

# U.S. Air Force Scientific Advisory Board

The U.S. Air Force Scientific Advisory Board (SAB) is a Federal Advisory Committee chartered by the Secretary of Defense that consists of civilian experts appointed to provide independent advice and recommendations to the Secretary of the Air Force and the Secretary of Defense on scientific and technical matters relating to the Air Force mission.

The SAB reports directly to the Secretary of the Air Force and the Chief of Staff of the Air Force in performing its duties as detailed in its charter. SAB products, including the Board's advice and recommendations, are intended primarily for senior leadership of the U.S. Air Force and the Department of Defense.

## Mission

Since its establishment in 1944, the SAB has continuously served as the principal external advisory body to the Secretary of the Air Force and the Air Force Chief of Staff, and to other senior leaders in Headquarters Air Force and the Air Force Major Commands, for scientific and technical matters relating to the Air Force mission.

In accordance with its charter, the Board is tasked to conduct several major studies each year on topics deemed critical by the Secretary of the Air Force, recommends applications of technologies to improve Air Force capabilities, and conducts annual in-depth reviews of the science and technology programs in the Air Force Research Laboratory (AFRL).

The SAB provides its independent findings and recommendations to the Air Force senior leadership, principally to the Secretary of the Air Force and the Chief of Staff of the Air Force. The Board's function is solely advisory.

Throughout the more than 70 years since the Board was established, SAB advice to Air Force senior leaders has had strong impacts on the science and technology programs conducted by the Air Force, and on the resulting capabilities that have emerged from these programs to support the Air Force mission. In recognition of the Board's consistent history of providing outstanding advice to the Air Force, in 2012 the Chief of Staff of the Air Force presented the Air Force Association's Jimmy Doolittle Award for Advancing Air Force Research and Development to the SAB Chair who accepted it on behalf of the entire Board.

## History

The U.S. Air Force Scientific Advisory Board, first known as the Army Air Forces Scientific Advisory Group, was established by General H. H. "Hap" Arnold in 1944 and chaired by his scientific advisor Dr. Theodore von Kármán. It consisted primarily of distinguished experts in academia, but after the end of World War II expanded its membership to include engineers and scientists from academia, government and industry, and became the USAF Scientific Advisory Board (SAB). Throughout its 70+ year history, the SAB has been the Air Force's principal external advisory body for scientific and technical matters relating to the Air Force mission. It assists the Air Force in maintaining its "vision into the future" of technology-enabled capabilities.

Originally, the SAB was organized around panels dedicated to specific technical areas, and these panels provided regular reports. Cross cutting *ad hoc* and special committee studies were also

performed, starting with the renowned “Toward New Horizons” report that set forth many of the early research and development goals pursued by the Air Force. By the early 1980s, standing technology panels were set aside, and studies were performed by the more agile study teams still used today. Along the way, the SAB was also tasked to begin performing regular reviews of science and technology research efforts in the Air Force's research laboratories.

As the role of the SAB grew, the total number of its members and consultants increased from about 30 when it was formed to about 50, which remains its present size. Past SAB members have included such notable experts as Theodore von Kármán, Jimmy Doolittle, Edward Teller, William Shockley, Norman Augustine, Alan Mulally, Louis Ridenour, Alexander Flax, Courtland Perkins, Ivan Getting, Robert Naka, Eugene Covert, and numerous others. Today's SAB members and consultants are distinguished experts drawn from among the nation's top leaders in science, technology, engineering, and technical program leadership across industry, FFRDCs/UARCs, national laboratories, and academia.

The Secretary of Defense, under the provisions of the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix) and 41 CFR §102-3.50(d), codified the role of the SAB as a Federal Advisory Committee to provide independent advice and recommendations on matters of science and technology relating to the Air Force mission. The SAB charter is renewed periodically under the provisions of the Federal Advisory Committee Act of 1972, the Government in the Sunshine Act of 1976, and 41 CFR 102-3.50(d), as implemented in DODI 5105.4, DOD *Federal Advisory Committee Management Program*, as supplemented by the Air Force.

## **Organization**

The SAB is composed of Board members and consultants, who are organized into a parent committee and four standing subcommittees established by the Secretary of Defense or the Secretary of the Air Force.

As necessary for the Board to perform its mission, the SAB forms task forces, working groups, and ad hoc panels, composed from expertise resident within its parent committee and subcommittees. Such task forces, working groups, and panels do not work independently of the Board; they report their recommendations and advice solely to the Board for deliberation and vote regarding approval.

The SAB is led by a Chair, appointed by the Secretary of the Air Force, who has responsibility for maintaining the quality and relevance of all Board activities and products to provide maximum benefit to the Air Force. The Chair is supported by a Vice Chair, also appointed by the Secretary of the Air Force, who takes on the duties of the SAB Chair during such times when the SAB Chair is unavailable, and takes on other duties as agreed with the SAB Chair. An Executive Committee, led by the SAB Chair, provides guidance and assistance concerning SAB processes, assists the Chair in managing SAB studies and technical reviews, and helps maintain the quality and relevance of SAB activities and products for the benefit of the Air Force.

The SAB Chair appoints Study Panel Chairs and Vice Chairs to lead ad hoc panels formed to conduct SAB studies as tasked by the Secretary of the Air Force. Study Panel Chairs plan, organize, and execute studies in accordance with written terms of reference that define the study tasking, with guidance from the Executive Committee and coordination with the SAB Chair and Vice Chair.

The SAB Chair also appoints a Science and Technology (S&T) Reviews Chair and Vice Chair to oversee planning, organization, and execution reviews of Air Force Research Laboratory (AFRL)

Technical Directorates and other AFRL S&T programs, as tasked by the Secretary of the Air Force. The S&T Reviews Chair, in coordination with the SAB Chair, appoints Review Panel Chairs and Vice Chairs to lead ad hoc panels that conduct reviews of AFRL Technical Directorates and other AFRL programs.

The SAB is supported by a permanent Secretariat, headed by an Executive Director, that provides direct management and administrative support to facilitate activities of the Board, including logistics and travel, report and outbrief preparation and distribution, planning and execution of Board meetings and information gathering meetings, and new member and new study topic solicitation and staffing. The Secretariat (SAF/AQB) is part of the Office of the Assistant Secretary of the Air Force (Acquisition), also known as SAF/AQ.

The 3-star Military Deputy in SAF/AQ also serves as the SAB Military Director, an ex officio member of the Executive Committee who assists the SAB Chair in matters of policy and operation, receives requests for Board assistance from Air Force Major Commands and other entities, and monitors actions by the Air Force to implement Board recommendations.

## **Members and Consultants**

Board members and consultants are drawn from among the nation's leading recognized experts in science, technology, engineering, and technical program leadership across industry, FFRDCs/UARCs, national laboratories, and academia, as well as a limited number of retired General Officers having relevant backgrounds. Those from industry are typically at senior technical or executive levels, and those from other organizations come with comparable levels of technical expertise, experience, leadership, and vision.

The SAB is currently composed of a total of 50 Board members and consultants, who dedicate their time to benefit the Air Force without compensation except reimbursement for travel expenses incurred in their service to the Board. While performing SAB duties, including travel to and from SAB activities, Board members and consultants are designated as Special Government Employees and accorded DV Code 4 status (3-star equivalent) on the Department of the Air Force Protocol Precedence list.

Board members are nominated by the Secretary of the Air Force, approved by the Department of Defense White House Liaison Office, and appointed by the Secretary of Defense under authority of 5 U.S.C. §3109. Consultants are appointed by the Secretary of the Air Force on an intermittent basis to work on specific Board-related efforts. All must be U.S. citizens and cleared or able to be cleared to appropriate security levels, and may not be active duty members of the military, employees of the Federal Government, or functioning as employees of the Federal Government under any mechanism.

SAB participants generally serve one to four-year terms, with annual renewals by the Secretary of Defense in the case of Board members and by the Secretary of the Air Force in the case of consultants. No participant, unless authorized by the Secretary of Defense or the Deputy Secretary of Defense, may serve more than two consecutive terms of service.

Board members and consultants are appointed to provide advice on the basis of their best judgment without representing any particular point of view and in a manner that is free from conflict of interest. They must adhere to all ethical obligations and conflict of interest requirements imposed by the Federal Advisory Committee Act and other applicable DoD and Air Force requirements.

No matter is assigned to the Board for its consideration that would require any Board member to participate personally and substantially in the conduct of any specific procurement or place him or her in the position of acting as a contracting or procurement official.

## **SAB Studies**

Under tasking from the Secretary of the Air Force, the SAB conducts major studies on topics deemed critical by the Secretary of the Air Force and the Chief of Staff of the Air Force. Studies typically occur on an annual cycle, though more urgent “quick look” studies are at times also tasked to the SAB. Each study tasking is accompanied by written terms of reference from the Secretary of the Air Force that define the scope of the study.

Study topics assigned to the SAB draw on the broad range of scientific and technical expertise of the Board’s members, but typically also require an understanding of operational, acquisition, manpower, logistics, training, and other factors to determine the best recommendations for the Air Force.

For each study, the SAB Chair designates a study panel chair and vice chair from among the parent committee and subcommittee members to lead a study panel created for the specific purpose of conducting the study in accordance with the terms of reference. The SAB Chair, coordinating with the study panel chairs, also designates SAB members and consultants from the parent committee and subcommittees to serve on each study panel. Through the SAB Military Director, the SAB Chair may invite one or more General Officer participants from Air Force Major Commands to provide operational perspectives on the study panel, and may also invite one or more participants from the Air Force Research Laboratory (AFRL) to provide additional technical perspectives to the study panel.

The study panel chairs then plan, organize, and execute these studies under guidance from the Executive Committee and in coordination with the SAB Chair and the SAB Vice Chair. SAB studies are usually tasked in late summer or early fall, and planning and organization occur through the end of the calendar year. Study execution typically begins in January, and studies typically conduct their fact-finding and deliberations through the end of June.

During this time, study panels meet regularly, typically for at least several days each month, to obtain numerous in-depth briefings that provide perspectives on essential aspects of the study topic from a wide range of government, industry, academic, and other organizations. They also conduct relevant site visits to obtain independent perspectives on operational and other aspects of the study topic, and conduct independent analyses clarifying essential aspects of the study topic. Throughout this time they deliberate extensively in caucus sessions to discuss information obtained from these briefings, site visits, and analyses in order to identify resulting key insights into the study topic, and to develop and formulate the major findings and recommendations relevant to the study topic.

Study panels then present their draft findings and recommendations, typically at the end of June, for consideration and deliberation by the entire SAB. Based on these deliberations, Board members then vote regarding approval and adoption of the final form of the findings and recommendations from the study, which then represent the views of the Board.

Upon approval by the Board, results of a study including all findings and recommendations are initially communicated in the form of a concise outbrief to senior leaders in Headquarters Air Force, the Air Force Major Commands, and other organizations in the Air Force and Department

of Defense. At the same time, a more detailed written report detailing these findings and recommendations, as well as supporting materials, is finalized and submitted for security review prior to publication by the SAB.

To the extent possible, the SAB produces study reports that are unclassified, or where feasible that have classified content limited to separate annexes. However, the nature of many SAB studies requires resulting reports to be classified in their entirety, and these can only be accessed through appropriate mechanisms. Other SAB reports may be unclassified but have restricted Distribution Statements, and these are available through the Defense Technical Information Center. Some SAB reports are publicly releasable and available on the SAB public web site.

SAB study results are intended primarily for senior leadership of the U.S. Air Force and the Department of Defense. They are communicated at the request of Air Force organizations, or where appropriate other organizations in the Department of Defense or U.S. Government, upon coordination with the SAB Secretariat. Communicating SAB results at workshops, conferences, or to the media is generally not permitted unless requested by Air Force leadership.

### **SAB Technical Reviews**

Under tasking from the Secretary of the Air Force, the SAB annually conducts in-depth reviews of the science and technology (S&T) portfolio in the Air Force Research Laboratory (AFRL). Typically, five such reviews are conducted each year, with each review addressing the portfolio in an AFRL Technical Directorate or other program area, so that each Technical Directorate or other program area is typically reviewed every other year. Generally, about half of the S&T portfolio of each Technical Directorate or program area is reviewed every other year, so that essentially the entire AFRL S&T portfolio is reviewed every four years.

For each review the SAB Chair, in coordination with the S&T Reviews Chair and Vice Chair, designates a review panel chair and vice chair from among the parent committee and subcommittee members to lead a review panel created to conduct the review of an AFRL Technical Directorate or other program area. The S&T Reviews Chair and Vice Chair, in coordination with the SAB Chair, then designate SAB members and consultants from the parent committee and subcommittees to serve on each of these review panels. The review panel chairs, in coordination with the SAB S&T Reviews Chair and the AFRL Technical Directorate being reviewed, then plan, organize, and execute the review that their panel has been tasked by the SAB to conduct.

Each of the five week-long reviews occurs between October and early December, and is conducted on-site at the Directorate being reviewed. Prior to each review, the corresponding review panel is provided information regarding organization, budgets, facilities, personnel, and other aspects of the Directorate being reviewed. During each week-long review panels are given in-depth briefings, lab tours, and other information detailing the Directorate's technical strategy, resources, focus areas, programs, facilities, people, results, accomplishments, challenges, collaborations, and other factors that are needed to assess the quality, relevance, impact, completeness, and balance of its science and technology portfolio.

Throughout each week-long review the panels deliberate in caucus sessions to discuss information obtained from this fact finding process, to identify key strengths of the Directorate, to determine significant issues associated with its research portfolio, and to develop recommendations for addressing these issues. Each panel also develops quantitative and qualitative assessments of the technical quality, near-term relevance, far-term relevance, and resource utilization for each research area included in the review.

Review panels present the draft findings and recommendations, typically in January, along with the quantitative assessments in the form of outbriefs for deliberation by the entire SAB. Based on these deliberations, Board members vote regarding approval and adoption of the final strengths, issues, recommendations, and assessments from the review, which then represent the views of the Board. At the same time the review panel, in coordination with the S&T Reviews Chair and Vice Chair, prepares a written report detailing the Board-approved strengths, issues, and recommendations.

The outbrief and report from the review of each AFRL Technical Directorate are provided to the Directorate leadership, and an integrated outbrief and report that combines the results from all of the reviews conducted that year are provided to the AFRL Commander, to the Commander of Air Force Materiel Command, and to Headquarters Air Force.