure that corporate objectives are met in Reliance 21 activities and plans. OASD(R&E) Staff actively participate in all COIs.

DoD S&T Components

The DoD S&T Components are critical members of the Reliance 21 process. They include strategic and technical leadership among the Services and Defense Agencies and underpin the Communities of Interest. Each Component contributes members to the S&T ExCom, S&T Deputies Council, COI Steering Groups, and subject matter experts in support of COI activities.

S&T Deputies Council

The S&T Deputies Council is composed of deputies to the S&T ExCom principals, or other designated officials. They identify issues for potential policy changes and recommend strategic issues for S&T ExCom discussion. They ensure that staff and information are available as required and disseminate information and actions to their Components. The Deputies Council has responsibility for vetting and optimizing all S&T related data-calls. Meetings are held weekly, chaired by the Principal Deputy to the DASD(Research), who is also the Executive Secretary to the S&T ExCom. Activities and meetings of the Deputies Council are supported by the role of the Deputies Executive Secretary which is contributed by each Service on a 2 year rotation.

Joint Staff

The Joint Staff is responsible for identifying the priority joint warfighting capability needs and gaps for S&T to be incorporated into Reliance 21 plans. To this effect, the appropriate member of the Joint Staff, as determined by the Reliance 21 Deputies Council member, participates in COI Steering Groups as appropriate.

Defense Advanced Research Projects Agency (DARPA)

Note that DARPA projects are considered disruptive and high risk and should not be considered on the critical path for the COI technology roadmaps. As a consequence, DARPA may not participate routinely in COI activities but DARPA will brief each COI, in detail on an annual basis, regarding active projects relevant to that topic. This will ensure that DARPA is informed by Component S&T investments and inform the other Components of DARPA program focus.

Annex: Associated Reliance 21 Governance Bodies

R&E ExCom

ASD(R&E) may convene an R&E ExCom, as required to address Research, Development, Test and Evaluation (RDT&E) issues that go beyond the S&T portfolio. This group includes the Service Acquisition Executives and will meet on an ad-hoc basis to consider outcomes from deep analyses it has commissioned on specific topics of concern.

Science Technology Engineering and Mathematics (STEM) Executive Board

The STEM Executive Board oversees a Department-wide approach to fostering the STEM enterprise for national security needs. It shares several members with the S&T ExCom, but also includes a wider membership from across the Department.

The Board assesses the adequacy of the Department's approaches to directing STEM investments, fostering the supply of high-caliber STEM candidates, recruiting STEM personnel, developing STEM human capital and retaining a stable, effective STEM workforce.

This group also leads the Department's contribution to the national STEM enterprise, with particular emphasis on supporting the Department's needs, the defense industrial base needs, and broader national competitiveness needs impacting the national security environment.

Defense Basic Research Advisory Group (DBRAG)

The DBRAG coordinates the DoD Basic Research program and assists in the clarification of issues and policy. The DBRAG includes Senior DoD Basic Research leaders from the Components and OASD(R&E).

Laboratory Quality Enhancement Panel (LQEP)

The LQEP reflects contemporary planning needs for the in-house DoD laboratory enterprise. The group holds quarterly meetings, including DoD lab directors, and representatives from the Services S&T Executives.

Areas of focus include laboratory workforce policies in support of the Department's S&T Reinvention Laboratory personnel programs - all personnel related efforts are in partnership with Under Secretary of Defense (Personnel and Readiness); identification and promulgation of in-house lab Core Technical Competencies (CTC); strengthening of linkages with the Department STEM and Basic Science programs; connectivity with industry and academia via Technology Transfer programs; and development and implementation of Department Laboratory military construction and Sustainment, Revitalization and Modernization strategic plans - in partnership with Deputy Under Secretary of Defense (Installations & Environment).

