Syracuse University

Welcome to DOD 101

Office of Government Relations

Office of Government Relations

Laura Kolton, Executive Director Federal Government Engagement

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Cornerstone Meeting Participants

Susan Sweat
Principal & Director

Former legislative director for Sen. Roger Wicker (R-MS) in the House and the Senate; Bicameral relationships in appropriations and authorization; Defense health expert

Marty Fuller, Ph.D.
Senior Consultant

Former Director of Federal Relations for Mississippi State University; former associate director of the Mississippi Agricultural and Forestry Experiment Station (MAFES); President and CEO of Federal Solutions, LLC.

Christian Lee
Principal

Former professional staff member for Senate Appropriations Subcommittee on Homeland Security; 24-year United States Coast Guard veteran and retired captain

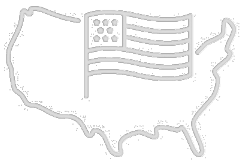
Agenda

1. Welcome and Introductions (Laura Kolton)
2. Navigating & Engaging Department of Defense (Susan Sweat)
3. Q&A
4. Quad Chart Overview (Marty Fuller)
5. Closing (Laura Kolton)

Cornerstone Government Affairs: Who We Are

- Full-service professional consulting firm founded in 2002; employee owned
- Top 3 independent government relations firm in DC
- Bipartisan team of more than 180 professionals across 16 offices in the Northeast, Mid-Atlantic, Midwest, Mountain West and South
- Help clients develop & implement strategies to engage the federal government
- Wide range of professionals, including several retired service members from the Army, Navy, Air Force, & Coast Guard

Federal Government Relations



State Government Relations

Public Affairs & Strategic Communications

Strategic Advisory Services

Department of Defense Research Agencies & Interests

Intro to DoD Speak

"Joint" - involving two or more of the "services"

"Services" - Army, Navy, & Air Force

RDTE - Research Development Test & Evaluation

S&T - Funding in Codes 6.1 - 6.3 is referred to as Science & Technology budget

DoD Research Funding Agencies & Labs

Air Force

- Air Force Research Laboratory (AFRL)
- Air Force Office of Scientific Research (AFOSR)

Navy

- Office of Naval Research (ONR)
- Naval Research Laboratory (NRL)

Army

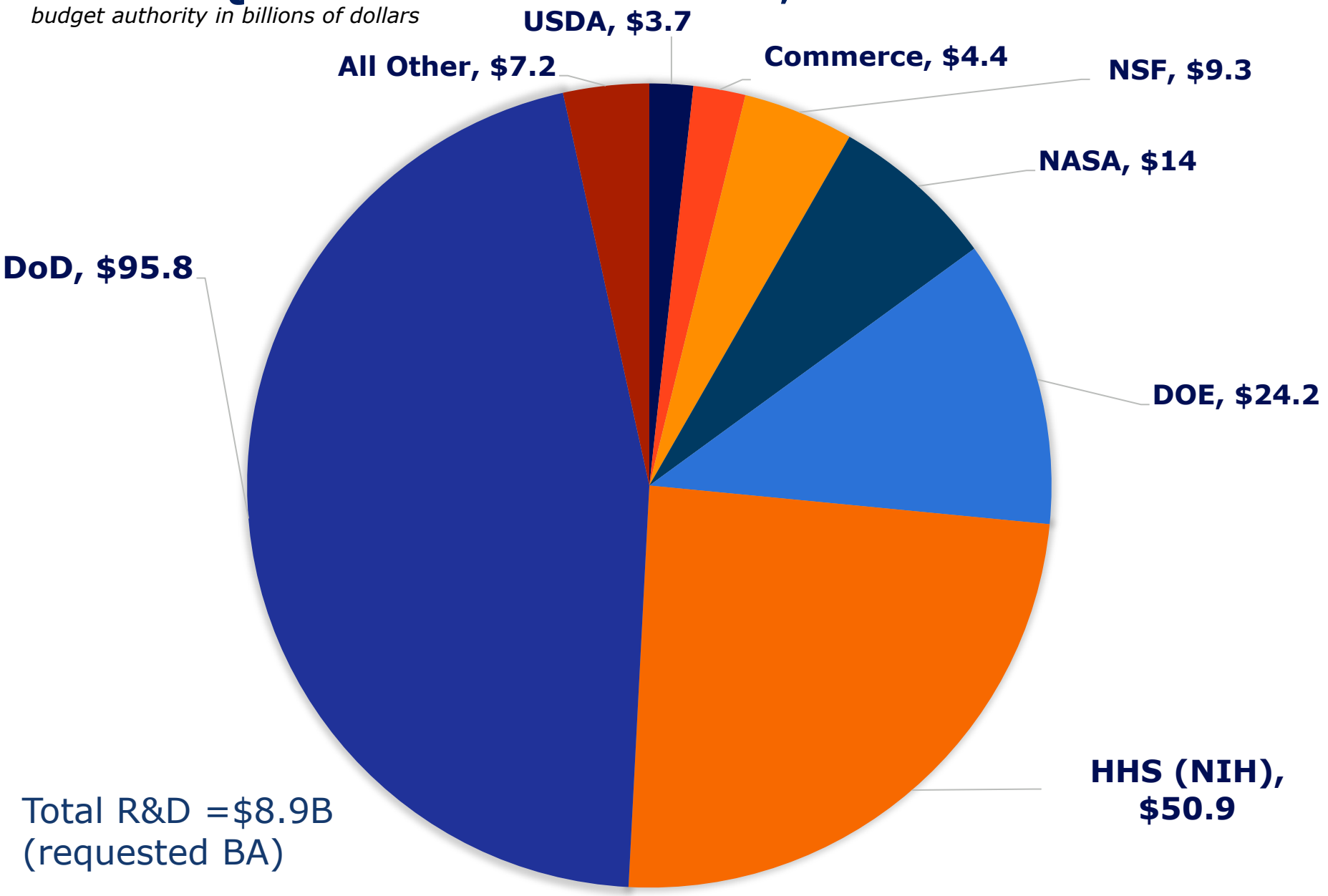
- Army Research Laboratory (ARL)
- Army Office of Research (AOR)
- Army Corps of Engineers Research and Development Center (ERDC)

Other Joint Agencies

- Defense Health Agency (DHA)
- Defense Advanced Research Projects Agency (DARPA)
- Defense Threat Reduction Agency (DTRA)
- Intelligence Advanced Research Projects Activity (IARPA)

TOTAL REQUESTED R&D BY AGENCY, FY2024

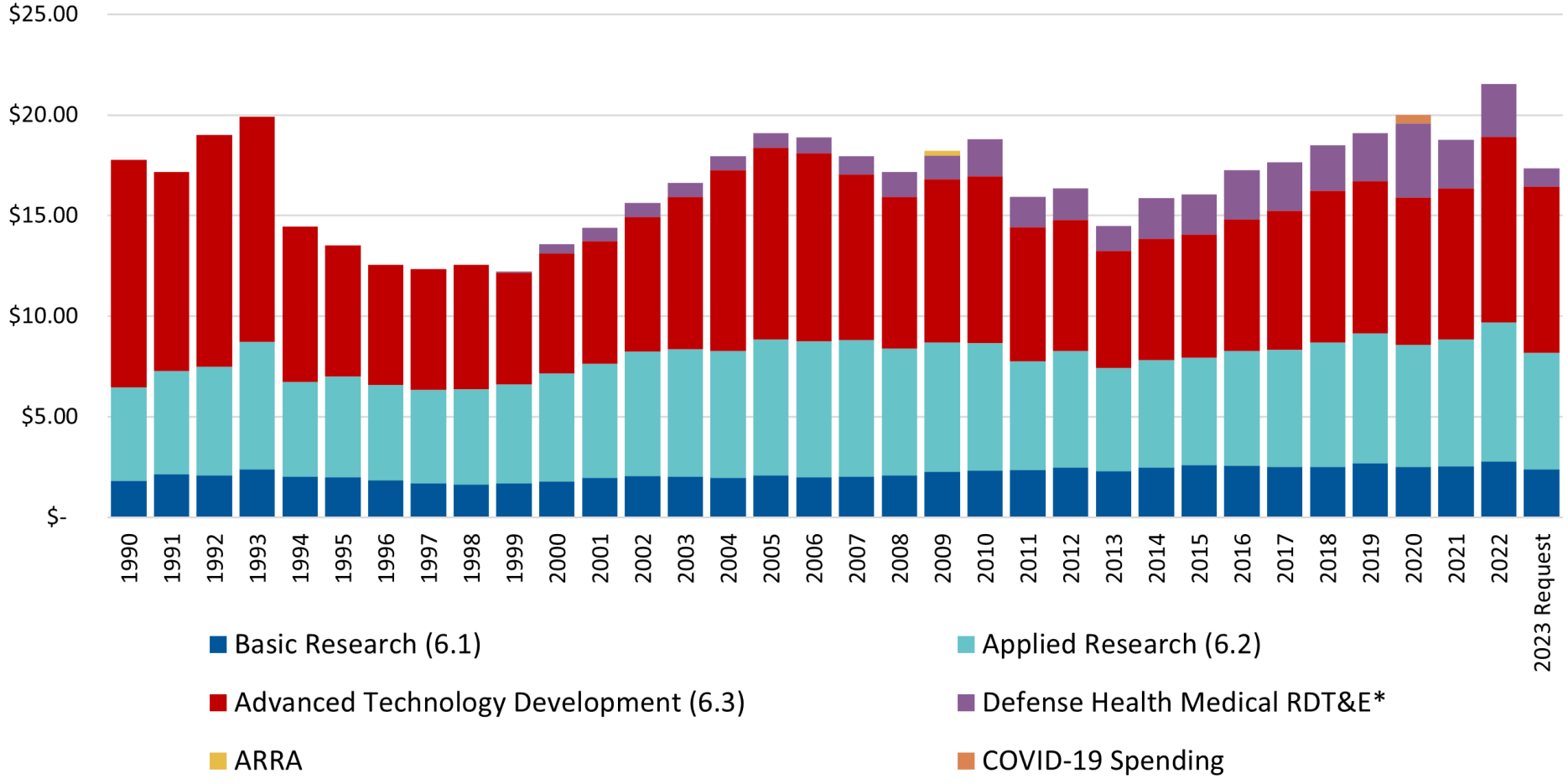
budget authority in billions of dollars



Total R&D =$8.9B
(requested BA)

DOD Science and Technology and Medical Research, FY 1990-2023

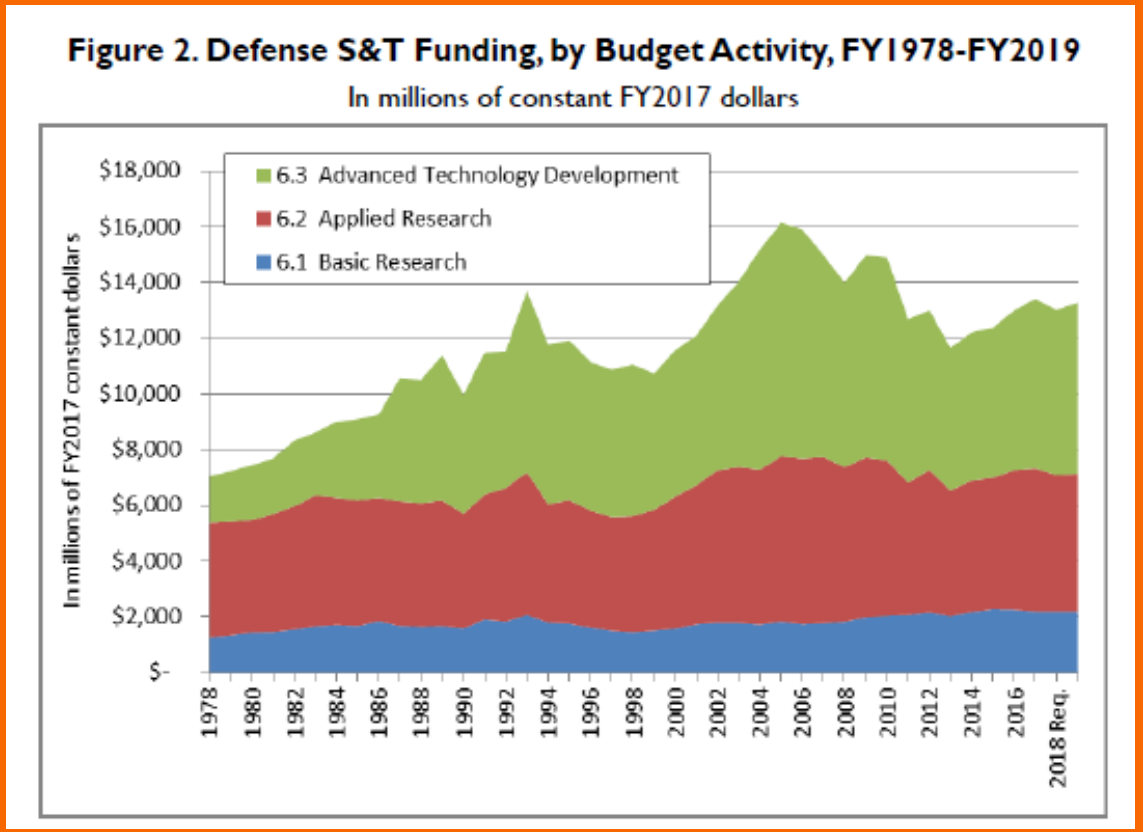
in billions of constant FY 2022 dollars



Source: DOD Budget documents. Mecical Research is appropriated outside RDT&E funding title | AAAS 2022

DoD S&T Budget

The S&T Program is the research-oriented part of the RDT&E budgets: 6.1, 6.2, and 6.3 (basic research, applied research, and advanced technology development, respectively).



- In FY23, DoD S&T funding accounted for $22.3 billion (15.5%) of DoD RDTE funding.
- About 60% of 6.1 funding goes to universities and 25% goes to DOD's own R&D facilities.
- Most of the 6.2 and 6.3 work is performed in industry (almost 50%) and at DOD's own facilities (30%).

Basic Research

- Within the Science & Technology program, “Basic Research” receives special attention, particularly from universities
- DoD spends nearly half of its basic research budget at universities
- In the FY23 DoD Funding Bill, Basic Research was funded at:
  - Defense-Wide: $927.339M
  - Army: $635.395M
  - Navy: $688.889M
  - Air Force: $612.317M
  - Space Force: $55M
  - Total: $2.9B

DoD Basic Research Priorities

On February 1, 2022, Undersecretary for Research and Engineering Heidi Shyu published a memo outlining 14 critical technology areas grouped into three categories:

Basic Science Interest Areas

- **Biotechnology:** Utilizing living systems to produce a wide range of technologies and capabilities
- **Quantum Science:** Defense application include atomic clocks, quantum sensors, quantum computing, and quantum networks
- **Future Generation Wireless Technology (FutureG):** A suite of emerging wireless network technologies enabled by DoD and commercial industry cooperation to enable military operations and ensure a free and open internet.
- **Advanced Materials:** Explores innovative new materials and novel manufacturing techniques that can dramatically improve many of the DoD's capabilities.

DoD Basic Research Priorities Cont.

Applied Research Areas

- **Trusted AI and Autonomy:** As AI, machine learning, and autonomous operations continue to mature, the DoD will focus on evidence-based AI-assurance and enabling operational effectiveness.
- **Integrated Network Systems-of-Systems:** This technology encompasses the capability to communicate, provide real-time dissemination of information across the Department, and effective command and control in a contested electromagnetic environment.
- **Microelectronics:** Working closely with industry, academia, and across the Government, the Department is addressing the need for secure microelectronics sources and will leverage state-of-the-art commercial development and production for defense microelectronic solutions.
- **Space Technology Areas:** . The space strategy must incorporate technologies that enhance the Department's adaptive and reconfigurable capabilities in space situational awareness, space control, communication path diversity, on-orbit processing, and autonomy.
- **Renewable Energy Generation and Storage**: This includes solar wind, bio-based and geothermal technologies, advanced energy storage, electronic engines, and power grid integration.
- **Advanced Computing and Software:** This includes supercomputing, cloud computing, data storage, computing architectures, and data processing.
- **Human Machine Interfaces:** Interactive human-machine interfaces enable rapid mission planning and mission command by providing a common operational picture to geographically distributed operations.

DoD Basic Research Priorities Cont.

Defense-Specific Areas

- **Directed Energy:** Directed Energy Weapons utilize lasers, high power microwaves, and high energy particle beams to produce precision disruption, damage, or destruction of military targets at range.
- **Hypersonics:** Hypersonic systems fly within the atmosphere for significant portions of their flight at or above 5 times the speed of sound, or approximately 3700 miles per hour. While strategic competitors are pursuing and rapidly fielding advanced hypersonic missiles, the DoD will develop leap-ahead and cost-effective technologies for our air, land, and sea operational forces.
- **Integrated Sending and Cyber:** To provide advantage for the joint force in highly contested environments, the Department must develop wideband sensors to operate at the intersection of cyber space, electronic warfare, radar, and communications. Sensors must be able to counter advanced threats and can no longer be stove-piped and single function.

DoD Medical Research Priorities

Combat Casualty Care

- Neurotrauma
- Hemorrhage control & battlefield resuscitation
- Prolonged Care
- Severe burn
- En Route Care
- Autonomous care & evacuation
- Radiation health countermeasures
- Sustainment of medical expeditionary skills
- Military medical photonics

Military Operational Medicine

- Musculoskeletal injury prevention and reduction
- Blunt, blast, accelerative, and neurosensory injury prevention and readiness
- Psychological health & resilience
- Performance in extreme environments
- Optimized cognition & fatigue mitigation

Military Infectious Diseases

- Viral
- Bacterial
- Wound Healing

DoD Medical Research Interest Areas

- Prolonged field care (Field medical care, applied beyond ‘doctrinal planning timelines’)
- En route care (care during transport/evacuation)
- Immune/inflammatory consequences of trauma
- Prepping or priming a patient or wound for improved outcomes
- Neurotrauma and Traumatic Brain Injury
- Polytrauma
- Precision medicine
- Warfighter readiness and performance enhancement
- Pain management
- Suicide prevention
- Artificial intelligence applied to medical systems & product development
- Decision support

Engaging the DoD

Ways to work with DoD

Grants

Cooperative Agreements

Contracts

Cooperative Research and Development Agreements (CRADA)

Small Business Innovation Research (SBIR)/ STTR

Broad Agency Announcements

New Products and Ideas Portal

Other Transaction Authorities (OTAs) – including OTA consortia

Funding Opportunities

OTA Consortia:

Medical Technology Enterprise Consortia (MTEC)

Medical Chemical Biological Radiological Nuclear (CBRN) Defense Consortium (MCDC)

Grant Programs:

University Research Initiatives (URIs):

- Defense University Research Instrumentation Program (DURIP)
- Multi-Disciplinary University Research Initiative (MURI)

Minerva

Special Funding Opportunities:

University Affiliated Research Centers (UARCs)

Federally Funded Research & Development Centers (FFRDCs)

FY23 Congressionally Directed Medical Research Programs >$1.5B

Program	FY23
Amyotrophic Lateral Sclerosis	$40M
Autism	$15M
Bone Marrow Failure	$7.5M
Breast Cancer	$150M
Chronic Pain Management	$15M
Combat Readiness Medical	$5M
Duchenne Muscular Dystrophy	$10M
Epilepsy	$12M
Hearing Restoration	$5M
Joint Warfighter	$25M
Kidney Cancer	$50M
Lung Cancer	$25M
Lupus	$10M
Melanoma	$40M
Military Burn	$10M
Multiple Sclerosis	$20M

Program	FY23
Neurofibromatosis	$25M
Orthotics & Prosthetics	$15M
Ovarian Cancer	$45M
Pancreatic Cancer	$15M
Parkinson's	$16M
Peer Reviewed Alzheimer's	$15M
Peer Reviewed Cancer	$130M
Peer Reviewed Medical	$370M
Peer Reviewed Orthopaedic	$30M
Peer Reviewed Rare Cancer	$17.5M
Prostate Cancer	$110M
Psychological Health/TBI	$175M
Reconstructive Transplantation	$12M
Spinal Cord Injury	$40M
Tick Borne Disease	$7M
Tuberous Sclerosis Complex	$8M
Vision	$20M

Three Types of Appropriations Funding

Programmatic

- Found in committee reports
    - Report language includes detail on funding levels (suggests, urges and directs)
- Funding follows the traditional pathway of that program (i.e. can be competitive or formula-based)
- Requesting Member not disclosed

"Plus-ups"

- A type of programmatic funding
- Often in national security bills and accounts
- Funding flows through a partnering program manager in the federal government
- Very short descriptor phrase included in the report
- Requesting Member not disclosed

Earmarks

- Now known as Community Project Funding in the House
- FY23 = 7,500 projects totaling $15.3 billion
- Receiving entity, funding level, and use of funds listed in the report
- Requesting Member's name disclosed in report

Congressional “plus-ups” & “earmarks”

Hard Work

- Earmarks are back - but very limited in nature

Key Relationships

- Program Managers are critical & not all can receive plus-ups
- Take direction - meet their needs, not your goals

Clear Communication

- Work through and with SU’s government relations and research offices

“Socializing” Your Research

RELATIONSHIPS MATTER: The key to success in the DoD is building relationships with DoD scientists, subject matter experts, and program managers.

Opportunities for dialogue:

- Conference calls and visits with DoD scientists/program managers
- Program or lab specific industry days
- DoD-sponsored Conferences
- Discipline-specific civilian conferences

Military Relevance

- Adapt your language to the audience – military research program managers are interested in **practical application** of new or novel concepts.

- The DoD's primary interest is in meeting requirements and **solving problems**. Iterative research is important to the DoD, but it has to be placed in the context of a specific problem to be addressed.

- Be sure to articulate a **long-range vision** for the research. The DoD will want to see that you are thinking about issues such as how long development will take, what regulatory approvals would be required, etc.

- **Be aware of the "operational" environment** where your research will be applied – i.e. austere and low-resourced areas; need for Size Weight And Power (SWAP) to be reduced

Tips for Success

- DoD process starts with an idea - not necessarily a posted funding opportunity
- Demonstrating a clear link between your research and a military need/capability is imperative.
- DoD has critical "capability gaps" and "requirements" that all their funded projects must be working toward. DoD is not funding "science for science's sake" or science whose applications will be exclusively or largely non-military. If another federal agency (NIH/NSF) will fund your work, DoD will need a compelling case about the military relevancy of your work.
- Socializing your research ideas ahead of program announcements is critical to success
- If they are interested, DoD program managers/scientists may point you to specific funding opportunities and encourage a submission. Often these are the same people who will be reviewing your proposal.
- Technical interchange with program managers/scientists and participation in relevant conferences can inform and help shape your focus. This improves your odds of success.

How we can support you

How We Can Help

Advising on engagement strategy

Initiating “socialization” with DoD officials

Reviewing for military relevance

Questions?

Quad Chart Overview & Examples

Multimodal Human Machine Teaming

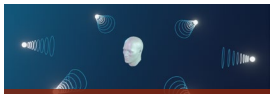
Enhance Human-Robot collaboration through the fusion of robot-sourced sensor inputs and intelligence, conveyed to Human team members via 'heads-up' feedback channels like visual Augmented Reality (AR), vibrotactile haptics, or spatial audio.

To improve perceptual bandwidth, reduce cognitive load, and increase real-time interpretation and understanding, multisensory UIs will be developed and studied.

Robots and other autonomous systems become better team members for their human handlers, via bi-directional decision support and multisensory information processing (augmented reality, haptic feedback, spatial audio)


Augmented Reality


Haptic Feedback


Spatial Audio

Technical Approach

1 - Define operator use cases and survey user community
- Investigate technology requirements and end-user objectives
- Document software functional requirements

2 – Develop and integrate software for end-user device
- Design the multisensory UI for information exchange in the human-robot team based on the outcomes of (1) above
- Create or leverage Government off the shelf (GOTS) software to support the multisensory interface, using TAK as the primary data transfer mechanism

3 – Design and Execute Human Factors Study
- Design and execute a series of evaluations to quantify the impact of the developed system

4 – Data Analysis and Final Report
- Analyze results from item (3) and document the study methodology, results, and conclusions in a Final Report

5 - Government Program Management
- Contracting activities by the government
- Program management and oversight of contractor deliverables

Problem Description

Today's heterogeneous Human-Robot teams rely on human interaction with mobile devices or PCs integrated with a robot's Ground Control System (GCS). Human operators are heads-down during dynamic situations. **Increased heads-up situational awareness (SA) can increase trust and safety in unmanned system operations.** Novel methods to communicate multisensory information from robot to the human, or human-to-robot, may reduce cognitive workload, increase situational awareness, and improve spatial attention, thereby establishing a common operating picture between human and robotic team members.

This program will develop and deliver a Government-off-the-shelf (GOTS) software application centered around the TAK ecosystem, to improve communication and efficacy (i.e., operational tempo) between humans and robots.

Fusing the robotic systems' data (e.g., sensor input, status) with existing TAK network entities will improve Human-Robot Interaction in Line of Sight (LOS) operations by eliminating the visual focus switch between a robot and its handheld monitoring system. **We believe multimodal bi-directional information flow (i.e., spatial audio, haptics, and AR) within human-robot teams will address this visual reference frame transition problem, resulting in improved situational awareness and overall operational efficiency.**

Cost and Schedule

Cost and Schedule

Work Area	Cost	PoP
1 – Use Cases / Community Survey	$ 0.5M	6 months
2 – Develop Software	$ 1.8M	12 months
3 – Design & Execute Study	$ 0.8M	10 months
4 – Data Analysis / Final Report	$ 0.5M	6 months
5 – Government Program Management	$ 0.4M	12 months
Total	**$ 4.0M**	**12 months**

Contact Information

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Budget Information

RDT&E, Army (RDA), Line 59, PE 0603774A, Night Systems Advanced Development, "Program Increase – Multimodal Human Machine Teaming"

Rapid Advanced Deposition Technologies

REQUEST

Developing a resilient domestic defense supply chain through additive manufacturing

OVERVIEW

The U.S. Army Combat Capabilities Development Command's Army Research Laboratory recognizes the importance of Rapid Advanced Deposition (RAD) for the future Warfighter. In the Department of Defense (DOD) action plan, "Securing Defense-Critical Supply Chains," developed in response to EO 14017, the DOD identified casting and forging capabilities as one of four critical vulnerabilities in the defense supply chain. In that same plan, the DOD named four strategic enablers required for mission success. Among those four, additive manufacturing (AM) was highlighted as an advanced manufacturing technology capable of bolstering US manufacturing efforts to support, or in some cases replace, casting and forging. Research that leads to robust, large-scale additive processes, such as those developed in RAD, is needed to broaden the defense manufacturing base and reduce lead times for mission-critical, large components.

RAD develops additive manufacturing methods that can rapidly deposit large volumes of material to produce near-net shape components to replace traditional cast or forged parts. Predictive capabilities for RAD provided by computational models reduce development time for component and process design and lead to higher quality final parts. Technologies that build domestic production capacity, while reducing infrastructure needs and lead times, increase the agility of the Army when responding to an everchanging, global adversary. RAD developed technologies enable a resilient domestic supply chain to support our warfighter

PROJECT LEAD

MSU's Center for Advanced Vehicular Systems is home to a well-equipped Additive Manufacturing Laboratory. To ensure research success at an accelerated pace, MSU and CAVS house unique resources, including AM machines, mechanical characterization equipment, full-service machine shops, a high-performance computing network/cluster and more. MSU's CAVS is one of only a few universities in the nation with a Laser Engineered Net Shaping (LENS)-equipped Stratonics ThermaViz dual pyrometer/infrared thermal imaging and control system. This system allows for the real-time collection of infrared images during LBAM and can be utilized for both in-situ monitoring and quality control of parts.

In addition to hands-on material capabilities, CAVS' facilities also have equipment that allows CAVS researchers the ability to model a range of materials, including metals, polymers, bio-materials and cementitious materials. CAVS' design and optimization abilities allow our researchers to evaluate the materials while involved in a variety of tests, including fatigue and fracture, crashworthiness, corrosion and heat treatment, then to adjust the materials in order to reach prime material optimization.

IMPACTS

- A stronger, more resilient domestic defense supply chain
- Reduced lead times for mission-critical, large components
- Improvements to overall U.S. manufacturing capabilities

FUNDING REQUEST

Amount Requested: $20 million

Committee: Defense

Agency: Army

Account: RDTE, FY 25

Program or Activity: Ground Technology

Line Item & PE: Line 12/ PE 0602144A

Syracuse University

Thank you

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BACK-UP SLIDES

RESEARCH BUDGET ACTIVITY CODES

6.1 Basic Research

6.2 Applied Research

6.3 Advanced Technology Development

6.4 Adv. Component Development & Prototypes

6.5 System Development & Demonstration

6.6 RDT&E Management Support

6.7 Operational Systems Development

TECHNOLOGY READINESS LEVELS

TRL1 Basic principles observed and reported

TRL2 Technology concept and/or application formulated.

TRL3 Analytical and experimental critical function and/or characteristic proof of concept.

TRL4 Component and/or breadboard validation in laboratory environment

TRL5 Component and/or breadboard validation in relevant environment.

TRL6 System/subsystem model or prototype demonstration in a relevant environment.

TRL7 System prototype demonstration in an operational environment.

TRL8 Actual system completed and qualified through test and demonstration.

TRL9 Actual system proven through successful mission operations.

RELEVANT CONFERENCE

Association of Defense Communities National Summit

Interservice/ Industry Training, Simulation and Education Conference

Air Force Association Air, Space and Cyber Conference

Air Force Association National Convention

American Institute of Aeronautics and Astronautics Space Forum (ASCEND)

Association of the US Army (AUSA) Expo

Defense Techconnect Innovation Summit & Expo

Defense Threat Reduction Agency (DTRA) Chemical and Biological Defense Conference

Institute for Defense and Government Advancement Future Combat Ground Vehicles

Institute for Defense and Government Advancement Future Indirect Fires Conference

The Intelligence and National Security Summit

Institute for the Study of War Annual Conference

Office of Naval Research Science and Technology Expo

Reagan Defense Forum

Navy League Sea Air Space

National Defense Industry Association - Special Operations Forces Industry Conference

DHS S&T Cyber Showcase

Surface Navy Association National Symposium

Naval Submarine League Annual Symposium

The Cybersecurity and Infrastructure Security Agency (CISA) Conference

Association for Unmanned Vehicle Systems International XPONENTIAL - All Things Unmanned

Cyber Maryland

Defense Entrepreneurs

RSA Conference

Joint Service Academy Cyber Summit

Technet Cyber 2019

Palo Alto Ignite

Air Force Research Laboratory (AFRL) Technical Directorates

711th Human Performance Wing (711 HPW)
Air Vehicles (RB)
Air Force Office of Scientific Research (AFOSR)
Directed Energy (RD)
Information (RI)
Materials and Manufacturing (RX)
Munitions (RW)
Propulsion (RZ)
Sensors (RY)
Space Vehicles (RV)

U.S. Navy Labs

Space & Naval Warfare Center Systems Centers

- SPAWAR Systems Center, Atlantic Division
- SPAWAR Systems Center, Pacific Division

Naval Undersea Warfare Centers

- Naval Undersea Warfare Center, Newport Division
- Naval Undersea Warfare Center, Keyport Division

Naval Air Warfare Centers

- Naval Air Warfare Center, Air Division
- Naval Air Warfare Center, Weapons Division

Naval Surface Warfare Centers

- NSWC, Carderock Division
- NSWC, Corona Division
- NSWC, Crane Division
- NSWC, Dahlgren Division
- NSWC, Explosive Ordnance Disposal Technology Division
- NSWC, Indian Head Division
- NSWC, Panama City Division
- NSWC, Port Hueneme Division

Navy Medicine

- Naval Medical Research Center
- Naval Health Research Center
- Naval Submarine Medical Research Laboratory
- Naval Medical Research Unit - Dayton
- Naval Medical Research Unit - San Antonio
- Naval Medical Research Center - Asia
- Naval Medical Research Unit - 3 Cairo
- Naval Medical Research Unit - 6 Peru

U.S. Army Labs

Engineer Research and Development Center (ERDC)

U.S. Army Research, Development and Engineering Command (RDECOM)

Research Laboratory (ARL)

Natick Soldier Research, Development and Engineering Center (NSRDEC)

Armament Research, Development and Engineering Center (ARDEC)

Tank Automotive Research, Development and Engineering Center (TARDEC)

Communications-Electronics Research, Development and Engineering Center (CERDEC)

Aviation & Missile Research, Development & Engineering Center (AMRDEC)

Edgewood Chemical Biological Center (ECBC)

Army Materiel Systems Analysis Activity (AMSAA)