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BRANCHE UND MARKTSITUATIONEN
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CHANCEN FÜR ÖSTERREICHISCHE UNTERNEHMEN
MARKTEINTRITTSTRATEGIEN

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Eine Information des

AußenwirtschaftsCenters Washington
T +1 202 656 00 60
E washington@wko.at
W https://wko.at/aussenwirtschaft/us

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Herausgeber, Medieninhaber (Verleger) und Hersteller:
WIRTSCHAFTSKAMMER ÖSTERREICH / AUSSENWIRTSCHAFT AUSTRIA
Wiedner Hauptstraße 63, 1045 Wien
Redaktion: AUSSENWIRTSCHAFTSCENTER Washington, T +1 202 656 00 60
E washington@wko.at, W wko.at/aussenwirtschaft/us

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INHALTSVERZEICHNIS

1. EXECUTIVE SUMMARY

The defense market in the United States is comprised of participants from both the public and private sectors. The public sector participants are the US Government's buyers of services or products dominated by the Department of Defense (DoD), but also include the Department of Homeland Security (DHS) and Department of Energy (DoE). The private sector is comprised of countless numbers of US and global industry members who compete for US Government contracts in a variety of functions, such as, research and development (R&D), science and technology (S&T), procurement of weapon systems as OEMs or system integrators, component and sub-system suppliers to the OEMs, foreign military sales, and provision of defense services and technical assistance.

The US Government represents a large potential market for US and global industry, to include the Austrian industry, in the defense and security sector. The public sector market consists of government solicitations for participation by industry in major R&D or S&T programs. The DoD is the principal buyer of defense and security services and while large and complex, the US defense and national security sector does provide business opportunities for Austrian industry. Additionally, the DHS and DoE do periodically offer opportunities for foreign companies to bid for S&T solicitations. The major organizations in the DoD, DHS, and DoE that offer potential opportunities for industry in the S&T and R&D sector are described in this report.

This report also addresses how the private sector engages the US Government, to include a review of impediments and obstacles to international trade with the US, business development considerations, and information on major upcoming events. The DoD Innovation Marketplace (a website) is the most complete open-source reference for Austrian companies to gain an understanding of the DoD innovation strategy, strategic direction, R&D priorities, and new solicitations and business opportunities that may be available in the US defense and security market.

While it may be difficult for Austrian companies to bid directly for a large R&D or procurement project with the DoD, there can be opportunities to partner with or be a subcontractor to US companies. Depending upon the capabilities of the Austrian company, the challenge will be to find the opportunity to be introduced to an appropriate US company.

2. DEFENSE AND SECURITY MARKET

1.1 General

The DoD is America's oldest and largest government agency. With its military tracing its roots back to the pre-Revolutionary War (1775-1783) era, the DoD has grown and evolved with our nation. It is a huge organization with the largest annual budget when compared to any other Department in the US Executive Branch.

Today, the Department, headed by Secretary of Defense Lloyd Austin, is not only in charge of the military, but it also employs a civilian force of the DoD and is the nation's largest employer. As of 2020, the active duty military force consists of approximately 1,400,000 personnel. Another 811,000 serve in the National Guard and Reserve forces. There are 750,000 in the DoD civilian workforce. More than 2 million military retirees and their family members receive pensions and benefits.The business outlook for US and allied partners defense industries competing for DoD contracts is related to the DoD's National Defense Strategy (NDS) for 2022 which will guide the DoD's requirements for military capability with state of the art technologies. In March 2022, the DoD announced that it had sent the classified version of the NDS to Congress—along with the classified Nuclear Posture Review (NPR) and Missile Defense Review (MDR). The Department is working on unclassified versions of the

NDS, NPR and MDR. As we await the unclassified summaries of each document, the DoD's press releases provided some clear information about the NDS, such as the following points of emphasis:

- The new NDS appears to have reprioritized the threats facing the United States to a "1+1+3" construct — with China described as the "most consequential strategic competitor," followed by "acute threats" from Russia, and then "persistent threats from North Korea, Iran, and violent extremist organizations."
- The forthcoming NDS calls out the "growing kinetic and non-kinetic threats to the United States' homeland from our strategic competitors" and vows to "take necessary actions to increase resilience."
- Like the 2018 NDS, the forthcoming strategy recognizes the "critical" importance of "mutually-beneficial Alliances and partnerships." According to DoD, the NDS will "incorporate ally and partner perspectives, competencies, and advantages at every stage of defense planning."

The FY 2022 Defense Budget reflects the President's national security values and DoD's NDS. It is a strategy-based budget aligned with the NDS and a commitment to realizing and defending the democratic values at the heart of the American way of life. To meet these values, the FY 2022 budget:

- Takes a broader approach to national security to address threats such as climate change, Covid-19, and extremism.
- Makes smart and disciplined choices regarding our national defense, particularly by aligning our resources to evolving threats.
- Addresses strategic competition with China through calculated defense investments.

The FY 2022 President's Budget of $715 billion when compared to the FY 2021 enacted amount of $703.7 billion, reflects a 1.6% increase. Importantly, the requested amount reflects a shift in resources to match priorities. For the Navy and Air Force, there are additional investments to address strategic competition with China. For the Army, the request reflects the President's decision to withdraw all U.S. troops from Afghanistan prior to the beginning of FY 2022.

Accordingly, we believe the timing will be opportunistic for Austrian companies who seek to gain defense related business in the United States.

Of interest to Austrian companies may be the evolving emphasis on innovation, non-traditional technologies, and direction by the DoD to promote outreach to non-defense commercial providers, high tech companies, and innovators across US industry and academia. This has led to the establishment of satellite DoD offices in Silicon Valley, California; Boston, Massachusetts; Austin, Texas, and most recently in Chicago, Illinois under what DoD calls the Defense Innovation Unit (DIU) initiative. The initiative has been given a high profile by senior Pentagon officials. They form part of a wider campaign that includes efforts by the DoD Strategic Capabilities Office (SCO) to promote defense innovation by enabling participation by commercial, non-traditional defense companies, foster greater competition and cost effectiveness in defense acquisition, and maintain the technological superiority of the DoD vis-à-vis near-peer adversaries like Russia and China.

DoD officials acknowledge that the DIU is not a wholesale cure for a complex and tedious government contracting process. The Federal Government acquisition process will not change overnight, and there are hurdles that are not present in other enterprises. Yet officials are determined to identify innovative approaches to attract non-traditional players. One of the goals of the DIU has been to present Federal Government contracting and DoD's arcane business practices in a more user-friendly manner. DoD officials have stated that while DoD is not the best source of quick revenue for entrepreneurs, there is an attractive stability that comes with dealing with the Federal Government. Because DoD is focused on addressing the largest and most enduring security challenges facing the country, its requirements are not short-lived and will endure beyond the next fiscal quarter. Opportunities to sustain relationships with the DoD over the long term therefore exist, whereas this is not always the case in Silicon Valley.

1.2 PUBLIC SECTOR PARTICIPANTS

The defense market in the United States is comprised of participants from both the public and private sectors. The public sector participants are the US Government's buyers of services or products, dominated by the DoD, but also includes the DHS and DoE. The private sector is comprised of countless numbers of US and global companies who compete for US Government contracts in a variety of functions, such as, research and development (R&D), science and technology (S&T), procurement of weapon systems as OEMs or system integrators and suppliers and component manufacturers under subcontract to the OEMs, construction services, foreign military sales, and provision of defense services and technical assistance.

The intent of this section is to provide the background necessary for Austrian industry to gain a clear understanding of the public sector participants, the US Government agencies that offer potential procurement opportunities in the defense and security areas. We will begin with a brief background on the DoD organizations that support R&D and S&T areas in the Office of the Secretary of Defense, the Defense Agencies, and the Military Services – Departments of the Navy, Army, and Air Force. We will also provide some information about the DHS and DoE because each of these departments could provide a potential business opportunity for Austrian industry.

1.2.1 DoD Research & Development and Science & Technology Organizations

The DoD Research and Engineering Enterprise includes the military departments and their laboratories; defense agencies, such as, the Defense Advanced Research Projects Agency (DARPA), the Defense Threat Reduction Agency (DTRA), and the Missile Defense Agency (MDA); other federal government laboratories; federally funded research and development centers; university affiliated research centers; allied and partner government laboratories; and the U.S. defense industrial base. This report will address the following DoD R&D and S&T organizations:

- The Office of the Assistant Secretary of Defense for Research and Engineering.
- Office of the Secretary of Defense, Emerging Capability & Prototyping and Comparative Testing Office.
- Defense Advanced Research Projects Agency.
- Office of Naval Research.
- Naval Research Laboratory.
- Army Research Laboratory.
- Army Research Office.
- Air Force Research Laboratory.
- Air Force Office of Scientific Research.

See additional information about other organizations within the DoD at the URL here.

Acquisition Reform

In early August 2017, DoD sent Congress a new guidance publication in which it outlined its current plans to split the Office of the USD(AT&L) into two organizations, one under the direction of an Under Secretary of Defense for Acquisition and Sustainment [USD(A&S)] and the other under the authority of an Under Secretary of Defense for Research and Engineering [USD(R&E)]. The FY17 NDAA also mandated that DoD must create a Chief Management Officer (CMO) within DoD, effective February 1, 2018. We have attached this detailed document along with this report for your review. The publication is entitled "Restructuring the Department of Defense Acquisition, Technology and Logistics Organization and Chief Management Officer Organization, In Response to Section 901 of the National Defense Authorization Act for Fiscal Year 2017," available at the URL here.

The provisions of the FY17 NDAA stipulated that the Secretary of Defense had to execute an extensive review and submit several reports to the Congressional defense committees in 2017 regarding its plans for the Department's new organizational and management structure, and implementation of the organizational policy guidance outlined by Congress. The review and recommendations had to encompass:

- DoD organizational and management structure, including the disposition of leadership positions, subordinate organizations, and defined relationships across leadership positions and organizations.
- Recommended dispositions within the Office of the Secretary of Defense (OSD) for the Assistant Secretaries of Defense (ASDs), Deputy Assistant Secretaries of Defense (DASDs), and Directors affected by the organizational policy guidance.
- Specific delineation of roles, responsibilities, and authorities, as directed by the Secretary.

Further, the NDAA directed the Secretary to submit to Congressional defense committees the final report mandated under the FY17 NDAA, including its DoD organizational and management structure proposal, by August 1, 2017. It was to contain the following:

- A proposed DoD implementation plan with respect to its recommendations.
- Recommendations for revisions to appointments and qualifications, duties and powers, and precedent in the Department.
- Recommendations for such legislative and administrative action, including conforming and other amendments to law.
- Other issues that the Secretary deemed appropriate.

DoD Recommendations

Under the sweeping guidance of the FY17 NDAA, DoD implemented significant changes to its acquisition management structure to achieve and/or maintain technical superiority and weapon system affordability. The USD(R&E) drives innovation and seeks to accelerate the development of new technologies in designated focus areas, while the USD(A&S) concentrates on the provision of proven technology to the warfighter more efficiently, affordably, and rapidly.

Under the new organization, the Office of the Secretary of Defense (OSD) saw its chief role shift from program oversight towards the direction of major DoD investments, ensuring that the Department produces integrated, technically superior military capability that keeps pace with the evolving threat environment. The Congressional impetus was designed to empower DoD to appreciably "streamline its acquisition organization and assign greater responsibility and accountability to the Services for program execution and performance." The two new USDs exercise their respective authorities to "determine and drive necessary changes to current acquisition processes, structure, and culture in accordance with the objectives outlined above, in support of the National Defense Strategy."

1.3 DoD Organizational and Management Structure

1.3.1 Under Secretary of Defense for Acquisition and Sustainment [USD(A&S)]

The USD(A&S) advises the Secretary of Defense on acquisition and sustainment; oversee individual programs (as required); and oversees major Joint programs (as appropriate), providing advice and assistance on Major Defense Acquisition Programs. A focus on joint mission integration will maximize the effectiveness and efficiency of new capability and the necessary resource allocations. To ensure delivery of critical capabilities in the most responsive, timely, and responsible manner – while mitigating risk – the USD(A&S) develops acquisition policy for weapon systems and services.

1.3.2 Under Secretary of Defense for Research and Engineering [USD(R&E)

The new USD(R&E) has responsibility and authority for ensuring US military technical superiority and assumes added technical risk that is inherent to this responsibility, leveraging the business tools that allow DoD to reach out to industry more effectively. The USD(R&E):

- **Sets the DoD technology strategy.** Decision authority to set the strategic direction for DoD's Research, Development, Test and Evaluation (RDT&E) investments, to ensure battlespace dominance and regain the clear advantage in every warfighting domain:
  - Understand technologies used by the threat in order to provide US forces with decisive disruptions.
  - Understand the maturity of US and world technology and know what it takes to adapt the technology for the US warfighter.
  - Ensure US forces are not surprised by an adversary's use of new technology.
- **Solves DoD's critical technical warfighting challenges.** Technical authority and overarching system architect for the increasingly complex, often Joint, warfighting challenges that no single Service can solve alone.
- **Delivers Technology Solutions Faster.** Establishes alternate pathways that accelerate delivery of superior technologies across the entire acquisition spectrum:
  - Align processes, incentives, and culture to deliver the needed advanced technology, new concept explorations, and prototyping of new ideas that will provide military superiority.
  - Revolutionize the way the Department leverages commercial technology by exploiting every opportunity to access the broader marketplace.
  - Leverage the combined capabilities of the Defense Industrial Base (including DoD Research and Engineering infrastructure, traditional defense companies, small businesses, and innovation companies) to solve the Department's hardest science and engineering problems – at speed.
  - Expand approaches by DARPA, the Defense Innovation Unit (DIU), and Strategic Capabilities Office (SCO), to include 1) repurposing or adapting fielded systems with new technology and innovation that change the calculus of warfighting, 2) experimenting with new commercial technology, contracting and workforce authorities, and acquisition methods to accelerate delivery of needed capability, and 3) coordinating with the Services and Staffs to shorten the requirements stroke between the warfighter and system deliverer.

Of particular interest to Austrian industries should be the commitment by the DoD Director for International Engagement within the recently established (April 2, 2022) Office of the Assistant Secretary of Defense for Industry Base Policy to international cooperation and the importance of international participation in DoD research and technology. Increased globalization of defense technology enhances DoD's research and technology development capabilities. To the extent DoD can leverage technology developments in allied and friendly nations, like Austria, the Department will be able to redirect resources to address other critical needs. This would also provide opportunities for DoD to increase commonality with these nations, creating increased efficiencies for all. However, globalization of defense technology creates challenges to our technological superiority through proliferation of advanced military capabilities among not only the United States and its allies and friends, but also our adversaries due to illegal technology transfer.

The DoD's international cooperative research and development programs are based on equitable investment by all participants. In addition to reducing cost burdens, these cooperative programs enable the DoD to interact with the best and brightest in many nations. Cooperative research and development programs deepen the US' defense relationships with its allies and other partner nations. Successful international cooperative research and development programs require trusted partnerships between the nations involved. Austria is considered by the US as among the most trustworthy of nations and accordingly, trusted partnerships among its US industry

partners are highly valued and welcomed. International partnerships require commitment by all parties, to include providing adequate or equitable levels of funding and involvement. International cooperative research and development programs can provide opportunities for the US industrial base to work with and develop relationships in other nations, such as, with Austria. This can lead to increased business opportunities through creation of new trusted partnerships. Herein may lay the key to growth and development of Austria's defense and security industrial base. International cooperation can also provide the Department with increased access to world-class research and researchers. Austria comprises, in the judgment of this report's author, both the quality of trust and world-class researchers.

Additionally, we refer to an interesting overview and study by the Center for Strategic and International Studies (CSIS) of how the DoD is Leveraging Outside Innovation to Sustain the DoD's Technological Edge. A copy is available at the URL here.

Office of the Secretary of Defense, Emerging Capability & Prototyping (EC&P)

The Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping in the Office of the USD(R&E) oversees three major efforts: (1) Joint Capability Technology Demonstrations (JCTDs), (2) Rapid Reaction Technology Office (RRTO) and (3) the Comparative Technology Office (CTO). The CTO effort includes opportunities for international partners through its Foreign Comparative Testing (FCT) Program. The FCT Program facilitates the testing of items and technologies of US foreign allies and friends that have a high Technology Readiness Level (TRL) to satisfy valid defense requirements more quickly and economically. Towards this mission, FCT under CTO continues to be a uniquely successful acquisition tool from a US Government-to-Foreign Industry standpoint. Austrian companies were first introduced to the FCT program in 2015 during the US-Austria Defense and Security Forum that was held at the Austrian Embassy in March 2015.

The FCT Program has helped to foster a two-way street in defense spending between the US and its Allies through the procurement of more than $5 billion in foreign items. Further, the program has reaped substantial savings by avoiding research and development costs, lowering procurement costs, reducing risk for major acquisition programs, and accelerating the fielding of equipment critical to the readiness and safety of US operating forces. Significantly, the FCT Program has served as a catalyst for industry teaming arrangements, which have been productive for both US and foreign industries in an increasingly competitive global market. Within the FCT Program, foreign items are nominated by a sponsoring organization within DoD for testing to determine whether the items satisfy US military requirements or address mission area shortcomings. The OSD CTO funds testing and evaluation; the military services fund all procurements that result from a successful test. Overall, the FCT Program's objectives are to improve the US war fighter's capabilities and reduce expenditures through:

- Rapidly fielding quality military equipment.
- Eliminating unnecessary duplication of research, development, test, and evaluation.
- Reducing life cycle or procurement costs.
- Enhancing standardization and interoperability.
- Promoting competition by qualifying alternative sources.
- Improving the U.S. military industrial base.

A presentation on the FCT program, the office's mission, registered progress to date, and 2020 focus areas from the Office of the USD(R&E) at the URL here. It includes details as to how industry can work with the FCT.

Defense Advanced Research Projects Agency (DARPA)

The Defense Advanced Research Projects Agency (DARPA) is an agency of the U.S. Department of Defense (DoD), which is responsible for the development of emerging technologies for use by the military. DARPA was created in 1958 as the Advanced Research Projects Agency (ARPA). Its purpose was to conduct research and development projects to expand the frontiers of technology and science, with the aim to reach beyond immediate

military requirements. The name of the organization changed several times from its founding name ARPA: DARPA (March 1972), ARPA (February 1993), and DARPA (March 1996).

DARPA is independent from other military research and development and reports directly to senior DoD management. Since its establishment, DARPA has provided significant technologies that influenced many non-military fields, such as computer networking and graphical user interfaces in information technology. It is widely recognized that DARPA explicitly reaches for transformational change instead of incremental advances.

DARPA comprises approximately 220 government employees in six technical offices, including nearly 100 program managers, who together oversee about 250 research and development programs. Significantly, despite no research and development facilities of its own, DARPA has become known as a laboratory and incubator of innovation by providing thought leadership, community-building frameworks, technology challenges, research management, funding, and other cultural and infrastructural support elements that it takes to usher transformative ideas toward consequential new realities.

DARPA plays a key role in the development of technologies to offset the advanced threats that our military and our Nation will face in the years ahead, and on the next generation of advanced military capabilities to deter and, if necessary, defeat highly sophisticated adversaries.

DARPA offers periodically some opportunities for the industry of our global partners, depending upon the nature of the research desired. For a complete listing of DARPA opportunities, please visit the www.SAM.gov website. These are typically offered at SAM.gov, the US contractor procurement organization that announces new solicitations by registered Federal organizations, available at the URL here. Additionally, procurement or business opportunities with DARPA are available at the URL here. Additionally, the Defense Innovation Marketplace online provides a listing of current or new business opportunities at DARPA.

1.3.3 Service Innovation Organizations

Office of Naval Research (ONR)

As an executive branch agency within DoD, the Office of Naval Research (ONR) provides technical advice to the Chief of Naval Operations and the Secretary of the Navy. Additionally, ONR supports technologies for the U.S. Marine Corps. ONR reports to the Secretary of the Navy through the Assistant Secretary of the Navy for Research, Development and Acquisition. Led by the Chief of Naval Research, its senior leadership oversees a portfolio of investments ranging from immediate, quick-turnaround technologies to long term basic research.

ONR was founded in 1946 and has been a pioneer in the public support of science and technology research that benefits both the naval services and the nation. From investments in the earliest computers to spearheading seminal research in deep sea exploration to cultivating groundbreaking efforts in solid-state electronics and countless other innovations, ONR has been shaping the Navy and Marine Corps — and the world around us — for seven decades and counting. ONR manages and funds basic and applied science and advanced technology development using grants and contracts with an array of partners in academia, industry, and government in the US and worldwide.

The Office of Naval Research Global (ONR Global) provides worldwide S&T-based solutions for current and future naval challenges. Leveraging the expertise of more than 50 scientists, technologists, and engineers, ONR Global maintains a physical presence on five continents. The command reaches out to the international technical community and the operational fleet/force commands to foster cooperation in areas of mutual interest and to bring the full range of possibilities to the Navy and Marine Corps. ONR Global engages the international science and technology community -- including academia, defense and commercial industries and government agencies -- in a range of technical areas of naval interest. To maintain this worldwide presence, ONR Global functions

through several international offices, with a commanding officer based in Singapore, and an executive officer and technical director seated in London.

ONR Global's mission is to build relationships between the international scientific community and the Naval Research Enterprise (NRE) and to identify innovative technologies to support the Navy's Science and Technology Strategic Plan. ONR Global pursues these goals through the following three programs:

- The Visiting Scientists Program (VSP) supports short-term travel opportunities for international scientists to the United States or to international conferences to interact with researchers and to socialize new S&T ideas or findings with the NRE that advance basic research though collaboration.
- The Collaborative Science Program (CSP) supports international workshops, conferences and seminars of naval interest held outside the United States.
- The Naval International Cooperative Opportunities in Science and Technology Program (NICOP) provides direct research support to international scientists to help address naval S&T challenges. NICOPs support the insertion of innovative, international S&T into core ONR and Naval Research Enterprise Programs.

See the current ONR Long-Range Broad Agency Announcement for Navy and Marine Corps Science and Technology (BAA) at the URL here for more information and direction on submitting a proposal.

Naval Research Laboratory (NRL)

The Naval Research Laboratory (NRL) in Washington, D.C., is a subordinate command of the ONR. As such, the NRL is the corporate research laboratory for the US Navy and the US Marine Corps and conducts a wide range of basic scientific research, applied research, technological development, and prototyping. A few of the laboratory's current specialties include plasma physics, space physics, materials science, and tactical electronic warfare.

NRL is one of the first US Government scientific R&D laboratories, having opened in 1923. NRL's research expenditures are approximately $1.1 billion per year. In 1992, the Secretary of the Navy consolidated existing Navy Research, Development, Test and Evaluation Engineering facilities and Fleet Support facilities to form a corporate community. This community consists of a single corporate research laboratory – NRL – aligned with ONR and four warfare-oriented centers aligned by mission with the Systems Commands. The four centers are the Naval Air Warfare Center, the Naval Command Control and Ocean Surveillance Center, the Naval Surface Warfare Center, and the Naval Undersea Warfare Center.

As part of the consolidation, the Naval Oceanographic and Atmospheric Research Laboratory, with locations in Stennis Space Center, Mississippi, and Monterey, California, merged with NRL to become what is today, the Navy's corporate laboratory.

Further, NRL operates as the Navy's full-spectrum corporate laboratory, conducting a broadly based multidisciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, systems, and ocean, atmospheric, and space sciences and related technologies. In fulfillment of this mission, NRL:

- Initiates and conducts broad scientific research of a basic and long-range nature in scientific areas of interest to the Navy.
- Conducts exploratory and advanced technological development deriving from or appropriate to the scientific program areas.
- Within areas of technological expertise, develops prototype systems applicable to specific projects.
- Assumes responsibility as the Navy's principal R&D activity in areas of unique professional competence upon designation from appropriate Navy or DOD authority.

- Performs scientific research and development for other Navy activities and, where specifically qualified, for other agencies of the Department of Defense and, in defense-related efforts, for other Government agencies.
- Serves as the lead Navy activity for space technology and space systems development and support.
- Serves as the lead Navy activity for mapping, charting, and geodesy (MC&G) research and development for the National Geospatial-Intelligence Agency (NGA).

NRL, the Navy's single, integrated corporate laboratory, provides the Navy with a broad foundation of in-house expertise from scientific through advanced development activity. Specific leadership responsibilities are assigned in the following areas:

- Primary in-house research in the physical, engineering, space, and environmental sciences.
- Broadly based applied research and advanced technology development program in response to identified and anticipated Navy and Marine Corps needs.
- Broad multidisciplinary support to the Naval Warfare Centers.
- Space and space systems technology, development, and support.

The laboratory is divided into four research directorates, one funding directorate, and one executive directorate. All the directorates are headquartered in Washington, D.C., and many have other facilities elsewhere. The four research directorates are:

- The **Systems Directorate** is responsible for performing a range of activities from basic research through engineering development to expand the operational capabilities of the US Navy. There are four research divisions: Radar, Information Technology, Optical Sciences, and Tactical Electronic Warfare.
- The **Materials Science and Component Technology Directorate** carries out a range of materials research with the aim of better understanding of the materials to develop improved and advanced materials for use by the US Navy. There are seven research divisions: Laboratory for the Structure of Matter, Chemistry, Material Science & Technology, Laboratory for Computational Physics and Fluid Dynamics, Plasma Physics, Electronics Science & Technology, and the Center for Bimolecular Science & Engineering.
- The **Ocean and Atmospheric Science and Technology Directorate** performs research in the fields of acoustics, remote sensing, oceanography, marine geosciences, marine meteorology, and space science. There are six research divisions: Acoustics, Remote Sensing, Oceanography, Marine Geosciences, Marine Meteorology, and Space Science.
- The mission of the **Naval Center for Space Technology (NCST)** is to preserve and enhance a strong space technology base and provide expert assistance in the development and acquisition of space systems for naval missions. There are two research divisions: Space Systems Development and Spacecraft Engineering.

Additionally, there are two support directorates are:

- The **Executive Directorate** operations are directed by the Commander of the NRL, who typically is a US Navy Captain. In addition to management functions, the Directorate also manages the Nan science Institute (NSI), founded in April 2001 as a multidisciplinary nanotechnology research institute at the intersections of the fields of materials, electronics, and biology. Scientific Development Squadron ONE (VXS-1),[49] located at Naval Air Station Patuxent River, Maryland, which provides airborne research facilities to NRL as well as other agencies of the US Government, is also run out of the Executive Directorate.
- The **Business Operations Directorate** provides program management for the business programs which support the scientific directorates of NRL. It provides contracting, financial management and supply expertise to the scientific projects.

Additional information and reading on the NRL is available at the URL here. For procurement opportunities with NRL, see the section in this report on the Defense Innovation Marketplace.

Army Research Laboratory (ARL)

The US Army Research Laboratory (ARL) of the US Army Research Development and Engineering Command (RDECOM) is the Army's corporate, or central, laboratory. ARL combines in-house technical expertise with those from academic and industry partners, to maximize investments to ensure the best technologies for war fighters. Although ARL was only activated in 1992, its genealogy dates to the early 19th century. ARL grew out of the Base Realignment and Closure (BRAC) process, the LAB 21 study, and other evaluations. The new lab consolidated the seven corporate labs of the Laboratory Command (LABCOM) with other Army research elements to form a centralized laboratory concentrating on scientific research, technology development, and analysis.

ARL's program consists of basic and applied research and survivability/lethality and human factors analysis. ARL also applies the extensive research and analysis tools developed in its direct mission program to support ongoing development and acquisition programs in the Army Research, Development, and Engineering Centers (RDECs), Program Executive Offices (PEOs)/Program Manager (PM) Offices, and Industry.

Technology and analysis products are moved into RDECOM RDECs and to other Army, Department of Defense (DoD), government, and industry customers. The Army relies on ARL to provide the critical links between the scientific and military communities. The Laboratory must marshal internal and external science and technology assets to fulfill the requirements defined by or requested by the war fighters. Equally important, the Laboratory must assist the Army user in understanding the implications of technology on doctrine and in defining future needs of opportunities.

Currently, ARL scientists and engineers are pioneering research in such areas as neuro-ergonomics, energetic materials and propulsion, individual warfighter protection, energy science, electronics technologies, network sciences, virtual interfaces and synthetic environments and autonomous systems.

ARL consists of several unique facilities for integrated research and analysis in the Army. ARL's programs consist of basic and applied research and survivability/lethality analysis. ARL itself consists of six directorates and the Army Research Office (ARO). ARO initiates the scientific and far reaching technological discoveries in extramural organizations: educational institutions, nonprofit organizations, and private industry. The directorates focus on technology areas critical to strategic dominance across the entire spectrum of operations:

- **Computational and Information Sciences Directorate (CISD):** Scientific research and technology focused on information processing, network and communication sciences, information assurance, and battlespace environments, and advanced computing that create, exploit, and harvest innovative technologies to enable knowledge superiority for the Warfighter. CISD's technologies provide the strategic, operational, and tactical information dominance across the spectrum of operations.
- **Human Research and Engineering Directorate (HRED):** Scientific research and technology directed toward optimizing Soldier performance and Soldier-machine interactions to maximize battlefield effectiveness, and to ensure that Soldier performance requirements are adequately considered in technology development and system design.
- **Sensors and Electron Devices Directorate (SEDD):** Scientific research and technology in electro-optic smart sensors, multifunction radio frequency (RF), autonomous sensing, power and energy, signature management, directed towards reconnaissance, intelligence, surveillance, and target acquisition (RISTA), fire control, guidance, fuzing, survivability, mobility, and lethality.
- **Survivability/Lethality Analysis Directorate (SLAD):** Integrated survivability and lethality analysis of Army systems and technologies across the full spectrum of battlefield threats and environments as well as analysis tools, techniques, and methodologies.

- **Vehicle Technology Directorate (VTD):** Scientific research and technology addressing propulsion, transmission, aeromechanics, structural engineering, and robotics technologies for both air and ground vehicles.
- **Weapons and Materials Research Directorate (WMRD):** Scientific research and technology in the areas of weapons, protection, and materials to enhance the lethality and survivability of the nation's ground forces.

  More information on ARL is available at the URL here.

Army Research Office (ARO)

The U.S. Army Research Laboratory's Army Research Office (ARO) mission is to serve as the Army's premier extramural basic research agency in the engineering, physical, information and life sciences; developing and exploiting innovative advances to insure the Nation's technological superiority.

Basic research proposals from educational institutions, nonprofit organizations, and private industry are competitively selected and funded. These are typically announced on SAM.gov, the Government's Central procurement website. ARO's research mission represents the most long-range Army view for changes in its technology. ARO priorities fully integrate Army-wide, long-range planning for research, development, and acquisition. The ARO research program consists principally of extramural academic research efforts consisting of single investigator efforts, university-affiliated research centers, and specially tailored outreach programs. Each approach has its own objectives and set of advantages. Programs are formulated in consultation with the Army Research Laboratory Directorates; the Research, Development and Engineering Command's Research, Development and Engineering Centers; the Army Medical Research and Materiel Command; the Army Corps of Engineers; and the Army Research Institute for the Behavioral and Social Sciences. The programs are also jointly coordinated and planned through the Defense Science and Technology Reliance process under the Basic Research Panel.

ARO Functions are as follows:

- Accelerating research results transition to applications in all stages of the research and development cycle.
- Strengthening academic, industrial, and nonprofit laboratories research infrastructures which serve the Army.
- Focus on those research topics that support technologies vital to the Army's future force, combating terrorism and new emerging threats.
- Directing efforts in research areas relating to new opportunities for Army applications and which underscore the role of affordability and dual-use, especially as they provide new force operating capabilities and emerging threats. Leveraging the science and technology of other defense and Government laboratories, academia and industry, and appropriate organizations of our allies.
- Fostering scientist and engineer training in the disciplines critical to Army needs.
- Actively seeking creative approaches to enhance education and research programs at historically black colleges and universities and at minority institutions.

For procurement opportunities with either the ARL or ARO, see the section in this report on Defense Innovation Marketplace below.

Air Force Research Laboratory (AFRL)

The Air Force Research Laboratory (AFRL) is the only USAF organization entirely dedicated to leading the discovery, development, and integration of warfighting technologies for the air, space, and cyberspace domain. AFRL traces its roots back to organizations that began their activities during the First World War, 100 years ago. AFRL technology breakthroughs can be found in all of today's modern aircraft and weapon systems to include

the B-2 Spirit, C-17 Globemaster III, F-22 Raptor, F-35 Lightning, the Predator and Global Hawk Unmanned Aerial Systems, to name a few.

To further its mission, AFRL has recently created a new Strategic Alliance Process. This new process enhances AFRL's ability to partner with domestic federal agencies and organizations in the pursuit of joint ventures. USAF hopes this will allow AFRL to fully exploit appropriate internal resources in conjunction with the unique talents of external entities. The AFRL Strategic Alliance Process applies to all traditional partnering agreements outlined by a Memorandum of Agreement, Memorandum of Understanding, Interagency Agreement, or similar governing document.

In addition to the Strategic Alliance Process, AFRL also boats the Air Force Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. These programs are designed to stimulate the technology research of small businesses, while providing the government with cost-effective technical and scientific solutions to challenging problems. SBIR and STTR also encourage small businesses to market SBIR/STTR technology in the private sector.

Moreover, the Air Force Technology Transfer (T2) Program exists to assure all Air Force science and engineering activities promote the transfer or exchange of technology with state and local governments, academia, and industry. Further, all T2 Program activities enhance the economic competitiveness of industry and promote the productivity of state and local governments while leveraging DoD research and development investment.

The map of the United States below depicts the various labs and testing facilities located around the country with AFRL responsibilities. Information on other technology development arms of AFRL is listed below.

711th Human Performance Wing: Wright-Patterson AFB, Ohio

The 711th Human Performance Wing (711 HPW), is the first human-centric warfare wing to consolidate research, education, and consultation under a single organization. Established in March 2008 under AFRL, the 711 HPW is comprised of the Human Effectiveness Directorate (RH), the United States Air Force School of Aerospace Medicine (USAFSAM) and the Human Performance Integration Directorate (HP). The Wing's primary mission areas are aerospace medicine, science and technology, and human systems integration.

Aerospace Systems: Wright-Patterson AFB, Ohio

The Aerospace Systems Directorate brings together world-class facilities including a fuels research facility, structural testing labs, compressor research facility, rocket testing facilities, supersonic and subsonic wind tunnels, flight simulation lab, and many other innovative research labs. Among the technologies in development in the Aerospace Systems Directorate are turbine engines, scramjet engines, alternative fuels, unmanned vehicles, hypersonic vehicles, collision avoidance and aircraft energy optimization.

Directed Energy: Kirtland AFB, New Mexico

The Directed Energy Directorate is the Air Force's center of expertise for directed energy and optical technologies. The Directed Energy Directorate focuses in four core technical competencies: Lasers Systems, High Power Electromagnetics, Weapons Modeling and Simulation, and Directed Energy and Electro-Optics for Space Superiority. AFRL pioneered the first and only megawatt class airborne laser and is a leader in ground-based space imagining using adaptive optics with our 3.5-meter telescope in New Mexico and a 3.6-meter telescope in Hawaii. The lab is transitioning game-changing counter-electronics weapon technologies that can degrade, damage, or destroy electronic systems with minimum collateral damage.

Information: Rome, New York

The Information Directorate develops information technologies for aerospace command and control, and its transition to air, space, and ground systems. Its focus areas include a broad spectrum of technologies including information fusion and exploitation, communications and networking, collaborative environments, modeling and simulation, defensive information warfare and intelligent information systems technologies. Directorate scientists and engineers develop systems, concepts, and technologies to enhance the Air Force's capability to successfully meet the challenges of the information age. In addition to its primary mission, the directorate has partnered with other elements of the federal government, national intelligence agencies, numerous allied nations, state and local governments, and more than 50 major universities to work problems of common interest.

Space Vehicles: Kirtland Air Force Base, New Mexico

The Space Vehicles Directorate serves as the Air Force's "Center of Excellence" for space research and development. The Directorate develops and transitions space technologies for more effective, more affordable warfighter missions. Primary mission thrusts include Space-Based Surveillance (space-to-space and space-to-ground) and Space Capability Protection (protecting space assets from man-made and natural effects). The Directorate also leverages commercial, civil, and other government resources that ensure America's defense advantage. Primary focus areas include: radiation-hardened electronics, space power, space structures and control, space-based sensing, space environmental effects, autonomous maneuvering, and balloon and satellite flight experiments. The directorate also operates an additional research site near Gakona, Alaska. Leading the nation in space supremacy research and development, the Space Vehicles Directorate consists of an integrated team of 900-plus military, civilian, and on-site contractors.

Munitions: Eglin AFB, Florida

The Munitions Directorate develops, demonstrates, and transitions science and technology for air launched munitions for defeating ground-fixed, mobile/relocatable, air, and space targets. The directorate works to assure preeminence of US air and space forces, conducting basic research, exploratory development, and advanced development and demonstrations. It also participates in programs focused on technology transfer, dual use technology, and small business development.

Materials and Manufacturing: Wright-Patterson AFB, Ohio

The Materials and Manufacturing Directorate develops new materials, processes, and manufacturing technologies for use in aerospace applications. This includes aircraft, spacecraft, missiles, rockets and ground-based systems and their structural, electronic, and optical components. With a host of modern materials and analysis laboratories, the directorate also provides quick reaction support and real time solutions to Air Force weapon system acquisition offices, field organizations and maintenance depots to solve materials related concerns and problems. The Directorate plans, executes and integrates advanced manufacturing technology programs and affordability initiatives addressing manufacturing process technologies, computer integrated manufacturing and excellence through design for military needs. The directorate is also responsible for the Air Force technology programs that address environmental issues and provides materials expertise for airbase assets such as runways and infrastructures and technologies for aerospace expeditionary forces.

Sensors: Wright-Patterson AFB, Ohio

The Sensors Directorate leads the discovery, development, and integration of affordable sensor and countermeasure technologies for our war fighters. In collaboration with other AFRL directorates and DoD organizations, the directorate develops sensors for air and space reconnaissance, surveillance, precision engagement and electronic warfare systems. The directorate's vision is to provide robust sensors and adaptive countermeasures that guarantee complete freedom of air, space, and cyber operations for our forces, and deny these capabilities to our adversaries. Its core technology areas include: radio frequency and electro-optical sensing, sensor fusion and exploitation, network enabled spectrum warfare, and revolutionary devices and components.

Additional details regarding AFRL are available at the URL here.

Air Force Office of Scientific Research (AFOSR)

Located in Arlington, Virginia, the Air Force Office of Scientific Research (AFOSR) serves as the basic research manager for AFRL. AFOSR invests in long-term, broad-based research into aerospace-related science and engineering. AFOSR distributes its basic research program via three key partnerships which include: The University Connection focused on academia; Small Business Technology Transfer (STTR) Program intended to involve small businesses in Air Force-relevant defense research and to enable them to commercialize innovative technologies; and the Air Force Intramural Research where AFOSR works closely with the other AFRL Technical Directorates to nurture and support quality research and, integrate intramural and external research efforts to transition the latest basic research discoveries to follow-on levels in the research and development chain.

To further enhance AFSOR's research portfolio with the latest scientific and engineering advancements around the world, the International Office (AFOSR/IO) consists of four geographically strategic divisions to further AFSOR worldwide: The European Office of Aerospace Research and Development (EOARD), in London, United Kingdom, The Asian Office of Aerospace Research and Development (AOARD), in Tokyo, Japan, with responsibility for Asia, India, and Pacific Rim countries, including Australia and New Zealand, The Southern Office of Aerospace Research and Development (SOARD), in Santiago, Chile, and The International Office North (AFOSR/ION), in Arlington, Virginia, serving as the Washington DC liaison for AFOSR's international activities.

The International Office's three overseas divisions accomplish this mission by way of three main programs: The Window-On-Science (WOS) program is an invitational program for prominent international scientists to visit and meet with scientists in the Air Force Research Laboratory, The Conference Support Program (CSP) which is designed to provide financial support for overseas workshops and conferences that are in scientific areas of interest to the Air Force, The Research Grants and Contracts program which directly funds research overseas, The

Engineer and Scientist Exchange Program (ESEP) which allows Air Force scientists and engineers to spend up to two-years as researchers in defense laboratories overseas, and allows scientists and engineers from overseas defense laboratories to do research in Air Force facilities in the US. The AFOSR is available at the URL here.

1.3.4 Defense Innovation Marketplace

The Defense Innovation Marketplace is a valuable communications resource between DoD S&T/R&D and Industry/Academia. In a single, centralized location, this website provides industry with improved insight into the research and engineering investment priorities of the DoD. The Marketplace contains DoD R&E strategic documents, solicitations, and News/Events to better inform Independent Research and Development (IR&D) planning. The IR&D Secure Portal houses project summaries that provide DoD with visibility into the IR&D efforts submitted.

For industry, the DoD Defense Innovation Marketplace provides the following:

- A centralized place to learn about DoD investment priorities and technology requirements.
- A source allowing industry to align their IR&D efforts to better support the current and future needs of the warfighter.
- A link to new business opportunities with each of the Services and Defense Agencies, as well as specific solicitations, upcoming R&D related events, presentations, and POCs, improving visibility to DoD activities.
- A portal to securely share their IR&D projects with S&T/R&D and acquisition personnel they consider their target market.

For the DoD, the Marketplace is designed to be:

- The place to post important, relevant, and future needs, S&T/R&D priorities, events, presentation, and solicitations.
- A secure portal for registered and approved DoD S&T/R&D and acquisition personnel to gain insight and visibility into industry Independent R&D investments.

The DoD Innovation Marketplace is easy to navigate and access. The main home page is located at the URL here. For industry, the Business Opportunities section provides a description of current solicitations across categories that include Acquisition Resources, Warfighting Lab Incentive Fund, Rapid Innovation Fund, Small Business Resources, and Technology Interchange Meetings.

The Reliance 21 Communities of Interest section represents a mechanism to encourage multi-agency coordination and collaboration in cross-cutting technology focus areas with broad multiple Component investment. COIs provide a forum to coordinate Science & Technology strategies and share innovative ideas, technical directions, and technology opportunities. COIs include the following:

Advanced Electronics ■ Air Platforms ■ Autonomy ■ Biomedical Armed Services Biomedical Research Evaluation and Management (ASBREM) ■ Biotechnology ■ C4I ■ Counter-IED ■ Counter-WMD ■ Cyber ■ Directed Energy ■ Electronic Warfare ■ Energy and Power Technologies ■ Engineered Resilient Systems ■ Ground and Sea Platforms ■ Human Systems ■ Kinetic Weapons ■ Materials and Manufacturing Processes ■ Sensors ■ Space.

1.4 Department of Homeland Security (DHS)

Eleven days after the horrible terrorist attacks of September 11, 2001, then Pennsylvania Governor Tom Ridge was appointed as the first Director of the Office of Homeland Security in the White House under President George W. Bush. The office oversaw and coordinated a comprehensive national strategy to safeguard the country against terrorism and respond to any future attacks. With the passage of the Homeland Security Act by Con-

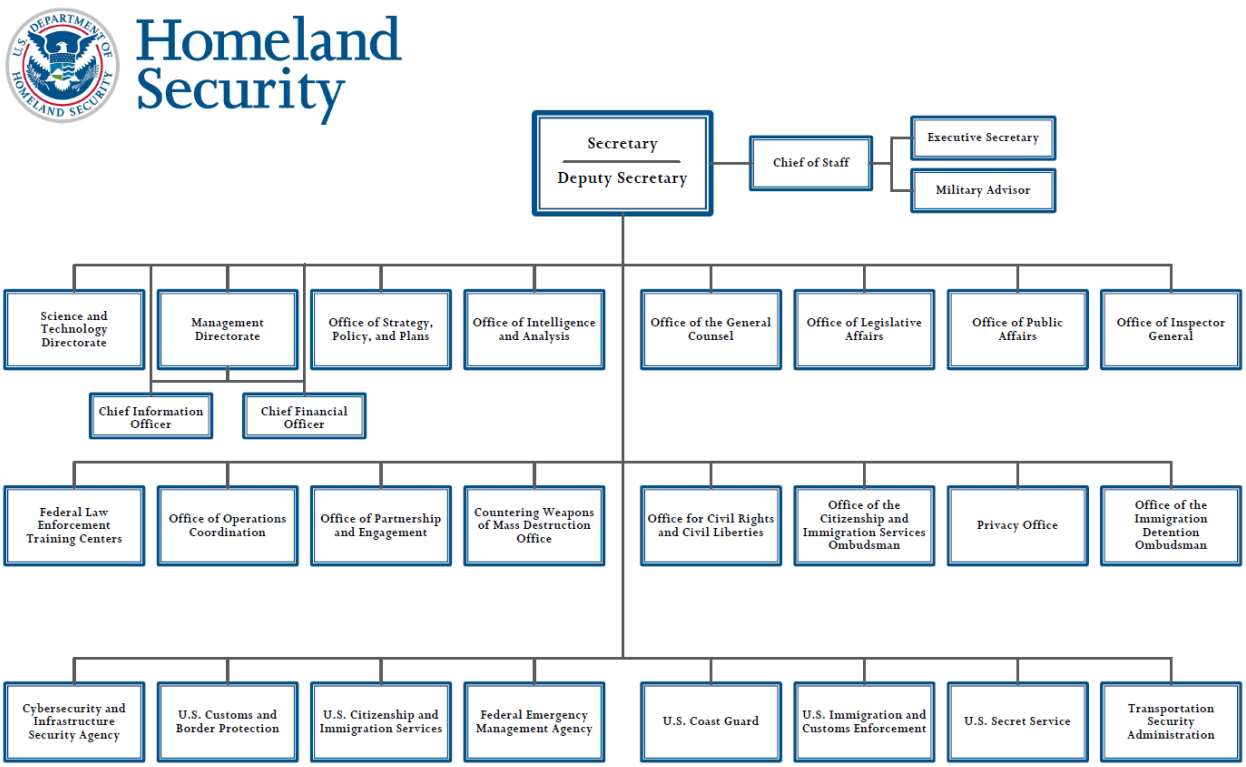
gress in November 2002, the Department of Homeland Security formally came into being as a stand-alone, Cabinet-level department to further coordinate and unify national homeland security efforts, opening its doors on March 1, 2003. A total of 22 different federal departments and agencies were combined into a unified, integrated cabinet agency.

The DHS is today one large department whose primary mission is to protect the American homeland. Other missions include to secure our borders, transportation sector, ports, and critical infrastructure; to synthesize and analyze homeland security intelligence from multiple sources; to coordinate communications with state and local governments, private industry, and the American people about threats and preparedness; efforts to protect the American people against bio-terrorism and other weapons of mass destruction; and to manage federal emergency response activities.

The DHS organization chart, below, updated on April 2, 2021, shows the myriad departmental command functions and major subordinate agencies.

1.4.1 Homeland Security Advanced Research Projects Agency (HSARPA)

The DHS Homeland Security Advanced Research Projects Agency (HSARPA) reports to the Under Secretary for Science and Technology and supports innovative research to produce revolutionary changes in technologies, new capabilities, and threat and risk assessments for the Homeland Security Enterprise (HSE.) HSARPA was established by the Homeland Security Act of 2002 and uses innovation and modernization to further scientific advances and produce front-line products that support DHS components such as U.S. Customs and Borders Protection, the U.S. Secret Service, the U. S. Coast Guard, and the Transportation Security Administration, as well as state, local, and private sector entities including first responders and critical infrastructure operators.



HSARPA conducts analysis to understand these organizations' current missions, systems and processes and helps identify operational gaps where new technologies can have the most impact. Program managers lead teams of subject matter experts to develop, test and evaluate these new homeland security technologies and capabilities. Some major areas of HSARPA focus are as follow:

- Borders and Maritime Security Division - Prevent contraband, criminals, and terrorists from entering the U.S. while permitting the lawful flow of commerce and visitors.
- Chemical and Biological Defense Division - Detect, protect against, respond to, and recover from potential biological or chemical events.
- Cyber Security Division - Create a safe, secure, and resilient cyber environment.
- Explosives Division - Detect, prevent, and mitigate non-nuclear explosives attacks against people and infrastructure.
- Resilient Systems Division - Strengthen resiliency across the HSE to include societal community resilience as well as physical infrastructure and disaster response and recovery capabilities.

Moreover, HSARPA divisions work directly with DHS components to better understand and address their high-priority requirements and define operational context by conducting analyses of current missions, systems, and processes. This process identifies operational gaps where S&T can have the greatest impact on operating efficiency and increasing capability. In addition, Apex Technology Engines (Engines) power open innovation by harnessing Subject Matter Experts (SME) and capabilities across DHS.

Apex Programs consist of high-profile and multidisciplinary programs executed over a three to five year time span. Using a balanced portfolio of projects, Apex Program deliverables range from game-changing technical capabilities to cost-saving business processes. Apex Technology Engines in turn, identifies and shares SMEs, technical solutions, tools, best practices, lessons learned and reusable products and solutions on behalf of Apex and other S&T programs. Over time, the Engines' collective experience and awareness of emerging technology trends will result in a robust knowledge base and network to serve the dynamic needs of S&T and the DHS enterprise. Further overview of the Apex Programs are also illustrated in the "Introduction to HSARPA" presentation.

HSARPA's Research and Development (R&D) portfolio strikes a balance between near term lower risk technologies and longer term, high-risk/high-payoff technologies. This technical focus on innovation encourages opportunities for new ideas and competition from the private sector, small business, industry, academia, and federally funded research and development centers. HSARPA's end-goal is to integrate knowledge, technologies, and science-based solutions into HSE operations with innovation cycles from project inception through operational testing. HSARPA hosts a competitive and rigorous project selection process with regular formal reviews of the entire procurement opportunity and responses from bidders.

The Science and Technology Directorate (S&T) at HSARPA oversees a variety of programs and projects to ensure and improve the security of our nation. Details concerning the HSARPA organization and potential opportunities for industry, such as BAAs, are available at the URL here.

Borders and Maritime Security

The Borders and Maritime Security Division's (BMSD) mission is to enhance U.S. air, land, and maritime border security while maximizing the flow of legitimate trade and travel. BMSD aims to achieve its mission by transitioning scientific and technical knowledge and solutions to operational use. The strategy involves three distinct activities: understanding the technical dimensions of homeland security challenges, working collaboratively across the HSE, and applying rigorous process and methodology.

BMSD consists of scientific and technical professionals responsible for funding, directing, and managing the research, development, prototyping, test, and evaluation of technical solutions for border, maritime, and cargo security. The division's primary customers – its end users – are the operational components within DHS, such as U.S. Customs and Border Protection, U.S. Immigration and Customs Enforcement and the U.S. Coast Guard, as well as the nation's first responders. BMSD's partners and performers include academia, national laboratories, private industry, and other members of the Homeland Security Enterprise.

Chemical and Biological Defense

The Chemical and Biological Defense Division's (CBD) mission is to strengthen U.S. security and resiliency by providing knowledge products and innovative technology solutions to enhance national preparedness against both current and future chemical and biological threats. It DoEs this through research and development programs in threat characterization, advanced agent/disease surveillance, agent detection, event attribution, and post-event response and restoration support.

CBD is supported by a strong and diverse group of scientists, engineers, program managers and analysts. Working with industry, academic, national laboratory and federal partners, CBD develops technologies, systems, and knowledge products to increase national preparedness in the focus areas of threat awareness, biosurveillance, detection and diagnostics, and response and recovery. Each of these areas have a number of programs, described below.

- **Threat Awareness** identifies, assesses, and prioritizes chemical and biological risks and threats to enable planning, response, countermeasures, and remediation. Significant contributions in the field include robust laboratory studies to characterize biological agents and evaluate mitigation procedures to their release; "first of its kind" field testing to characterize behavior of large scale releases of toxic industrial chemicals; real-time decision support tools for planning and response; and a comprehensive knowledge repository of threat information and 24/7 subject matter expert reach back support.
- **Biosurveillance** primarily focuses on developing effective surveillance, prevention, and operational capabilities for detecting and countering biological threats. S&T takes a system-level approach to integrating information into surveillance architectures, developing, and testing advanced detection systems, and implementing a cross-domain focus on biological, chemical, and agricultural threats.
- **Detection and Diagnostics** focuses on developing tools to rapidly detect and diagnose high-priority and emerging biological and chemical threats. Significant contributions in the field include developing and validating environmental assays for use by first responders, multiplex assay panels for incident response and cost-effective approaches for effective use of the Strategic National Stockpile. The Centers for Disease Control and Prevention (CDC) maintains the Strategic National Stockpile, which houses large quantities of vaccines, medicine, and medical supplies to protect the American public in the event of a public health emergency.
- The **Response and Recovery** program focuses on returning things to normal following a chemical or biological incident. This involves the development of plans, technologies, capabilities, and tools for remediation, as well as forensic capabilities to aid in the investigation, prosecution, and prevention of future incidents. The goal is to put decision support tools into the hands of urban and rural emergency planners and first responders. The program also develops medical countermeasures to mitigate threats to agriculture.

Cyber Security Division

The Cyber Security Division's (CSD) mission is to contribute to enhancing the security and resilience of U.S. critical information infrastructure and the Internet by (1) developing and delivering new technologies, tools, and techniques to enable DHS and the United States to defend, mitigate and secure current and future systems, networks and infrastructure against cyberattacks; (2) conduct and support technology transition; and (3) lead and coordinate R&D among the R&D community which includes department customers, government agencies, the private sector, and international partners.

Explosives Division

The Explosives Division (EXD) works with universities, industry, and other DHS components to develop new technologies and systems capable of detecting or mitigating non-nuclear explosives. To support this mission, EXD's programs focus on three operational areas: aviation, facilities, and intermodal security.
Aviation security develops technology to protect airports, airplanes, and the travelling public. Facilities protection develops technologies that allow better screening for threats entering key public buildings or large special events, such as the Super Bowl or political conventions. Intermodal security develops systems capable of screening for threats within high-volume, mass transportation systems (subways, buses, ferries) that do not have traditional, airport-style checkpoints.

Resilient Systems Division

The Resilient Systems Division's (RSD) mission is to rapidly develop and deliver innovative solutions that enhance the resilience of individuals, communities, and systems. RSD explores solutions that enable the whole community to prevent and protect against threats, mitigate hazards, effectively respond to disasters and expedite recovery. RSD's focus areas include: community resilience, critical infrastructure, cyber physical systems, decision support, evaluation research, and security and identification.

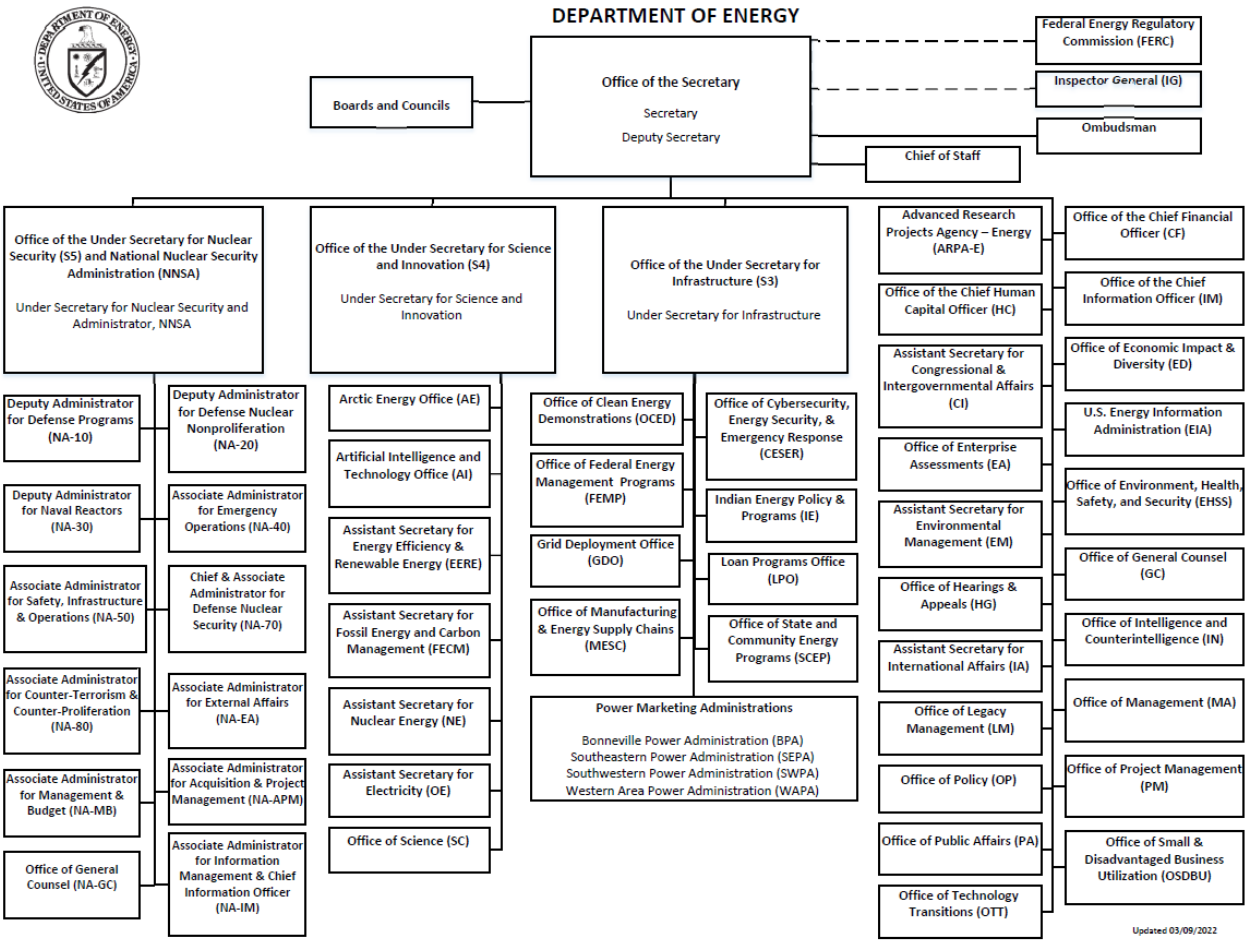
1.5 Department of Energy

The Department of Energy's (DoE's) mission is to ensure the United States' security and prosperity by addressing its energy, environmental, climate, and nuclear security challenges through transformative Science and Technology (S&T) solutions. Three Under Secretaries manage the core functions that carry out the DoE mission, with significant cross-cutting work spanning across the enterprise.

On February 9, 2022, the DoE announced an organizational realignment that is designed to ensure that DoE is structured to effectively implement the clean energy investments in the Bipartisan Infrastructure Law and the Energy Act of 2020. The new alignment bolsters DoE's ability to advance more clean energy breakthroughs, accelerate clean infrastructure nationwide, and support market-ready solutions to address climate change. The new organizational structure establishes two Under Secretaries, one of which is focused on fundamental science and clean energy innovation and the other on deploying clean infrastructure. They support DoE's ongoing efforts to achieve carbon-free electricity in the U.S. by 2035 and a net zero economy by 2050.

All told, the Bipartisan Infrastructure Law and the Energy Act of 2020 provide more than $60 billion primarily for new major clean energy demonstration and deployment programs and more than triples DoE's annual funding for energy programs, including significantly expanded R&D and entirely new demonstration and deployment missions.

Below is the DoE's organization chart that is current as of March 9, 2022. The DoE enterprise is comprised of approximately 14,000 federal employees and over 90,000 management and operating contractor and other contractor employees at the Department's headquarters in Washington, D.C., and at 85 field locations. DoE operates a nationwide system of 17 national laboratories that provides world-class scientific, technological, and engineering capabilities, including the operation of national scientific user facilities used by over 29,000 researchers from academia, government, and industry. The range, scale and excellence of S&T at the DoE laboratories provide strategic assets to accomplish DoE missions, support government responses to unforeseen domestic and international emergencies, and provide technical capabilities to help shape the global S&T agenda.



1.5.1 Advanced Research Projects Agency-Energy

DoE's Advanced Research Projects Agency-Energy (ARPA-E) is modeled after the DoD's DARPA organization. ARPA-E accelerates the advancement of transformational energy technologies to enhance the economic and energy security of the United States by investing in high-potential, high-impact energy projects that are too early for the private sector, and that, if successfully developed, will create the foundation for entirely new industries. ARPA-E is a direct report to the Deputy Secretary of Energy.

Successful projects will address at least one of ARPA-E's two key Mission Areas:

- Enhance the economic and energy security of the United States through the development of energy technologies that result in:
  - Reductions of imports of energy from foreign sources.
  - Reductions of energy-related emissions, including greenhouse gases.
- Improvement in the energy efficiency of all economic sectors.
- Ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.

ARPA-E tracks key early indicators that help illustrate how the advanced R&D funded by the Agency can potentially turn into commercial impact, including private-sector follow-on funding, new company formation, partnership with other government agencies, publications, inventions, and patents. Since 2009, ARPA-E has provided approximately $3 billion in R&D funding for more than 1,294 potentially transformational energy technology projects (as of April 2022).

ARPA-E recently announced in spring 2022 that many of its project teams have continued to advance their technologies: 129 new companies have formed; 285 licenses have been issued for ARPA-E tech; 268 have partnered with another government agency; and 185 teams have together raised more than $9.87 billion in private-sector follow-on funding to continue to advance their technology toward the market. Moreover, ARPA-E projects have helped advance scientific understanding and technological innovation through 5,497 peer-reviewed journal articles and 829 patents issued by the U.S. Patent and Trademark Office.

After over a decade, ARPA-E is starting to count exits through public listings, mergers, and acquisitions. ARPA-E has 20 exits as of January 2022, with a total reported value of $21.6 billion at the time of the deals. These indicators demonstrate that ARPA-E's approach to selecting, funding, and actively managing early-stage energy R&D continues to pay off, advancing the state of the art in energy science and engineering and defining new opportunities for commercialization of advanced energy technologies.

Foreign entities are eligible to apply for funding. However, if the project is selected for award negotiations and an award is made, all work must be performed in the United States by subsidiaries or affiliates incorporated in the United States or U.S. territories, unless ARPA-E grants a foreign work waiver to allow performance of part of the work outside of the United States. ARPA-E's grant of a foreign work waiver is a fact dependent, case-by-case determination that is made only in exceptional circumstances and only for discrete parts of an award that necessitate foreign work.

1.5.2 National Laboratories

Founded during the immense investment in scientific research in the period preceding World War II, the National Laboratories have served as the leading institutions for scientific innovation in the United States for more than sixty years. The mission of the DoE National Laboratories follows:

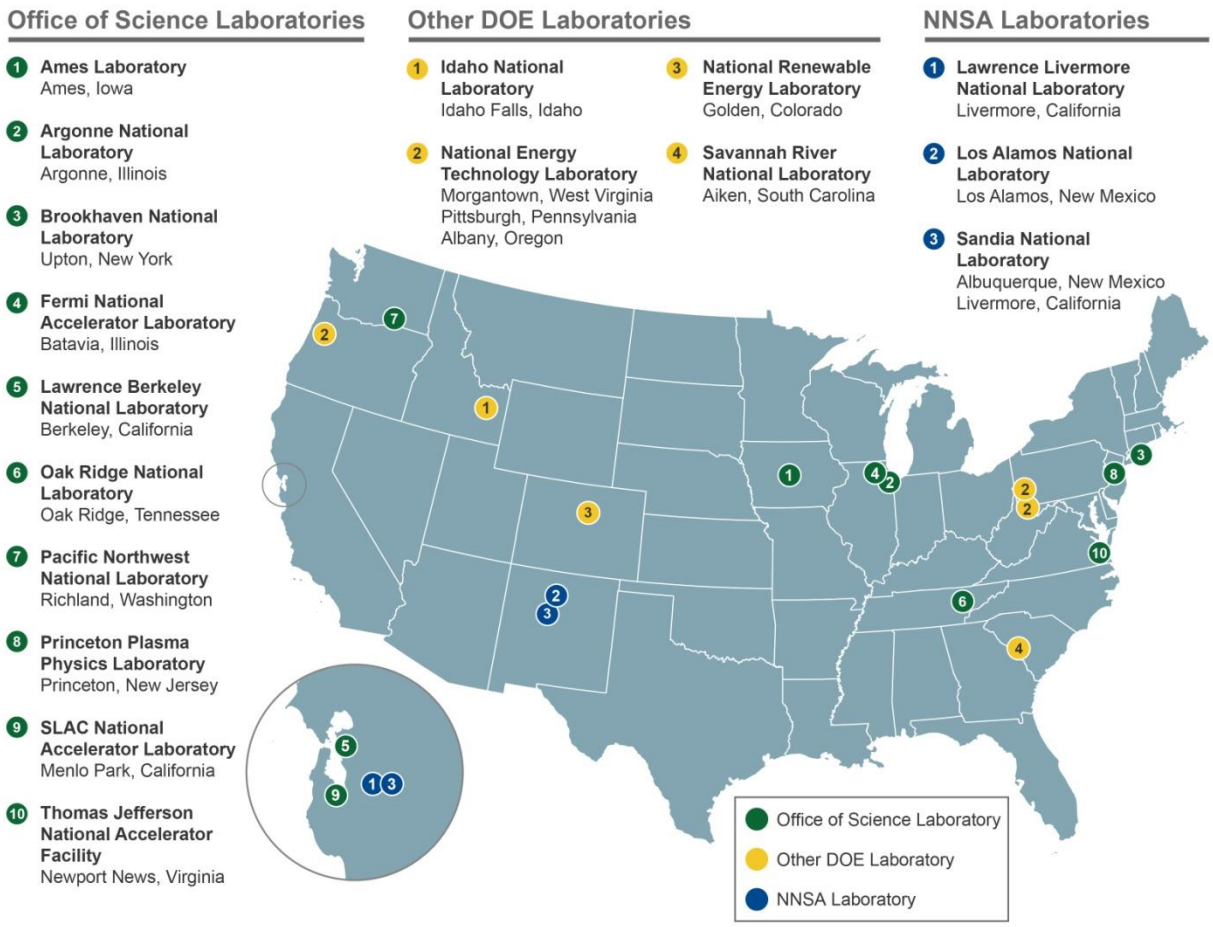
- Research of the highest caliber in physical, chemical, biological, and computational and information sciences that advances understanding of the world.
- Advance U.S. energy independence and leadership in clean energy technologies to ensure the ready availability of clean, reliable, and affordable energy.
- Enhance global, national, and homeland security by ensuring the safety and reliability of the U.S. nuclear deterrent, helping to prevent the proliferation of weapons of mass destruction, and securing the nation's borders.
- Design, build, and operate distinctive scientific instrumentation and facilities, and make these resources available to the research community.

The National Labs tackle existing critical scientific challenges – from combating climate change to discovering the origins of the universe – and possess unique instruments and facilities, many of which are found nowhere else in the world. They address large scale, complex research and development challenges with a multidisciplinary approach that places an emphasis on translating basic science to innovation. They also develop unique, often multidisciplinary, scientific capabilities beyond the scope of academic and industrial institutions, to benefit U.S. researchers and national strategic priorities.

The 17 DOE laboratories comprise a preeminent federal research system and provide the United States with strategic S&T capabilities. Another 13 Laboratories exist within the Office for Under Secretary for Science and Energy, with DOE's Office of Science supporting 10 of those labs. The Office of Science is the single largest supporter of basic research in the physical sciences in the United States. The National Nuclear Security Administration (NNSA) supports three Laboratories, while the Office of Environmental Management supports one.

Below is a map of the United States that indicates the geographic locations of the Office of Science laboratories, the Department of Energy laboratories, and the National Nuclear Security Agency (NNSA) laboratories under the

umbrella of the National Laboratories. These are color coded and include references to their city/town and host state.



Office of Technology Transitions

DoE's National Laboratories and other Facilities play a major role in DoE's mission to contribute to U.S. economic security. In FY19, DoE and the National Laboratories managed and executed more than 1,000 Cooperative Research & Development Agreements (CRADAs); 2,248 Strategic Partnership Projects (SPPs) involving nonfederal entities (NFEs); and 126 Agreements for Commercializing Technology (ACTs). Partners contributed about $380 million to R&D efforts via these agreements in FY19 and nearly $1.7 billion between FY15 and FY19. Non-federal SPPs are the most significant component of industrial interactions in terms of number of agreements, with an average of about 2,250 active agreements annually, and funds, with an average of $245 million annually.

In total, the National Laboratories used these mechanisms to partner with approximately 2,650 industry, academic, and non-profit partners between FY15 and FY19. Small businesses represented the largest segment of non-federal partnerships, with more than 1,200 different partners entering into agreements with the Laboratories. During the same timeframe, the Laboratories partnered with nearly 300 additional organizations, ranging from state and local governments to other FFRDCs.

Licensing these technologies to external partners is an important component of DoE's technology transfer activity. To these ends, DoE makes available the point of contact at each National Laboratory technology transfer or partnership office.

1.5.3 Budget and Priorities

The Fiscal Year 2023 (FY23) budget request for DoE of $48.2 billion in discretionary funding, represents a $6.3 billion or 15.1 percent increase over FY21 enacted spending. The Request reflects the February 9, 2022, DoE realignment to set the DoE up for success as it conducted its missions.

The FY23 request aims to advance core science and security missions through investments in clean energy innovation and infrastructure and to drive down the costs of clean energy. The request supports over $11 billion in investments in clean energy research, development, demonstration, and deployment, which are central to maintaining U.S. competitiveness and enabling achievement of the Administration's goals of 50-52 percent reduction from 2005 levels in economy-wide net greenhouse gas pollution in 2030 and zero emissions economy-wide by 2050. It continues support for National Laboratories and deployment of the critical technologies invented and developed through related R&D. The National Laboratories have served as the Nation's leading institutions for scientific innovation for more than 75 years and investments help to foster development of solutions to the most pressing challenges facing the U.S.

The FY23 request aims to strengthen domestic clean energy manufacturing, developing key energy industries and supply chains to enhance U.S. energy security. The request reflects the importance of strategically supporting the U.S. domestic manufacturing base through innovation, technical assistance, and training. Specifically, the request includes $200 million for a new Solar Manufacturing Accelerator that will help create a robust domestic manufacturing sector capable of meeting the Administration's solar deployment goals without relying on imported goods manufactured using unacceptable labor practices. The request also funds a new Manufacturing USA institute and increases support for Industrial Assessment Centers, giving students valuable experience conducting energy audits for small and medium-sized manufacturers. The Request also proposes a $1 billion mandatory investment to launch a Global Clean Energy Manufacturing effort that would build resilient supply chains for climate and clean energy equipment through engagement with allies, enabling an effective global response to the climate crisis while creating economic opportunities for the U.S. to increase its share of the global clean technology market. These domestic manufacturing and resilient supply chain investments would help shield the U.S. from supply chain disruptions to key industries and ensure the availability of low-cost materials for the energy sector.

3. PRIVATE SECTOR PARTICIPANTS

The private sector is comprised of countless numbers of US and global companies who compete for US Government contracts in a variety of functions, such as R&D, S&T, procurement of weapon systems as OEMs or system integrators, construction services, foreign military sales, and provision of defense services and technical assistance.

The US Government depends heavily on the private sector to conduct several activities required by the mission of the government organizations. In the case of defense and national security, the DoD is the dominant US Government department that provides opportunities for global and US companies to compete for contracts that provide either the capability and/or services required to conduct its defense mission. The business case for Austrian companies is that it may be easier to align with a US or global defense company who has established relationships in working with the DoD and other US government agencies. US companies recognize the benefits of having capable international partners, such as from Austria, with state-of-the-art technologies for providing a competitive edge in their competition for government contracts.

Regarding the private sector, the top ten DoD contractors in 2021, as reported by Defense News at the URL here, were:

1 – Lockheed Martin
2 – Raytheon Technologies
3 – Boeing
4 – Northrop Grumman
5 – General Dynamics
6 – BAE Systems
7 – L-3 Harris Technologies
8 – Huntington Ingalls Industries (HII)
9 – Leidos
10 – Honeywell

For Austrian companies, the above listing indicates that their business strategy for US defense business should include seeking partnership with those companies who work as subcontractors to the above listed prime contractors. Depending upon the major equipment that is being developed by these OEM examples, the primes will select a variety of subcontractors to meet its overall requirements. Furthermore, the subcontractors will in turn be looking for suppliers, technologies, and smaller companies to provide them the capability they need to support their competitiveness in bidding for the subcontracts to the OEMs. Herein provides the opportunity for Austrian companies, with their niche technological capabilities, to penetrate the US defense and security market. A key will be to identify the appropriate second and third tier of suppliers to the prime contractors whose overall capability could significantly increase by partnering with an Austrian company.

A fundamental question by Austrian companies should be where can one find a list of either US or global companies who work in the defense and national security areas in support of the DoD or other US government organizations? In the opinion of this author, one of the most comprehensive listings is found in the Mega-Directory published by the National Defense Industrial Association or NDIA. NDIA is the premier industry association representing all facets of the defense and technology industrial base and serving all military services. NDIA provides a legal and ethical forum for the exchange of information between Industry and Government on National Security issues. Members of NDIA foster the development of the most innovative and superior equipment, training, and support for our warfighters and first responders through our divisions, local chapters, affiliated associations, and events.

As of June 2021, NDIA is comprised of around 1,700 corporate members, all of whom are listed in the NDIA Mega-Directory, and more than 90,000 individual members from both industry (small, medium, and large defense contractors) and government. This is an excellent source to identify potential prime contractors, sub-contractors, suppliers and in most all companies who operate in the defense and security supply chain. The Mega-Directory can be found at the URL here.

Sixteen categories of industry are each broken down into further functional areas for each category, thereby making it straightforward to identify the type of company that may benefit from Austrian technology or capability. The 16 categories include:

Aviation ■ C4ISR ■ Combat Gear ■ Electronics ■ Environment and Energy ■ Homeland Security ■ Logistics, Transportation and Manufacturing ■ Maritime Systems ■ Modeling, Simulation, Testing and Training ■ National Security ■ Professional Services and Consulting ■ Research and Development ■ Small Business Classifications ■ Space and Missile Defense ■ Vehicles ■ Weapons and Ammunition

4. SUPPLY CHAIN CONSIDERATIONS

Although the COVID-19 pandemic created a supply chain shock of unparalleled global scope and scale, supply chain disruptions have become more frequent and severe overall. Companies must now address the consequences of everything from wildfires and power outages to cyberattacks and acute workforce dissatisfaction.

U.S. armed forces rely on the commercial sector to design and produce many necessary capabilities and materials, so these disruptions pose significant risks to national security.

The risks of disruption have grown in tandem with the increasing complexity of U.S. defense supply chains. The average American aerospace company relies on approximately 200 first tier suppliers. The second and third tiers have more than 12,000 companies.3 With the globalization of supply chains, these suppliers and their goods come from a wide array of places. Some foundational industrial supply chain sectors, like optical instruments, mechanical gears, welding equipment, and printed circuit boards source a large part of their components from outside North America.

The Biden Administration released a new report in February 2022, entitled "Securing Defense-Critical Supply Chains: An action plan developed in response to President Biden's Executive Order 14017." The report is available at the URL here.

The Department of Defense (DoD) requires healthy, resilient, diverse, and secure supply chains to ensure the development and sustainment of capabilities critical to national security. The ongoing COVID-19 pandemic highlighted vulnerabilities in complex global supply chains in very real ways to the public, government, and industry. Beyond COVID-19, supply chain disruptions have become more frequent and severe overall.

In order to strengthen the national industrial base during times of disruption, President Biden signed Executive Order (EO) 14017: "America's Supply Chains," on February 24, 2021. The EO calls for a comprehensive review of supply chains in critical sectors, including the Defense Industrial Base (DIB). The linked report offers a recent DoD assessment of supply chains in the DIB and articulates the Department's plans to ensure security of supply for items vital to national security.

Congress has also demonstrated a commitment to renewing and strengthening U.S. manufacturing through the Bipartisan Infrastructure Law (BIL) and the Critical Supply Chain Task Force of the House Armed Services Committee (HASC). The DIB and related trade associations have outlined myriad actions and are actively engaging with government at all levels to build resiliency. The DoD is committed to strengthening the industrial base and establishing a network of domestic and allied supply chains to meet national security needs. Given the breadth and scale of defense supply chains, the one-year effort prioritized four areas in which critical vulnerabilities pose the most pressing threat to national security, including:

- Kinetic capabilities – Current missiles systems and advanced and developing missile capabilities, including hypersonic weapons technology, as well as directed energy weapons.
- Energy storage and batteries – High-capacity batteries, with a particular focus on lithium batteries.
- Castings and forgings – Metals or composites developed into key parts and manufacturing tools through high-intensity processes.
- Microelectronics – State-of-the-Practice (SOTP) and legacy microelectronics, as well as State-of-the-Art (SOTA) microelectronics.

The DoD report also offers an update regarding the implementation of recommendations in DoD's Review of Critical Minerals and Materials, included in the 100-day response to EO 14017. That document was published on June 8, 2021.

Underpinning all four key focus areas are strategic enablers that are required for mission success. Fragility or gaps in these enablers create operational and strategic risk. Addressing the challenges in each enabler is critical to building overall supply chain resilience. These strategic enablers include:

- Workforce – Trade skills through doctoral-level engineering skills.
- Cyber posture – Industrial security, counterintelligence, and cybersecurity.

- Manufacturing – Current manufacturing practices, as well as advanced technology like additive manufacturing.
- Small business – The role of key members of DoD supply chains.

This report provides a strategic assessment of these focus areas and enablers, as well as the steps that can be taken to mitigate identified threats and vulnerabilities and build resilience. Across all focus areas and enablers, the Department identified certain foundational recommendations to enhance and grow the industrial base. These cross-cutting recommendations underpin sector-specific recommendations outlined in the report and are critical to the Department's overall ability to make strategic informed acquisition and sustainment decisions. The recommendations include:

- Build domestic production capacity – For those supply chains that are critical for national defense, the U.S. is committed to ensuring reliable production access within the defense industrial base, both domestic and allied.
- Engage with partners and allies – The U.S. is collaborating with its international partners and allies to develop policies and arrangements that strengthen our defense industrial bases and improve supply chain resilience.
- Mitigate Foreign Ownership, Control, or Influence (FOCI) and safeguard markets – The Department is committed to protecting its supply chains and the defense industrial base from adversarial FOCI by scaling efforts to identify and mitigate FOCI concerns.
- Conduct data analysis – DoD will continue to build on previous efforts to expand its visibility into supply chains by collecting and organizing key data.
- Aggregate demand – The Department will signal to industry what the likely total demand is across multiple programs, so industry can better anticipate number of orders from year to year.
- Develop common standards – To leverage commercial sector innovations, and to embed modernizing technologies in weapon systems, the DoD will work, where possible, to limit its use of military-unique requirements when developing performance requirements.
- Update acquisition policies – DoD should engage in efforts to develop a whole-of-government strategy and implementation plan to engage with industry and Congress to determine which policy and regulatory changes would encourage expansion of capabilities.

These sector-specific recommendations are designed to provide DoD with a strategic roadmap to renew the DIB and maintain its position as an innovation leader into the 21st Century.

The aforementioned study underscores the tremendous market that is available in support of the vital DoD Supply Chain that supports the life cycle management and sustainability of goods (weapon systems, equipment, and materiel) procured by the Military Services. The OEM has a supply chain that involves a number of secondary tier suppliers, some of whom may offer opportunities for Austrian Companies. Depending upon the nature of the technology and capability provided by each supplier, we can anticipate opportunities for Austrian companies in the Supply Chain. The challenge is for the Austrian company(ies) to be introduced to the major subcontractor(s) that is supporting the OEM and show that they are trustworthy sources, as the DoD prioritizes efforts to secure supply chains against perceived vulnerabilities. This is where we can assist the Austrian Commercial Office in the Embassy of Austria to help identify the US subcontractors or suppliers who can benefit from support by an Austrian company.

5. Engaging the USG and Opportunities for Austrian Companies

1.6 DoD Procurement Process

DoD procurement follows a very standardized, uniform system that is the same for the many procurement offices in each military service and the defense agencies mentioned earlier in this report. Each follows and adheres closely to the provisions of the Federal Acquisition Regulation or FAR and in the case of the DoD, its Department of Defense FAR Supplement or DFARS.

Actual procurement is decentralized and managed by the procurement offices in many different contracting offices. The Army, Navy, Air Force and Defense Agencies have different procurement or contracting offices in many locations, normally associated with the command or organization that is offering the solicitation.

1.6.1 The Two General Phases of Procurement

There are normally two specific phases of procurement in which the private sector can engage the DoD, DHS or DoE. This includes the Pre-Solicitation Phase, in which the government announces its interest and/or intention in having industry respond to a future solicitation on a particular system, capability or service. It also includes the Post-Solicitation Phase, by which time the government has issued a Request for Proposal or RFP. After that point, contact by industry with the offering government office is prohibited. Pre-Solicitation Phase actions by industry could include the following:

- Attend any briefings for industry as announced by the government sponsor.
- Request meetings with the government to understand the user's requirements.
- Submit unsolicited proposals with introduction of proposed technical solutions to an anticipated problem by the government user.
- Submit white papers which can address the anticipated user's requirements.
- Respond to government Requests for Information, if appropriate.
- Seek teaming arrangements with other US or global companies who plan to compete for the anticipated solicitation.

Post-Solicitation Phase actions involve the contractors working with industry team members:

- If the solicitation is Full and Open, meaning that it is open to any size company (large or small business), then interested Austrian companies should seek to be a sub-contractor/supplier for a bidding large or small company. Normally, large prime contractors dominate Full and Open competition. (It should be noted, however, that the US government regularly mandates a major percentage of a new defense contract include awards to small business companies. Many Austrian companies should find this mandatory provision to be advantageous, depending upon the small business criteria that the government has designated.)
- In some cases, there may be an opportunity for a large Austrian company to bid as a prime contractor for a government solicitation.
- If the solicitation is designated for a small business company, then the competition for prime contractor cannot include large companies who then typically seek to be a subcontractor to the bidding small business company.
- Assist in responding to the RFP by contributing to the bidding prime contractor's management, technical, cost, and past performance requirements as specified by the government solicitation.

1.6.2 Broad Agency Announcement (BAA)

The Broad Agency Announcement (BAA) is a competitive solicitation procedure used to obtain proposals for basic and applied research and that part of development not related to the development of a specific system or hardware procurement. The BAA is described in FAR 6.102, "Use of Competitive Procedures," and FAR 35.016, "Broad Agency Announcements." Any company or institution or combination of companies, institutions, and individuals (like a university professor) can apply for a BAA. The Defense Innovation Marketplace lists many BAAs which have been provided by the military service laboratories.

1.6.3 Acquisition Reform

It is worth noting that the U.S. Government stakeholders are moving to begin reviewing DoD defense acquisition processes. There is a broad consensus that the DoD's Planning, Programming, Budgeting, and Execution (PPBE) process that governs how the Department allocates its resources is antiquated, a lumbering and slow process that places a premium on predictability. In the context of an operating environment that is characterized by increasing unpredictability, there is growing dissatisfaction with the PPBE process and a belief that reforms are necessary to avoid falling behind China in such areas as emerging technology and innovation.

In place since approximately 1960, the PPBE process requires DoD planners to lock in acquisition decisions more than two years in advance. Critics charge that existing PPBE processes are too slow to allow planners to pivot and swiftly procure advanced technology to outpace China as it emerges from the commercial technology innovation sector. The PPBE process saddles the DoD with a slow defense acquisition system, prevents the military from acting with agility to adopt innovative technologies when compared with the pace of development, uptake, updates, iteration, and replacement of hardware and software by the commercial Information Technology (IT) community. An unresponsive or slow defense resourcing process can cost lives and threaten national security if adversaries can act with greater agility to field a promising new technology solution. Failure to anticipate and adopt emerging technology can be costly in future conflicts. For years, critics both inside and outside the Pentagon have called for defense acquisition reform, including a reduction in bureaucracy, increased flexibility in the face of Congressional oversight, as well as the ability to respond more rapidly to global events with timely DoD resourcing.

The Fiscal Year 2022 (FY22) National Defense Authorization Act (NDAA) provides the first steps towards improving existing processes. The FY22 Authorization Bill establishes a new commission to "examine the effectiveness of the planning, programming, budgeting, and execution process and adjacent practices of the Department of Defense, particularly with respect to facilitating defense modernization." Reform of the PPBE process is likely to be a significant undertaking. Some problems may not have optimal solutions, particularly as different stakeholders may have different views on what new legislation should reform.

In February and March 2022, Congress and DoD appointed members to the committee, which is due to submit an interim report to Congress on February 6, 2023, and a final report on September 1, 2023. For the commission to swiftly develop meaningful reform recommendations, it will need to clearly define the problem it is trying to address, set specific targets, and focus on an end state in which it delivers a more agile and accountable military. This process is still in the early stages. Over time, we can help Austria Advantage and its members to navigate this complicated system as defense acquisition undergoes changes in the years ahead.

6. International Trade

1.7 Impediments and Obstacles

There are three categories of impediments and obstacles to international trade: Tariffs, Quantitative Restrictions, and Other Non-Tariff Barriers

1.7.1 Tariffs

Tariffs are a tax placed on an imported or exported good involved in international trade. There are typically three types of taxes imposed in international trade: (1) ad valorem tax that is imposed based upon the assessed value of an item, (2) specific tax designated for an import or export, and (3) compound tax or a tax charged in addition to a specific tax already imposed.

1.7.2 Quantitative Restrictions

Quantitative restrictions are those trade barriers that impose a numerical limit on the quantity of a good that may be imported or exported. Such restrictions may appear in the way of (1) quotas, (2) numerical export controls, (3) embargoes, or (4) voluntary export restraints.

1.7.3 Other Non-Tariff Barriers

Other non-tariff barriers can appear in the form of government laws, regulations, policies, or procedures that impede international trade. The obvious example in the case of the United States has been the International Traffic in Arms Regulation or ITAR which controls the export and import of defense-related articles and services on the United States Munitions List. The Obama Administration made considerable progress in executing the Export Control Reform Initiative wherein a number of items on the ITAR have been transferred to the Commerce Control List, thereby greatly facilitating the export of defense articles which have a dual use application.

1.8 Reciprocal Defense Procurement (RDP) MOU

The purpose of RDP MOUs is to promote rationalization, standardization, and interoperability of conventional defense equipment with allies and other friendly governments. These MOUs provide a framework for ongoing communication regarding market access and procurement matters that enhance effective defense cooperation.

A Reciprocal Defense Procurement MoU provides the following benefits for the partner nations:

- ***Allow fair competition*** by responsible sources of each nation for defense procurements.
- ***Reduce barriers*** to market access; facilitate defense procurement from industry of the other country.
- ***Exchange information*** on procurement-related laws, regulations, policies, administrative procedures, and international obligations.
- Provide information regarding requirements and proposed purchases.
- Provide adequate time for proposal submission by firms of the other country.
- ***Protect information***, software, and property.
- Avoid making conflicting commitments.
- ***Exchange statistics*** on the monetary value of defense procurements awarded to firms of the other country.

The DoD and the Ministry of Defense (MoD) of Austria have consummated a Reciprocal Defense Procurement (RDP) MOU which presently requires a Purchase by Purchase Exception to circumvent US laws that pose as barrier to reciprocal market access. This MOU enables Austrian companies to circumvent such provisions as the domestic preferences and restrictions on purchasing from non-U.S. sources. This would include circumventing the restrictions of such barriers as the Buy American Act, Berry Amendment, specialty metals restrictions, and others.

7. Business Development Considerations

The question is how do Austrian companies find public procurement opportunities in the defense R&D and S&T areas, as relates to the DoD, DHS, and DoE? The short answer is that the following websites provide regular opportunities that US industry uses for finding procurement opportunities offered by the DoD, DHS, and DoE:

- Federal Business Opportunities are posted regularly on this website for all US government organizations, not limited to defense and security areas. Link
- Defense Innovation Marketplace. This is the best and most comprehensive source for DoD-related business development opportunities and pertinent background information for each of the Services and DoD agencies discussed in this report. Link
- Defense Advanced Research Projects Agency (DARPA). Link
- DHS Acquisition Innovations in Motion. Link
- DoE Advanced Research Projects Agency-Energy (ARPA-E). Link

In addition to the above opportunities to find new business and procurement opportunities in the US defense and security market, Austrian companies can find potential business partners by participating in industry exhibitions and conferences, such as the many that are hosted by the US military services annually and defense industry associations like the National Defense Industrial Association and the Armed Forces Communications and Electronics Association (see next section below). Additionally, if Austrian companies already have a subsidiary office or US industrial partner or client, then finding additional new business opportunities can be accomplished through those relationships.

8. Events and Exhibitions

There are numerous defense industry and trade shows worldwide. In the United States, our defense industry associations hold a series of major events – usually annually – providing informative opportunities for industry to hear from and meet government guest speakers, visit with industry exhibitors, attend educational sessions, and network with industry representatives. The Association of the US Army, Air Force Association, and Navy League hold annual meetings and exhibitions which are well attended by service members in addition to representatives from industry. The National Defense Industrial Association (NDIA) sponsors a number of industry events throughout the calendar year. The Armed Forces Communications and Electronics Association (AFCEA) also sponsors events for industry and government during the year.

Listed below are the Annual Military Service Association Meetings and Exhibitions:

Sea, Air, Space Exposition. At the Gaylord National Harbor, Maryland. This event is the Navy League's Premier Maritime Exposition. Like the events hosted by the Air Force and US Army, the Navy Exposition features many exhibitors displaying naval and maritime related technologies and products. This is one of the first major trade shows to take place in person since the impact of the pandemic began to lessen in the National Capital Region (NCR). Most major Service events during the pandemic were held in a virtual forum. More information on this event is available at the URL here.

Air Force Association Air, Space and Cyber Conference and Technology Exposition. At the Gaylord National Harbor, Maryland. Conference planners have made the following statements. Airpower success in the future depends on close relationships between the Air Force, industry, and its international partners. As defense budgets shrink and threats expand over time, it is vital that the Air Force and its industry and international partners come together to deliver air, space, and cyber capability and effects solutions to ensure the freedom and security of the U.S. and its allies. More information on this event is available at the URL here. Agenda information is not yet available.

Association of the US Army (AUSA) Annual Meeting and Exhibition. At the Washington, D.C Convention Center. This event is one of the largest land warfare expositions and professional development forums in the world. The Army claims attendance of 33,000, 650 exhibitors, 150 sessions, and the participation of representatives from more than 80 counties in the last live AUSA national event in Washington, DC, before the pandemic. More information on this event is available at the URL here.

NDIA: NDIA is a not-for profit educational association with over 1600 corporate members, approximately 90,000 individual members (including around 25,000 government individuals), 52 nation-wide chapters and 37 functional divisions. NDIA conducts conferences for industry regularly throughout the year that are smaller in size than the three major annual service events described above but focused more specifically on specific classes of products and services, as well as on three of NDIA affiliate organizations – the National Training and Simulation Association (NTSA), the Precision Strike Association (PSA), and the Association for Enterprise Information (AFEI).

NDIA conferences are organized by each Functional Division of NDIA as well as NDIA's NTSA, PSA and AFEI affiliates. NDIA keeps an up-to-date listing of nation-wide events at its website, at the URL here.

AFCEA: AFCEA is a member based, non-profit international organization that provides a forum for military, government, and industry communities to collaborate so that technology and strategy align with the needs of those who serve in the information technology, intelligence, and communications and electronics areas. AFCEA has over 32,000 individual members,150 chapters and over 1600 corporate members. AFCEA is recognized internationally among other defense, intelligence, and service associations.

In addition to its US headquarters in Fairfax, Virginia, AFCEA has a dedicated European office in Brussels, Belgium, to support the organization's international partnerships and chapters. An up-to-date listing of AFCEA events is available for review at the URL here.

9. Conclusions

We conclude this report with the following summary points:

As is apparent from our discussion of the DoD organizations involved in S&T and R&D, as well as the list of major private sector participants seeking business with the DoD, the US defense and security market remains enormous, featuring participants from across the public and private sectors, navigating a complicated defense acquisition environment that is continually evolving to keep pace with the rapid pace of innovation occurring in the commercial sector.

The DoD leadership, Services, defense agencies, and laboratories are all interested in International S&T and R&D capabilities and robust engagement. With the clear emphasis on emerging technologies and commercial dual use technologies to assist in meeting requirements gaps in the DoD, defense officials are increasingly receptive to working with international partners for technology development to fill their gaps, creating cooperative opportunities. A compelling case can be made for the potential contribution by Austrian industry, given its strong reputation for technological prowess.

We consider the DoD Innovation Marketplace to be the most complete open-source reference for Austrian companies to gain a better understanding of DoD's defense industry outreach strategy, its strategic direction, R&D priorities, and business opportunities that may be available in the US defense and security market.

10. References and Relevant Links

- Advanced Research Projects Agency-Energy (ARPA-E). Link
- Air Force Association Annual Air, Space and Cyber Conference. Link
- Air Force Research Laboratory. Link
- Armed Forces Communications and Electronics Association (AFCEA) Events calendar. Link
- Army Research Laboratory. Link
- CSIS Study on how the DoD is Leveraging Outside Innovation to Sustain the DoD's Technological Edge. Link
- Defense Advanced Research Projects Agency (DARPA) Opportunities. Link
- Defense Innovation Marketplace. Link
- Department of Defense. Link
- Homeland Security Advanced Research Projects Agency (HSARPA). Link
- National Defense Industrial Association Mega-Directory. Link
- National Defense Industrial Association Events. Link
- Navy League. Sea-Air-Space Conference Information. Link
- Navy Research Laboratory. Link
- Office of Naval Research (ONR) Long-Range Broad Agency Announcement for Navy and Marine Corps Science and Technology (BAA). Link
- Sam.gov, formerly Federal Business Opportunities. Link
- White Paper on Enhancing the Effectiveness of Independent Research and Development, dated 26 August 2015. Link

AUSSENWIRTSCHAFT AUSTRIA

AUSSENWIRTSCHAFTSCENTER WASHINGTON
818 18th Street NW Suite 500
20006 Washington D.C, USA
T +1 202 656 00 60
E washington@wko.at | washington@advantageaustria.org
W https://wko.at/aussenwirtschaft/us