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Defense Research Capacity at Historically Black Colleges and Universities and Other Minority Institutions: Transitioning from Good Intentions to Measurable Outcomes

The United States Department of Defense (DoD) plays an essential role in the U.S. science and technology ecosystem, in addition to its vital national security responsibilities. It is one of the nation's largest funders of science, technology, engineering, and mathematics (STEM) research at institutions of higher education (IHEs) and its largest employer of STEM talent. DoD's priorities, as articulated by the Secretary of Defense in March 2021, include defending the nation through innovation and modernization; growing civilian and military talent; and reinforcing teamwork with allies and partners. Achieving these priorities calls for DoD to invest in Research and Development (R&D) today and cultivate a diverse pool of U.S. STEM talent for a strong workforce in the future. Yet, while DoD and other federal agencies recognize that a racially and ethnically diverse workforce and research base is in the national interest, little progress has been made in turning intentions into measurable results.

Congress, DoD, and other stakeholders acknowledge that the nation's more than 400 Historically Black Colleges and Universities (HBCUs) and other Minority Institutions (MIs) should play a larger role in Defense-related research. In response to a Congressional request, the National Academies of Sciences, Engineering, and Medicine convened an expert committee to recommend the methods and means necessary to expand research capacity at HBCU/MIs to conduct Defense research. The committee developed research conclusions and strategic recommendations to expand HBCU/MI research and, in turn, further the mission of the Department of Defense.

BUILDING RESEARCH CAPACITY AT HBCU/MIS

To address the core tenet of the study charge, the committee developed two frameworks that it believes are useful in significantly moving from stakeholders' good intentions to measurable outcomes, such as increased investments in capacity building and higher participation by students of color in DoD-related STEM graduate study.

First, the committee determined that institutional capacity to conduct DoD-related research encompasses three mutually enforcing areas: a strong institutional research and contract base; research faculty support; and ancillary services.

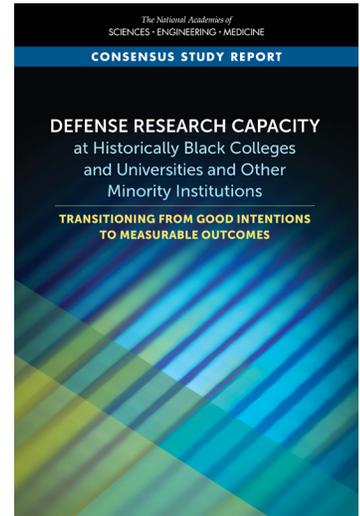




FIGURE 1 Elements of institutional capacity.

Second, the committee developed a general depiction of the spectrum of research activity spanned by HBCU/MIs across the U.S. higher education landscape. The committee offered this spectrum as a tool for institutions to consider where they fit—or want to fit—in the research ecosystem, as well as for DoD to consider a multi-dimensional approach to expand the number and types of institutions with which it engages. For example, reaching students at “undergraduate-centric” institutions through internships, summer research programs, and other experiences can build skills and interest in DoD-relevant graduate work.¹

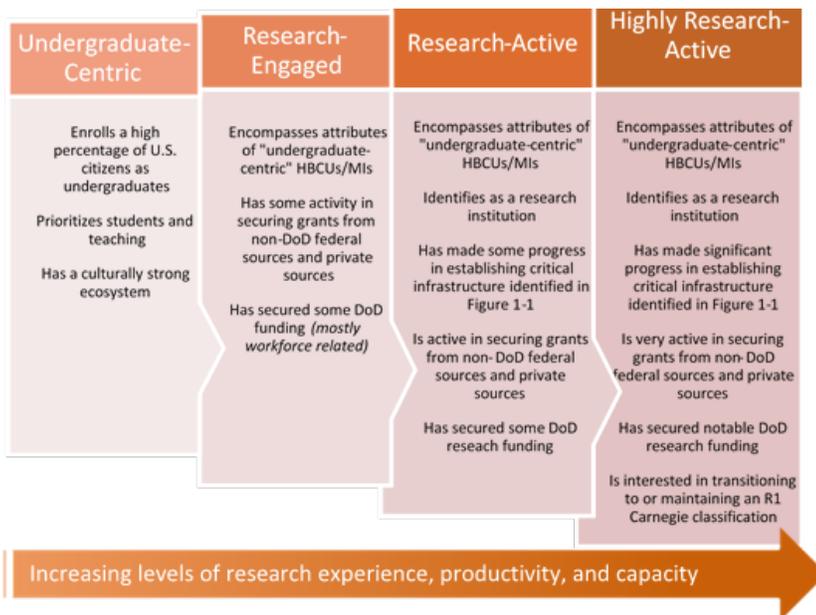


FIGURE 2 Research spectrum of HBCU/MI institutions.²

¹ Note: HBCU/MIs have different goals and priorities that determine where they may see themselves on the spectrum depicted in Figure 2, and it is not the committee’s intention to suggest that all institutions of higher education should aspire to become “highly research active.”

² The committee also referred to the Carnegie Classification System in the spectrum depicted above; see <https://carnegieclassifications.iu.edu>.

In addition, as part of their consideration of promising practices to expand Defense research capacity, the committee underscored the value of true partnerships: that is, partnerships that are mutually beneficial and grounded in mutual respect, meaningful engagement, and equity in funding and resources. True partnerships can present opportunities for joint research and collaboration, workforce development, and transition and commercialization, so that HBCU/MIs advance their own capacity to conduct DoD-funded research.

OVERARCHING RESEARCH CONCLUSIONS

Through testimony from public workshops, commissioned papers, focus groups, and its own extensive data analysis, the committee reviewed the current status and highlighted a range of opportunities for DoD, Congress, institutions, and other stakeholders. Two overarching conclusions became clear:

OVERARCHING CONCLUSION 1: A strategic commitment with long-term targeted investments (i.e., on the order of at least a decade) is needed from within the Office of the Under Secretary of Defense for Research and Engineering (USD(R&E)) to increase research capacity at HBCU/MIs to more successfully compete for and execute DoD awards. Long-term additional investments are needed in research infrastructure (e.g., physical research facilities, equipment), personnel (e.g., research faculty, student researchers, research staff, teaching loads), and programmatic support (e.g., administrative support, sponsored programs offices, legal review, and technology transfer office).

OVERARCHING CONCLUSION 2: There is insufficient data collection, inter-departmental program coordination, long-term records, and a lack of quantitative evaluations to appropriately assess DoD's total investment and measurable impact on the advancement of HBCU/MI research capacity.

RECOMMENDATIONS

The committee developed 8 broad recommendations related to institutional support, data collection and analysis, true partnerships, and promising practices.³

Increasing Department of Defense Support to HBCU/MIs

RECOMMENDATION 1A: DoD entities (i.e., USD (R&E), military departments, and defense agencies) with responsibilities to establish or increase DoD-relevant research capacity at HBCU/MIs should provide **long-term institutional support** in one or more of the following areas: physical research infrastructure (e.g., equipment, facilities); institutional research support and personnel (e.g., sponsored program offices, tech transfer offices, administrative and technical support); programmatic support to research faculty and students (e.g., reduction of faculty teaching loads, training in DoD grants and contracts, incentives to conduct DoD-relevant research); and/or business information technology support (i.e., establishment or updates in grant management systems).

RECOMMENDATION 1B: Annual increases in congressional allocations notwithstanding, the DoD S&T Basic Research budget (Budget Activity BA1) has largely remained flat in terms of purchasing power. To achieve DoD's goal to increase the nation's competitiveness, USD(R&E) should seek to be an exemplar in advancing the research capacity of HBCU/MIs to help address the national security and defense needs of the nation. Recommended actions include to:

- Request real growth in the S&T Basic Research budget to help fund HBCU/MI capacity building. In the short term, request at least a doubling of FY 2020 HBCU/MI targeted funding (DoD Program Element 0601228D8Z) and dedicate it to capacity building in DoD-interest areas, with resources provided to manage the recommended increase. In the longer term, DoD should strive to meet or exceed the funding levels of other mission-focused agencies that are also continuing to improve their engagements with HBCU/MIs.

³ See the full report (Summary and Chapter 6) for elaboration on the recommendations.

- Identify new allocations of non-S&T funds to help build certain aspects of institutional capacity over the longer term, such as Research, Development, Test and Evaluation Management Support (6.6), Operations & Maintenance, and select procurement accounts.

Should these potential, alternative funding sources become available, the funds should be carefully tracked by USD(R&E) and by the recipient HBCU/MI for use in research capacity-building efforts.

RECOMMENDATION 1C: Additional funds requested and appropriated for HBCU/MI institutional capacity-building should be deployed to put military departments' S&T program offices in more direct contact with HBCU/MIs (e.g., using the Military Department Multidisciplinary University Research Initiative competition process as a model). These additional funds, with more discretionary authority on allowable institutional costs, would be generally aimed at long-term capacity building (not discrete short-term research projects).

RECOMMENDATION 2: To improve capacity building at HBCU/MIs, the Office of the Secretary of Defense (OSD) HBCU/MI program office should have policy and oversight over DoD HBCU/MI targeted funding, but the development and execution of HBCU/MI programs should reside primarily in the military departments and defense agencies.

Improving Data Collection and Evaluation

RECOMMENDATION 3A: All military departments and defense agencies should collect and analyze HBCU/MI research and research capacity to inform decision-making and assess the impact of DoD investments. Data collection and analysis should be continual and consistent across military departments and agencies so that the data can be analyzed and, to the extent practical, be compatible with and included in national databases.

RECOMMENDATION 3B: To increase the coordination of data collection, USD(R&E)—in collaboration with the military departments, defense agencies and the director of the Defense Technical Information Centers—should develop guidelines for data collection on defense research and institutional capacity at HBCU/MIs. A directive should be issued by USD(R&E) to ensure the coordination of data collection and codify the guidance. Whenever possible, existing databases (such as www.grants.gov and www.usaspending.gov) should be used to provide access to DoD proposal data, so that funding trends for HBCU/MIs can be compared with other IHEs in a systematic and ongoing manner. The military departments and defense agencies should collect, maintain, and analyze data and disseminate analyses to USD(R&E) for all IHEs.

RECOMMENDATION 3C: USD(R&E) should work with the military departments and defense agencies and IHEs to:

- Define the components of research capacity for IHEs (including HBCU/MIs) that are of greatest interest to DoD
- Determine areas for data collection on institutional research capacity
- Develop metrics to help evaluate, track, and improve institutional growth and competitiveness
- Support future data analyses that assess the impact of DoD investments on building research capacity at HBCU/MIs

Data collection and analyses should be performed on a continual basis for all DoD grants and contracts across all IHEs and should result in a formal annual report to the OSD and Congress early in the calendar year to inform the development of future National Defense Authorization Act and appropriation bills.

Fostering True Partnerships

RECOMMENDATION 4A: USD(R&E) should move beyond encouraging partnerships to incentivize mutually beneficial *true* partnerships by adding an element to award evaluation criteria that assigns value (or some other metric) for including HBCU/MIs as true research partners. Weighted grant or contract solicitation evaluation criteria for proposals that include true HBCU/MI research partnerships could serve as a sample incentive.

RECOMMENDATION 4B: USD(R&E) contracts with true partnerships should include increased funding to support the partnership and longer performance periods to allow for capacity-building at the HBCU/MI.

RECOMMENDATION 4C: USD(R&E) should examine opportunities to incentivize the defense industry to support HBCU/MI capacity building.

RECOMMENDATION 4D: USD(R&E) should establish a data descriptive tool as a resource that regularly captures the STEM research capabilities and technical disciplines of HBCU/MIs, as this can aid in developing research and educational collaborations between DoD-funded entities and HBCU/MIs. Such information will help match research needs with available HBCU/MI talent and facilities.

RECOMMENDATION 5: To further highlight opportunities to partner with HBCU/MIs, USD(R&E) should examine and highlight HBCU/MIs with close proximity to DoD R&D centers and other DoD entities. It should also look to Defense Established Program to Stimulate Competitive Research (DEPSCoR) and Established Program to Stimulate Competitive Research (EPSCoR) programs, which may serve as models to expand research capacity in areas with potential for increased DoD research participation, as is the case for many Tribal Colleges and Universities.

RECOMMENDATION 6: To identify HBCU/MIs with STEM research capabilities that are relevant to DoD research, USD(R&E) should compile a list of HBCU/MIs that have received STEM funding from other federal agencies. This list should include data on HBCU/MIs' graduate programs, majors offered, and research capabilities. The information should be updated regularly.

Incorporating Promising Practices and Programs

RECOMMENDATION 7: By FY 2024, USD(R&E) with the military departments and defense agencies should review the programs and practices of other government agencies relevant to increasing research capacity at HBCU/MIs. The results of the review should be shared widely within DoD, the White House Office of Science and Technology Policy, and Congress. In addition to examining the practices of other federal agencies, USD(R&E) should identify opportunities to strengthen collaboration with those agencies and seek interagency leveraging opportunities to build capacity at HBCU/MIs.

RECOMMENDATION 8: USD(R&E) should immediately direct current workforce development programs, such as the SMART program and other scholarship and fellowship programs, to increase HBCU/MI representation in the DoD S&T workforce, with a goal to increase proportional representation by FY 2025. DoD should also examine opportunities through and in collaboration with other federal agencies to expand HBCU/MI representation in the federal STEM workforce. Specifically:

- USD(R&E) should collaborate with the National Science Foundation (NSF) to expand the DoD Access and Support for Successful Undergraduate Research Experience (ASSURE) program to two- and four-year HBCU/MIs in order to attract more students into graduate degree programs. USD(R&E) and military departments should also expand the ASSURE program to make it possible for HBCU/MI principal investigators to obtain research supplement awards for adding undergraduate student researchers to current DoD grants.
- USD(R&E) should examine opportunities to leverage or collaborate with NSF to expand its Tribal Colleges and Universities Program (TCUP) to promote STEM research and accelerate capacity-building at these institutions.

A PATH FORWARD

There are HBCU/MIs that have demonstrated an ability and interest to carry out DoD research, while others stand just at the cusp of becoming long-standing DoD performers. Current DoD programs, practices, and investments, targeted to HBCU/MIs or otherwise, are insufficient to enhance the capacity and competitiveness of HBCU/MIs. New, additional investments in infrastructure support and research funding can increase these institutions' effectiveness as performers. However, simply allocating a larger share of the small and stagnant DoD S&T budget to HBCU/MI projects is not sufficient to gain relevant capacity. DoD has an opportunity to increase funding, strengthen capacity, and incentivize partner-

ships at HBCU/MIs. The recommendations in this report are offered to guide DoD, Congress, HBCU/MIs, and partnering entities in supporting and strengthening the role of these institutions in defense research. A strategic commitment will translate into increased opportunities for HBCU/MIs to diversify the future U.S. academic, industrial, and government STEM workforce upon which DoD will depend.

For More Information: This Consensus Study Report Highlights was prepared by the Committee on Defense Research Capacity at Historically Black Colleges and Universities and Other Institutions, based on the Consensus Study Report, *Defense Research Capacity at Historically Black Colleges and Universities and Other Minority Institutions: Transitioning from Good Intentions to Measurable Outcomes* (2022). The study was sponsored by the U.S. Department of Defense. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. Copies of the Consensus Study Report are available from the National Academies Press, (800) 624-6242; <http://www.nap.edu>.

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