Engaging with DARPA

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DARPA’s Mission:
Breakthrough Technologies For National Security

**Communications/Networking**
- Stealth
- Precision Guidance & Navigation

**Materials Science:**
- Semiconductors, superalloys, carbon fibers, composites, thermoelectrics, ceramics

**Microelectronics:**
- VLSI, CAD, manufacturing, IR, RF, MEMS
- Timesharing, client/server, graphics, GUI, RISC, parallel computing, speech recognition

**Information Technology:**
- Timesharing, client/server, graphics, GUI, RISC, parallel computing, speech recognition

These new capabilities require a healthy ecosystem across Service S&T, universities, and industry.

DARPA’s role: pivotal early investments that change what’s possible
DARPA Inside

**Stellar program managers**

- Technology leadership
- Adventurous spirit
- Conviction and drive to change the world

**Active engagement with technology community**

- Universities
- Labs
- Companies small and large
- Military services and agencies

**DARPA Culture**

- Off-scale impact
- Risk taking
- Honor in public service

Distribution Statement “A” (Approved for Public Release, Distribution Unlimited)
BIOLOGICAL TECHNOLOGY OFFICE
- Biological Complexity at Scale
- Neurotechnologies
- Engineering Biology
- Restore, Maintain and Improve Warfighter Abilities

DEFENSE SCIENCE OFFICE
- Math, Modeling & Design
- Physical Systems
- Human-Machine Systems

INFORMATION INNOVATION OFFICE
- Empower the Human within the Information Ecosystem
- Guarantee Trustworthy Computing and Information

MICROSYSTEMS TECHNOLOGY OFFICE
- Electromagnetic Spectrum
- Tactical Information Extraction
- Globalization

STRATEGIC TECHNOLOGY OFFICE
- System of Systems (SoS)
- Battle Management/Communication and Control (BMC2)
- Communications and Networks (C&N)
- Electronic Warfare (EW)
- Intelligence Surveillance, and Reconnaissance (ISR)
- Positioning, Navigation, and Timing (PNT)

TACTICAL TECHNOLOGY OFFICE
- System Focus Areas:
  - Ground
  - Maritime
  - Air
  - Space
- Crosscutting Themes:
  - Agile development
  - Cooperative Autonomy
  - Unmanned Systems
  - Power and Propulsion

Further dissemination only as directed by DARPA Director’s Office or higher DoD authority
## Seedlings vs. Programs

<table>
<thead>
<tr>
<th>Seedlings</th>
<th>Programs</th>
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<tbody>
<tr>
<td>Usually submitted through DSO Office-Wide BAA</td>
<td>Proposals solicited through specific DSO program BAAs</td>
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<tr>
<td>Small short duration (6-9 months) projects</td>
<td>Often multi-year, multi-disciplinary efforts</td>
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<tr>
<td>Move concepts from “disbelief” to “mere doubt”</td>
<td>Technology development to move from “possibility” to “capability”</td>
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<tr>
<td>May lead to the next generation of program ideas</td>
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How we think: The Heilmeier Catechism

Important questions to consider when approaching DARPA with ideas:

• What are you trying to do? (no jargon!)
• How does this get done today?
• What is new about your approach?
• If you succeed, what difference do you think it will make?
• How long do you think it will take?
• Can your work transition (to the DoD or others)?
• How much will it cost?
Three Ways to Engage with DARPA

Talk to a Program Manager (PM)
- Email/phone/face to face throughout the year

Submit ideas to an Office-Wide BAA (DSO’s is BAA-15-39)

Respond to DARPA program BAAs

Distribution Statement “A” (Approved for Public Release, Distribution Unlimited)
DSO is “DARPA’s DARPA”

Accelerating breakthrough discoveries to create new enabling technologies for national security
Factors Shaping DARPA Investments Today

Wide range of national security challenges: evolving nation states, shifting networks

Powerful, globally available technologies set a fast pace

Military systems’ cost, pace, and inflexibility limit our operational capabilities
Accelerate discovery and development

Enable rapid, customized production of (nearly) everything

Harness complexity through modeling and design
Focus Areas

Math, Modeling & Design

Physical Systems

Human-Machine Systems

Social Systems

Credit: Detroit Institute of Arts

© 2007 Ned Batchelder

The Economist, April 2012
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Description</th>
<th>Release Date</th>
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<tbody>
<tr>
<td>Spectral Combs from Ultraviolet to Terahertz (SCOUT)</td>
<td>Advanced stand-off detection of trace chem/bio species in clutter</td>
<td>BAA release: 10/7/2014</td>
</tr>
<tr>
<td>Agnostic Compact Demilitarization of Chemical Agents (ACDC)</td>
<td>On-site agnostic chemical destruction capability using local resources to convert harmful agents with no hazardous output</td>
<td>BAA release: 12/10/2014</td>
</tr>
<tr>
<td>Enabling Quantification of Understanding in Physical Systems (EQUIPS)</td>
<td>Foundational mathematics to enable quantification of uncertainty in physical systems</td>
<td>BAA release: 12/18/2014</td>
</tr>
<tr>
<td>Fast Lightweight Autonomy (FLA)</td>
<td>Minimalistic algorithms for high-speed autonomous navigation in cluttered, unfamiliar environments</td>
<td>BAA release: 12/22/2014</td>
</tr>
<tr>
<td>Materials for Transduction (MATRIX)</td>
<td>Integrate transduction modeling, design and validation into unified R&amp;D approach with applications focus</td>
<td>BAA release: 1/23/2015</td>
</tr>
<tr>
<td>Revolutionary Enhancement of Visibility by Exploiting Active Light-fields (REVEAL)</td>
<td>Comprehensive theoretical framework to enable maximum information extraction from complex scenes by using all photon pathways and leveraging light’s multiple degrees of freedom</td>
<td>BAA release: 5/22/2015</td>
</tr>
<tr>
<td>Make-It</td>
<td>Automated chemical synthesizer that can produce, purify, characterize and scale a wide range of small molecules</td>
<td>BAA release: 6/9/2015</td>
</tr>
<tr>
<td>Tailorable Feedstock and Forming (TFF)</td>
<td>Rapid manufacturing of small aerospace composite parts at costs competitive with metal</td>
<td>BAA release: 9/11/2015</td>
</tr>
<tr>
<td>Complex Adaptive System Composition And Design Environment (CASCADE)</td>
<td>Design system of systems architectures for resilient response to unexpected situations</td>
<td>BAA release: 11/23/2015</td>
</tr>
<tr>
<td>Fundamental Limits of Detection (Detect)</td>
<td>Establish the first-principles limits of photon detection by developing new models, and by testing those models in proof-of-concept experiments</td>
<td>BAA release: 1/21/2016</td>
</tr>
<tr>
<td>Next Generation Social Science (NGS2)</td>
<td>New experimental methods, models, and practices for conducting research into complex social systems</td>
<td>BAA coming soon</td>
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We look forward to your ideas
Backups
DSO’s Office-wide BAA Proposal Process

Optional templates for full proposals

Submit to the DARPA BAA Submission Website (https://baa.darpa.mil) or grants.gov, as applicable
# Types of Programs

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<th>Foundations</th>
<th>Tools</th>
<th>Integrated Demonstrations</th>
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<tr>
<td>• Monitor and explore scientific frontiers across multiple disciplines to create new communities and capabilities</td>
<td>• Exploit discoveries to develop tools</td>
<td>• Bring together multiple lines of research into a new capability, outside the laboratory</td>
</tr>
<tr>
<td>• Mostly measurement and theory</td>
<td>• Translate capability from within a research community to outsiders</td>
<td>• Often opportunistic, and/or driven by specific DoD needs</td>
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<tr>
<td></td>
<td>• Increased focus on use cases and potential CONOPS</td>
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</table>
• E-mail questions about the BAA to **DARPA-BAA-15-39@darpa.mil**


• Find PM bios and program information at [https://www.darpa.mil/about-us/offices/dso](https://www.darpa.mil/about-us/offices/dso)