

Defense Funding Guide



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Understanding DoD Culture

Highly Mission-driven Culture:

- DoD culture is very different than academic culture
- DoD not interested in funding research for the sake of advancing science but rather for the very specific needs and challenges arising from their defense missions
- What you propose must solve a problem they have
- Program Officers have great latitude – cultivation is critical
- Culture of innovation
- Discipline, focus, and control are key values

Perceptions Pls May Have of Academics:

- Silos, ivory towers, education and research created in a vacuum
- Big egos
- Too much emphasis on publications
- Not enough emphasis on timely deliverables

What to Do to **Change** Perceptions:

- Do your homework
- Focus on framing your research for a real world problem the military faces
- Describe your research using technical and plain language
- Focus on outcomes
- Include key milestones/deliverables and time schedules
- If funded – deliver on time and within budget; no delays and cost extension
- Think “marriage” not “date”

Working with DoD

Key Players/Roles in DoD Research

Program Officers: Gatekeepers, decision making, funding

University researchers: expertise, equipment, labs

DoD Internal Researchers: Labs, existing projects, testing equipment, evaluate proposals

Industry Partners: Existing projects, equipment, facilities, relationships

Students: interns, research opportunities, future researchers and personnel

Suggestions for Working with Program Officers

- Program Officers serve as gatekeepers
- POs typically receptive to discussing a potential project and whether it fits into agency's needs; they also attend professional conferences
- Do your homework: familiarize yourself with their mission, strategic priorities, structure :

Work to understand their needs as thoroughly as possible so that you can describe how your research will help them address their needs

- Always contact POs before submitting a white paper or proposal
- Do not cold call
- Send a short email, with a short summary of the proposed project
- Give them some available dates and times or ask them to email you with times when you can contact them
- Use your elevator pitch
- Probe for current interests
- Tailor your project to PO interest
- Have more than one idea to propose
- If first PO is not interested, ask for suggestions on other POs that might have interest
- The goal is a long term relationship – a marriage not a date
- Always Ask whether funds are available

Working with Industry is Key

- To pursue DoD funding as a long term funding strategy, it is critical to develop collaborative working relationships with defense companies
- Companies can provide you with insight into potential applications of your research
- May look to university researchers for basic research that they may not have time or resources to conduct
- 6.2 research and above, which tends to be higher funding levels, may include basic research that a university can conduct along with applied research that requires the capabilities of a defense company

Get to Know Internal DoD Researchers

- It is a good idea to get to know the internal DoD researchers who are working in their research areas
- Often expected that externally funded projects will be conducted in collaboration with DoD scientists – building on their prior results, utilizing specialized equipment at DoD labs etc.
- DoD scientists often involved in proposal review, thus building these connections is critical

DoD Wants Your Students

- DoD funds research at universities not only for the research results but as a way to recruit graduate students into research positions at DoD
- By involving graduate students in your research projects, you will provide students with potential networking and employment opportunities – and establish yourself as a good source of employees for DoD labs (i.e. a way to fund grad students)

Engagement Strategies

- Attend DoD sponsored events such as Proposer's Days, Air Force Programmatic Reviews, Conferences, Pitch Days, Industry Partnership Days etc
- Connect with DoD scientists that attend conferences in your field
- Attend relevant workshops/conferences
- Work at a DoD Lab during summer
- Offer to serve as a reviewers where appropriate
- Invite DoD researchers to give department seminars
- Have more than one idea to propose
- Be ready to adapt your research to program officer's needs

DoD Sponsored Meetings

Military Health System Research Symposium

DoD's premier scientific meeting that focuses specifically on the unique medical needs of the warfighter

DARPA Proposers Day

AFOSR Programmatic Reviews

Army Science & Technology Symposium and Showcase

Defense Communities National Summit

Chemical and Biological Defense Science and Technology Conference

DoD Agencies that Fund Research

U.S. Army Medical Research Acquisition Activity (USAMRAA)

- USAMRAA procures supplies, services, Research and Development (R&D) and issues assistance agreements on behalf of a number of organizations
- Uses the Broad Agency Announcement (BAA) to solicit extramural research and development ideas; continuously open announcement; pre-proposals may be submitted at anytime throughout the 5-year period
- Research funded through the USAMRDC BAA (next slide) is intended and expected to benefit and inform both military and civilian medical practice and knowledge.
- Organizations supported include Army Aeromedical Research Lab, Medical Research Institute of Chemical Defense, Medical Research Institute of Infectious Diseases, among others . For a full list navigate to the About page. Organizations We Support

Navigating AMRAA: Click on the Doing Business tab, then BAA or the Grants tab which will refer you to grants.gov. Us CFDA: 12.420

U.S. Army Medical Research and Development Command (USAMRDC)

Mission: Responsively and responsively create, develop, acquire, and deliver capabilities for the warfighter

Vision: Lead the advancement of military medicine

Responsible for medical research, development, and acquisition

Manages a large extramural research program

Biomedical Research Focus Areas:

Military Infectious Diseases

Combat Casualty Care

Military Operational Medicine

Medicinal Chemical and Biological Defense

Clinical and Rehabilitative Medicine

Navigating MRDC: Peruse the site to learn about priorities, soldier care, and see the “Collaborate Tab” [Grants.gov](#) Search: [CFDA 12.420](#)

Congressionally Directed Medical Research Program (CDMRP)

- Medical research as directed by Congress
- Invests in groundbreaking research targeting critical gaps - high impact, high risk, and high gain projects that other agencies may not venture to fund
- Paradigm shifting research and solutions that will lead to cures or improvements in patient care or breakthrough technologies and resources for clinical benefit
- Involves consumer advocates throughout the program cycle including review of proposals
- Applications are reviewed using a two-tier formal review; no standing peer review panels and no pay lines
- Funds the full pipeline of research development including basic, translational, and clinical research
- Supports next generation of researchers and established scientists
- Culture closer to NSF and NIH than DoD

Navigating CDMRP: See the See “Research Programs”, Funding Opportunities” and “Search Award” tabs at the top and “For Investigators” section, Peruse “Funded Research” , and “Program News & Highlights” , “About Us” Facts & Figures for the research funding process

CDMRP Webinar Series

A helpful webinar series on types of funding opportunities offered and strategies to increase the success of applications submitted to different CDMRP programs.

Funding Opportunities and Strategies for Success

High Risk/High Gain Funding Opportunities

Team Science Funding Opportunities

Clinical Research and Clinical Trial Funding Opportunities

Funding Opportunities for the Development of Technology and/or Resources

Funding Opportunities for Early Career Investigators

Consortium-Type Funding Opportunities

US Army Combat Capabilities Development Command Army Research Laboratory (ARL)

Mission: To operationalize science for transformational overmatch

The U.S. Army Combat Capabilities Development Command (DEVCOM) Army Research Laboratory is the Army's research laboratory solely focused on cutting-edge scientific discovery, technological innovation, and transition of knowledge products that offer incredible potential to improve the Army's chances of surviving and winning any future conflicts.

Directorates that focus on technology areas critical to strategic dominance across the entire spectrum of operations:

Computational and Informational Sciences

Human Research and Engineering

Sensors and Electron Devices

Weapons and Materials Research

Army Research Office (next slide)

Navigating ARL: Become familiar with research they support, See the “Who We Are”, “What We Do”, and “Business” sections

Army Research Office (ARO)

- Funds basic research to increase fundamental knowledge and understanding in the **chemical, life, physical, engineering, materials, mechanical, computing, information, network, mathematical, earth, and social sciences related to long-term national security needs**
- Part of U.S. Army Combat Capabilities Development Command (DEVCOM)
- Research is conducted at 250 universities across the U.S. with more than 1000 individual researchers
- Results of research efforts are transitioned to the Army research and development community, industry, or academia for future technological superiority of Soldiers, Army, and nation.
- Research represents the most long-range Army view, with system applications often 20-30 years away

Navigating ARO: Spend time on the “Business” section of the site and the “What We Do” section

Air Force Research Laboratory

- AFRL leads the discovery, development, and delivery of warfighting technologies for air, space, and cyberforces
- Nearly every aerospace technology in the last century has been influenced by AFRL
- Partners with academia, small business, industry, Air force users
- Facilities and state-of-the-art equipment in locations around the world
- Comprised of Technology Directorates, Functional Directorates, 711 Human Performance Wing, and the Air Force Office of Scientific Research

User friendly, welcoming site:

[Air Force Research Lab](#)

Navigating AFRL: Peruse Technology tab to Understand AFRL Research areas then head straight to the Partner/Higher Education page!

Air force Office of Scientific Research (AFOSR)

- AFOSR is one of the technology directorates of the Air Force Research Laboratory (AFRL) on the previous slide
- Supports nearly 40 areas of research organized and managed through four scientific divisions: Engineering and Complex Systems, Information and Networks, Physical Sciences, Chemistry and Biological Sciences
- AFOSR manages the Air Force basic research program via three strategic partnerships: 1) The University Connection, 2) Small Business Technology Transfer (STTR) Program, and 3) Air Force Intramural Research
- **The University Connection** provides much of the backbone for our nation's technological progress while performing the bulk of the basic research
- Funds basic research using the BAA solicitation

Navigating AFOSR: Peruse the white tabs in the center “Research Areas”, “Funding Opportunities”

Office of Naval Research (ONR)

- To meet current and emerging warfighter needs and deliver future force capabilities, ONR invests 90% of its portfolio in mid-and-long term research while allowing for responsive, limited near-term technology insertions
- Manages and funds basic and applied science and advanced technology development through grants and contracts with partners in academia, industry, and government
- A major funder of scientific research since WWII, ONR has a major role in fostering scientific and technological innovations in a wide range of fields and in maintaining the basic scientific research infrastructure that makes these breakthroughs possible

Naval Priorities include:

Augmented Warfighter

Integrated and Distributed Forces

Operational Endurance

Sensing and Sense-Making

Scalable Lethality

Naval Research and Development Framework

Navigating ONR: Visit the “Our Research” tab to learn about ONR technology areas, program managers, and the Naval Research Framework, then head to the “Work with Us” section

Minerva Research Initiative

Mission: The Minerva Research Initiative aims to improve DoD's basic understanding of the social, cultural, behavioral, and political forces that shape regions of the world of strategic importance to the U.S

- Minerva university research grants receive technical oversight from program managers based at the three military service basic research organizations" the Air force Office of Scientific Research (AFOSR), the Army Research Office (ARO), and the Office of Naval Research (ONR). ARO is no longer supporting new awards
- All supported projects are university-based and unclassified, with the intention that all work be shared widely to support thriving stable and safe communities.
- Primarily funds social science basic research by university-led research teams

Navigating Minerva: Study the Research Priorities, read the blog, Read the FAQs section to learn about the application process

National Geospatial-Intelligence Agency (NGA)

Mission: Provide GEOINT for our nation's security

Strategic intelligence

Warfighter support

Indications and warning

Safety of navigation

Foundation data

Humanitarian and disaster relief

Special event planning

Homeland defense

Research Funding:

Academic Research Program

NGA New Investigator Program (NID)

NGA University Research Initiative (NURI)

NGA Research Collaboration Forum

Grants are generally awarded for a 2-year base period with up to three 1-year options, in response to the Academic Grant Broad Agency Announcement (BAA) that is posted on www.grants.gov

Visiting Scientist Program

National Geospatial Intelligence Agency Boosting Innovative GEOINT Research Broad Agency Announcement (NGA BIG-R BAA) Current Priorities – This BAA effective through July 31, 2023

- **Foundational GEOINT:** Focuses on the creation of always accurate, high-resolution, continually updated representations of the earth's properties, available on demand. Topics of interest in this domain include, but are not limited to, innovations advancing the GEOINT physical sciences in the areas of: (1) terrestrial/celestial reference frames, (2) earth gravitational models, (3) world magnetic models, (4) assured positioning, navigation and timing, and resilience, (5) geopositioning, (6) feature extraction, attribution, classification and modeling, (7) infrastructure models, (8) human geography and environmental models, (9) bathymetric/topological models, and (10) maritime environmental mapping.
- **Advanced Phenomenologies:** Employs novel methods and efficient strategies to drive development and delivery of improved spatially, spectrally and temporally resolved data from a growing number of traditional and non-traditional sources. Topics of interest in this domain include, but are not limited to, innovations advancing the design and development of algorithms, components, and enabling technologies for systems in the areas of: (1) detection, tracking, and identification of the most challenging targets in complex environments, (2) sensing and real-time processing of both static and dynamic targets, (3) novel source exploitation and optimization, (4) collection technologies to optimize use of phenomenology sources, (5) space situational awareness, (6) information assurance, data integrity and quality validation, (7) error propagation modeling, and (8) multi-domain data aggregation.
- **Analytic Technologies:** Enhances the definition and utility of GEOINT by leveraging new sources of data and developing novel analytic techniques to deliver a geospatial dimension to multi-INT analytics, in particular to address emerging threats and mission domains. New data sources drive us of these technologies to provide accurate, timely, reliable and scalable methods for data exploitation, integration, and analysis. Topics of interest in this domain include, but are not limited to, innovations in advanced processing techniques and enabling technologies for (1) geospatial signatures detection, analysis, and tracking, (2) derivation of GEOINT from non-traditional data in cyberspace, (3) stand-off detection of counter proliferation and chemical, biological, radiological, nuclear and explosive activities, (4) water security, (5) image/video understanding and computer vision, (6) image and product standards development and enhancement, (7) automatic target recognition, (8) temporal and activity modeling and contextualization, (9) event forecasting and prediction, (10) knowledge and ontology modeling, (11) artificial intelligence, to include novel learning techniques, (12) automation, to include software tools, (13) natural language processing, (14) social media analytics, (15) location-based insights, (16) workflow effectiveness and analyst workflow modernization, (17) human-machine interaction, (18) tools that provide better human understanding of automated solutions, (19) tools to guide algorithm and automation governance, and (20) immersive GEOINT visualization tools.

Defense Advanced Research Projects Agency (DARPA)

Mission: to make pivotal investments in breakthrough technologies for national security to ensure that the U.S. is the initiator and not the victim of technological surprise

DARPA differs from the service service agencies (ARO, AFOSR, ONR) in that its mission benefits all areas of defense

- High risk/high reward research that may benefit any of the DoD branches
- Focus on transformational change, not incremental advances within an innovation ecosystem of academic, corporate, and governmental partners
- Six program offices, nearly 100 program managers, and 250 research and development programs
- Program managers rotate every 3-5 years and are often well-known researchers in their fields
- Matrix teams of government, academic and industry partners encouraged
- DARPA is interested in transitioning new technology into military use as quickly as possible, teaming with defense industry or defense lab researchers is critical when proposing new research

Navigating DARPA: Study research priorities, See Opportunities section, Respond to BAAs, Use the Polyplexus Social Collaboration platform

Intelligence Advanced Research Projects Activity (IARPA)

- IARPA does not have an operational mission and does not deploy technologies directly to the field.
- IARPA facilitates the transition of research results across the intelligence community
- High risk/high payoff research to tackle some of the most difficult challenges of the agencies and disciplines in the intelligence community
- Research thrusts include Analysis, Anticipatory Intelligence, Collection, and Computing

Navigating IARPA: Peruse the Research Programs, Program Managers, and Working with IARPA sections

Defense Threat Reduction Agency

Mission: DETECT. DETER.DEFEAT. DTRA enables DoD, the U.S. Government, and International Partners to counter and deter Weapons of Mass Destruction and emerging threats

- Contract opportunities for industry partnerships
- Fundamental research to counter weapons of mass destruction

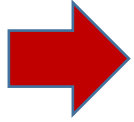
Navigating DTRA: Peruse the strategic plan, [Grants.gov](https://www.grants.gov) for funding opportunities

Types of Research Funded by DoD

DoD Character of Work

6.1 Basic Research

6.2 Applied Research



Most Single Investigator projects will fit in 6.1-6.2

6.3 Advanced Technology Development

6.4 Advanced Component Development and Prototypes

6.5 System Development and Demonstration

6.6 RDT&E Management Support

6.7 Operations System Development

6.8 Software and Digital Technology Pilot Programs

6.1-6.8 are budget activity codes

More detailed descriptions on the following slides

6.1 Basic Research

- Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products
- Includes all scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs.
- Farsighted high payoff research that provides the basis for technological progress
- Basic research may lead to: (a) subsequent applied research and advanced technology developments in Defense-related technologies, and (b) new and improved military functional capabilities in areas such as communications, detection, tracking, surveillance, propulsion, mobility, guidance and control, navigation, energy conversion, materials and structures, and personnel support
- Usually the type of research funded at a university

Source: Department of Defense Research, Development, Test and Evaluation Appropriations Structure, Congressional Research Service, R44711, Oct 7, 2020

6.2 Applied Research

- Systematic study to understand the means to meet a recognized and specific need
- Systematic expansion and application of knowledge to develop useful materials, devices, and systems or methods
- It may be oriented, ultimately, toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements
- Applied research may translate promising basic research into solutions for broadly defined military needs, short of system development. This type of effort may vary from systematic mission-directed research beyond that in [6.1] to sophisticated breadboard hardware, study, programming and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges
- It includes studies, investigations, and non-system specific technology efforts
- The dominant characteristic is that applied research is directed toward general military needs with a view toward developing and evaluating the feasibility and practicality of proposed solutions and determining their parameters. Applied Research precedes system specific technology investigations or development
- Often funded at a defense company which may partner with a university

Source: Department of Defense Research, Development, Test and Evaluation Appropriations Structure, Congressional Research Service, R44711, Oct 7, 2020

6.3 Advanced Technology Development (ATD)

- Includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.
- Includes concept and technology demonstrations of components and subsystems or system models. The models may be form, fit, and function prototypes or scaled models that serve the same demonstration purpose.
- The results of this type of effort are proof of technological feasibility and assessment of subsystem and component operability and producibility rather than the development of hardware for service use.
- Projects in this category have a direct relevance to identified military needs. Advanced Technology Development demonstrates the general military utility or cost reduction potential of technology when applied to different types of military equipment or techniques.
- Program elements in this category involve pre-Milestone B efforts, such as system concept demonstration, joint and Service-specific experiments or Technology Demonstrations and generally have Technology Readiness Levels of 4, 5, or 6.
- Projects in this category do not necessarily lead to subsequent development or procurement phases, but should have the goal of moving out of Science and Technology (S&T) and into the acquisition process within the Future Years Defense Program (FYDP). Upon successful completion of projects that have military utility, the technology should be available for transition

Source: Department of Defense Research, Development, Test and Evaluation Appropriations Structure, Congressional Research Service, R44711, Oct 7, 2020

6.4 Advanced Component Development and Prototypes (ACD&P)

- Efforts necessary to evaluate integrated technologies, representative modes, or prototype systems in a high fidelity and realistic operating environment are funded in this budget activity.
- The ACD&P phase includes system specific efforts that help expedite technology transition from the laboratory to operational use.
- Emphasis is on proving component and subsystem maturity prior to integration in major and complex systems and may involve risk reduction initiatives

6.5 System Development and Demonstration (SDD)

- SDD programs conduct engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production. This budget activity is characterized by major line item projects
- Prototype performance is near or at planned operational system levels.
- Characteristics of this budget activity involve mature system development, integration, demonstration ... conducting live fire test and evaluation, and initial operational test and evaluation of production representative articles. ...

6.6 RDT& Management Support

- Includes management support for research, development, test, and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test, and evaluation
- Test ranges, military construction, maintenance support of laboratories, operation and maintenance of test aircraft and ships, and studies and analyses in support of the RDT&E program are funded in this budget activity.
- Costs of laboratory personnel, either in-house or contractor operated, would be assigned to appropriate projects or as a line item in the Basic Research, Applied Research, or ATD program areas, as appropriate.
- Military construction costs directly related to major development programs are included in this budget activity.

Source: Department of Defense Research, Development, Test and Evaluation Appropriations Structure, Congressional Research Service, R44711, Oct 7, 2020

6.7 Operational System Development

- Includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

6.8 Software and Digital Technology Pilot Programs

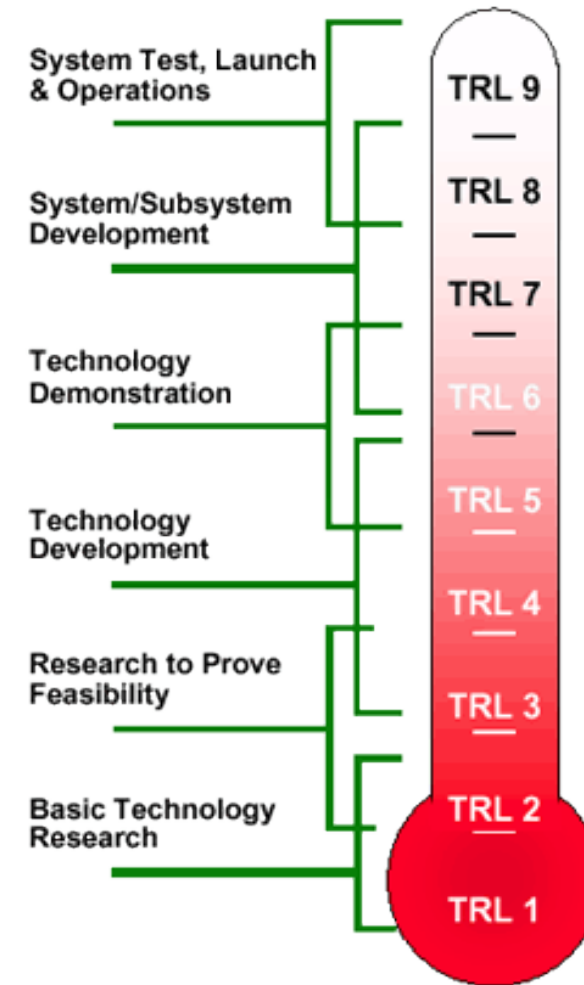
- Includes program elements that are directly related to DOD's Software and Digital Technology Pilot Programs. These funds are intended to be used for expenses necessary for agile development, test and evaluation, procurement and modification, and the operation and maintenance of these Pilot initiatives

Technology Readiness Levels (TRL)

TRL is shorthand for evaluating the maturity of a technology or invention

1 is the lowest level and 9 is the highest

More detailed descriptions are included in the following slides



TRL 1: Basic Principles Observed and Reported

- Lowest level of technology readiness
- This is where scientific research begins to be translated into applied research and development (R&D)
- An example might includes a paper that studies technology's basic properties
- Supporting information includes published research that provides foundation or rationale for the technology

TRL 2: Technology Concept and/or Application Formulated

- Invention begins here
- Once basic principles have been observed, practical applications can be invented
- Applications are still speculative and there may be no proof of concept to support assumptions
- Supporting information includes publications including analysis to support the concept

TRL 3: Analytical and Experimental Critical Function and/or Characteristic Proof of Concept

- Active research and development is initiated
- Includes analytical and laboratory studies to physically validate analytical predictions of separate elements of the technology
- Examples include components that not yet integrated or representative
- Supporting information includes results of laboratory tests

TRL 4: Component and/or Breadboard Validation in Laboratory Environment

- Basic technological components are integrated to establish that they will work together. This is relatively “low fidelity” compared to the eventual system
- Examples include integration of “ad hoc” hardware in the laboratory

TRL 5: Component and/or Breadboard Validation in Relevant Environment

- Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment.
- Examples include “High fidelity” laboratory integration of components

TRL 6: System/subsystem Model or Prototype Demonstration in a Relevant Environment

- Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment
- Represents a major step up in a technology's demonstrated readiness
- Examples include testing a prototype in a high-fidelity laboratory environment or in a simulated operational environment

TRL 7: System Prototype Demonstration in an Operational Environment

- Prototype near or at planned operational system.
- Represents a major step up from TRL 6 by requiring demonstration of an actual system prototype in an operational environment (e.g. in an aircraft, vehicle, or in space)
- Example includes testing the prototype in a test bed aircraft
- Supporting information includes results from testing a prototype system in an operational environment

TRL 8: Actual System Completed and Qualified through Test and Demonstration

- Technology has been proven to work in its final form and under expected conditions
- In almost all cases, this TRL represents the end of true system development
- Examples include developmental test and evaluation (DT&E) of the system in its intended weapon system to determine if it meets design specifications
- Supporting information includes results of testing system in its final configuration under the expected range of environmental conditions in which it will be expected to operate; assessment of whether it meets operational requirements

Source: Technology Assessment Guidance, Assistant Secretary of Defense for Research and Engineering

TRL 9: Actual System Proven Through Successful Mission Operations

- Actual application of the technology in its final form and under mission conditions
- Supporting information includes operational test and evaluation (OT&E) reports

Navigating DoD Funding Opportunities

How To Find Funding Opportunities

Look for the “Work with US” section on agency websites

[GRANTS.GOV](https://www.grants.gov) - best for finding basic research funding

[SAM.GOV](https://www.sam.gov) - use to find contracting opportunities

Types of Funding Announcements

Program Announcements:

- Similar to an NIH announcement
- For military-focused or public-purpose research
- Can be put out before they are exactly sure what they want
- Mainly focused on early stages of research

Types of Funding Announcements

Broad Agency Announcements (BAA)

- Competitive solicitation process to obtain proposals for basic and applied research -
- for scientific study and experimentation directed toward advancing state of art or increasing knowledge or understanding rather than focusing on a specific system of hardware solution
- Typically open and accepted for a specified period of time
- No commitment to make an award
- No budget limits are given; PI establishes proposed budget
- Contains broad research topics; they are looking for investigators to suggest the specific research topics
- a pre-proposal is usually required
- Long Range BAAs outline technical research interests and priorities over a multi-year period
- University research is often funded through unsolicited proposals based on the long range BAA
- Targeted BAAs address specific, shorter term priorities

Typical Application Process for Unsolicited Proposals in Long Range BAAs

- Look for strong fit in Long Range BAA
- Contact the Program Officer to discuss your project idea
- If PO is interested, he/she will request a white paper (Rules for white paper format and length can be found in the long range BAA or will be designated by the PO)
- IF PO likes white paper, he/she will request a full proposal

Types of Funding Announcements

Requests for Proposals (RFP)

- Always awarded as contracts
- Looking for more specific outcomes
- Usually leads to a prototype or physical deliverable
- Once an RFP has been issued, POs usually not allowed to discuss
- They also put out Requests for Information (RFI)

Small Business Innovation Research (SBIR):

- Company must be the applicant
- Typically leads to contracts
- Review criteria set by SBA instead of DoD

Types of Awards

Discretionary Grants:

- Most like what you are used to
- Competitive award decisions are made based on programmatic, technical, or scientific contributions

Assistance agreements

- Most similar to a grant
- Put out by DoD to fulfil a specific government need priority
- Looking for researchers to come up with unique ideas for a research priority
- Gives the PI more freedom without substantial involvement from DoD
- Referred to as “Best Effort” grants in that funding is not contingent upon getting a certain outcome

Types of Awards

Cooperative Agreements:

- The researcher will have substantial involvement from DoD
- You will work closely with staff at DoD continually seeking their input

Contracts:

- More specific on what the government needs and what they expect in return
- Less of a “Best Effort” structure
- Payment dependent on your work such as a cost reimbursement
- If you exceed budget, you may be responsible for the extra costs
- DoD can also ask for different deliverables during contract negotiations

Types of Awards

Military Interdepartmental Purchase Requests (MIPRs):

- Type of agreement between governmental agencies, usually originating from DoD
- Relevant if you want part of your award subcontracted to another federal laboratory or institute

Cooperative Research and Development Agreements (CRADA):

- Not a funding mechanism, but a formal agreement between a government agency and a private company or university to work together on research and development
- Must be an intellectual contribution from all parties
- Both parties may provide personnel, facilities, equipment, or other resources

Example: Use of a certain piece of equipment that is only in a federal lab, or otherwise inaccessible to you

Solicitation Types and Corresponding Award Mechanisms

Type of Solicitation	Common Award Mechanism(s)
Program Announcement (PA)	Cooperative or Assistance Agreements
Broad Agency Announcement (BAA)	Cooperative or Assistance Agreements, Contracts
Requests for Proposals (RFP)	Contracts
SBIR	Contracts

Opportunities for Early Career and Single Investigators

Opportunities for Single Investigators

- Comprises the majority of DoD basic research funding
- Advertised primarily through Broad Agency Announcements (BAA)
- Proposals to long-range BAA programs can be submitted any time
- Typical award size \$100-200K/3 years
- Continuation is possible
- Essential to contact program officers
- No standard proposal format – each agency/office has its own requirements

Opportunities for Early Career Investigators

[DARPA Young Faculty Award](#)

[Army Research Office Young Investigator Program](#)

[Air Force Young Investigator Program](#)

[ONR Young Investigator Program](#)

[NASA Early Career Faculty \(ECF\)](#)

Faculty Exchanges and Summer Faculty Positions in DoD Labs

ONR Summer Faculty Research Program

- Provides science and engineering faculty members from institutions of higher education the opportunity to participate in research of mutual interest to the faculty member and peers at U.S. Navy laboratories for a 10-week period
- Three levels of appointment: 1) Summer Faculty Fellow, 2) Senior Summer Faculty Fellow, and 3) Distinguished Summer Faculty Fellow
- Participants have an opportunity to establish continuing research relationships with the R&D personnel of the host laboratories which may result in sponsorship of the participant's research at their home institutions
- Open to U.S citizens and legal permanent residents who hold teaching or research appointments at U.S. colleges at universities
- Security clearance varies among laboratories

U.S. Air Force Research Lab Summer Faculty Fellowship Program

- Offers hands-on exposure to Air Force research challenges through 8-12 week research residences at participating Air Force research facilities for full-time science, mathematics, and engineering faculty at U.S. colleges and universities

Opportunities for Universities

Multidisciplinary Research Program (MURI)

- Addresses high-risk basic research
- Attempts to understand or achieve something that has never been done before
- MURI has produced significant scientific breakthroughs in science and revolutionary new military technologies
- Service program officers play an active role in providing research guidance and management
- ONR and ARMY

[ONR MURI](#)

[Army MURI](#)

- Multidisciplinary teams, 2-4 universities

Defense University Research Instrumentation Program (DURIP)

- Designed to improve capabilities of U.S. institutions of higher education to conduct research and to education scientists and engineers in areas of importance to national defense by providing funding for acquisition of research equipment or instrumentation.
- Proposals can request funding for more than one item if requested items comprise a “System” that is used for a common research purpose
- Administered by Army Research Office (ARO), Office of Naval Research (ONR), and Air Force Office of Scientific Research (AFOSR)
- Typical award size between \$50,000-\$1,500,000

AFRL/AFOSR Center of Excellence (CoE) Program

- The goal is to perform excellent research in high priority Air Force interest areas, strengthen AFRL in-house technical capabilities by providing frequent substantive professional interchanges between AFRL and university personnel, and educate students in vital technology areas, and opportunities for AFRL new employee recruitment
- New CoE topics posted on grants.gov as Funding Opportunity Announcements
- Individual and/or teams of universities can apply
- Award is made in form of grant to a university team

University Affiliated Research Center (UARC)

- Collaborative research partnerships between universities and DoD
- Currently 14 in the U.S.
- Chartered to provide technical excellence in unique disciplines that do not overlap
- Deep core knowledge
- Broad access to government information
- Easy access to technical resources
- Quick response to evolving government requirements – sole source authority allows agencies, offices, and programs to get them on contract in weeks or days

There are Currently 14 UARCS

- Institute for Collaborative Biotechnologies, UC-Santa Barbara (ARMY)
- Institute for Creative Technologies, University of Southern California (ARMY)
- Georgia Tech Research Institute, Georgia Institute of Technology (ARMY)
- Institute for Soldier Nanotechnologies, MIT (ARMY)
- Applied Physics Laboratory, Johns Hopkins University (NAVY)
- Applied Research Laboratory, Penn State (NAVY)
- Applied Research Laboratories, University of Texas-Austin (NAVY)
- Applied Physics Laboratory, University of Washington (NAVY)
- Applied Research Laboratory, University of Hawaii (NAVY)
- Space Dynamics Laboratory, Utah State University (Missile Defense Agency (MDA))
- Applied Research Laboratory for Intelligence and Security, University of Maryland (USD (I&S))
- Systems engineering Research Center, Stevens Institute of Technology (USD (R&E))
- National Strategic Research Institute, University of Nebraska (STRACOM)
- Geophysical Detection of Nuclear Proliferation, University of Alaska (DASD (TRAC))

Responding to Opportunities

Use the Heilmeier Catechism to Frame White Papers

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you are successful, what difference will it make?
- What are the risks?
- How much will it cost?
- How long will it take?
- What are the mid-term and final “exams” to check for success?

George H. Heilmeier, former DARPA director (1975-1977)

White Papers

- Some BAAs will specify white paper requirements or the PO may tell you what to include
- General framework for white papers/concept papers:
- Problem- what problem are you trying to solve or what is the critical need?
- Prior Work – what have others done to try to solve the problem
- Gaps – what are the gaps or shortcomings in prior efforts?
- Solution – what is your proposed solution to the problem
- Justification – Why is your solution better? How does it address key gaps?
- Source: Anthony Caruso, UMKC

Proposal Tips

- There is no standard proposal format; agencies and programs differ in requirements
- Proposals go through administrative review first – make sure you follow all instructions carefully
- Always talk to Program Officers before submitting white papers or proposals
- Frame your research to fit their problem and their priorities
- Use clear simple language, no jargon!
- Include a Gantt chart

Quad Chart – Poster in a PowerPoint

- Some BAAs will stipulate the content for quad charts
- There are many examples of quad charts on the web

Common Quad Chart Elements:

Header: Logo, Title, BAA #

Top Left: Powerful, compelling, easy to understand graphic, in color

Top Right: Proposed technical capability, the problem it solves

Bottom Left: Statement of Work including Milestones, Tasks, Cost, and Schedule

Bottom Right: Prototypes/Deliverables/Outcomes and Contact Information

Footer: Markings such as Proprietary, Confidential etc

Source: Caruso, UMKC

How Proposals are Evaluated

- Overall scientific merit
- Relevance to military mission – addresses a critical need
- Execution plan – schedule with clear milestones
- Appropriate level of technical risk
- Qualifications of PI/team: experience, overall capabilities, facilities, techniques, expertise, or unique contributions
- Budget – realistic costs and availability of funds

Resources

[Electronic Biomedical Research Application Portal \(eBRAP\)](#)

[Defense Innovation Marketplace](#)

[Polyplexus](#)

Where to Get Help

For questions, help identifying funding opportunities, preparing to talk to program officers, developing white papers and proposals, proposal review and editing :

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