



Assessing the Impact of DoD-Funded Assistance Projects on the Availability of New Warfighting Capabilities

Amanda Bresler, *Chief Strategy Officer* | PW Communications | abresler@pwcommunications.com
Alex Bresler, *Chief Data Officer* | PW Communications | alexbresler@pwcommunications.com

Research Question

The Department of Defense (DoD) spends billions annually on efforts intended to advance warfighting capabilities. This funding takes the form of “procurements” and “assistance.” Assistance, which includes grants, loans, and cooperative agreements, represents a significant and critical component of DoD resourcing for innovation.

How does the DoD direct assistance funding, and what entities receive these funds? To what extent does DoD-funded assistance for R&D facilitate the delivery of innovative capabilities to the warfighter?

Isolating DoD-Funded Assistance Data

FY2018-FY2023

+54%

DoD assistance funding grew ~54%

+16%

Unique entities in receipt of DoD assistance grew 16%

| Fiscal Year | Total DoD Assistance Funding | Unique Awardees |
|--------------|------------------------------|-----------------|
| 2018 | \$6,617,043,955 | 1,774 |
| 2019 | \$7,618,583,833 | 1,836 |
| 2020 | \$9,222,099,811 | 1,945 |
| 2021 | \$8,298,107,140 | 1,963 |
| 2022 | \$9,832,531,017 | 2,041 |
| 2023 | \$10,187,578,149 | 2,061 |
| Total | \$51,775,943,906 | |

DoD R&D Assistance Programs

ASSISTANCE PROGRAM

| |
|--|
| COLLABORATIVE RESEARCH AND DEVELOPMENT - CONSTRUCTION PRODUCTIVITY ADVANCEMENT RESEARCH CPAR PROGRAM |
| MILITARY MEDICAL RESEARCH AND DEVELOPMENT |
| BASIC AND APPLIED SCIENTIFIC RESEARCH |
| AIR FORCE DEFENSE RESEARCH SCIENCES PROGRAM |
| BASIC SCIENTIFIC RESEARCH |
| RESEARCH AND TECHNOLOGY DEVELOPMENT |
| COMMERCIAL TECHNOLOGIES FOR MAINTENANCE ACTIVITIES PROGRAM - CTMA |
| BASIC, APPLIED, AND ADVANCED RESEARCH IN SCIENCE AND ENGINEERING |
| UNIFORMED SERVICES UNIVERSITY MEDICAL RESEARCH PROJECTS - UNIFORMED SERVICES UNIVERSITY USU |
| DEFENSE PRODUCTION ACT TITLE III - DPA TITLE III |
| MILITARY HEALTH SERVICES RESEARCH |
| RESEARCH ON CHEMICAL AND BIOLOGICAL DEFENSE |
| MILITARY HEALTH SERVICES RESEARCH |
| RESEARCH AND DEVELOPMENT - MEDICAL AND PROSTHETIC RESEARCH AND DEVELOPMENT |
| SCIENTIFIC RESEARCH - COMBATING WEAPONS OF MASS DESTRUCTION |
| SPACE TECHNOLOGY - STMD, SPACE TECH |
| RESEARCH GRANTS |
| NAVY COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE - C4ISR |
| AIR FORCE MEDICAL RESEARCH AND DEVELOPMENT |
| WATER USE AND DATA RESEARCH - WUDR |
| NAVAL MEDICAL RESEARCH AND DEVELOPMENT |
| AGRICULTURAL RESEARCH BASIC AND APPLIED RESEARCH - EXTRAMURAL RESEARCH |

Assistance is directed through
Federal financial assistance programs
("assistance programs")

DoD obligated assistance funding through
90 assistance programs

We isolated assistance programs
referencing "research" and/or "research and
development" in the program name or
Catalog of Federal Domestic Assistance
(CFDA) ID; and programs that appeared to
relate to R&D, based on award details ⇒

22 "DoD R&D Assistance Programs"

Analyzing DoD R&D Assistance

DoD R&D Assistance Entities Buck DIB Trends

Unique entities in receipt of DoD R&D assistance grew 14.4%

More than 1/3 of for-profit companies had no prior defense revenue; 16% had no prior USG funding whatsoever

Future research: What can DoD learn about how R&D assistance programs manage to identify, attract, and engage new companies?

| Fiscal Year | Total DoD R&D Assistance Funding | Unique R&D Assistance Awardees |
|--------------|----------------------------------|--------------------------------|
| 2018 | \$3,805,222,335 | 1375 |
| 2019 | \$4,521,258,181 | 1421 |
| 2020 | \$5,576,549,778 | 1485 |
| 2021 | \$5,093,791,396 | 1491 |
| 2022 | \$6,213,365,287 | 1586 |
| 2023 | \$6,106,604,741 | 1574 |
| Total | \$31,316,791,717 | |

| BUSINESS TYPE | TOTAL OBLIGATIONS (FY2018-FY2023) | UNIQUE ENTITIES |
|---|-----------------------------------|-----------------|
| STATE GOVERNMENT | \$15,168,587,623 | 277 |
| PUBLIC/STATE CONTROLLED INSTITUTION OF HIGHER EDUCATION | \$13,784,597,987 | 495 |
| NONPROFIT WITH 501C3 IRS STATUS | \$6,694,894,445 | 763 |
| PRIVATE INSTITUTION OF HIGHER EDUCATION | \$5,858,347,288 | 277 |
| FOR-PROFIT ORGANIZATION OTHER THAN SMALL BUSINESS | \$3,823,262,941 | 459 |
| FOR-PROFIT ORGANIZATION SMALL BUSINESS | \$3,201,860,378 | 435 |
| SPECIAL DISTRICT GOVERNMENT | \$1,002,121,654 | 65 |
| INDEPENDENT SCHOOL DISTRICT | \$626,138,337 | 124 |
| NONPROFIT WITHOUT 501C3 IRS STATUS | \$581,343,367 | 54 |
| NON-DOMESTIC ENTITY | \$331,550,619 | 359 |
| COUNTY GOVERNMENT | \$316,950,471 | 77 |
| CITY OR TOWNSHIP GOVERNMENT | \$238,334,936 | 88 |
| INDIAN/NATIVE AMERICAN TRIBAL GOVERNMENT/ORGANIZATION | \$78,267,550 | 42 |
| REGIONAL ORGANIZATION | \$37,921,171 | 16 |
| INDIVIDUAL | \$31,599,154 | 4 |
| HISTORICALLY BLACK COLLEGE OR UNIVERSITY | \$763,270 | 3 |
| PUBLIC/INDIAN HOUSING AUTHORITY | \$242,606 | 3 |
| UNDISCLOSED | -\$839,892 | 4 |

Allocators received the majority of R&D assistance

EX: \$1.4 billion award to the National Center for Manufacturing Sciences, Inc. (NCMS) ⇒ \$1.2 billion (84%) was allocated to 530 subawardees

Future research: incorporate subaward data to better understand DoD R&D assistance projects, and capture better insights on the types of entities involved in this work.

DoD Medical R&D

| Assistance Program | Total Obligations, FY2018-FY2023 | % of Total R&D Assistance, FY2018-FY203 |
|---|----------------------------------|---|
| MILITARY MEDICAL RESEARCH AND DEVELOPMENT | \$7,830,757,467 | 25% |
| UNIFORMED SERVICES UNIVERSITY MEDICAL RESEARCH PROJECTS - UNIFORMED SERVICES UNIVERSITY USU | \$1,658,592,440 | 5% |
| NAVAL MEDICAL RESEARCH AND DEVELOPMENT | \$141,774,087 | 0.4527% |
| RESEARCH AND DEVELOPMENT - MEDICAL AND PROSTHETIC RESEARCH AND DEVELOPMENT | \$32,150,848 | 0.1027% |
| MILITARY HEALTH SERVICES RESEARCH | \$4,903,267 | 0.0157% |
| AIR FORCE MEDICAL RESEARCH AND DEVELOPMENT | \$300,000 | 0.0010% |

“**Military Medical R&D**” received **25%** of all DoD R&D assistance funding

Medical R&D assistance programs accounted for nearly **1/3 of all DoD R&D assistance**

\$1.9 billion+ in DoD R&D assistance referenced “cancer” in the award description; \$706 million+ specifically referenced “breast cancer”

\$179 million referenced “hypersonics” ⇒ **DoD directed 10x more R&D assistance funding into cancer than hypersonics**

Hundreds of millions in DoD R&D assistance was directed into projects for obesity/diabetes, autism, heart disease, Parkinsons, and other general health/medical fields

HHS, CDC, VA and other departments/agencies invest ~~billions into the same areas~~

DoD Medical R&D: Mission Creep

Assistance funding for broad **medical R&D** has eclipsed projects explicitly linked to **DoD priorities**

DoD should comprehensively review all DoD medical R&D projects and **spin-off projects focused on the health of the general population** to other departments and/or agencies

“Military research and development provide the United States with the capability to produce technologies which are needed or may be needed to support the needs of National Security.”

OUSD USDR&E

Nonmedical DoD R&D Keyword Extraction & Analysis

Utilized KeyBERT, an open source NLP library, to analyze award data for the 16 nonmedical R&D programs

Relying on award data limited the efficacy of the analysis, but KeyBERT produced useful & descriptive “top keywords” for certain programs.

BASIC AND APPLIED SCIENTIFIC RESEARCH

Machine Learning, Modeling, Prediction, Physics

RESEARCH ON CHEMICAL AND BIOLOGICAL DEFENSE

Biosafety Level, Coating Warehouse, Covid Vaccines

SPACE TECHNOLOGY - STMD, SPACE TECH

Biomanufacturing, Space Travel, Variable Radiation Exposure

COMBATING WEAPONS OF MASS DESTRUCTION PROGRAM

Radiation Effects, Chemical Warfare Agents, Radiation, Alphavirus Infections, Bacillus Anthracis

Tracing the Path from R&D to Available Capabilities

“Communities of Interest” across DoD elevate R&D projects ⇒ DoD should study these communities and amplify their reach

No straightforward methodology for tracking transition; in future research, consider proxies:

- Identify assistance entities' subsequent contract and/or subcontract awards and explore award details to determine if there is a link between their assistance-funded project, and the products/services being procured
- Explore citations of assistance-funded projects in subsequent proposals
- Identify corresponding patents and explore references to this IP in subsequent procurement data
- Explore DTIC final reports to gauge technology readiness levels

The overarching purpose of military R&D should not be funding experiments, for experiments' sake. To ensure programs serve the warfighting community to the maximum extent possible:

- Ensure USG stakeholders receive information about R&D projects ⇒ *they cannot leverage capabilities, if you do not know they exist*
- Develop realistic goals for what share of assistance-funded R&D projects should be subsequently leveraged; and incentivize/require USG stakeholders and prime contractors to leverage assistance-funded capabilities
- Prior to funding R&D projects, USG stakeholders must determine if materially-similar projects have already been funded

DoD-Funded R&D

One Piece of the Military Innovation Puzzle

New innovations that stand to benefit the military are produced by a wide range of communities inside and outside of the USG. Assistance is one of many funding mechanisms available to DoD to support/harness these efforts.

Additional research is needed to better understand:

1. the types of projects funded through DoD R&D assistance
2. the types of entities involved in this work.

Assessing the effectiveness of R&D assistance as a means of enhancing warfighting capabilities, in isolation, is meaningful only to a point. A serious commitment to advancing warfighting capabilities depends on three pillars:

1. Attracting and engaging the disparate stakeholders at the helm of relevant innovation
2. Reducing duplicative efforts
3. Ensuring breakthroughs reach potential beneficiaries across the DoD as quickly as possible.

The mechanisms by which the DoD directs resources into innovation—R&D assistance programs, SBIR/STTR, the Defense Innovation Unit (DIU), Futures Command, and more—must operate in concert with one another.



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