



Defense Primer: Under Secretary of Defense for Research and Engineering

Advances in science and technology (S&T) have long played a critical role in ensuring the technological preeminence of the U.S. military. For this reason, the Department of Defense (DOD) is the largest funder of federal research and development. The Under Secretary of Defense for Research and Engineering (USD (R&E)) is a civilian official reporting directly to the Secretary of Defense. The USD (R&E) serves as the principal advisor to the Secretary of Defense for DOD research, engineering, and technology development activities and programs.

Over the last several years, policymakers and others have expressed concern that the long-held technological edge of the U.S. military is eroding due to, in part, the proliferation of technologies outside the defense sector, organizational and cultural barriers to DOD effectively incorporating and exploiting commercial innovations, and insufficient engagement with leading-edge companies that have not historically been a part of the DOD innovation system. The position of the USD (R&E) as the third highest ranking DOD official—behind the Secretary and Deputy Secretary—is intended to promote faster innovation and to increase risk tolerance in the pursuit of new technologies.

Origin of the USD (R&E) Position

Leadership of DOD research, engineering, and technology development activities and functions within the Office of the Secretary of Defense has varied over the course of DOD's history. For example, there was a USD (R&E) from 1977 to 1986. Reestablishment of the position of the USD (R&E) in 2016 through the National Defense Authorization Act (NDAA) for Fiscal Year 2017 (P.L. 114-328) is the most recent realignment. Specifically, P.L. 114-328 eliminated the position of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)) and established the positions of USD (R&E) and the Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)).

In reestablishing the position of USD (R&E), the Senate Armed Services Committee stated (S.Rept. 114-255),

The committee expects that just as previous USD(R&E) incumbents led the so-called “Second Offset” strategy, which successfully enabled the United States to leap ahead of the Soviet Union in terms of military technology, the new USD(R&E) would be tasked with driving the key technologies that must encompass what defense leaders are now calling a “Third Offset” strategy: cyber and space capabilities, unmanned systems, directed energy, undersea warfare, hypersonics, and robotics, among others.

Furthermore, in the conference report (H.Rept. 114-840) for the FY2017 NDAA, the conferees stated their expectation that the USD (R&E) “would take risks, press the technology envelope, test and experiment, and have the latitude to fail, as appropriate.”

USD (R&E) Roles and Responsibilities

The powers and duties of the USD (R&E) include

- serving as the chief technology officer of DOD with the mission of advancing technology and innovation for the military services and DOD;
- establishing policies on and supervising all defense research and engineering, technology development, technology transition, appropriate prototyping activities, experimentation, and developmental testing activities and programs, and unifying defense research and engineering efforts across DOD; and
- serving as the principal advisor to the Secretary of Defense on all research, engineering, and technology development activities and programs in DOD.

DOD Directive (DODD) 5137.02 specifies 45 key functions and responsibilities of the USD (R&E) and defines the authorities of the USD (R&E) and his or her relationships with other senior DOD officials. The responsibilities include managing the DOD S&T portfolio to address near- and far-term capability gaps against emerging threats and ensuring that DOD technical infrastructure, scientific and engineering capabilities, and associated resources align with DOD priorities.

Section 236 of the FY2023 NDAA (P.L. 117-263) directs the Secretary of Defense, acting through the USD (R&E), to develop a strategy and implementation plan for fostering and strengthening the defense innovation ecosystem. The required strategy's purpose is to “provide a framework for identifying, assessing, and tracking innovation ecosystems that are beneficial to advancing the defense, national security, and warfighting missions of the department.”

Organizational Structure of the Office of the USD (R&E)

The organizational and management structures of the Office of the USD (R&E) (OUSD (R&E)) have evolved numerous times from the original structure proposed in a 2017 DOD report to Congress and from the structure approved by the Deputy Secretary of Defense in a memorandum dated July 13, 2018. As shown in **Figure 1**, currently, the OUSD (R&E) has three main subcomponents:

- Office of the Assistant Secretary for S&T, responsible for oversight of DOD's S&T enterprise, including S&T workforce and laboratory infrastructure; management and administration of a broad portfolio of S&T

programs, including basic research, the Small Business Innovation Research and Small Business Technology Transfer programs, and DOD’s Manufacturing Innovation Institutes; and efforts related to technology and program protection.

- Office of the Assistant Secretary for Critical Technologies, responsible for managing the capability analysis and investments for DOD’s 11 critical technologies: 5G, advanced computing and software, directed energy, human-machine interfaces, hypersonics, integrated network system-of-systems, integrated sensing and cyber, microelectronics, renewable energy generation and storage, space technology, and trusted artificial intelligence and autonomy.
- Office of the Assistant Secretary for Mission Capabilities, responsible for identifying, incubating, and transitioning technologies, systems, and system of systems that close time-critical gaps in high-priority, multicomponent missions to maintain the United States’ technological superiority.

In addition, three agencies within DOD’s research and engineering enterprise are overseen by and report to the OUSD (R&E): the Defense Advanced Research Projects Agency, the Office of Strategic Capital, and the Missile Defense Agency.

USD (R&E) and USD (A&S) Relationship

A wide range of observers see a close and cooperative relationship between the USD (R&E) and the USD (A&S) as critical for the efficient and effective delivery of advanced technologies to the warfighter, especially at the fast pace many expect is needed to maintain the United States’ technological lead over potential adversaries.

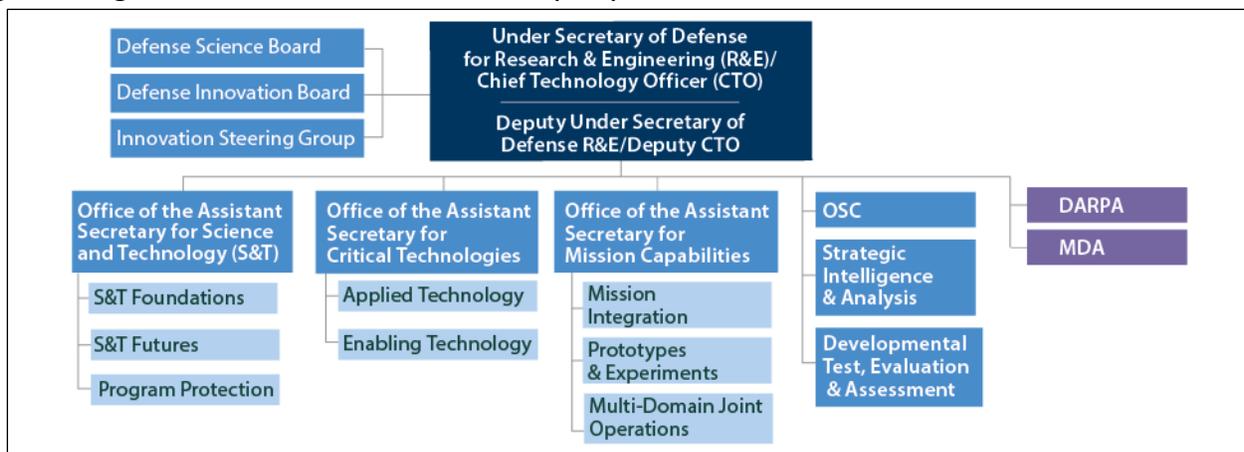
Some have expressed concerns that dividing the roles and responsibilities of the USD (AT&L) into a USD (R&E) and a USD (A&S) will exacerbate the *valley of death* (i.e., the barriers and challenges that exist in bringing a new technology from the research laboratory to full-scale deployment in the Armed Forces).

In the conference report (H.Rept. 114-840) for the FY2017 NDAA, the conferees acknowledged the potential challenges that exist in separating the roles and responsibilities of the USD (AT&L) into the positions of a USD (R&E) and a USD (A&S). However, the conference report asserts that elevating the missions of advancing technology and innovation within DOD, fostering distinct technology and acquisition cultures to better deliver superior capabilities, and providing greater oversight and management of DOD components outside the military services would best be addressed by the creation of two under secretaries. Furthermore, the conferees indicated that any potential barriers or gaps could “be mitigated through effective leadership and management.”

In an effort to bridge gaps between the two offices, DODD 5137.02 details their relationship, including requiring the USD (R&E) to advise the USD (A&S) on materiel development, milestone, and production decisions.

Relevant Statutes
U.S. Code, Title 10, Chapter 4—Office of the Secretary of Defense
CRS Products
CRS In Focus IFI0553, <i>Defense Primer: RDT&E</i> CRS Report R45403, <i>The Global Research and Development Landscape and Implications for the Department of Defense</i>

Figure 1. Organizational Chart for Office of USD (R&E)



Sources: Adapted from <https://www.cto.mil/leadership/>, <https://www.cto.mil/>, and https://web.archive.org/web/20221202145612/https://www.cto.mil/wp-content/uploads/2022/05/usdre_org_chart_09may2022_distro_a.pdf (accessed November 13, 2024).

Notes: The chart shows a simplified version of the organizational structure of the Office of the Under Secretary of Defense for Research and Engineering (OUSD (R&E)). As indicated by the purple boxes, the Missile Defense Agency (MDA) and Defense Advanced Research Projects Agency (DARPA) are distinct Department of Defense agencies that report to the USD (R&E). Others are wholly within the OUSD (R&E). The Office of Systems Engineering and Architecture and the Test Resource Management Center (not shown) report directly to the USD (R&E). OSC = Office of Strategic Capital.

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