

SIVA BANDA, PhD

ASSOCIATE, DAYTON AEROSPACE, INC.

PROFILE

Senior technology executive and leader with 40+ years of experience focused on ensuring the US Air Force (USAF) and aerospace industry possess the cutting-edge solutions essential to fielding revolutionary air and space platforms for both military and commercial applications. Former chief scientist of the Air Force Research Laboratory (AFRL) Aerospace Systems Directorate—served as the principal scientific and technical advisor to the director and ensured the directorate's technical emphases and investments met national, Department of Defense (DoD) and USAF needs in aerospace-relevant technologies essential to maintaining the pre-eminence and national security of the United States. Led 1,200+ AFRL scientists and engineers attacking a wide range of USAF/DoD-critical needs, including: air-breathing, missile, rocket, electric, and space propulsion; hypersonic flight; space access; autonomous air vehicles; advanced flight control; sustainment of aircraft, engines, missiles, and rockets; power and thermal management; air vehicle structures and aerodynamics; energy efficient aircraft; alternative fuels and energy resource management; and flight vehicle integration and demonstration. Senior Professional (ST), Department of the Air Force (DAF) (Retired).

PROFESSIONAL HIGHLIGHTS

Skilled at identifying and nurturing new areas of fundamental R&D and driving the rapid transition of new technologies to tomorrow's air and space platforms. Strong track record of developing and leveraging partnerships with national and international, government and non-government entities, the worldwide aerospace industrial base, and leaders in the worldwide academic community. Continuously ensured a seamless focus on the entire spectrum of science and technology (S&T) development, from the creation of foundational knowledge through flight demonstrations. Made personal pioneering, lasting contributions to robust multivariable control theory, on-line system identification, reconfigurable flight control, and the use of adaptive guidance and control for hypersonic and reusable space access vehicles. Aggressively advocated for, and established, cooperative control as the key to making autonomously operating unmanned air vehicles an integral part of tomorrow's airspace. Authored more than 200 technical papers, reports and books, two patents and more than 130 invited lectures worldwide. Internationally recognized and respected face in the aerospace technical community and recipient of multiple professional recognitions including: Presidential Distinguished and Meritorious Senior Professional Awards; National Academy of Engineering Membership; and Fellow Grade in five Professional Groups.

PROFESSIONAL HONORS

- National Academy of Engineering
- Presidential Rank Award, Distinguished Senior Professional
- Presidential Rank Award, Meritorious Senior Professional
- Fellow, American Institute of Aeronautics and Astronautics (AIAA)
- Fellow, Institute of Electrical and Electronics Engineers (IEEE)
- Fellow, International Federation of Automatic Control (IFAC)
- Fellow, Royal Aeronautical Society (RAeS)
- Fellow, Air Force Research Laboratory (AFRL)
- Multiple Awards, Professional Societies and Associations



DAYTON AEROSPACE

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EDUCATION

PhD, Aerospace Engineering
University of Dayton

MS, Systems Engineering
Wright State University

MS, Aerospace Engineering
Indian Institute of Science

BS, Electrical Engineering
Regional Engineering College

KEY POSITIONS

Chief Scientist
AFRL/RQ

Chief Scientist
AFRL/RB

USAF Senior Scientist for Control Theory
AFRL

Director
AFRL Control Science Center of Excellence

NATIONAL AND INTERNATIONAL BOARDS

NATO Research and Technology Organization - Panel Member

Department of Aerospace Engineering, Univ of Michigan - Advisory Board Member

Department of Aerospace Engineering, Univ of Washington - Advisory Board Member

College of Engineering, Univ of Central Florida - Advisory Board Member

Board of Visitors, Army Research Office - Member

Board of Visitors, Office of Naval Research - Member

Peer Review Board, NASA Langley - Member

WORK HISTORY

Associate | Dayton Aerospace, Inc.

2021-present, Dayton, OH

Chief Scientist | Aerospace Systems Directorate, Air Force Research Laboratory (AFRL/RQ)

2012-2020, WPAFB, OH

Responsible for the technical vector of the directorate's 1,800-person staff and \$600M annual S&T portfolio. Ensured that the USAF is never technologically surprised by an adversary and that the directorate's total technical research program was: (a) meeting national, DoD and USAF needs in critical, aerospace-relevant, core technical competencies; (b) identifying and nurturing new areas of fundamental R&D and the transition of new technologies to tomorrow's air and space platforms; and (c) developing partnerships with national and international, government and non-government entities, the worldwide aerospace industrial base, and leaders in the academic community around the world. The directorate's portfolio spans propulsion systems for both atmospheric and space flight, hypersonic flight, flight control and aircraft autonomy, aircraft power and thermal management, aerospace structures, vehicle aerodynamics, and flight vehicle integration and demonstration. Notable accomplishments include: the successful flight demonstration of a hypersonic vehicle powered by a scramjet engine (X-51); the successful transition of an Automated Ground Collision Avoidance System (Auto-GCAS) to F-16 aircraft; paved the way to integrate laser weapons onto supersonic fighter aircraft; the tremendous progress in enabling the use of manned and unmanned air vehicle teams for efficient and shared situational awareness; and the design of unmanned aircraft to serve as forward-leaning wingmen to extend the effects and reach of manned aircraft.

Chief Scientist | Air Vehicles Directorate, Air Force Research Laboratory (AFRL/RB)

2010-2012, WPAFB, OH

Served as the director's principal scientific and technical advisor and the primary authority for the technical content of the directorate's S&T portfolio. With its \$220M annual S&T budget and 350-person staff, the directorate led and conducted research, exploratory and advanced development in aerospace structures, flight control, vehicle aerodynamics, flight vehicle integration and flight demonstration. Technology thrusts in the directorate included: hypersonic flight and space access, autonomous air vehicles, sustainment and energy efficient aircraft. Made pioneering, lasting personal contributions to robust multivariable control theory, on-line system identification, reconfigurable flight control, and the use of adaptive guidance and control for hypersonic and reusable space access vehicles. Aggressively advocated for, and established, cooperative control as the key to making autonomously operating unmanned air vehicles an integral part of tomorrow's airspace.

USAF Senior Scientist for Control Theory & Director, AFRL Control Science Center of Excellence | AFRL

2000-2010, WPAFB, OH

As the USAF's Senior Scientist for Control Theory, served as the primary scientific and technical authority and advisor for USAF senior leadership (SECAF, CSAF, etc.) on all matters pertaining to flight control for USAF platforms and capabilities. As the director of the Air Force Research Laboratory's Control Science Center of Excellence, responsible for setting the scientific and technical direction for multivariable flight control research for the 21st century. Led a high-performing research team in the development of new control system design and analysis methods and their application to important USAF problems. The team was designated the Air Force Control Science Center of Excellence. Influenced the technical direction and emphasis of wide-ranging research programs in flight control technologies for the USAF, Navy, Army and DARPA.

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**Senior Aerospace Engineer/Supervisory Aerospace Engineer/Aerospace Engineer | Air Vehicles
Directorate, Air Force Research Laboratory
1981-1999, WPAFB, OH**

Transitioned flight control research results to Joint Strike Fighter (JSF) and the USAF/DARPA JUCAS vehicle. Successfully flight-tested a neural network control algorithm guidance on the NASA/Boeing X-36 vehicle. Consulted on and coordinated multiple flight control research efforts within DoD and industry. Formulated many university research initiatives in the flight control area for funding by the Air Force Office of Scientific Research (AFOSR). Attracted top graduate students, visiting scientists, and faculty on sabbatical to spend time and work on challenging USAF research problems. Performed collaborative research with the Propulsion Directorate. Analyzed and developed methods for controlling rotating stall and surge in axial flow jet engine compressors. Results shared with United Technologies Research Center, California Institute of Technology and MIT. Successfully flight tested reconfigurable flight control algorithms on an F-16 test aircraft, honored by the Air Force Chief of Staff, and wrote a book on flight control. Instrumental in developing a control design technique that was successfully tested on an advanced missile for improved performance. Formulated a robust multivariable control design method to address multiple modeling uncertainties using mixed norms. Built an outstanding, externally recognized basic research team. Did extensive research in multivariable flight control and applied it to aircraft and large space structures.

PUBLICATIONS, LECTURES & PATENTS

- **Personally Authored/Co-Authored:** Two graduate level books on flight control, 60+ journal papers, 120+ conference papers, 7 Air Force technical reports, 3 theses, 2 patents and significant contributions to 4 additional technical books.
- **Enabled and Made Possible:** 100+ additional journal papers, 250+ additional conference papers, and numerous additional seminars and invited talks by the members of the research team that constitutes the Air Force Center of Excellence in Control Science.
- **Invited Lectures:** Delivered 100+ invited seminars at universities, at conferences, at industry forums, and at government laboratories within the USA and overseas.
- **Patents:** U.S. Patent #4,949,236, a command following logical network entitled smart controller, 1990; U.S. Patent #4,970,638, a command following logical network entitled Control of Unknown Systems, 1990

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