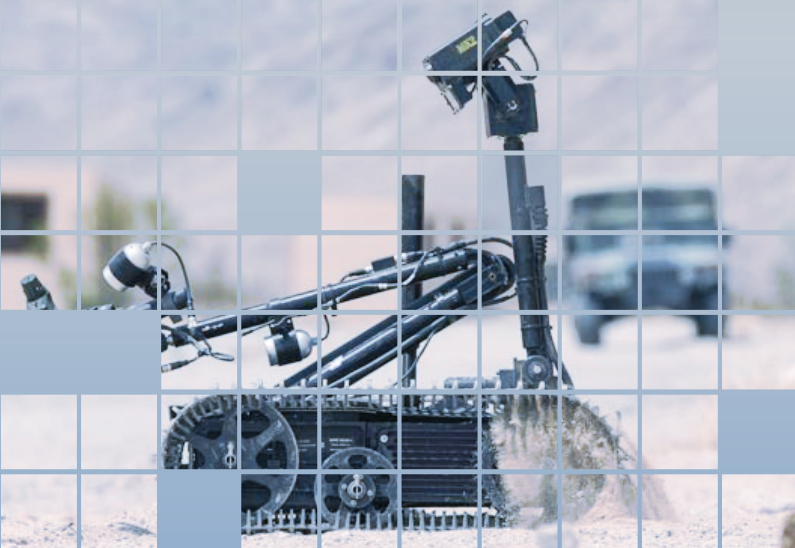
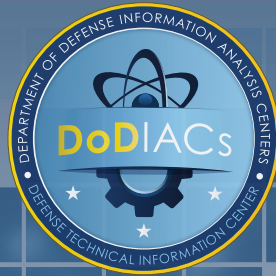


# State *of the* INFORMATION ANALYSIS CENTERS



Fiscal Year 2021

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**Middle:** Airman 1st Class William Rosado

**Bottom Left:** Lance Cpl. Andrew Bray

**Bottom Right Image:** By Gorodenkoff

# LETTER FROM THE DIRECTOR

In our 75th year of existence, I am pleased to report the IAC program has reached new heights in bringing R&D innovation to the Department of Defense (DoD) Science and Technology (S&T) ecosystem.

We provide critical, flexible, efficient, and cutting-edge research and analysis to acquisition program managers, DoD laboratories, Program Executive Officers (PEOs), Combatant Commands, and other federal agencies. The IAC program continues to expand its offerings and capabilities beyond its foundational heritage as the Rocket Propulsion Information Analysis Center (RPIAC) in 1946 to now encompass ground-breaking Research and Development (R&D) efforts across the technological spectrum.

The IAC program provides rapid answers to technical questions and customer-focused acquisition in support of advanced R&D services. The IAC model is tailored to address many different problems and scenarios, meeting the diversity of technical challenges faced by DoD customers across the breadth and depth of 22 technical focus areas (TFAs) in 3 domains (Homeland Defense and Security, Defense Systems, and Cybersecurity and Information Systems). As part of the Defense Technical Information Center (DTIC) with the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) as our higher headquarters, the work of the IAC program aligns with Ms. Shyu's vision "to foster technological dominance across the Department of Defense, ensuring the unquestioned superiority of the American joint force." As such, the IAC program has aligned its efforts to support OUSD(R&E)'s eleven modernization priorities depicted on pages 16-17.

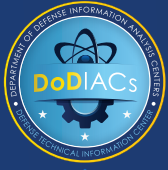


**THOMAS  
GILLESPIE**  
Director,  
DoD IACs

The IAC model includes a team of scientists, engineers, and analysts conducting original research, analyzing technical information, and synthesizing knowledge. To be able to provide a world-class information service, the DoD IACs leverage a network of over 2,300 subject matter experts (SME) across our technical focus areas. Our SMEs deliver information and analysis support, create technical products, and provide services as shown on pages 6-11. To meet customer specific research requirements, the DoD IACs also provide R&D contracting vehicles supported by assisted acquisition and requirements development services. Our customer support cell works directly with each Requiring Activity to help scope the Performance Work Statement and ensure that it is based on the latest research and meets their objectives.

Fiscal Year 2021 has seen the highest level of R&D work performed through the IAC program, with \$2.265 billion in funded work and over \$4.7 billion in new ceiling awarded. The IAC program is continuing to increase the savings to the customer by reducing our Customer Shared Direct Cost (CSDC) from 1.05% in FY21 to 1% in FY22. In order to meet the increasing demand for IAC services into FY22, we will continue to work hand in hand with our Air Force contracting partners to maintain our record of low times-to-award and low cost.

I wish to close with a personal remark: after 37+ years of government service with the U.S. Marine Corps and the IACs, I have decided to retire this December 2021. I want to express my sincere appreciation to all the team players that have made the IACs so successful over the last eight years: my own team within the IAC Program Office, Air Force contracting and legal operations, the Defense Finance Accounting Service, our numerous contracted industry firms, and of course the Defense Technical Information Center (especially the Resource Directorate). It takes a team of this size and complexity to make the IACs the valuable resource it is for the DoD research community, and so I wish all of you continued success and fair winds and following seas!



## OUR MISSION

Our mission is to provide a comprehensive resource for the DoD research community that runs the gamut from small, quick-turn research questions to large, multi-million dollar research projects executed in partnership with leading firms in the private defense research community.

## OUR VISION

Our vision is to accelerate innovation & technological developments by anticipating and responding to the research needs of the defense community with integrated Scientific and Technical Information (STI) development and dissemination.

## OUR BEGINNINGS

The need for the IACs became clear immediately after World War II, when a treasure trove of captured technical material evinced the need for technically sophisticated analysis that could turn this information into actionable innovation. The mass of unorganized, often redundant, and increasingly undependable information at times clouded the issues, introduced misinformation, and slowed progress.

To solve these problems, scientific and technical libraries collected and organized the latest published knowledge and brought it to the users' notice. At the basic level, libraries collected and disseminated information, answered reference queries, and provided current awareness to keep users informed of developments in a particular discipline. At the next level, special libraries and information centers offered complex literature searches in specific subject fields.

### □ The Defense Technical Information Center (DTIC) is the only information center serving the defense S&T community that:

- Preserves and disseminates current and historical research
- Delivers applications and services to make finding the right information easier
- Maximizes the value of each dollar that DoD spends through the analysis of funding, work-in-progress, and independent research and development data

### □ However, even with the establishment of these specialized libraries and information centers, several challenges remained [1]:

- Leadership still had no way to satisfy its critical need for state-of-the-art knowledge at any given time in a given focus area
- Scientists and engineers still had to sift through a mass of material to select the essential information to address their emerging requirements
- The lack of evaluation and analysis of the wide variety and the sheer number of research data and information sources made it impossible for researchers to quickly find the most important, relevant, and timely information they needed





To answer these challenges, **INFORMATION ANALYSIS CENTERS** were created to **PROVIDE RESEARCH AND ANALYSIS** services in highly specialized focus areas. Several IACs are in existence supporting individual organizations, but only the DoD IACs are **DEDICATED TO SERVING THE ENTIRE DOD COMMUNITY.**



The DoD IACs are staffed with scientists, engineers, and information specialists who provide research and analysis to customers.



Cybersecurity and Information Systems (CS)



Defense Systems (DS)



Homeland Defense and Security (HD)

- Provide state-of-the-art analysis for leadership across three domains, enabling scientists, S&T advisors, Program Executive Officers, and program managers to have the latest knowledge at their fingertips.
- Analyze vast databases of existing research and analysis and provide curated, actionable information that addresses emerging requirements. Keep abreast of research efforts across the government, identify and fill knowledge gaps.
- Evaluate and analyze research, data, or other scientific and technical material and synthesize it into a usable format that highlights the essential information. Promote communication and collaboration among scientists, engineers, acquisition professionals, and provide the latest scientific data and technological findings to the S&T community.

## The DoD IACs also:



Conduct original research and analysis, capability development, concept design, and prototyping



Answer technical inquiries and perform literature searches



Develop and conduct technical training



Create technical products



Offer requirement specific, low-cost, and rapid award contracting vehicles

# TECHNICAL INQUIRIES

The DoD IACs answer technical questions in 22 TFAs across three domains—cybersecurity and information systems, defense systems, and homeland defense and security.

Our access to worldwide information resources and an extensive network of subject matter experts (SMEs) enables us to provide up to **4 hours of free** research/analysis expertise to DoD and government decision makers, engineers, and scientists.

*The DoD IACs answered **2,195** technical inquiries in FY21 without charging our customers, saving DoD and government researchers valuable time and resources so they can focus on their mission.*

## EXAMPLES INCLUDE:

### The effects of small and large particulates in the air on high-speed (hypersonic/supersonic) vehicles

Photo by U.S. Army Acquisition Support Center



SMEs analyzed research describing the effects of a variety of particles including water droplets, ice, rain, dust, sand, and volcanic ash. Volcanic ash effects on subsonic flight vehicles, mainly jets, were explored since the research may apply to hypersonic flight vehicles. Small particles can impact hypersonic flight vehicles by causing erosion hazards to the vehicle's thermal protection, mechanical failure, and engine failure in subsonic vehicles. Research included using algorithms to simulate flight conditions, shock-tube experiments, modeling collisions between molecules, and exploring the effects of fluid mechanics.

■ **DSIAC:** <https://www.dsiac.org/services/technical-inquiries/notable-ti/small-particle-effects-on-hypersonic-flight/>

## Recent advances in armored personnel carrier (APC) survivability

---

Modern APCs are required to provide protection against heavy machine gun projectiles, rocket-propelled grenades, landmines, and improvised explosive devices. To accomplish this, APCs use modular armor, active protection, vehicle height, blast-attenuating seats, and structures to ensure protecting their content. To answer this inquiry, our SMEs compiled a survey of armor materials and armor types (steel, aluminum, ceramics, spall liners, and appliques) for APC survivability and discussed APC tires as well as seat and floor designs.

- **DSIAC:** <https://www.dsiac.org/services/technical-inquiries/notable-ti/armored-personnel-carrier-apc-survivability/>.

## Wearable diagnostic devices able to measure viral and/or bacterial infections

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Analysts discussed wearable symptom monitoring devices and implantable biomarker monitoring devices for disease diagnostics. We also described advances in wearable disease detection devices to include studies designed for the detection of COVID-19.

- **HDIAC:** <https://hdiac.org/technical-inquiries/notable/wearable-diagnostic-devices-to-measure-infections/>

For technical questions requiring more than 4 hours of research and analysis, the DoD IACs provide **extended technical inquiry** services on a **cost recovery basis**. These quick task orders can be up to **2 months in duration** and have a maximum cost limit of **\$50,000**. They can be classified up to TS/SCI, CONUS, and/or OCONUS.

For example, in FY21, the DoD IACs researched and analyzed weapon system lithium battery chemistry and cell design, manufacturers, safety certification and track record, weapon system application, and failure rates to enable the DoD to identify potential weapon system application concerns based on performance deficiency reports.

# TECHNICAL TRAINING

The DoD IACs provide free, in-depth technical training on subjects of particular interest to the DoD S&T community. These training sessions are delivered online or in a classroom setting and are led by domain SMEs.

The DoD IACs provided **54** technical trainings with **6,422** attendees in FY21

To request training topics please email us at [dtic.belvoir.iac.mbx.dodiacs@mail.mil](mailto:dtic.belvoir.iac.mbx.dodiacs@mail.mil).

## EXAMPLES OF TRAINING CONDUCTED IN FY21

### Large-Scale, Multiagent, Reinforcement Learning Control

Reinforcement learning provides a way to optimally control agents with uncertain behavior to achieve multi-objective goals when the precise model for the agent is unavailable. This training provides the current state of development of a theoretical foundation for data-driven, optimal control for large-scale swarm networks, where control actions will be taken based on low-dimensional measurement data instead of dynamic models. Discussions include Hierarchical Reinforcement Learning (HRL), which decomposes the global control objective into multiple hierarchies—namely, multiple, small group-level microscopic control and a broad, swarm-level macroscopic control. These HRL efforts allow the development of control policies for swarms of unmanned aerial and ground vehicles so that they can optimally accomplish different mission sets, even though the individual dynamics for the swarming agents are unknown. The webinar also included preliminary experimental results obtained from applying the developed HRL scheme for multiagent, target-tracking problems.

■ **DSIAC:** <https://www.dsiac.org/resources/webinars/large-scale-multiagent-reinforcement-learning-control/>

Photo by chesky





## DoD's Research Security and S&T Protection Efforts to Counter Foreign Influence

The U.S. faces evolving challenges to its military and technological dominance. Some of the most pressing challenges include rapid technological change, development and procurement issues, and strategic competition with China. Preserving our technology advantage from unwanted diversion, exploitation, or transfer is difficult to balance against the competition for global talent with the increased use of non-traditional collectors by foreign intelligence services. This webinar described how the DoD is developing standardized research security efforts, offering new program protection resources, and pursuing other activities to mitigate unwanted foreign influence and technology transfer. We also discuss the development of consistent risk methodologies and tailored science and technology (S&T) protection measures for DoD Modernization Priorities as well as the impact of DoD's research security efforts on federally-funded research and Foreign Talent Recruitment Programs.

■ **HDIAC:** <https://hdiac.org/webinars/dods-research-security-and-st-protection-efforts-to-counter-foreign-influence/>

## DevSecOps Pipeline for Complex Software-Intensive Systems: Addressing Cybersecurity Challenges

A major challenge for cybersecurity comes from new technology approaches that focus primarily on the benefits of implementation rather than on defining the governance and risk management changes necessary to establish and enforce appropriate protections. This challenge is especially important for the adoption of technology that impacts critical infrastructure and shared services, such as voting and defense. Researchers examined the challenges and the effective cybersecurity options facing Department of Defense (DoD) programs delivering cyber-physical systems and adopting DevSecOps. These researchers found a lack of broad understanding about the level of management and governance responsibility needed to define and use the DevSecOps pipeline. Adopting DevSecOps is a socio-technical decision that links technology with operational process and practice. Researchers identified several areas that require cross-functional and organizational management attention to fit the pipeline for mission use and considerations to address for producing the system.

■ **CSIAC:** <https://www.csiac.org/podcast/devsecops-pipeline/>



Photo by Alex

# TECHNICAL PRODUCTS

The DoD IACs develop a wide variety of technical products to provide the scientific community a deeper understanding of emerging technologies and research.

*These products include State-of-the-Art Reports (SOARs), technical assessments, critical reviews, alternative technology analyses, models, and current awareness activities. The DoD IACs developed **169** technical products and distributed them to all registered users in FY21, with an average user rating of 4.7 out 5.*

HERE ARE SOME EXAMPLES FROM FY21:



Photo by Vink Fan

## Web article and podcast: Securing the Soft Underbelly of a Supercomputer with BPF Probes

The primary objective of High Performance Computing (HPC) systems is to ensure the most resourceful execution of large-scale data analytics. Cybersecurity for HPC is a critical mission aspect that presents unique challenges in providing non-repudiation, a high level of data protection and confidentiality for scientific observations. In this special report, CSIAC delineated methods for closing HPC Security Gaps by using Berkeley Packet Filter (BPF) as part of a network load balancer. This special report is geared toward developers and users who want to understand HPC and BPF broader functionality as part of the Kernel Runtime Security to assist with improving detection of security threats.

■ **CSIAC:** <https://csiac.org/podcast/securing-the-soft-underbelly-of-a-supercomputer-with-bpf-probes/>



## State of the Art Report: Critical Infrastructure Protection

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Attacks on our critical infrastructure (CI), both in the physical realm and in cyber space, can cause significant economic disruption, loss of confidence in our civilian institutions, and injuries and deaths. This SOAR reviews the current state of emerging technologies and methodologies relating to the protection of infrastructure and resources critical to national security. Volume I provides an overview of the evolution of critical infrastructure protective measures focusing on the physical threats and the role of the government. Volume II discusses the increasingly complex cyber environment and the cyber threat to CI.

■ **HDIAC:** <https://hdiac.org/state-of-the-art-reports/critical-infrastructure-protection/>

## Monograph: The Effects of Blast on a Combat System

---

Blast waves are “shock waves” which, in the absence of fragments, shrapnel, and other penetration devices, are the primary lethal mechanism of blasts. Modeling the response of ground vehicles and its occupants against underbody, buried blasts has been a continued challenge that is often tackled through utilizing complex computation simulations. However, approaching the scenario from principles of physics and mathematics yields valuable insight and simple, fast-running models. This report discusses the basics of blast wave propagation and interaction, specifically as these apply to ground vehicles. It describes calculating global loads on the vehicle, local and structural responses in the vehicle, and responses to internal occupants, along with experimental verifications of calculations.

■ **DSIAC:** <https://dsiac.org/state-of-the-art-reports/the-effects-of-blast-on-a-combat-systems/>



# THE IAC MAC

The DoD IACs offer a \$28B Multiple Award Contract (MAC).



## The IAC MAC is an Indefinite Delivery, Indefinite Quantity (IDIQ) contract vehicle

that supports R&D and other related services in 22 TFAs across 3 domains.

## Why IAC MAC for my contracting needs?

### Easy to Use:

IAC MAC Customer Support Cell provides dedicated assisted acquisition and requirements development support to each user at no additional cost.

### Rapid Award:

4.5 months average time from solicitation to award.

### Pre-Vetted Contractors:

Best-in-class businesses with expertise across 22 TFAs.

### Low Customer

### Shared Direct Cost (CSDC):

Our CSDC is far below the industry average. It includes end-to-end pre/post-award support (requirements, contracts, financial, surveillance). No additional cost or contract access fee.



Booz | Allen | Hamilton



## Technical Focus Areas

### Defense Systems





### Pool 1

**Full and Open**  
**(TO value > \$15M)**  
Ordering Period:  
30 SEP 2018 - 30 MAR 2028

### Pool 2

**Small Business**  
**(TO value < \$15M)**  
Ordering Period:  
1 MAR 2019 - 1 APR 2028

### Pool 3

**CBRN Lab**  
**(Performed in CBRNE Facilities)**  
Ordering Period:  
30 SEP 2018 - 30 MAR 2028

## How does IAC MAC make my job easier?

#### Flexible Contract Structure:

- Up to 60 months of TO period of performance
- No minimum or maximum ordering value
- Contract types (CPFF, FFP, FFP LOE)
- Supports classified requirements up to TS/SCI
- CONUS and/or OCONUS to include OCO

#### Ease of Collaboration:

Quickly add co-funders with in-scope research requirements to your TO.

#### Maximize Value:

IAC MAC is not your traditional contract vehicle. As an S&T program, DoD IACs provide continuous research analysis support to all TOs and facilitate novel reuse of research findings and technical information generated to accelerate similar research across DoD.

**BAE SYSTEMS**



ManTech



**BARBARICUM**



**MRIGlobal**



### Contact Us

We look forward to supporting your RDT&E needs and enhancing your mission success. If you have any questions about the IAC MAC, contact us at:  
[dtic.belvoir.iac.mbx.csc@mail.mil](mailto:dtic.belvoir.iac.mbx.csc@mail.mil)

To learn about the DoD IACs' Research & Analysis services, please visit us at:  
<https://dodiac.dtic.mil/services>

# RAPID

Research, Analysis, Prototyping,  
Innovation, and Development



For smaller research efforts the DoD IACs provide a RAPID process to acquire research and analysis or prototyping services. These efforts are awarded within 8 weeks, have an analytical component, and generate scientific or technical information or prototypes.

## Homeland Defense and Security



CBRNE



Cultural  
Studies



Homeland  
Defense & Security



Medical



Alternative  
Energy



Biometrics



Critical  
Infrastructure  
Protection



WMD

## Defense Systems



Weapons  
Systems



Survivability &  
Vulnerability



Advanced  
Materials



Autonomous  
Systems



RMQSI



Non-Lethal  
Weapons

## RAPID Examples

### Counter-Unmanned Aerial System (C-UAS)

In response to growing proliferation of small Unmanned Aerial Systems (sUAS) used by adversarial forces, we developed and demonstrated a passive C-UAS technology to acquire and track sUAS, class 1-3. We also developed a list of C-UAS technologies designed to defeat drone swarms with nonkinetic electromagnetics in “Counter-Unmanned Aerial System (C-UAS) Technologies Using Nonkinetic Electromagnetics” (AD1129410).

Operated by SURVICE Engineering Company

## Cybersecurity and Information Systems



Military Sensing



Directed Energy



Software Data & Analysis



Modeling & Simulation



Energetics



C4ISR



Cyber Security



Knowledge Mgmt & Info Sharing

- Maximum \$1M ceiling and 12-month period of performance
- Contract types: Cost-Plus-Fixed-Fee (CPFF), Firm-Fixed-Price (FFP), Firm-Fixed-Price, Level-of-Effort (FFP- LOE)
- Can be classified up to TS/SCI
- CONUS and/or OCONUS to include Overseas Contingency Operations (OCO)

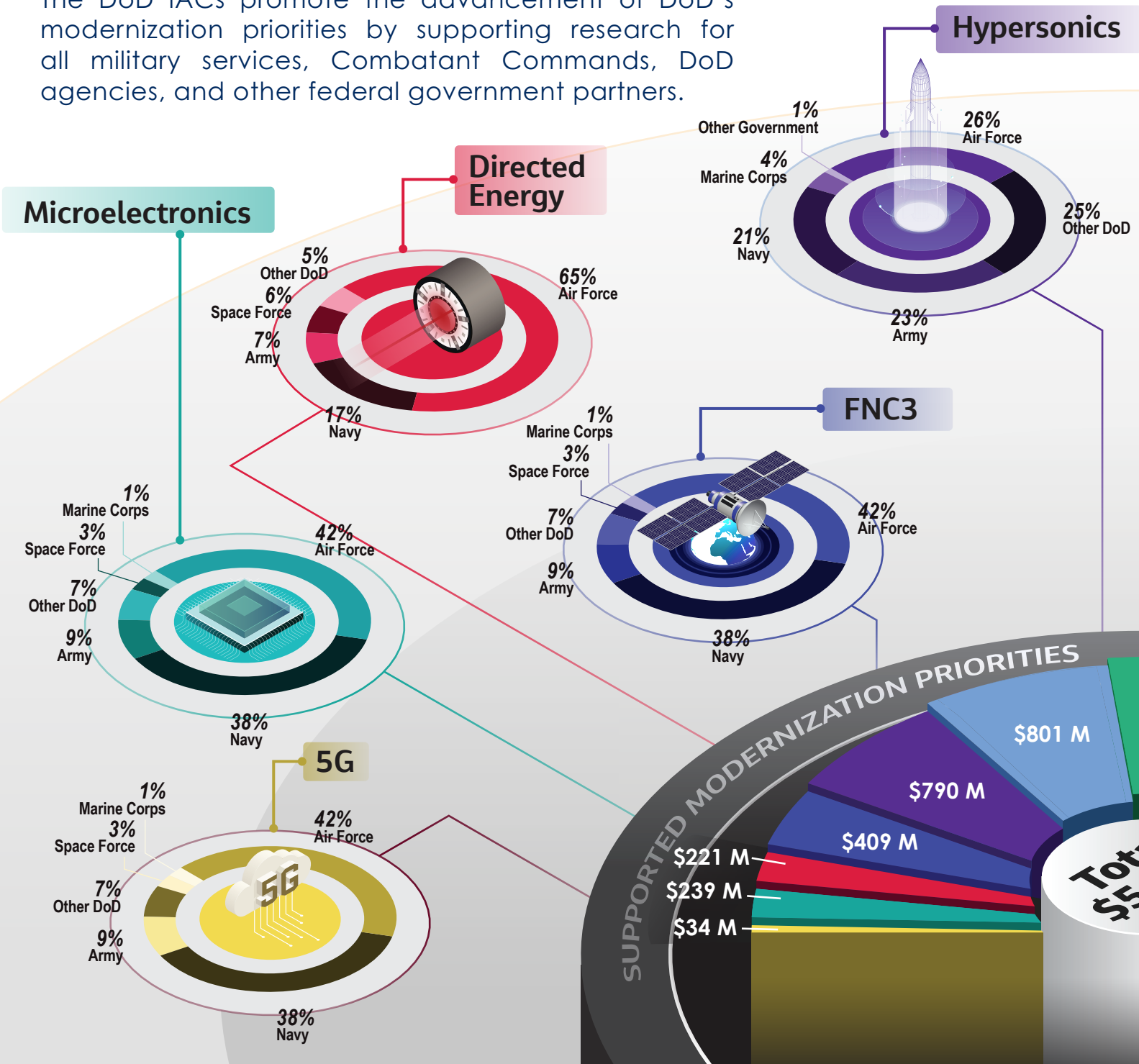
## Electro-Magnetic Interference (EMI) Protection of UAS

To harden the U.S. unmanned aerial systems (UAS) and protect them from enemy action, we are working to develop and validate a fuselage skin that will provide a greater than 90 decibels (>90dB) reduction in the micro-wave and radio-wave bands of the electromagnetic spectrum while not exceeding the weight of the state of the art unshielded fuselage skin. This effort will reduce the gaps in current EMI protection caused by the proliferation of electronics on the modern battlefield and help ensure UAS mission success.

# SUPPORT TO MODERNIZATION

The DoD IACs continue to stay at the forefront of research efforts. For the past seven decades, we have provided technical expertise to help solve the nation's toughest R&D challenges. The DoD IACs will continue to support the modernization priorities through research and assist in transitioning technologies into operational use.

The DoD IACs promote the advancement of DoD's modernization priorities by supporting research for all military services, Combatant Commands, DoD agencies, and other federal government partners.



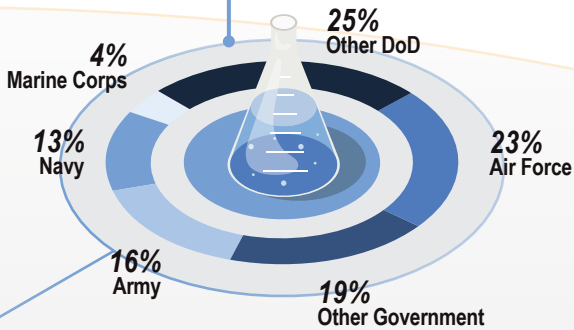


Since 2018, the IAC program has awarded over \$5.43B in R&D support across the following DoD modernization priorities:

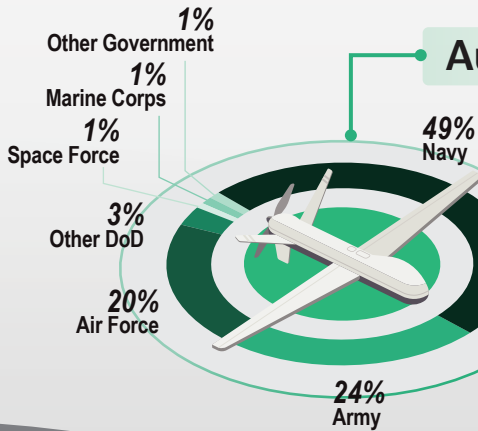
### Supported Modernization Priorities

- Cyber
- Fully Networked Command, Control, & Communications
- AI
- Autonomy
- Directed Energy
- Biotechnology
- Microelectronics
- Hypersonics
- 5G

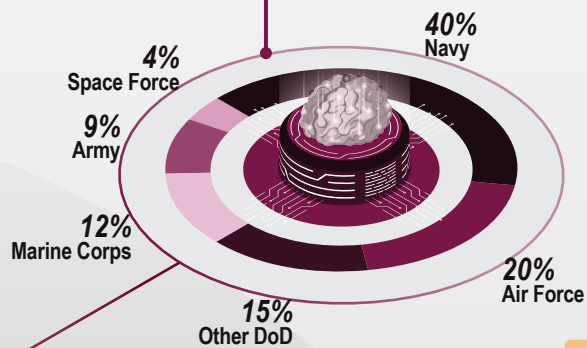
## Biotechnology



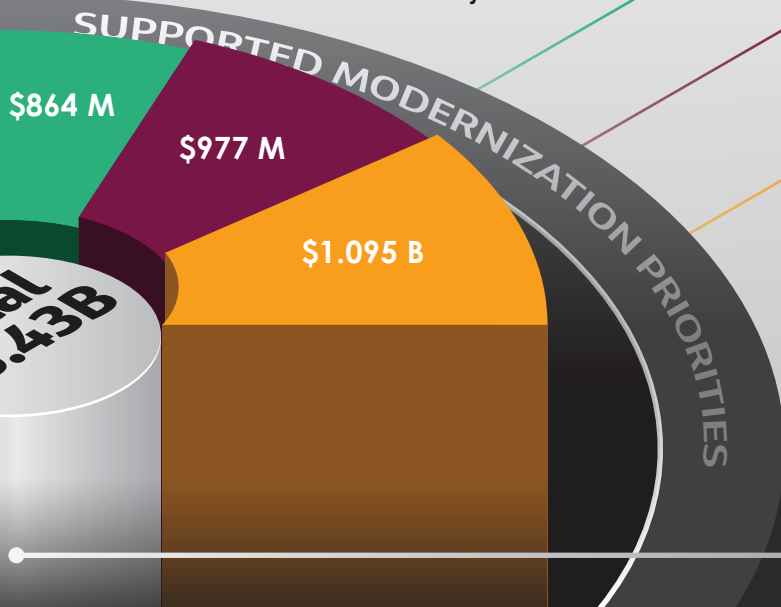
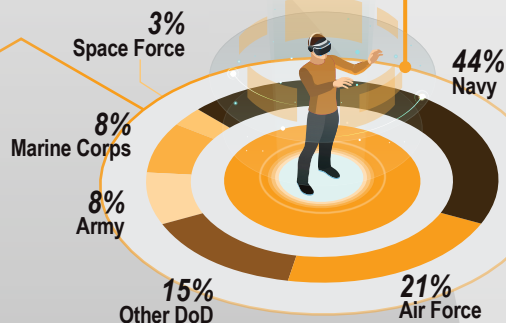
## Autonomy



## AI



## Cyber



The following is a short selection of the 295 research and engineering projects our prime vendors are currently working



Photo by Spc. Derek Mustard

## Counter Unmanned Aerial Systems (C-UAS)

The focus of this research is to engineer, analyze, and develop state-of-the-art technology to develop the next generation of intelligence, surveillance, and reconnaissance (ISR), Electronic Warfare (EW), mission systems, and survivability systems for C-UAS with a multifunctional team of the United States Navy, Army, Air Force, and Coast Guard.

## Unmanned Aerial Systems

The focus of this research is to perform advanced engineering, analysis, development, and integration of state-of-the-art technology to enhance the capabilities of Unmanned Aircraft Systems (UAS) to include unmanned and autonomous aircraft, weapons, and target systems. The upgraded UAS programs will enhance intelligence preparation of the maritime battle space by providing a more continuous source of information to maintain the Common Operational and Tactical Picture (COTP). This task order also includes RDT&E of the Department of Defense (DoD) Distributed Common Ground Station (DCGS) family of systems that provides multi-service integration of Intelligence, Surveillance, Reconnaissance, and Targeting (ISR&T) capabilities. The goal is to develop and refine the next generation of Intelligence, Surveillance, and Reconnaissance (ISR), Electronic Warfare (EW), mission systems, and survivability systems for UAS.

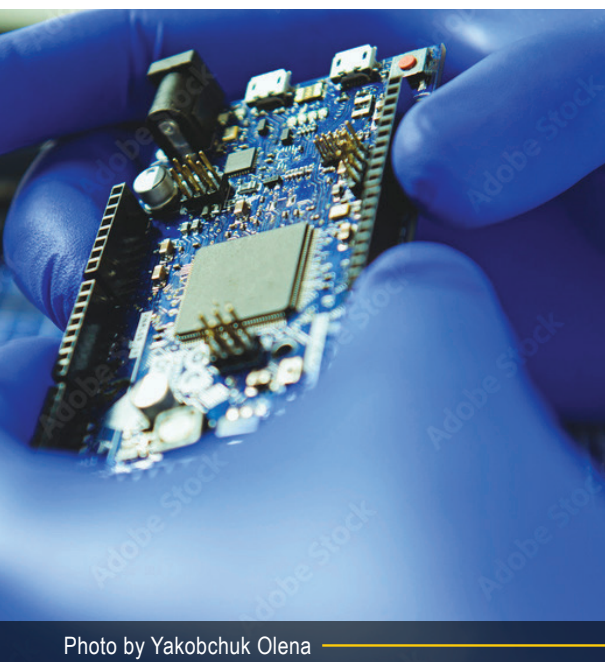


Photo by Yakobchuk Olena

## Microelectronics

The focus of this research is to enhance the complex technologies that form the building blocks critical to high performance signal processing for ISR Anti-Access/Area Denial applications. This effort provides disciplined research into verification and validation of third-party Intellectual Property (IP) as applied to Field Programmable Gate Array (FPGA), embedded FPGA (eFPGA), and Application Specific Integrated Circuit (ASIC) domains. The IAC MAC researchers investigate, evaluate, and establish methodologies to procure and analyze third-party intellectual property (3PIP), fabricate physical ASIC demonstrators, and perform post fabrication analysis.

## Fuze Military Sensing

The focus of this research is developing, evaluating, and testing the next generation of Electro-Optic Infrared (EO/IR) technology solutions of lasers, visual augmentation systems, multi-sensor EO/IR targeting systems, weapon sights, beacons, sensors, displays, and peripherals for various weapon systems and situational awareness platforms. This research will increase system reliability while reducing system costs; identifying critical enabling technologies and suitability; and analyze, assess, and develop new technical approaches and opportunities for technology transfer and integration.

## Enhancing Lethality of Special Operations Forces

The focus of this effort is to perform advanced Research and Development (R&D) studies to develop, identify, and field solutions to requirements gaps as well as to expand the technological advantage on the battlefield of dismounted maneuver and engagement technologies. This effort focuses on man-portable systems related to ease of movement and access, threat and target defeat, and defensive posture for dismounted maneuver and engagement operations. Research involves systems and technologies of both kinetic or non-kinetic; hand emplaced or delivered via a weapons system or autonomous vehicle; controlled locally, remotely, or autonomously; and used in different combat environments. The objective of this effort is to maintain the technological superiority of the warfighter to accomplish the mission over the full spectrum of military operations.

## Advanced Computing and Sensors

The focus of this effort is advanced computing research and development and advanced sensor research in four core areas: (1) advanced computing systems, (2) microelectronics integration, (3) optical and radio frequency innovations, and (4) solid state and quantum physics to provide increased homeland security, cyber security, and infrastructure protection technologies. This research includes both fundamental and applied research, analysis, and development for advanced computing research initiatives for cloud computing, big data analytics, High Performance Computing (HPC), cognitive cyber security, and algorithmic development. This also includes advanced sensor research and proof of concept prototypes yielding technical breakthroughs in non-software cyber threat detection and mitigation techniques, stealth communications, pattern recognition, and signal processing within electronic and optical domains.



Photo by Siarhei



The following is a short selection of the 295 research and engineering projects our prime vendors are currently working on.



Photo by Lance Cpl. Brendan Mullin

## Enhance Multi-Domain Operations

The focus of this research is the analysis of emerging technologies, cross-domain and Multi-Domain techniques (e.g., Radiant Mercury (RM) and Secure View (SV)), and developing innovative technical solutions in research, engineering, science, technology, rapid prototyping, technical development, integration, and operational support. The effort includes software and data integration, coordination, knowledge management, and information sharing of systems and subsystems for military Intelligence, Surveillance and Reconnaissance (ISR) data collection, analysis, and dissemination to support Joint All-Domain Command and Control (JADC2); Joint Artificial Intelligence Center (JAIC) National and Component Mission Initiatives (NMI/CMI); AI/ML; and autonomous software monitoring. The results of this initiative will enable decision makers to rapidly identify key areas for investment in new capabilities that build the foundation for a Joint Force that is able to conduct true Multi-Domain operations, even in the most difficult scenarios.

## Aircraft Survivability

The focus of this effort is to conduct research, development, and live fire test and evaluation to assess the survivability and vulnerability of several military platforms. The assessments include modeling and simulations studies and analyses against specified threat types and across a wide range of scenarios, data analyses, evaluation of test methods, and battle damage assessment. The results of effort will be used to enhance the survivability of weapons platforms and the safety of the warfighter.

## Optoelectronic Research

The focus of this effort is to conduct basic research and analysis of military and commercial developmental devices using emerging electronic, plasmonic, electro-optic, and photonic technology. Research output will include technical analyses related to specific devices such as lasers, waveguides, detectors, and focal plane arrays; specific materials such as semiconductors (e.g. zinc selenide (ZnSe), zinc oxide (ZnO), gallium nitride (GaN), silicon-germanium-tin (SiGeSn)), nonlinear crystals (e.g. CdSiP<sub>2</sub>, orientation-patterned gallium arsenide), and laser gain media (e.g. iron-doped ZnSe, rare-earth-doped tantalates). The research results will be applicable to nearly every airborne platform, spacecraft, sensors, and GPS satellites.



## Analysis for SOCAFRICA

The focus of this research is to assess security cooperation programs and initiatives, conduct geospatial analysis and mapping, perform operational and strategic assessments, and analyze threats and environmental and strategic trends. The IAC MAC's recommendations based on its multifaceted analyses will form the framework that supports resource allocation, operational and strategic planning, and command decisions.

## Enhance Protective Clothing and Equipment

The focus of this research is to perform analysis for the research and development (R&D) of improving and enhancing the performance, survivability, and comfort of protective clothing and equipment of the warfighter. Research and analysis includes the seamless integration of a variety of multi-disciplinary technology mission areas comprised of individual subsystems, the integrated, networked, and augmented vision for future concepts; and the design and development of prototypes relevant to survivability and operational efficacy. Further R&D will include prototyping of microclimate cooling and heating systems, wired and wireless power and data distribution, personal electronics and information portrayal systems, energy harvesting, energy storage, integrated helmet systems, and energy generation.

## Autonomous Vehicle Development

The focus of this research is the development of modeling and simulation (M&S) enhancements for manned and unmanned ground combat systems, combat service and service support systems, hybrid combat vehicles, joint light tactical vehicles, and robotic vehicles. The effort also includes the analysis of mobility, power, and energy systems; the research, design, and development of capabilities of autonomous vehicle software-in-the-loop integration laboratories (SIL); and the methodologies to train and assess autonomous vehicles to improve current force effectiveness and future capabilities.

## Microelectronics: Trust and Assurance

The focus of this research is in the verification and validation (V&V) of trusted and assured microelectronics including lifecycle (reliability and aging) research and failure analysis. Research efforts include microelectronics system design through foundational assurance principles, characterization and assessment of microelectronics components, and the research of microelectronics fabrication. This research will develop reliability best practices and methodologies for trusted systems in the digital and analog realm; unique and science driven counterfeit detection schemes through microelectronic device characterization methodology; and advanced fabrication and packaging schemes for trust and assured microelectronics.

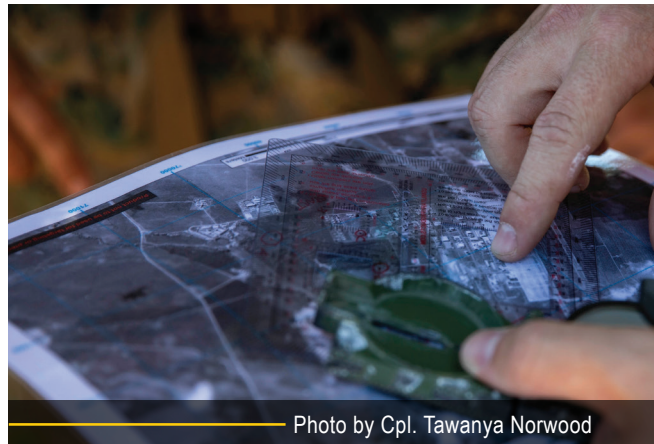


Photo by Cpl. Tawanya Norwood

The following is a short selection of the 295 research and engineering projects our prime vendors are currently working on.

## Intelligence, Surveillance, & Reconnaissance and Force Protection

The focus of this effort is to conduct research, testing, development, and evaluation of emerging technologies, materials, and manufacturing processes to significantly enhance the functionality and capability of existing and future Intelligence, Surveillance, and Reconnaissance (ISR), Force Protection (FP), and counter terrorism systems and sensors. This effort includes developing new technical approaches and opportunities for technology transfer and technology insertion, designing and building prototypes, and incorporating advanced technologies into existing and future systems, subsystems, and components. The objectives of this effort are to identify and mitigate problematic materials, processes, and assessment methods and enhance ISR and FP system performance through technology insertion and rapid prototyping.

## Advanced Multi-Purpose Munition Development

The focus of this effort is the cutting edge research and development of innovative concepts, pilot programs, and prototypes of novel explosives and propellants for advanced multipurpose munitions with extended range, higher lethality, and low vulnerability. This research includes identifying and developing novel ingredients and prototypes with the potential for improved capabilities; scaling-up and processing the development of these materials, testing performance, and conducting technology transition, integration, large-scale production, and demilitarization studies. The objective of this effort is to ensure continued technical overmatch against a broad spectrum of advanced enemy weapons and tactics.

## Autonomous & Robotic Vehicles

The focus of this research is advanced technology development, experimentation, and system integration to provide robotics and control system solutions related to manned, optional-manned, and unmanned ground and UAV vehicles.



Photo by Petty Officer 2nd Class Jeanette Mullinax

## Advanced Sensor Development

The focus of this effort is instead of RDT&E of emerging technologies, materials, and processes to significantly enhance the functionality and capability of existing and future sensor systems. The researchers will conduct rapid prototyping, development, integration, and operational analysis to incorporate advanced technologies and materials into sensor systems, subsystems, and components. The objective of this effort is to enhance the performance and reliability of sensor systems to enable them to operate successfully in changing environments.

## Fuze and Munition Development

The focus of this research is to conduct enhanced munitions and fuzing technology evaluation and assessment; develop recommendations for technology roadmaps for munition technical areas; develop technical training on munitions-related technologies; and perform program and portfolio operations analysis and planning. The objective of this effort is to exploit technology dominance and enable the next generation of weapon capabilities.

## Electromagnetic Spectrum

The focus of this effort is to perform technical and analytical spectrum research, analysis, and assessments pertaining to national and international spectrum issues to ensure U.S. access to the global spectrum. The reallocation of spectrum from Federal Government to commercial services might have a major impact on the research, development, operations, analysis, and support of U.S. spectrum-dependent weapons systems and platforms. The IAC MAC will conduct strategic planning, to include integrated spectrum plans and long-term strategies, addressing current and future spectrum access requirements and provide scientific and technical support for domestic and international policy development.



Photo by peterschreiber.media

## Computing & Communications Networks

This effort focuses on improving the cybersecurity, data analysis, modeling and simulation, and information sharing and knowledge management of selected cyber-physical systems. Specifically, the focus is on developing the means to dominate global computing and communications networks; coping with the overload of information; providing the means for ubiquitous, secure collaboration; identifying emerging areas that may enhance operational capability in the medium term; and providing context to understand and leverage the results of significant new discoveries. Key to these goals is the discovery of technology areas providing the warfighter with a disruptive advantage such as preventing cyber-attacks and providing objective analytical assessments and recommendations to decision makers.

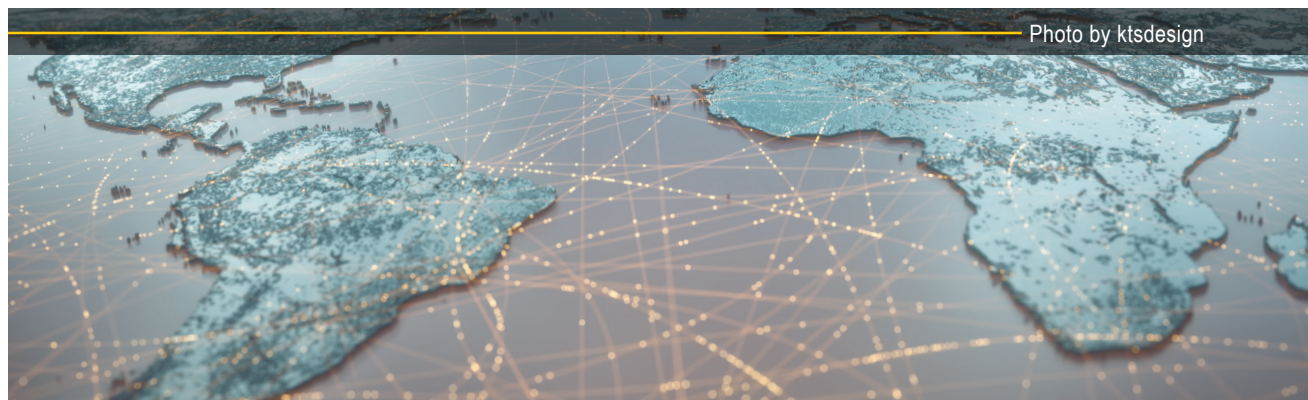


Photo by ktsdesign

## 85,298

Users across DoD, industry, and academia

**Why this matters:**

A broad user base increases the exchange of technical ideas across these three enclaves.

## 2,195

Technical inquiries answered

**Why this matters:**

These inquiries, answered at no cost to the user, allow the rapid injection of subject matter expertise to solve DoD's technical challenges.

## 6,422

Attendees at 54 IAC training and educational events

**Why this matters:**

These events, provided at no cost to attendees, address developments in cutting-edge technologies and stimulate cross-enclave (government, industry, academia) technical exchanges.

## 4.5 mos.

Average time from solicitation to award

**Why this matters:**

Quick awards allow us to get work started on our customers' research needs faster, accelerating innovative development.

## \$4.7B

New R&D contract ceiling awarded

**Why this matters:**

This new record in R&D contract ceiling will facilitate innovative work for years to come.

## \$2.26B

Research performed

**Why this matters:**

The volume of work performed, an historical high for the IAC program, funds over 10,000 industry SMEs in performing vital R&D for the DoD.



## FY21 RESEARCH FUNDING



The DoD IACs are excited to add

**89** new  
DoD Customers  
to the program

with **761** currently  
active organizations  
supported by the program.

The DoD IACs are supporting  
research efforts in

**500** locations  
**39** states and  
**10** countries  
around the world.

# WHO USES THE DOD IACs

## FY15-FY21 Summary

### U.S. NAVY



Naval Air Systems Command (NAVAIR)	46.23%
U.S. Fleet Forces Command (USFF)	19.86%
Naval Sea Systems Command (NAVSEA)	12.56%
Space and Naval Warfare Systems Command (SPAWAR)	6.96%
Chief of Naval Operations (CNO)	3.59%
Chief of Naval Research (ONR)	3.27%
Bureau of Medicine and Surgery (BUMED)	2.39%
U.S. Pacific Fleet (USPACFLT)	1.18%
Navy Systems Management Activity (NSMA)	0.99%
Naval Reserve Force Command (NAVRESFORCOM)	0.95%

### U.S. AIR FORCE



Air Force Materiel Command (AFMC)	57.35%
Air Combat Command (ACC)	9.17%
Air National Guard (ANG)	6.68%
Air Force HQ (HAF)	6.31%
Air Force Education and Training Command (AETC)	5.68%
Air Force District of Washington (AFDW)	5.62%
Air Mobility Command (AMC)	4.07%
Pacific Air Forces (PACAF)	3.11%
Air Force Reserve Command (AFRC)	0.72%
North American Aerospace Defense Command (NORAD)	0.39%

### U.S. ARMY



Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (OASA(ALT))	50.35%
Army Materiel Command (AMC)	26.90%
U.S. Army Corps of Engineers (USACE)	4.82%
U.S. Army Intelligence and Security Command (INSCOM)	3.61%
Office of the Secretary of the Army (OSA)	1.81%
Army Training and Doctrine Command (TRADOC)	1.70%
U.S. Army Pacific (USARPAC)	1.68%
U.S. Army Research, Development & Engineering Command (RDECOM)	1.16%
U.S. Army Criminal Investigation Command (CID)	1.08%
U.S. Army Space and Missile Defense Command (USASMDC)	0.85%

\$3.68B

\$2.99B

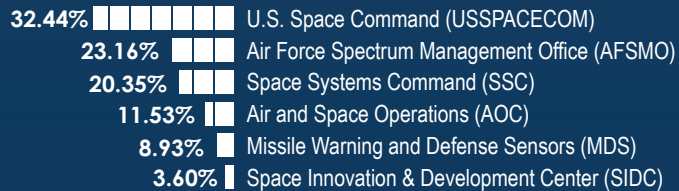
\$2.96B

\$12.18B

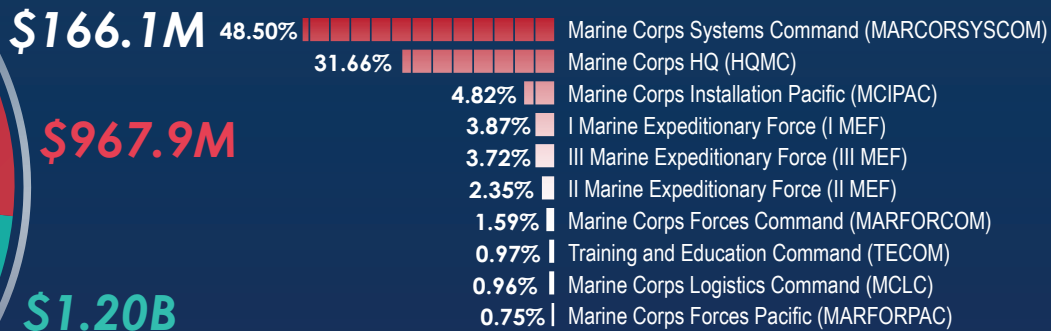




## U.S. SPACE FORCE



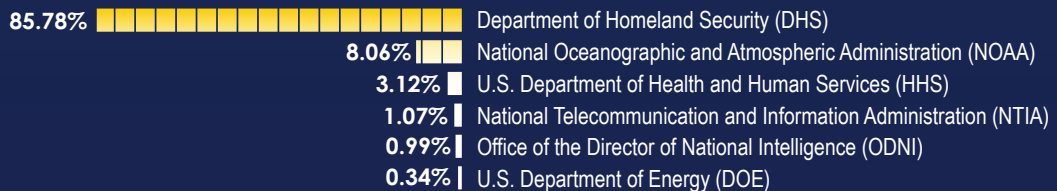
## U.S. MARINE CORPS



## OTHER DoD



## OTHER GOVERNMENT

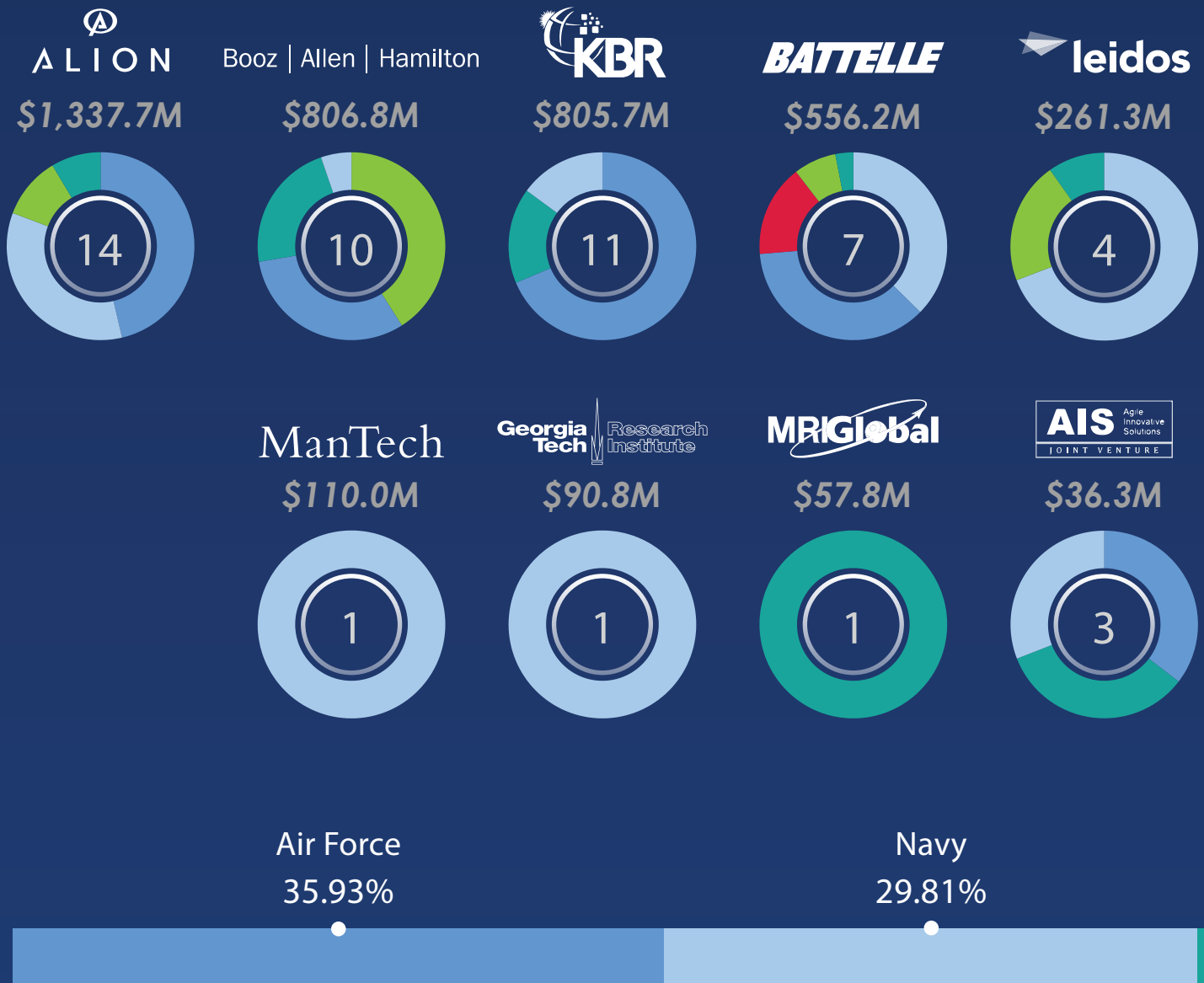


Total Funded Amount

# DOD IACs PRIME ACTIVITY

## FY21 Summary

To achieve customer R&D requirements, the DoD IACs are supported by a competitively selected group of prime contractors who are industry leaders in our TFAs.

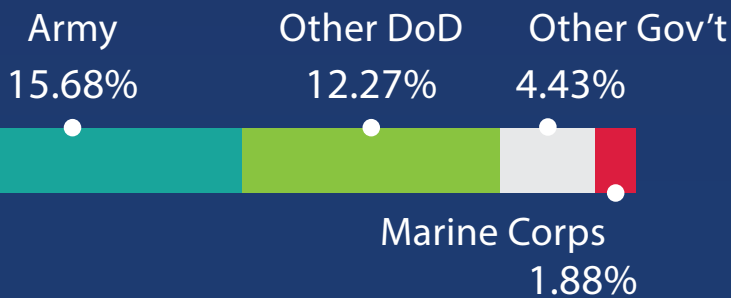


This graph shows the total ceiling awarded by service and federal agencies.

Note: These colors represent the identified service in circles above.



The following graphics show the awards under the IAC MAC by DoD IACs' prime contractors with the total ceiling value awarded, number of awards, and percentage of ceiling awarded to the different services identified by color.



**Legend**

- \$ Total Awarded Ceiling FY21
- # Number of awards
- Percentage of awarded TO ceiling by service

# REPORTING STRUCTURE



**Heidi Shyu**  
Under Secretary of  
Defense for Research and  
Engineering (OUSD(R&E))



**Robert E. Irie**  
Acting Director,  
Deputy Director, Strategic Technology  
Protection and Exploitation



**Christopher Thomas**  
Administrator,  
Defense Technical  
Information Center

Reporting Structure  
DoD IACs Program Office

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Direct  
Support

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**Patricia Coulter**  
Program Analyst

**Melinda Rozga-Moore**  
Program Analyst

**Harvey Bullock**  
Program Analyst

**Emese Horvath**  
Program  
Management  
Analyst

**Mollie Steele**  
Program  
Management  
Analyst

**Patty Crawford**  
Program  
Management  
Analyst



OFFICE OF THE SECRETARY OF DEFENSE  
1000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-1000

JUL 27 2018

MEMORANDUM FOR COMMANDER, UNITED STATES SPECIAL OPERATIONS  
COMMAND (ATTN: ACQUISITION EXECUTIVE)  
COMMANDER, UNITED STATES TRANSPORTATION  
COMMAND (ATTN: ACQUISITION EXECUTIVE)  
ASSISTANT SECRETARY OF THE ARMY (ACQUISITION,  
LOGISTICS, AND TECHNOLOGY)  
ASSISTANT SECRETARY OF THE NAVY (RESEARCH,  
DEVELOPMENT, AND ACQUISITION)  
ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION)  
DIRECTORS OF THE DEFENSE AGENCIES  
DIRECTORS OF THE DOD FIELD ACTIVITIES

SUBJECT: Preferred Use of Department of Defense Information Analysis Center Contracts

First established in 1946, the Department of Defense (DoD) Information Analysis Centers (IAC) continue to serve as an essential resource for research and analysis in innovative technologies to support current and future operations. The DoD IACs continue to prove their value in maximizing the utility of DoD research and development dollars by emphasizing knowledge re-use and building upon previous research, development, and other technical information.

The DoD IACs operate across a broad range of task orders for technical research and analysis, managing over 230 task orders and conducting \$1.5 billion in research efforts in Fiscal Year (FY) 2017. Through the DoD IACs, research data is collected, analyzed, and re-used to answer recurring technical challenges, stimulate innovation, and provide solutions to meet Government requirements.

The IAC program incorporates a number of best practices that make it a model for rapid and user-friendly acquisition of advanced Research and Development services:

- Open to all DoD components
- Full service assisted acquisition, that includes:
  - Customer Support Cell to assist users in developing a Performance Work Statement (PWS) that ensures work meets mission requirements
  - Dedicated contracting capability - expert in Research, Development, Test, and Evaluation contracting (research, analysis, studies, modeling and simulation, test, fabrication, prototyping)
  - Post-award surveillance of work to ensure quality, timeliness, scope, and correct billing
- Task orders that are flexible and scalable to the user's needs, supporting ceiling levels ranging from \$1 million to \$500 million



## A Preferred Use of DoD IACs Contracts memorandum was signed 27 July 2018

OUSD(R&E) recognizes the DoD IACs as a model for rapid and customer-focused acquisition of advanced R&D services tailored to meeting the diversity of technical challenges faced by DoD customers.

Check out the full memo at:  
<https://dodiac.dtic.mil/resource>

- Pre-vetted contract performers, industry leaders in their fields
- Rapid turnaround of incremental funding on task orders, and the ability for sharing of task orders across customers, speeding execution of work
- Knowledge re-use that relies heavily on knowledge-mining in the over four million technical documents of the Defense Technical Information Center
- All at a low cost to the user, 1.2 percent in FY 2018.

These best practices result in a rapid acquisition process that can be readily tailored to many different problems and scenarios, meeting the diversity of technical challenges faced by DoD users.

The DoD IACs offer several multiple award, indefinite delivery/indefinite quantity contracts (MAC IDIQ) to meet this broad need (to become a single MAC IDIQ by FY 2019), covering these scope areas:

Advanced materials	Homeland Security & Defense
Alternative Energy	Information Sharing & Knowledge Management
Autonomous Systems	Medical
Biometrics	Military Sensing
Chemical, Biological, Radiological, and Nuclear (CBRN) Defense	Modeling & Simulation
Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR)	Non-lethal Weapons and Information Operations
Critical Infrastructure Protection	Reliability, Maintainability, Quality, Supportability, and Interoperability (RMQSI)
Cultural Studies	Software & Data Analysis
Cyber Security	Survivability & Vulnerability
Directed Energy	Weapons Systems
Energetics	

In continuing the policy of our predecessors established in January 2015, we encourage Requiring Officers and Contracting Officers to use the IACs as best value vehicles to acquire services that fall within the applicable scope areas. In developing acquisition strategies, all new and ongoing efforts should consider the DoD IAC contracts as vehicles of first choice.

Additional information on the DoD IACs can be found at <http://iac.dtic.mil/>. Questions regarding this action memorandum can be directed to the DoD IAC's Director, Mr. Thomas Gillespie, at 703-767-9235 or [thomas.c.gillespie.civ@mail.mil](mailto:thomas.c.gillespie.civ@mail.mil).

Shay B. Assad  
Director, Defense Pricing  
and Contracting

Mary J. Miller  
Performing the Duties of the  
Assistant Secretary of Defense  
for Research and Engineering

### Maximize Value

IAC MAC is not your traditional contract vehicle. DoD IACs provide continuous research analysis support to all TOs and facilitate novel reuse of research findings and technical information, generated to accelerate similar research across DoD.

### Easy to Use

IAC MAC Customer Support Cell provides dedicated assisted acquisition and requirements development support to each user.

### Ease of Collaboration

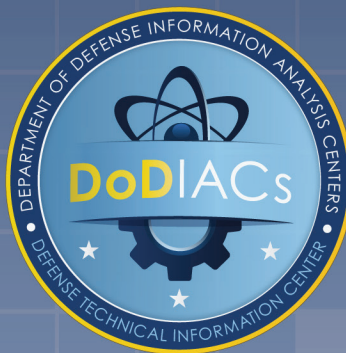
Quickly add co-funders with in-scope research requirements to your TO.

### Low Customer Shared Direct Cost (CSDC)

CSDC includes end-to-end pre/post-award support (requirements, contracts, financial, surveillance). No additional cost or contract access fee.

### Pre-Vetted Contractors

Best-in-class businesses with expertise across 22 TFAs.



**PLEASE VISIT US AT:**

<https://dodiac.dtic.mil>



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