POSITION STATEMENT

Air Force Office of Scientific Research

(Approved by the IEEE-USA
Board of Directors, 14 February 2014)

IEEE-USA strongly supports the Air Force Office of Scientific Research (AFOSR). Its outstanding basic research program should be maintained at its present funding level, and conducted from its current location in Arlington, Virginia.

The AFOSR basic research program promotes U.S. military superiority through highly innovative science and engineering superiority. It supports research at U.S. universities that provides the bridge between fundamental science and future military applications. Additionally, it trains future engineers and scientists in such critical disciplines as electrical engineering, computer science and mathematics. This emphasis on long-term research leads to revolutionary advances in military capability, and has resulted in civilian applications with major benefits to the general public.

The Air Force has proposed that AFOSR be moved away from the Washington metropolitan area, where it is in close proximity to most other federal basic research agencies, and that its budget be reduced by a percentage--substantially exceeding proposed reductions to the Air Force budget as a whole, or to the Air Force Research Laboratory budget. These actions would not be in the best interests of the Department of Defense (DOD), or of the nation.

IEEE-USA recommends that the administration and Congress work together to:

- Prevent the proposed move and 31 percent budget cut
- Maintain the existing "Co-located Center of Excellence"[1] among federal basic research organizations, by retaining AFOSR in the Washington metropolitan area
- Sustain the AFOSR budget to the maximum extent possible
- Increase Assistant Secretary of Defense for Research and Engineering [ASD(R&E)] oversight of DOD basic research management

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Others have proposed that the Army Research Office (ARO), Office of Naval Research (ONR) and AFOSR be merged to form a DOD basic research agency. Although IEEE-USA believes that retaining the three basic research offices as independent entities, (but with increased Office of the Secretary of Defense (OSD) advocacy and oversight), is preferable to merging them; it also believes that a merger would be preferable to the proposed AFOSR move and budget cut. Consequently, IEEE-USA recommends, as a possible alternative to the three recommendations above:

- Merging the DOD basic research offices into a new DOD agency, reporting to ASD(R&E), and maintaining their total current budgets and tri-service mission responsibilities.

This statement was developed by the IEEE-USA Research & Development Policy Committee and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good, and promotes the careers and public policy interests of more than 205,000 engineers, scientists and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.

BACKGROUND

IEEE-USA strongly supports the AFOSR basic research program. Since its founding sixty years ago, AFOSR has played a seminal role in many important technologies, including lasers and integrated circuits in the 1950s; anti-G protection and the Global Positioning System (GPS) in the 1960s; superconductivity and advanced metal-forming in the 1970s; high-efficiency compressor blades and gallium arsenide technology in the 1980s; and dip-pen nanolithography and titanium aluminides in the 1990s. Discoveries within the past decade have led to greatly improved space-object identification and tracking, flexible electronics, and better understanding of what motivates terrorists, to name just a few advances.[2] Some sixty AFOSR-sponsored researchers have received Nobel Prizes. AFOSR technological advances also play an important role in the nation's innovation economy--in such diverse areas as microelectronics, aerospace structural materials, computers and propulsion. For instance, AFOSR was responsible for funding the development of the computer mouse. Educating future generations of STEM graduates is another highly important product of AFOSR research. Each year, AFOSR supports thousands of STEM students, primarily through university research grants, but also through direct fellowships. The Air Force can truly be proud of AFOSR's many contributions to the nation's defense and economic vitality.

Importance of collocating AFOSR with other basic research organizations.

Almost all federal basic research offices are located in the Washington metropolitan area. In fact, the National Science Foundation, the Office of Naval Research, the Defense Advanced Research Projects Agency's basic research directorate, and AFOSR are within a few blocks of one another in Arlington. The OSD Basic Research Office is also located in Arlington, readily accessible by public transportation.

ASD(R&E) recognized the value of collocation, when it directed AFOSR to move there from its previous location at Bolling Air Force Base in the late 1990s. Likewise, the DOD recommended all DOD basic research offices be collocated "at a single location, in a single facility, or a cluster of facilities" at the National Naval Medical Center, Bethesda, Maryland, as part of the *2005 Base Realignment and Closure (BRAC)* study. The BRAC Commission disapproved this action, noting that "Placing the organizations onto a military installation would restrict their key partners' access to them, and the Commission found that visibility and public accessibility is mission critical in the performance of their functions." However, the Commission certainly favored collocation, stating "that a 'Co-located Center of Excellence' currently exists in Northern Virginia, which already promotes interagency synergy."[3] Co-location facilitates funding coordination among agencies, joint program reviews, attendance at one another's meetings, and the exchange of ideas among program managers. It also reduces the time and cost burden on university faculty, and others meeting with multiple agencies.

Even more serious than disrupting the existing "Co-located Center of Excellence" would be the loss of qualified personnel. Experience with numerous BRAC-directed and other DOD organizational moves indicate that no more than 25 percent of AFOSR personnel would relocate, causing a disastrous loss of technical and contracting expertise. Given the existing hiring freeze, replacing them externally would not be possible. And, because only AFOSR identifies and funds promising basic research within the Air Force, few appropriately experienced personnel are available elsewhere within the Air Force. Consequently, the technical personnel that AFOSR would lose would have to be replaced by personnel experienced in applied research management, fundamentally changing the AFOSR culture. Alternatively, AFOSR would be dissolved.

Those advocating that AFOSR be relocated claim significant savings. In fact, if AFOSR is to remain off-base, as recommend by the BRAC Commission, savings would be negligible, because rental space would be needed there, just as in Arlington. Moreover, the lease on Arlington space does not end before 2016.

Importance of AFOSR basic research funding.

Through AFOSR, the Air Force sponsors and conducts scientific and engineering research to generate new knowledge and technical capabilities relevant to national defense, often in areas not emphasized by other agencies.[4,5] Doing so creates "future affordable options for new defense systems and helps the Nation avoid technological surprise."[6] The best research creates new ways of thinking about the natural world. AFOSR research support also produces a cadre of creative scientists and engineers who understand fundamental science, and are also aware of defense issues. Having experts upon whom to call for advice enables the Air Force to access the entire world's scientific advances, not merely those advances that it or other federal agencies fund. Describing science and technology as a priority, the Secretary of Defense stated "that accelerating trends in both technology development and a dynamic threat environment dictate that we must maintain our edge by protecting our investments in development of future capabilities."[7]

Although focused on national security, AFOSR's basic research program indirectly supports other U.S. priorities as well, including economic growth, education, national prestige, and international scientific collaborations that promote good will. Both the current and the previous Administrations have been strong advocates of basic research. As articulated by President Obama, "maintaining our leadership in research and technology is crucial to America's success."[8] As much as 85 percent of measured growth in U.S. per capita income can be attributed to technological advances. Since World War II, the United States has been the world's scientific and engineering leader, and consequently, its economic leader as well. Maintaining these positions will require dedicated effort.

In this time of restricted budgets, the Air Force must resist the temptation to divert research funds to other, seemingly more urgent, requirements. Basic research is particularly vulnerable in this regard and must be protected diligently. To sacrifice future military superiority through basic research to pay current operating expenses, including those of in-house laboratories, would be a serious mistake.

End Notes

[1] As endorsed by the Defense Base Closure and Realignment Commission, **Final Report to the President**, Volume 1, pp 281-282, 2005.

[2] Air Force Office of Scientific Research, **Turning Scientific Discovery into Air Force Opportunity, 1951-Present**, 2013.

[3] Defense Base Closure and Realignment Commission, **Final Report to the President**, Volume 1, pp 281-282, 2005.

[4] Stephen Merrill, "A Perpetual Imbalance? **Issues in Science and Technology**, Winter 2013.
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[5] American Academy of Arts and Sciences, **ARISE**, 2008.

[6] White House Office of Science and Technology Policy, **Innovation for America's Economy, America's Energy, and American Skills**, 2012.

[7] Office of the Secretary of Defense, **Defense Budget Priorities and Choices**, 2012.

[8] President Barack Obama, **2011 State of the Union Address to Congress**.